

Ref: 7574

September 19, 2017

Ms. Alison C. Steinfeld, Planning Director
Town of Brookline
Department of Planning and Community Development
333 Washington Street
Brookline, MA 02445

Re: Response to Traffic Peer Review
Cypress Apartments at Brookline Hills - 111 Cypress Street
Brookline, Massachusetts

Dear Ms. Steinfeld:

Vanasse & Associates, Inc. (VAI) is providing responses to the comments that were raised in the August 15, 2017 review memorandum prepared by Environmental Partners Group (EPG) on behalf of the Town in reference to their review of the June 2017 *Transportation Impact Assessment* (the "June 2017 TIA") prepared by VAI in support of the proposed Cypress Apartments at Brookline Hills to be located at 111 Cypress Street in Brookline, Massachusetts (hereafter referred to as the "Project"). Listed below are the comments that were raised in EPG's memorandum concerning the June 2017 TIA followed by our response on behalf of the Applicant; responses to the comments pertaining to the Site Plans will be provided by others under separate cover.

Existing Traffic Volumes

Comment: *In Table 2 (Existing Traffic Volumes), for the weekday morning at Brington Road, west of Cypress Street, a typo of 33 vehicles per hour is listed. It was intended to be 53 vehicles per hour per Figure 3 (2017 Existing Weekday Morning Peak Hour Traffic Volumes).*

Response: The comment is acknowledged and we are in agreement that the existing weekday morning peak-hour traffic volume measured on Brington Road west of Cypress Street is 53 vehicles per hour.

Spot Speed Measurements

Comment: *A typo exists in Table 3 (Vehicle Travel Speed Measurements), indicating two "Northbound" columns while one should read "Southbound."*

Response: This comment is acknowledged and we are in agreement that the columns under the Cypress Street heading in Table 3 should be labeled as "Northbound" and "Southbound", respectively.

Existing Pedestrian and Bicycle Volumes

Comment: *A significant amount of pedestrian traffic exists adjacent to the site with 258 pedestrians counted crossing the western Brington Street approach to Cypress Street during the morning peak hour. Since these counts were performed during winter months (March), it is likely that the pedestrian and bicycle volumes are greater during the warmer times of year.*

Response: This comment is acknowledged and we are in agreement that overall pedestrian and bicycle volumes within the study area are likely higher during the warmer months of the year; however, we do not expect that the primary pedestrian travel routes or crossing locations would be significantly different from those that are presented in June 2017 TIA.

Parking

Comment: *An assessment of parking availability and needs has been included under separate cover by Walker Parking Consultants.*

Response: Responses to the comments raised in the August 11, 2017 review memorandum prepared by Walker Parking Consultants is provided under separate cover.

Intersection Safety

Comment: *The report included a review of crash data provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the five year period of 2010 to 2014. The crash rate at each of the study intersections were found to be lower than the State or local district averages; no fatalities were recorded. None of the locations were found to be within the State's Highway Safety Improvement Program (HSIP) listing of high crash locations. The town may consider asking the proponent to review crash data from the Brookline Police Department to verify MassDOT crash history at the Cypress Street at Brington Road intersection that shows only one crash during the five year period.*

Response: Motor vehicle crash data for the study area intersections was obtained from the Town of Brookline Police Department for the 5-year period from 2012 through 2016, inclusive. This data is summarized in Table 1 and is generally consistent with the motor vehicle crash data that was presented in the June 2017 TIA, with a low incidence of motor vehicle crashes occurring within the study area. With specific regard to the Cypress Street/Brington Road intersection, the Brookline Police Department data is consistent with the MassDOT data and indicated that one (1) motor vehicle crash was reported to have occurred at the intersection over the 5-year review period.

Table 1
BROOKLINE POLICE DEPARTMENT MOTOR VEHICLE CRASH DATA SUMMARY^a

	Brington Road/ Project Site Driveways	Cypress Street/ Davis Avenue	Cypress Street/ Tappan Street	Cypress Street/ Brington Road	Boylston Street/ Cypress Street	Boylston Street Brington Road
<i>Traffic Control Type^b:</i>	U	S	S	U	S	U
<i>Year:</i>						
2012	0	1	0	0	2	0
2013	0	0	0	0	3	0
2014	0	2	0	1	0	0
2015	0	1	0	0	2	0
<u>2016</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>4</u>	<u>0</u>
Total	0	5	0	1	11	0
Average Rate ^c	0.00	1.00	0.00	0.20	2.20	0.00
MassDOT Crash Rate ^d	0.58/0.53	0.77/0.70	0.77/0.70	0.58/0.53	0.58/0.53	0.58/0.53
Significant? ^e	No	No	No	No	No	No
<i>Type:</i>						
Angle	0	1	0	1	2	0
Rear-End	0	1	0	0	2	0
Head-On	0	0	0	0	0	0
Fixed Object	0	0	0	0	1	0
Sideswipe	0	0	0	0	3	0
Pedestrian	0	2	0	0	1	0
<u>Other/Unknown</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>
Total	0	5	0	1	11	0
<i>Severity:</i>						
Property Damage Only	0	2	0	1	9	0
Personal Injury	0	3	0	0	2	0
<u>Fatal</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	5	0	1	11	0
<i>Day of Week:</i>						
Monday through Friday	0	3	0	1	8	0
Saturday	0	2	0	0	3	0
<u>Sunday</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	5	0	1	11	0

^aSource: Brookline Police Department, 2012 through 2016.

^bTraffic Control Type: U = unsignalized; S = signalized

^cCrash rate per million vehicles entering the intersection.

^dStatewide/District crash rate.

^eThe intersection crash rate is significant if it is found to exceed MassDOT statewide or District crash rate for the MassDOT Highway Division District in which the intersection is located (District 6).



Trip-Generation

Comment: *A comparison was provided of traffic that could be generated by the existing office space assuming complete occupancy. Land Use Code 710 “General Office Building” was used to estimate the number of trips that the existing office building generates. Based on this evaluation, the office space could generate 500 vehicles per day, 69 vehicles during the morning peak hour and 66 vehicles during the evening peak hour. (The methodology used for the evening peak hour varied from the ITE fitted curve equation but was more conservative, resulting in fewer existing trips generated by the current usage.) However, no reduction was applied to the office trip generation to account for the same mode split used for the apartment trip generation, accounting for transit, pedestrian and bicycle trips. In order to accurately compare trips between the existing usage and proposed development, mode split should be taken into consideration or traffic counts should be provided at the site driveways accessing the existing parking lot.*

Response: The trip comparison table that was presented in the June 2017 TIA (Table 7) has been revised to include: i) traffic counts obtained at the driveways that serve the existing office building the occupies the Project site; and ii) adjusted ITE traffic volume projections for the existing office building to reflect the use of alternative modes of transportation to single-occupant vehicles (SOV’s). The revised data and trip comparison is presented in Table 7R.

**Table 7R
 TRAFFIC VOLUME COMPARISON**

Time Period/Direction	Vehicle Trips			(A-B) Difference ^c
	(A) Proposed Residential Community	(B) Existing Office Building		
		Existing Traffic Counts ^a	Adjusted ITE Traffic Volume Projections ^b	
<i>Average Weekday Daily:</i>	434	260 ^d	362	+174/+72
<i>Weekday Morning Peak Hour:</i>	32	33	50	-1/-18
<i>Weekday Evening Peak Hour:</i>	43	35	48	+8/-5

^aBased on traffic counts conducted on September 8, 2017.
^bBased on ITE LUC 710, *General Office Building* (28,041 sf), and adjusted (reduced) to reflect 72% automobile trips, 16% use of public transportation, 8% pedestrian/bicycle trips and 4% other modes based on commuting trends for the Boston Metropolitan Area compiled by the Central Transportation Planning Staff from the 2013 American Community Survey and using a vehicle occupancy ratio of 1.13.
^cExisting traffic counts/Adjusted ITE data.
^dEstimated based on the ratio of the weekday evening peak-hour trip rate to the average weekday trip rate for ITE LUC 710 applied to the observed weekday evening peak-hour traffic volume.



As can be seen in Table 7R, using traffic counts obtained at the driveways serving the existing office building, the Project is expected to generate 174 additional vehicle trips on an average weekday, with one (1) fewer vehicle trip expected during the weekday morning peak-hour and eight (8) additional vehicle trips expected during the weekday evening peak-hour. If the existing office building were occupied by a generic office use represented the ITE data and with consideration of the use of alternative modes of transportation to SOV's, the Project would generate approximately 72 additional vehicle trips on an average weekday, with 18 fewer vehicle trips expected during the weekday morning peak-hour and five (5) fewer vehicle trips expected during the weekday evening peak-hour.

Traffic Operations

Comment: *Based on the analysis, an increase in delay and queues can be found along the unsignalized Brington Road approach to Cypress Street between the 2024 No-Build and Build conditions as a result of the projected site generated traffic (21 vehicles in the morning peak hour and 12 vehicles in the evening peak hour). The analysis reflects an increase of 21 seconds in delay and queues by 2 vehicles along the Brington Road approach during the morning peak hour (a change from LOS E to F), and 6 seconds in the delay and 1 vehicle queue during the evening peak hour (a change from LOS D to E). However the methodology used does not incorporate a reduction to account for the existing office usage being eliminated and therefore is conservative.*

Response: As stated by EPG and illustrated in Table 7R, eliminating traffic volumes associated with the existing office building that occupies the Project site would reduce the projected impact of the Project on motorist delays and vehicle queuing at the Cypress Street/Brington Road intersection from the conditions that were assessed in the June 2017 TIA.

Sight Distance

Comment: *Minimum stopping sight distance requirements are met at the site drive approach to Brington Road assuming obstructions are not installed within the landscaped corners of the driveway. Zoning bylaw requirements for sight distance to pedestrians appear to be met.*

Response: No response required.

Comment: *At the Cypress Street/Brington Road intersection, site distance is limited by the short (100 foot) distance between Cypress Street's intersection with Route 9 and Brington Road as well as queued vehicles approaching the Route 9 traffic signal. Although pavement markings and "do not block the box" signage exists to direct drivers to not block access at the intersection along the southbound Cypress Street lane, it is frequently not obeyed, further impacting visibility for vehicles approaching from Brington Road. (It is also a challenge for Brington Road vehicles turning right onto Cypress Street to turn left or straight at the Route 9 intersection due to the exclusive right turn lane and queued vehicles.) The short length of Cypress Street between Brington Road and Route 9 and the presence of queued vehicles clogging the intersection result in inadequate sight distance from the Brington Road approach looking to the south. This however is a condition that exists today and a frequent challenge for urban communities. Additional treatments at the*

intersection such as installing a larger Manual on Uniform Traffic Control Devices (MUTCD) compliant “Do Not Block Intersection” sign and improved pavement markings are proposed by the proponent.

Response: The Applicant is committed to: i) implementing traffic signal timing adjustments at the Route 9/Cypress Street intersection in order to improve operating conditions and reduce both motorist delays and vehicle queuing along Cypress Street; and ii) providing an enhanced sign and pavement marking program for the Cypress Street/Brington Road intersection to increase motorist compliance with the “Do Not Block Intersection” regulation and awareness of conflicting vehicle, pedestrian and bicycle activity at the intersection. A suggested enhancement to the sign and pavement marking program could include the installation of an LED sign or border around the “Do Not Block Intersection” sign. In addition, the Applicant will work with the Brookline Engineering Department on the design of the pavement marking treatment to reduce on-going maintenance costs.

