Stantec Consulting Services Inc.
5 LAN Drive, Suite 300, Westford MA 01886-3538

Transportation Demand Management Plan (TDMP)

Proposed NETA Registered Marijuana Dispensary (RMD)

160 Washington Street
Brookline, MA

PURPOSE

The purpose of this Transportation Demand Management Plan (TDMP) is to ensure that the future traffic and parking impacts of the Proposed New England Treatment Access (NETA) Registered Marijuana Dispensary (RMD) are generally consistent