Pedestrian Accommodations

Comment: *The project is anticipated to result in 20 pedestrian trips during the morning peak hour and 28 pedestrian trips during the evening peak hour. As a result, mitigation is proposed by the proponent to include ADA-compliant sidewalk improvements “as may be necessary” adjacent to the project site along Brington Road and Cypress Street. It is recommended that construction limits be clarified.*

Response: The limit of work for the sidewalk improvements will extend the full length of the Project site frontage along both Brington Road and Cypress Street.

Comment: *At the Cypress Street/Brington Road intersection, the proponent proposes to install ADA-compliant wheelchair ramps and to reapply/upgrade pavement markings (intersection box, “do not block” legend, stop line and cross walks) and MUTCD-complaint signage (“Do Not Block Intersection” sign and “Stop” sign).*

Response: No response required.

Comment: *At the Cypress Street/Tappan Street intersection, the proponent proposes to replace wheelchair ramps and traffic signal equipment where non-ADA compliant ramps or equipment exist. Verification that this will include providing Accessible Pedestrian Signals (APS) and countdown pedestrian heads is requested.*

Response: The planned improvements at the Cypress Street/Tappan Street intersection will include the installation of Accessible Pedestrian Signals (APS) and countdown pedestrian heads.

Transit

Comment: *The report documents anticipated transit trips generated by the site (17 during the morning peak hour and 24 during the evening peak hour) and the total capacity for the Green Line D Branch. However it appears that current ridership and the number of available seats should be referenced to support the statement that the “capacity is*

sufficient to accommodate the modest increase in peak-hour ridership that is expected as a result of the Project”.

Response: Based on data provided in the 14th Edition of the MBTA’s Ridership and Service Statistics (a.k.a. the “Blue Book”),¹ total weekday boardings on the Green Line D Branch (all stations) were reported as 24,632 passengers, with 1,225 passengers boarding at Brookline Hills Station. Inbound between Riverside Station and Brookline Hills Station (inclusive), approximately 15,195 passengers boarded. Based on a review of transit ridership data for the Green Line presented in the Final Environmental Impact Report for the South Station Expansion Project (SSX),² approximately 10 percent of the weekday boardings and alightings occur between 7:00 and 9:00 AM and 4:00 and 6:00 PM, or approximately 1,520 passengers boarding and 1,520 alighting between Riverside Station and Brookline Hills Station. This would imply an approximate occupancy of 3,040 passengers at Brookline Hills Station over a 2-hour period during the weekday morning and evening peak service periods.

As presented in June 2017 TIA, the MBTA operates 42 cars on the Green Line D Branch during both the weekday morning and evening peak service periods (7:00 to 9:00 AM and 4:00 to 6:00 PM, respectively) , which have a seating capacity of 46, a service policy capacity of 101 riders and a “crush capacity” of 269 riders.³ Applying the capacity standards to the Green Line D Branch results in a service policy capacity of 4,242 riders during the weekday morning and evening peak service periods (42 cars x 101 riders per car), and a “crush capacity” of 11,298 riders (42 cars x 269 riders per car). This capacity is below the weekday peak period passenger occupancy at Brookline Hills Station (3,040 passengers) and indicates that there is more than sufficient capacity to accommodate the modest increase in peak-hour ridership that is expected as a result of the Project (17 additional riders during the weekday morning peak-hour and 24 additional riders during the weekday evening peak-hour).

Site Driveway

Comment: *The site driveway is proposed to meet the zoning requirements’ minimum 20 foot width for two-way access “or as required to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the Town of Brookline Fire Department”. It appears that the driveway opening as shown will restrict passenger vehicles (and larger vehicles) from turning right from the site driveway given the relocated bump-out or on-street parking. Vehicle templates are requested for review.*

Response: A vehicle turning analysis for the Project site driveway will be provided by others under separate cover in conjunction with the submission of the revised Site Plans.

¹Ridership and Service Statistics, Fourteenth Edition; MBTA; Revised July, 2014.

²Traffic Analysis Technical Report, South Station Expansion; MassDOT; October 2014.

³The service capacity standards are defined in the MBTA’s June 2, 2010 *Service Delivery Policy* which specifies vehicle loading standards and levels of crowding that are deemed “acceptable” by time period and transit mode. Individual trips or vehicles can exceed the service capacity; however, the average loading should continue to be within the service capacity standard



Trash Pickup/Loading Zone

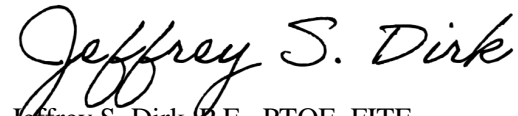
Comment: *It is unclear where trash pick-up and loading will take place for the development. Clarification is requested.*

Response: Trash/recycling will be deposited in containers located in a trash room on the first floor of the building. The containers will be moved (wheeled) by maintenance staff to the circular drive within the Project site on collection day for pick-up and then returned to the trash room. Loading will occur curbside from the circular drive aisle and will be coordinated with property management staff, with tenant moves scheduled in advance so as to avoid conflicts.

We trust that this information is responsive to the comments that were raised in the August 15, 2017 memorandum from EPG concerning their review of the June 2017 TIA prepared in support of the Project. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.



Jeffrey S. Dirk, P.E., PTOE, FITE
Principal

Professional Engineer in CT, MA, ME, NH, RI and VA

JSD/jsd

Attachments

cc: M. Morelli, AICP – Town of Brookline (via email)
J. Fitzgerald, P.E., LEED AP® – Environmental Partners Group (via email)
M. Bobrowski, Esquire – Blatman, Bobrowski & Haverty, LLC (via email)
File

ATTACHMENTS

**111 CYPRESS STREET MANUAL TURNING MOVEMENT COUNTS
EXISTING OFFICE BUILDING TRIP-GENERATION CALCULATIONS**

111 CYPRESS STREET MANUAL TURNING MOVEMENT COUNTS

Accurate Counts
978-664-2565

N/S Street : East Driveway
E/W Street: Brington Road
City/State : Brookline, MA
Weather : Clear

File Name : 75740006
Site Code : 75740006
Start Date : 9/8/2017
Page No : 1

Groups Printed- Cars

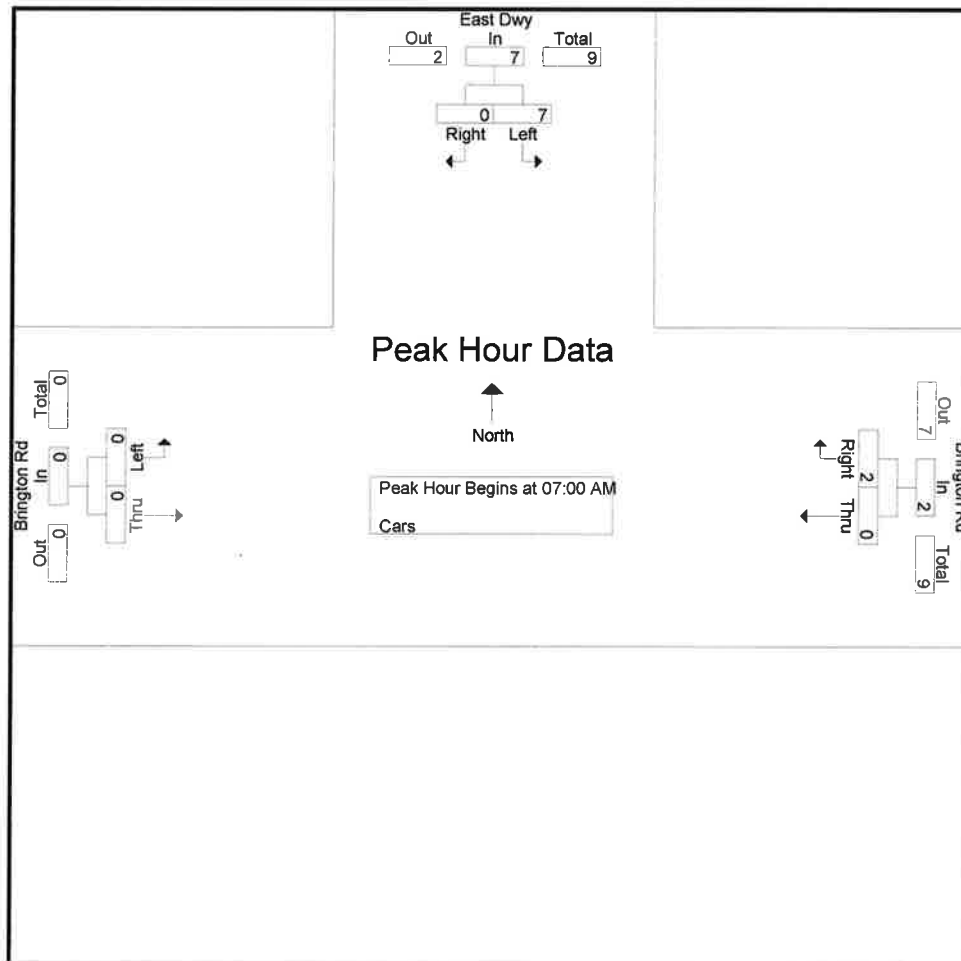
Start Time	East Dwy From North		Brington Rd From East		Brington Rd From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
07:00 AM	4	0	0	1	0	0	5
07:15 AM	1	0	0	0	0	0	1
07:30 AM	1	0	0	0	0	0	1
07:45 AM	1	0	0	1	0	0	2
Total	7	0	0	2	0	0	9
08:00 AM	1	0	0	1	0	0	2
08:15 AM	0	0	0	0	0	0	0
08:30 AM	1	0	0	0	0	0	1
08:45 AM	1	0	0	0	0	0	1
Total	3	0	0	1	0	0	4
Grand Total	10	0	0	3	0	0	13
Apprch %	100	0	0	100	0	0	
Total %	76.9	0	0	23.1	0	0	

Accurate Counts
978-664-2565

N/S Street : East Driveway
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City/State : Brookline, MA
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Start Time	East Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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	4	0	4	0	1	1	0	0	0	5
07:15 AM	1	0	1	0	0	0	0	0	0	1
07:30 AM	1	0	1	0	0	0	0	0	0	1
07:45 AM	1	0	1	0	1	1	0	0	0	2
Total Volume	7	0	7	0	2	2	0	0	0	9
% App. Total	100	0		0	100		0	0		
PHF	.438	.000	.438	.000	.500	.500	.000	.000	.000	.450



Accurate Counts
978-664-2565

N/S Street : East Driveway
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City/State : Brookline, MA
Weather : Clear

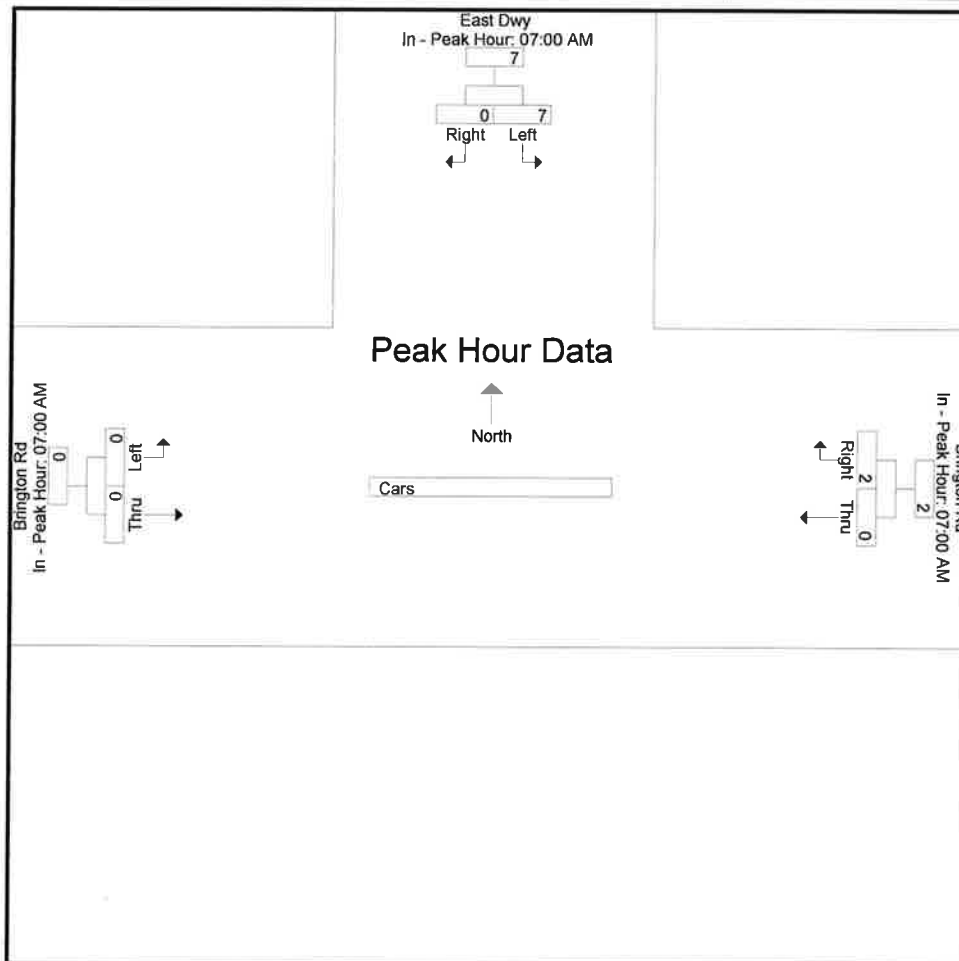
File Name : 75740006
Site Code : 75740006
Start Date : 9/8/2017
Page No : 3

Start Time	East Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	4	0	4	0	1	1	0	0	0
+15 mins.	1	0	1	0	0	0	0	0	0
+30 mins.	1	0	1	0	0	0	0	0	0
+45 mins.	1	0	1	0	1	1	0	0	0
Total Volume	7	0	7	0	2	2	0	0	0
% App. Total	100	0		0	100		0	0	
PHF	.438	.000	.438	.000	.500	.500	.000	.000	.000



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978-664-2565

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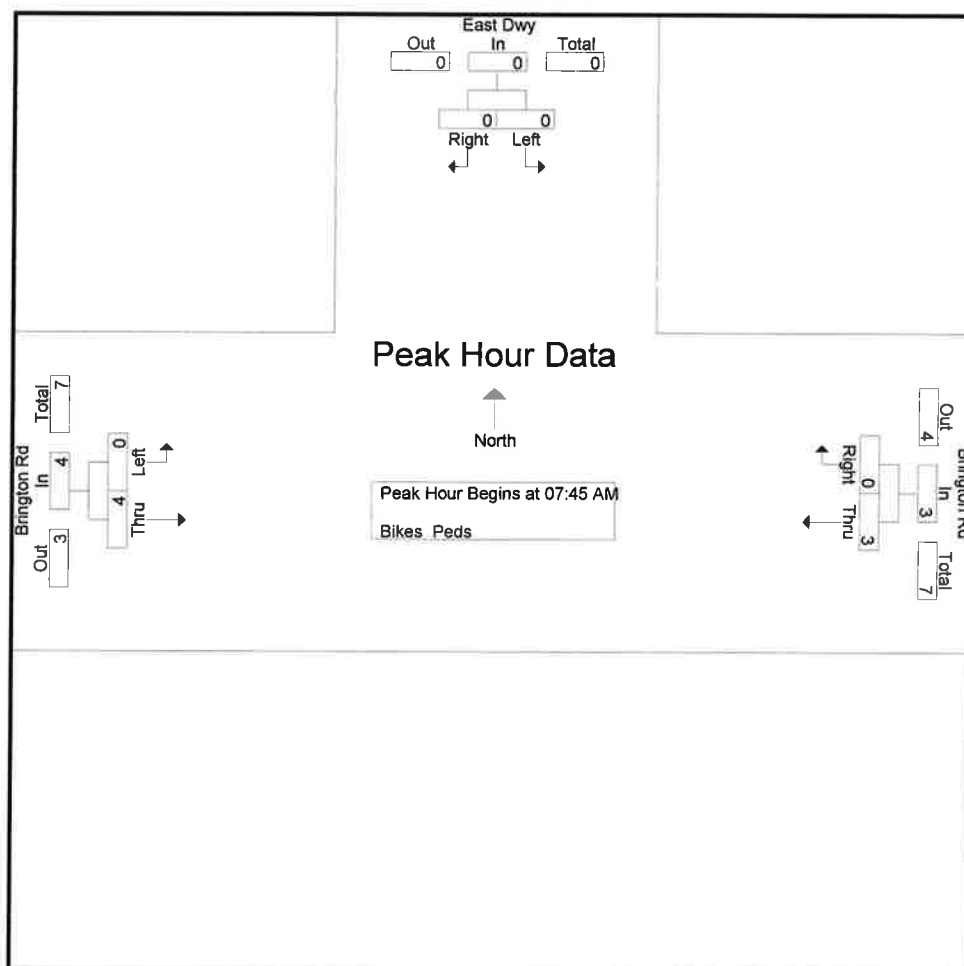
Start Time	East Dwy From North			Brington Rd From East			Brington Rd From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds			
07:00 AM	0	0	3	0	0	1	0	1	2	6	1	7
07:15 AM	0	0	1	0	0	0	0	0	1	2	0	2
07:30 AM	0	0	7	0	0	1	0	0	7	15	0	15
07:45 AM	0	0	0	1	0	1	0	2	2	3	3	6
Total	0	0	11	1	0	3	0	3	12	26	4	30
08:00 AM	0	0	3	0	0	1	0	1	3	7	1	8
08:15 AM	0	0	1	1	0	1	0	1	0	2	2	4
08:30 AM	0	0	2	1	0	0	0	0	1	3	1	4
08:45 AM	0	0	1	0	0	0	0	1	1	2	1	3
Total	0	0	7	2	0	2	0	3	5	14	5	19
Grand Total	0	0	18	3	0	5	0	6	17	40	9	49
Apprch %	0	0		100	0		0	100				
Total %	0	0		33.3	0		0	66.7		81.6	18.4	

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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	1	0	1	0	2	2	3
08:00 AM	0	0	0	0	0	0	0	1	1	1
08:15 AM	0	0	0	1	0	1	0	1	1	2
08:30 AM	0	0	0	1	0	1	0	0	0	1
Total Volume	0	0	0	3	0	3	0	4	4	7
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.750	.000	.750	.000	.500	.500	.583



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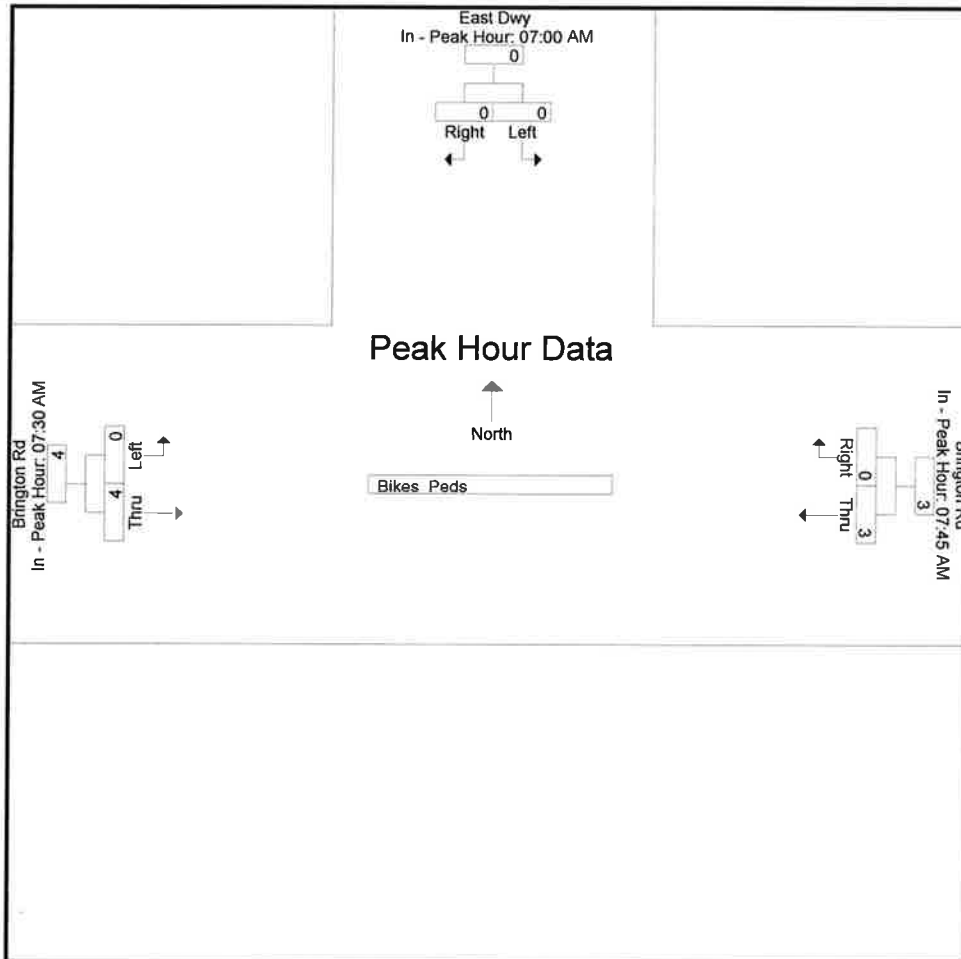
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Peak Hour for Each Approach Begins at:

	07:00 AM			07:45 AM			07:30 AM		
+0 mins.	0	0	0	1	0	1	0	0	0
+15 mins.	0	0	0	0	0	0	0	2	2
+30 mins.	0	0	0	1	0	1	0	1	1
+45 mins.	0	0	0	1	0	1	0	1	1
Total Volume	0	0	0	3	0	3	0	4	4
% App. Total	0	0		100	0		0	100	
PHF	.000	.000	.000	.750	.000	.750	.000	.500	.500



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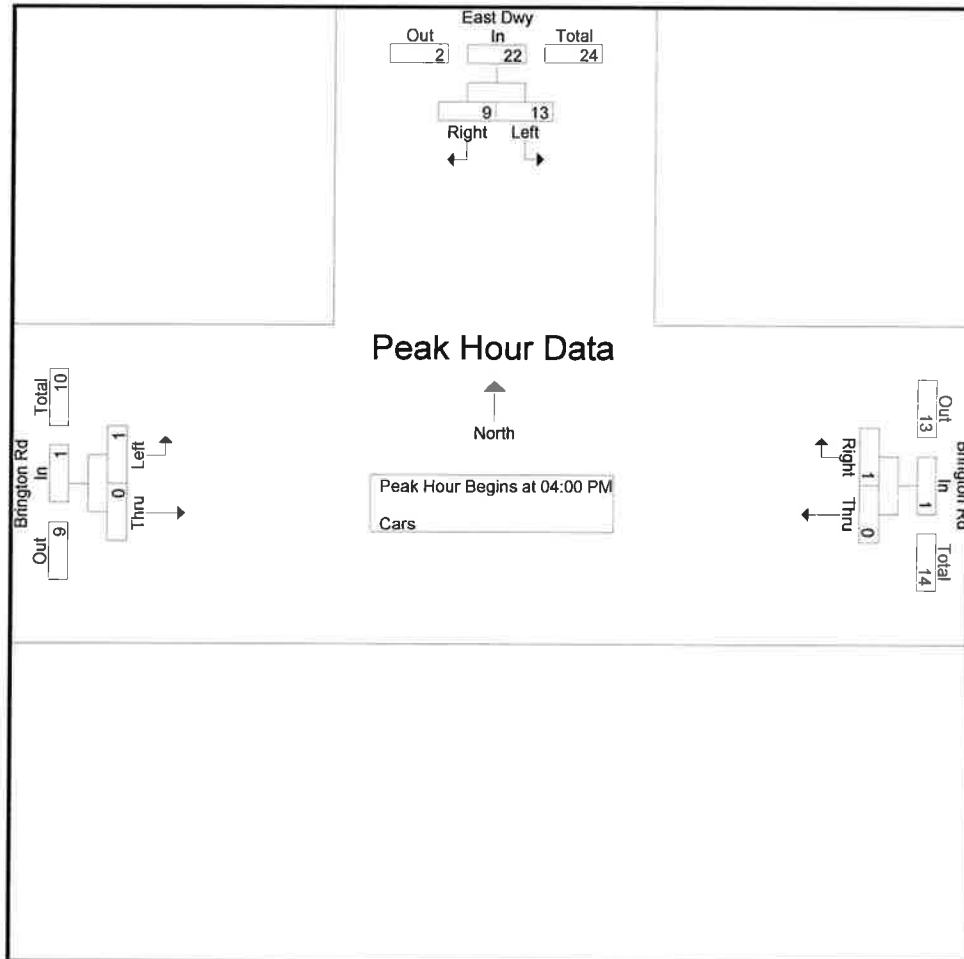
Start Time	East Dwy From North		Brington Rd From East		Brington Rd From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
04:00 PM	5	4	0	0	0	0	9
04:15 PM	1	2	0	0	0	0	3
04:30 PM	5	2	0	0	1	0	8
04:45 PM	2	1	0	1	0	0	4
Total	13	9	0	1	1	0	24
05:00 PM	3	0	0	0	0	0	3
05:15 PM	0	0	0	0	0	0	0
05:30 PM	5	1	0	0	0	0	6
05:45 PM	1	0	0	0	0	0	1
Total	9	1	0	0	0	0	10
Grand Total	22	10	0	1	1	0	34
Apprch %	68.8	31.2	0	100	100	0	
Total %	64.7	29.4	0	2.9	2.9	0	

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Start Time	East Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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	5	4	9	0	0	0	0	0	0	9
04:15 PM	1	2	3	0	0	0	0	0	0	3
04:30 PM	5	2	7	0	0	0	1	0	1	8
04:45 PM	2	1	3	0	1	1	0	0	0	4
Total Volume	13	9	22	0	1	1	1	0	1	24
% App. Total	59.1	40.9		0	100		100	0		
PHF	.650	.563	.611	.000	.250	.250	.250	.000	.250	.667



Accurate Counts
978-664-2565

N/S Street : East Driveway
E/W Street: Brington Road
City/State : Brookline, MA
Weather : Clear

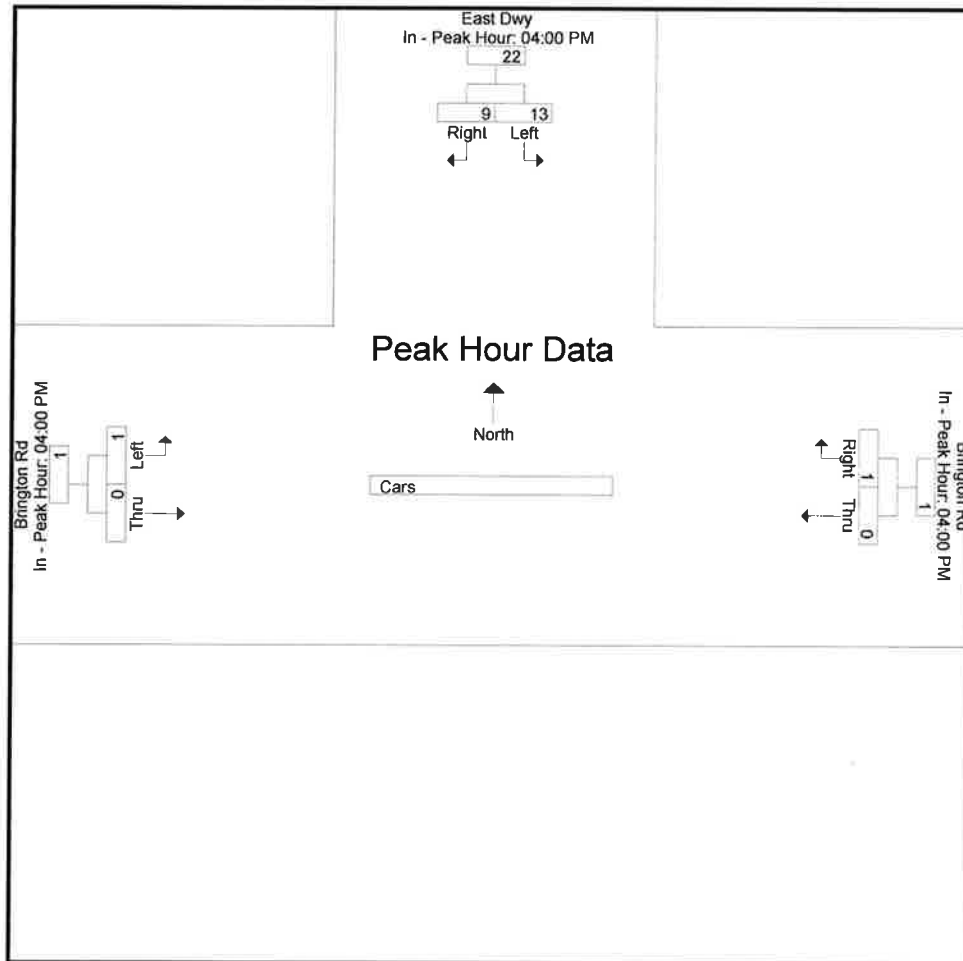
File Name : 75740006
Site Code : 75740006
Start Date : 9/8/2017
Page No : 3

Start Time	East Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:00 PM		
+0 mins.	5	4	9	0	0	0	0	0	0
+15 mins.	1	2	3	0	0	0	0	0	0
+30 mins.	5	2	7	0	0	0	1	0	1
+45 mins.	2	1	3	0	1	1	0	0	0
Total Volume	13	9	22	0	1	1	1	0	1
% App. Total	59.1	40.9		0	100		100	0	
PHF	.650	.563	.611	.000	.250	.250	.250	.000	.250



Accurate Counts
978-664-2565

N/S Street : East Driveway
E/W Street: Brington Road
City/State : Brookline, MA
Weather : Clear

File Name : 75740006
Site Code : 75740006
Start Date : 9/8/2017
Page No : 1

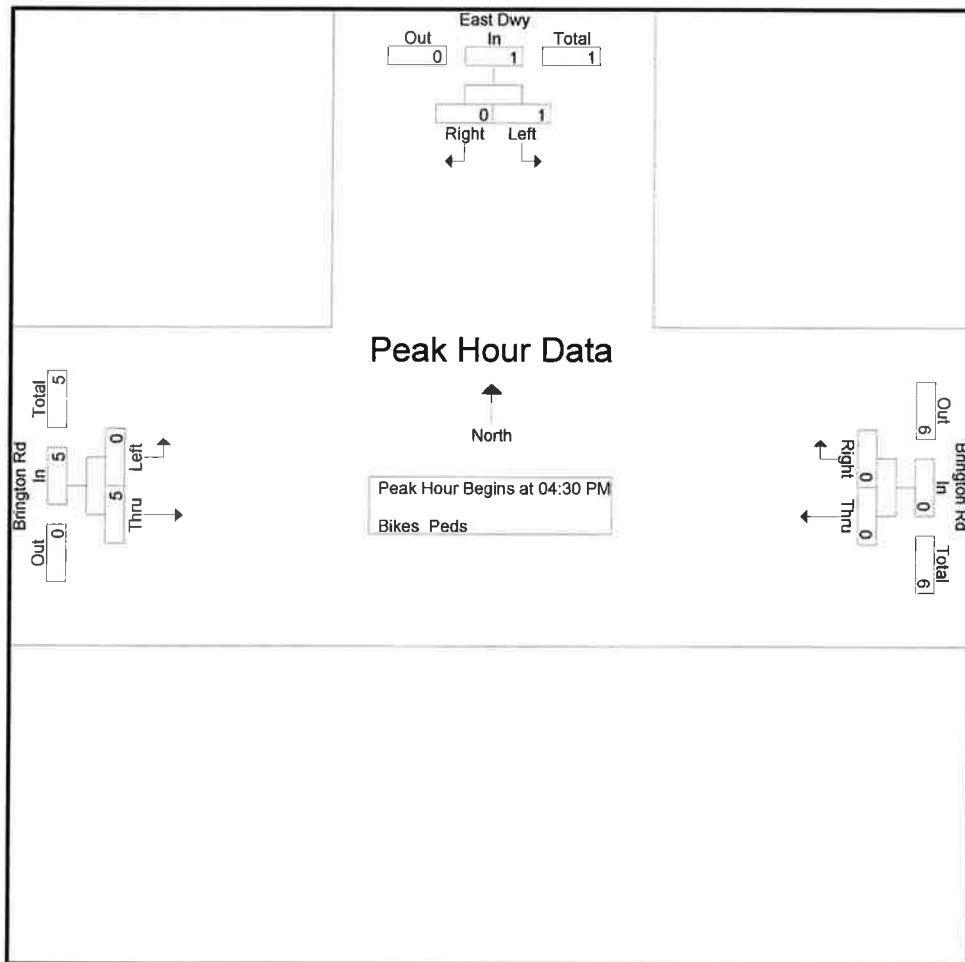
Start Time	East Dwy From North			Brington Rd From East			Brington Rd From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds			
04:00 PM	0	0	1	1	0	1	0	0	1	3	1	4
04:15 PM	0	0	0	1	0	1	0	0	0	1	1	2
04:30 PM	0	0	0	0	0	0	0	0	2	2	0	2
04:45 PM	0	0	1	0	0	0	0	3	1	2	3	5
Total	0	0	2	2	0	2	0	3	4	8	5	13
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	1	0	1	0	0	0	0	2	0	1	3	4
05:30 PM	0	0	1	0	0	0	0	0	2	3	0	3
05:45 PM	0	0	1	0	0	0	0	0	1	2	0	2
Total	1	0	3	0	0	0	0	2	3	6	3	9
Grand Total	1	0	5	2	0	2	0	5	7	14	8	22
Apprch %	100	0		100	0		0	100				
Total %	12.5	0		25	0		0	62.5		63.6	36.4	

Accurate Counts
978-664-2565

N/S Street : East Driveway
E/W Street: Brington Road
City/State : Brookline, MA
Weather : Clear

File Name : 75740006
Site Code : 75740006
Start Date : 9/8/2017
Page No : 2

Start Time	East Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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
04:45 PM	0	0	0	0	0	0	0	3	3	3
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	1	0	1	0	0	0	0	2	2	3
Total Volume	1	0	1	0	0	0	0	5	5	6
% App. Total	100	0		0	0		0	100		
PHF	.250	.000	.250	.000	.000	.000	.000	.417	.417	.500



Accurate Counts
978-664-2565

N/S Street : East Driveway
E/W Street: Brington Road
City/State : Brookline, MA
Weather : Clear

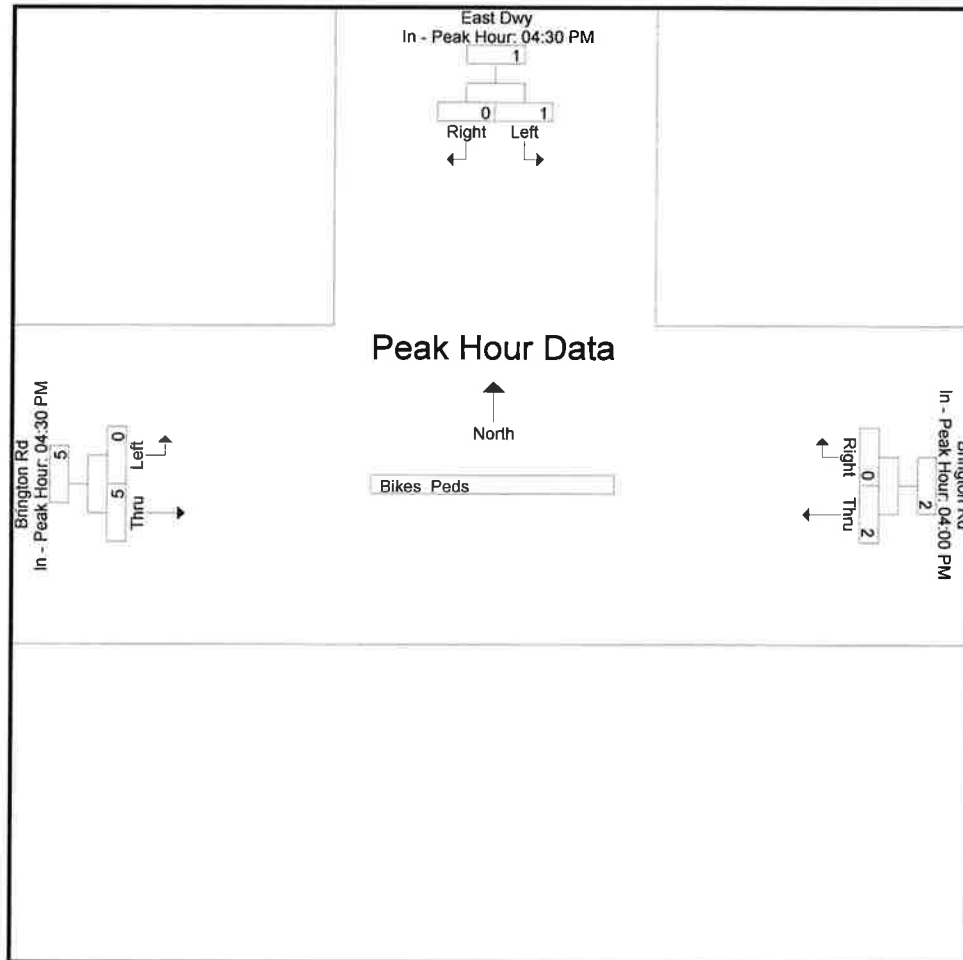
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Start Date : 9/8/2017
Page No : 3

Start Time	East Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:30 PM			04:00 PM			04:30 PM		
+0 mins.	0	0	0	1	0	1	0	0	0
+15 mins.	0	0	0	1	0	1	0	3	3
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	1	0	1	0	0	0	0	2	2
Total Volume	1	0	1	2	0	2	0	5	5
% App. Total	100	0		100	0		0	100	
PHF	.250	.000	.250	.500	.000	.500	.000	.417	.417



Accurate Counts
978-664-2565

N/S Street : West Driveway
E/W Street: Brington Road
City/State : Brookline, MA
Weather : Clear

File Name : 75740007
Site Code : 75740007
Start Date : 9/8/2017
Page No : 1

Groups Printed- Cars

Start Time	West Dwy From North		Brington Rd From East		Brington Rd From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
07:00 AM	0	0	0	7	0	0	7
07:15 AM	1	0	0	5	1	0	7
07:30 AM	0	0	0	4	0	0	4
07:45 AM	0	0	0	6	0	0	6
Total	1	0	0	22	1	0	24
08:00 AM	0	0	0	4	0	0	4
08:15 AM	0	0	0	1	0	0	1
08:30 AM	0	0	0	4	0	0	4
08:45 AM	1	0	0	4	0	0	5
Total	1	0	0	13	0	0	14
Grand Total	2	0	0	35	1	0	38
Apprch %	100	0	0	100	100	0	
Total %	5.3	0	0	92.1	2.6	0	

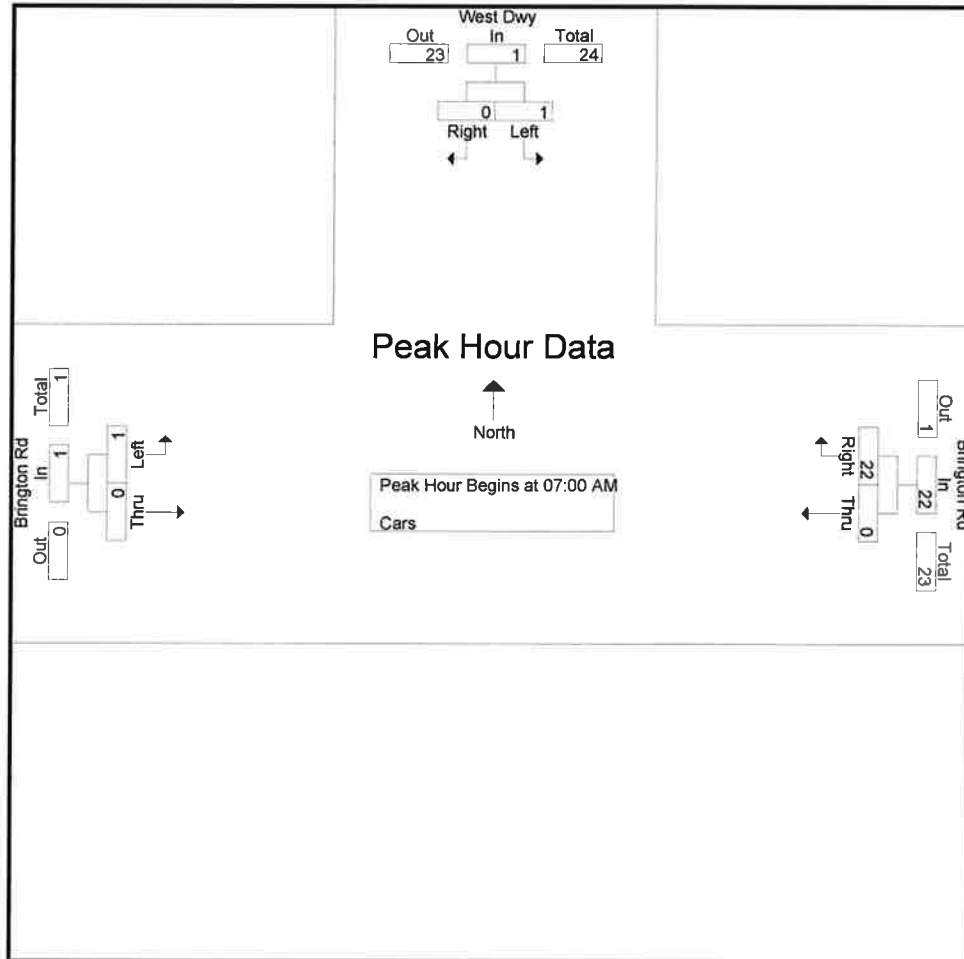
Accurate Counts

978-664-2565

N/S Street : West Driveway
 E/W Street: Brington Road
 City/State : Brookline, MA
 Weather : Clear

File Name : 75740007
 Site Code : 75740007
 Start Date : 9/8/2017
 Page No : 2

Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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	7	7	0	0	0	7
07:15 AM	1	0	1	0	5	5	1	0	1	7
07:30 AM	0	0	0	0	4	4	0	0	0	4
07:45 AM	0	0	0	0	6	6	0	0	0	6
Total Volume	1	0	1	0	22	22	1	0	1	24
% App. Total	100	0		0	100		100	0		
PHF	.250	.000	.250	.000	.786	.786	.250	.000	.250	.857



Accurate Counts

978-664-2565

N/S Street : West Driveway
 E/W Street: Brington Road
 City/State : Brookline, MA
 Weather : Clear

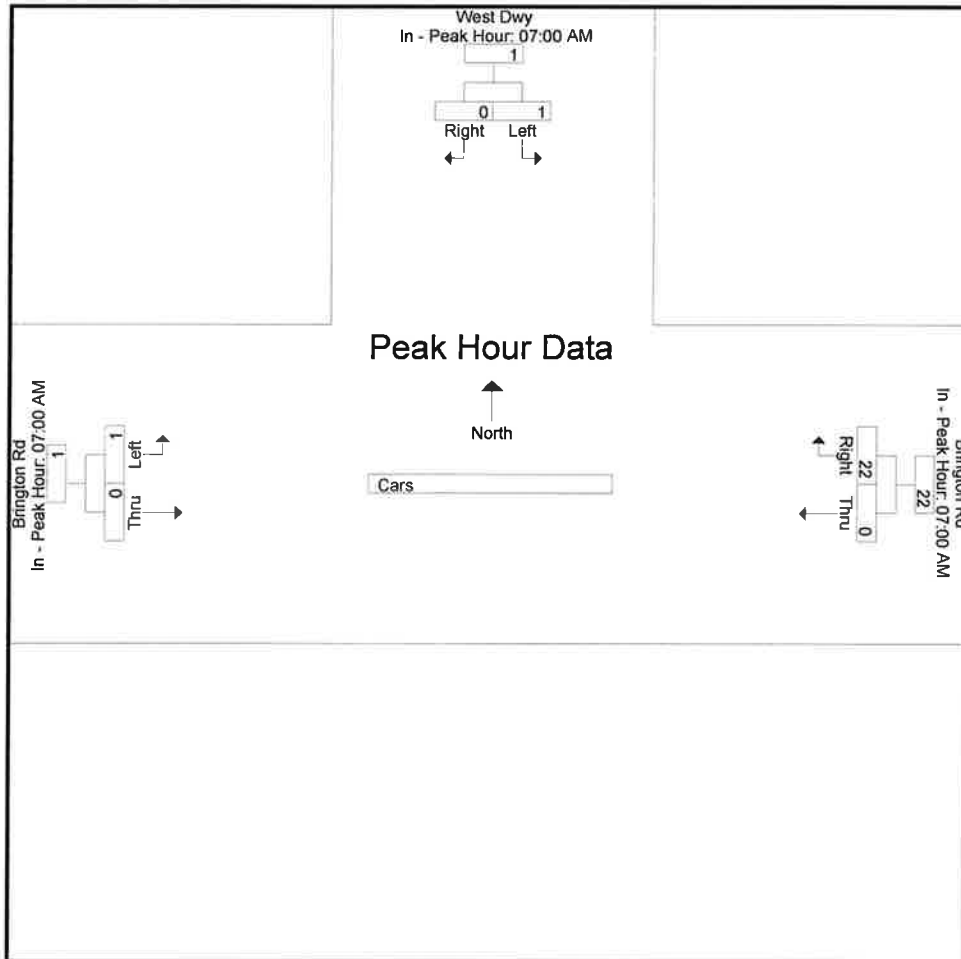
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 Start Date : 9/8/2017
 Page No : 3

Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	0	7	7	0	0	0
+15 mins.	1	0	1	0	5	5	1	0	1
+30 mins.	0	0	0	0	4	4	0	0	0
+45 mins.	0	0	0	0	6	6	0	0	0
Total Volume	1	0	1	0	22	22	1	0	1
% App. Total	100	0		0	100		100	0	
PHF	.250	.000	.250	.000	.786	.786	.250	.000	.250



Accurate Counts

978-664-2565

N/S Street : West Driveway
 E/W Street: Brington Road
 City/State : Brookline, MA
 Weather : Clear

File Name : 75740007
 Site Code : 75740007
 Start Date : 9/8/2017
 Page No : 1

Groups Printed- Bikes Peds

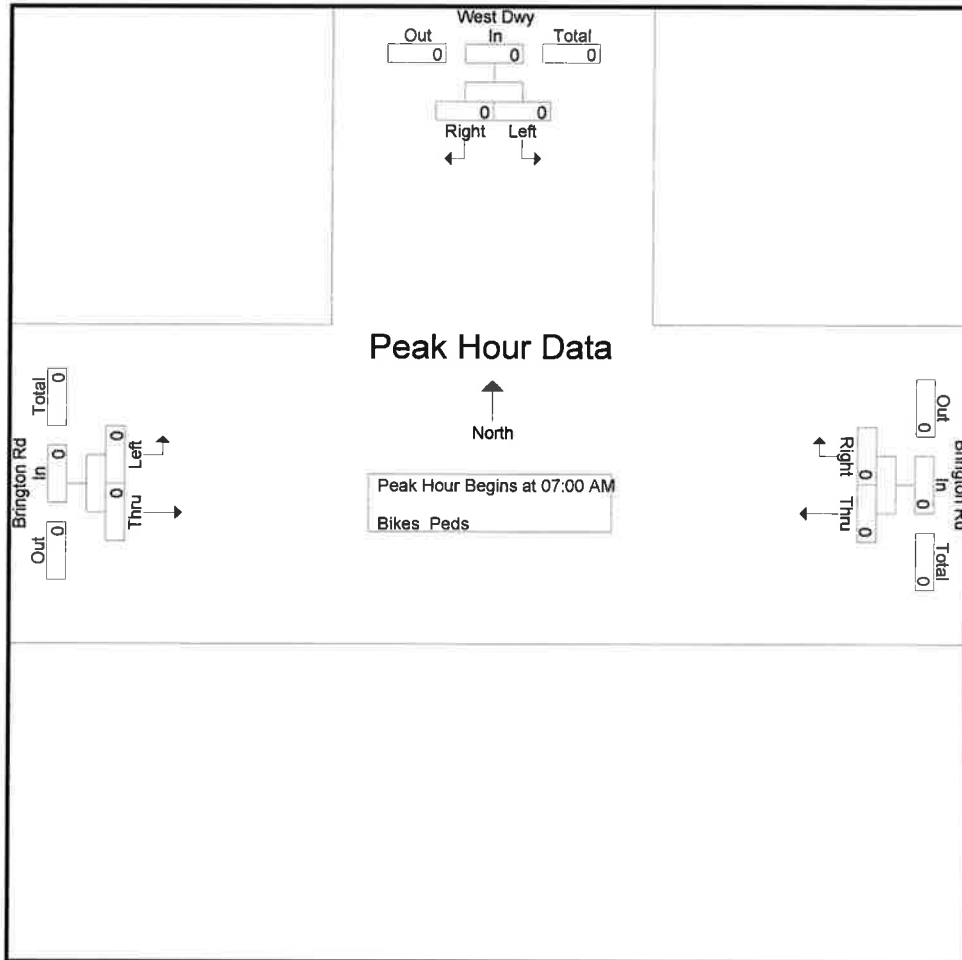
Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	1	1	0	1
07:30 AM	0	0	1	0	0	0	0	0	0	1	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	0	0	1	2	0	2
08:00 AM	0	0	0	0	0	0	0	0	1	1	0	1
08:15 AM	0	0	1	0	0	0	0	0	1	2	0	2
08:30 AM	0	0	1	0	0	0	0	0	1	2	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	2	0	0	0	0	0	3	5	0	5
Grand Total	0	0	3	0	0	0	0	0	4	7	0	7
Apprch %	0	0		0	0		0	0				
Total %										100	0	

Accurate Counts
978-664-2565

N/S Street : West Driveway
E/W Street: Brington Road
City/State : Brookline, MA
Weather : Clear

File Name : 75740007
Site Code : 75740007
Start Date : 9/8/2017
Page No : 2

Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Accurate Counts

978-664-2565

N/S Street : West Driveway
 E/W Street: Brington Road
 City/State : Brookline, MA
 Weather : Clear

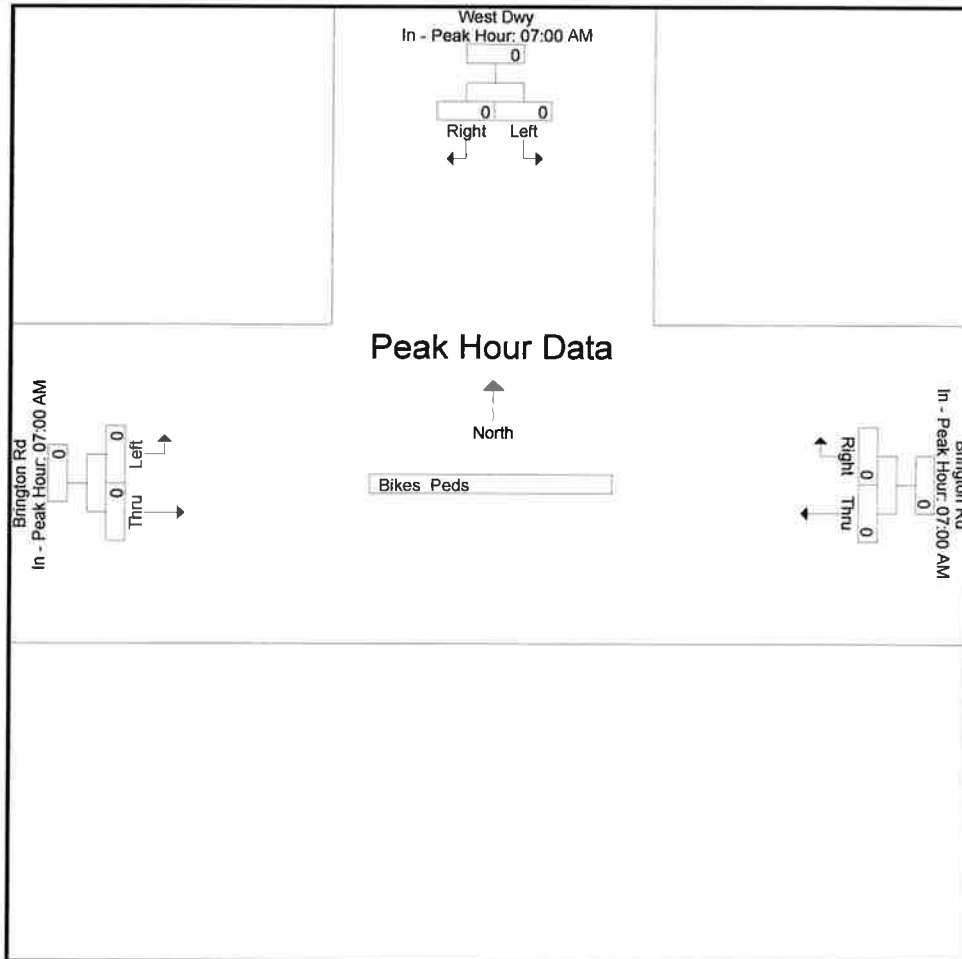
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 Start Date : 9/8/2017
 Page No : 3

Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000



Accurate Counts

978-664-2565

N/S Street : West Driveway
 E/W Street: Brington Road
 City/State : Brookline, MA
 Weather : Clear

File Name : 75740007
 Site Code : 75740007
 Start Date : 9/8/2017
 Page No : 1

Groups Printed- Cars

Start Time	West Dwy From North		Brington Rd From East		Brington Rd From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
04:00 PM	0	0	0	1	0	0	1
04:15 PM	0	0	0	1	0	0	1
04:30 PM	2	0	0	0	0	0	2
04:45 PM	1	2	0	2	0	0	5
Total	3	2	0	4	0	0	9
05:00 PM	2	0	0	1	0	0	3
05:15 PM	0	0	0	1	0	0	1
05:30 PM	0	0	0	2	0	0	2
05:45 PM	0	0	0	1	0	0	1
Total	2	0	0	5	0	0	7
Grand Total	5	2	0	9	0	0	16
Apprch %	71.4	28.6	0	100	0	0	
Total %	31.2	12.5	0	56.2	0	0	

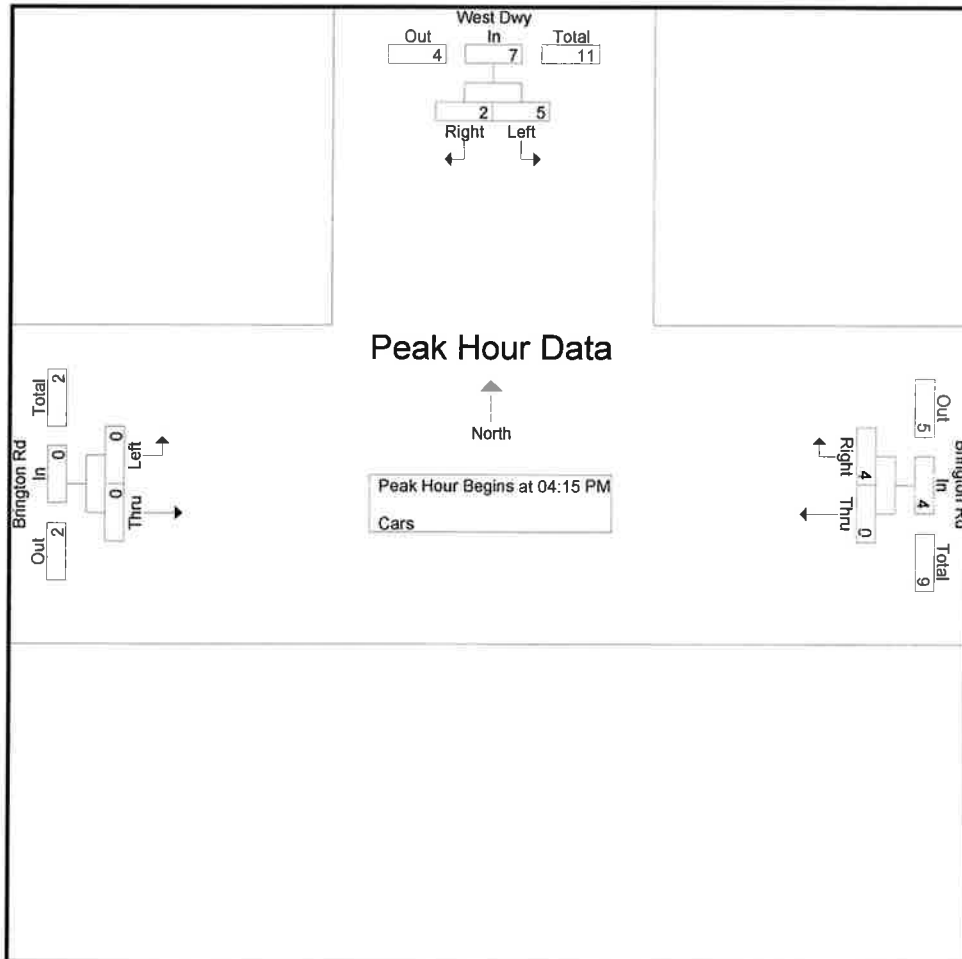
Accurate Counts

978-664-2565

N/S Street : West Driveway
 E/W Street: Brington Road
 City/State : Brookline, MA
 Weather : Clear

File Name : 75740007
 Site Code : 75740007
 Start Date : 9/8/2017
 Page No : 2

Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	0	0	0	0	1	1	0	0	0	1
04:30 PM	2	0	2	0	0	0	0	0	0	2
04:45 PM	1	2	3	0	2	2	0	0	0	5
05:00 PM	2	0	2	0	1	1	0	0	0	3
Total Volume	5	2	7	0	4	4	0	0	0	11
% App. Total	71.4	28.6		0	100		0	0		
PHF	.625	.250	.583	.000	.500	.500	.000	.000	.000	.550



Accurate Counts

978-664-2565

N/S Street : West Driveway
 E/W Street: Brington Road
 City/State : Brookline, MA
 Weather : Clear

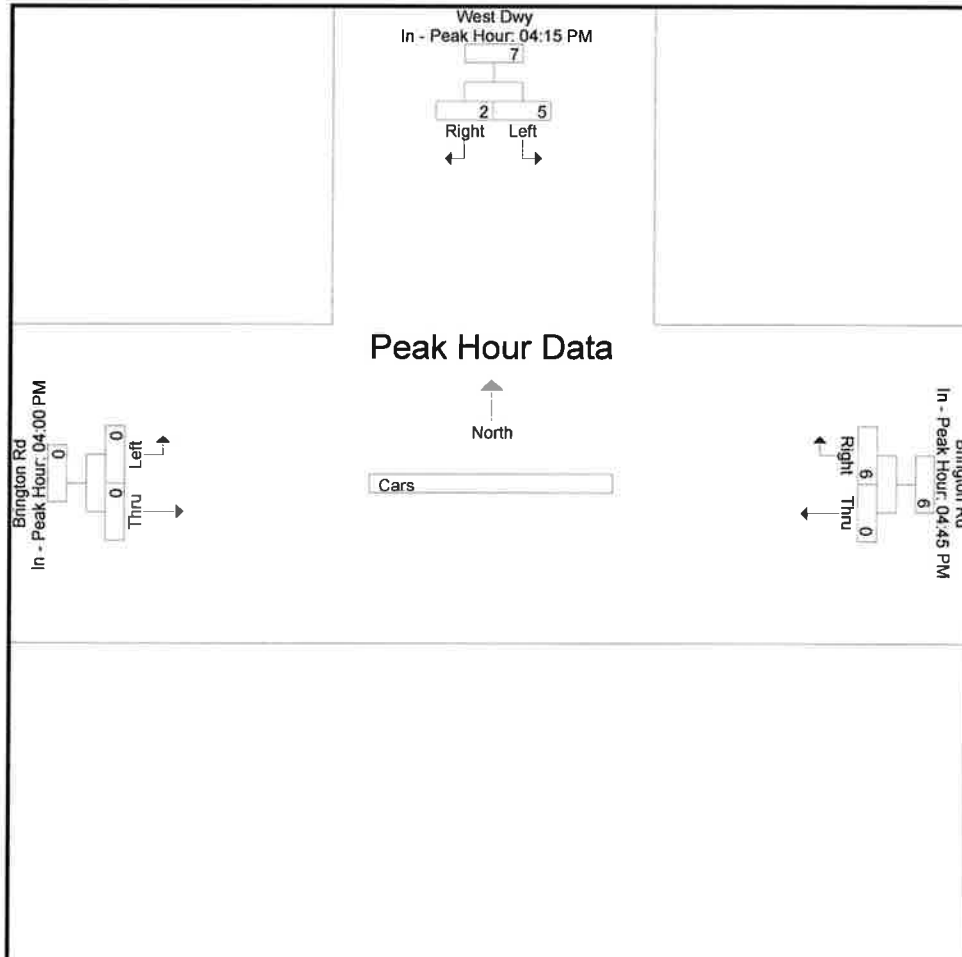
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 Page No : 3

Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:15 PM			04:45 PM			04:00 PM		
+0 mins.	0	0	0	0	2	2	0	0	0
+15 mins.	2	0	2	0	1	1	0	0	0
+30 mins.	1	2	3	0	1	1	0	0	0
+45 mins.	2	0	2	0	2	2	0	0	0
Total Volume	5	2	7	0	6	6	0	0	0
% App. Total	71.4	28.6		0	100		0	0	
PHF	.625	.250	.583	.000	.750	.750	.000	.000	.000



Accurate Counts

978-664-2565

N/S Street : West Driveway
 E/W Street: Brington Road
 City/State : Brookline, MA
 Weather : Clear

File Name : 75740007
 Site Code : 75740007
 Start Date : 9/8/2017
 Page No : 1

Groups Printed- Bikes Peds

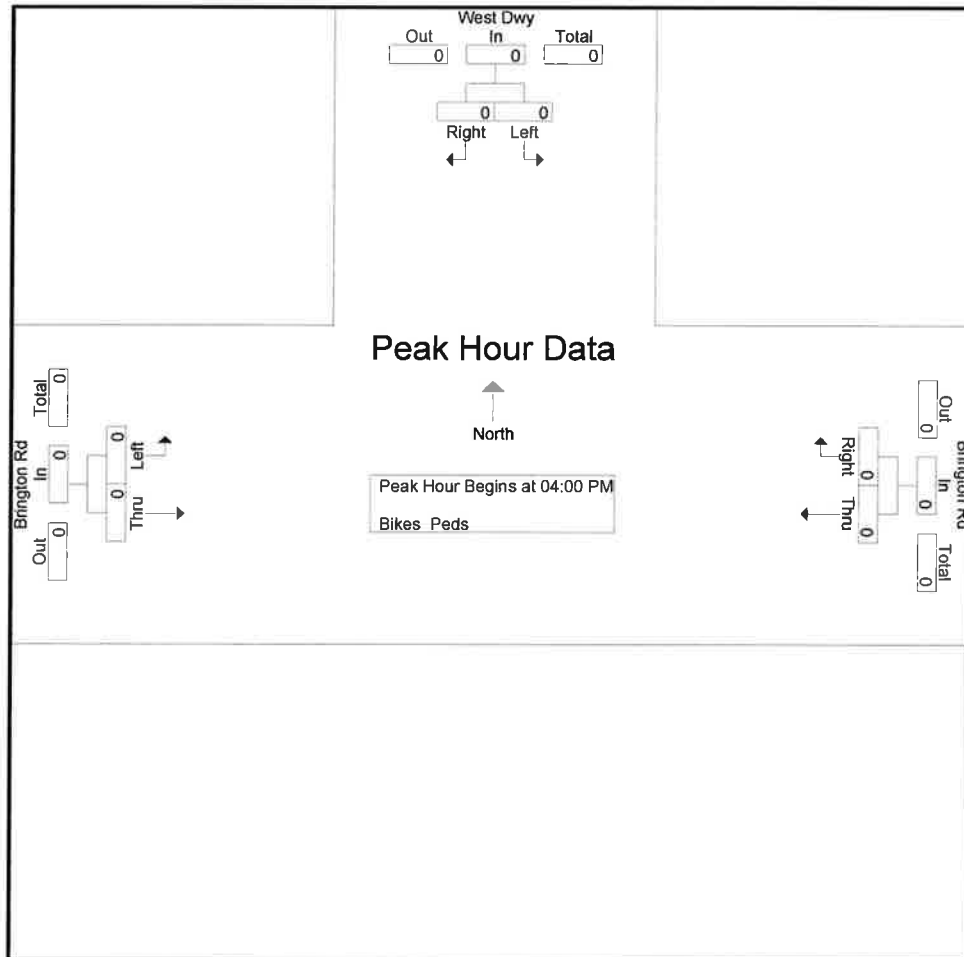
Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	1	0	0	0	0	0	1	2	0	2
Total	0	0	1	0	0	0	0	0	1	2	0	2
05:00 PM	0	0	0	0	0	0	0	0	1	1	0	1
05:15 PM	0	0	1	0	0	0	0	0	0	1	0	1
05:30 PM	0	0	0	0	0	0	0	0	3	3	0	3
05:45 PM	0	0	1	0	0	0	0	0	0	1	0	1
Total	0	0	2	0	0	0	0	0	4	6	0	6
Grand Total	0	0	3	0	0	0	0	0	5	8	0	8
Apprch %	0	0		0	0		0	0				
Total %										100	0	

Accurate Counts
978-664-2565

N/S Street : West Driveway
E/W Street: Brington Road
City/State : Brookline, MA
Weather : Clear

File Name : 75740007
Site Code : 75740007
Start Date : 9/8/2017
Page No : 2

Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Accurate Counts
978-664-2565

N/S Street : West Driveway
E/W Street: Brington Road
City/State : Brookline, MA
Weather : Clear

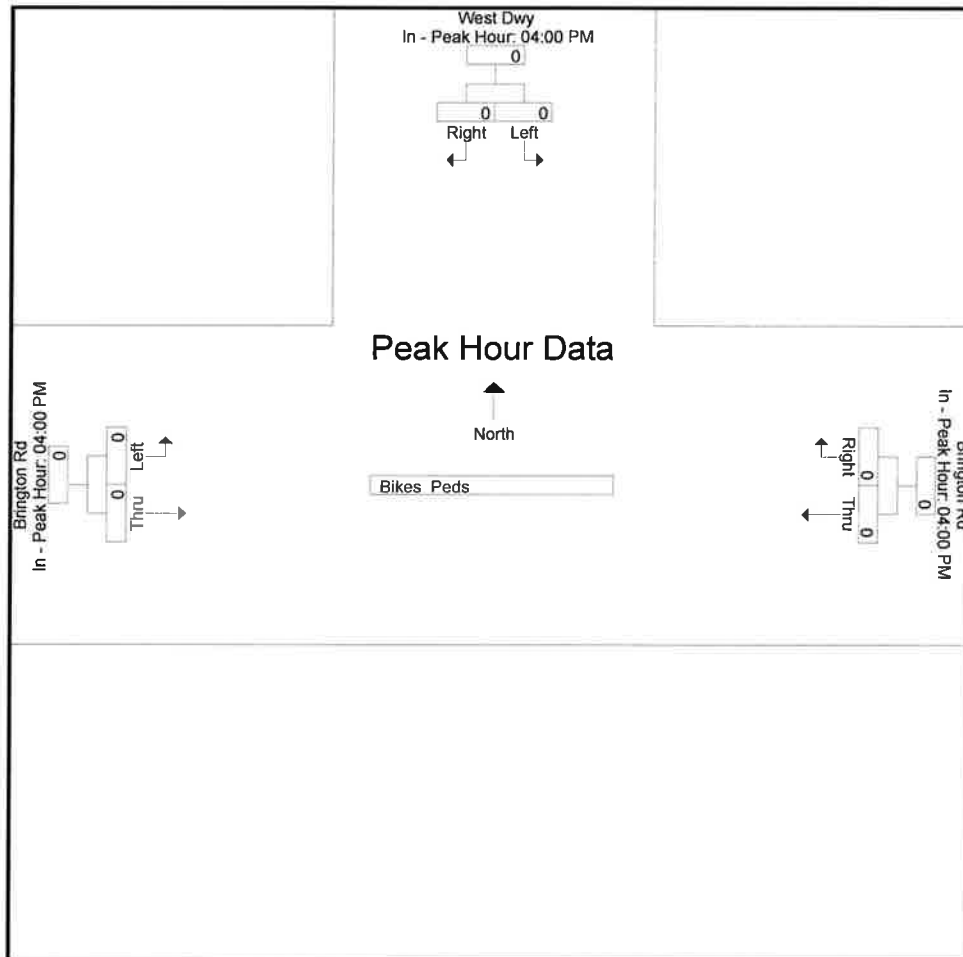
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Start Date : 9/8/2017
Page No : 3

Start Time	West Dwy From North			Brington Rd From East			Brington Rd From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	

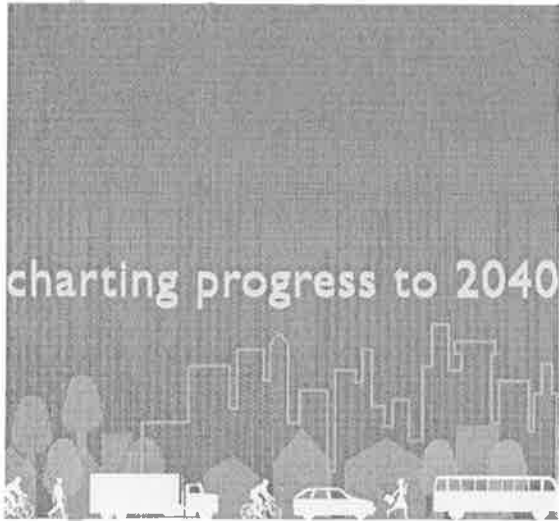
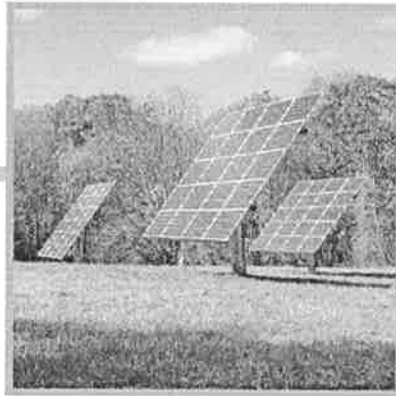
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:00 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000



EXISTING OFFICE BUILDING TRIP-GENERATION CALCULATIONS



Long-Range Transportation Plan of the Boston Region Metropolitan Planning Organization



July 2015

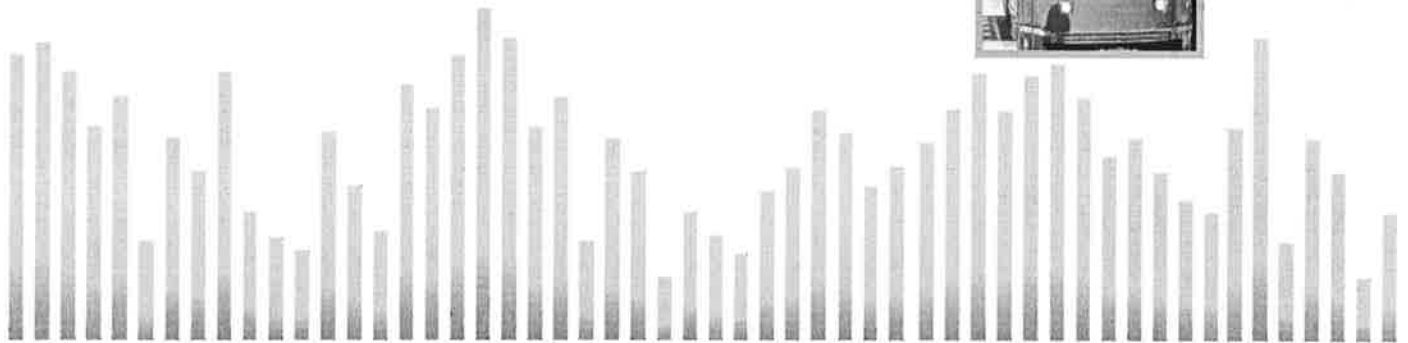
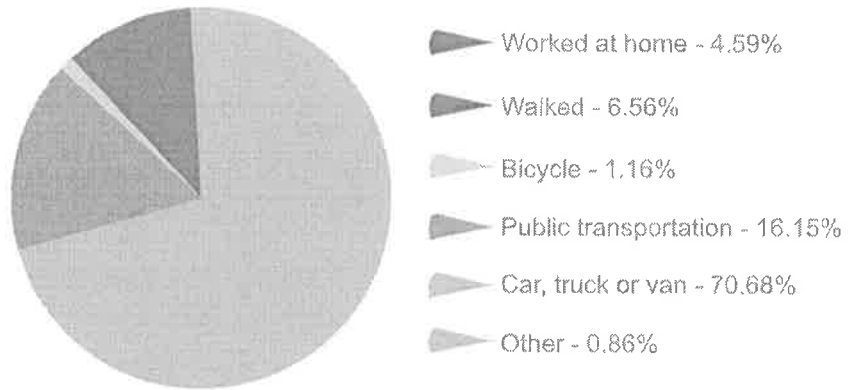


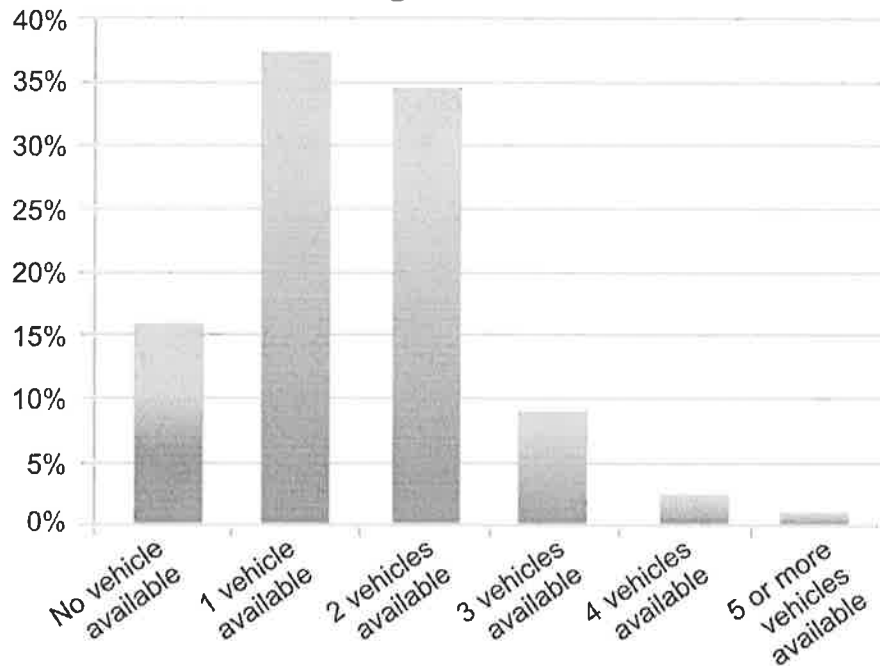
FIGURE 1.11
Means of Transportation to Work



Source: 2013 American Community Survey 5-Year Summary File, Table B16001.

The region also has a significant number of zero- and one-vehicle households, totaling more than half of all households at 53 percent (Figure 1.12).

FIGURE 1.12
Vehicles Available by Household as Percentage of Total Households



Source: 2013 American Community Survey 5-Year Summary File.

Institute of Transportation Engineers (ITE)
Trip Generation, 9th Edition
Land Use Code (LUC) 710 - General Office Building

Average Vehicle Trips Ends vs: 1,000 Square Feet Gross Floor Area
 Independent Variable (X): 28.04

AVERAGE WEEKDAY DAILY

$$\ln T = 0.76 \ln (X) + 3.68$$

$$\ln T = 0.76 \ln 28 + (3.68)$$

$$\ln T = 6.21$$

$$T = 499.49$$

$$T = 500 \text{ vehicle trips}$$

with 50% (250 vpd) entering and 50% (250 vpd) exiting.

WEEKDAY MORNING PEAK HOUR

$$\ln T = 0.80 \ln (X) + 1.57$$

$$\ln T = 0.80 \ln 28.04 + (1.57)$$

$$\ln T = 4.24$$

$$T = 69.20$$

$$T = 69 \text{ vehicle trips}$$

with 88% (61 vph) entering and 12% (8 vph) exiting.

WEEKDAY EVENING PEAK HOUR

$$\frac{\text{ITE LUC 710 Weekday Morning Eqn Trip Rate}}{\text{ITE LUC 710 Weekday Morning Ave Trip Rate}} = \frac{\text{ITE LUC 710 Weekday Evening Eqn Trip Rate}}{\text{ITE LUC 710 Weekday Evening Ave Trip Rate}}$$

$$\frac{2.46}{1.56} = \frac{(Y)}{1.49} \quad Y = 2.350267$$

$$T = Y * 28.041$$

$$T = 66$$

$$T = 66 \text{ vehicle trips}$$

with 17% (11 vph) entering and 83% (55 vph) exiting.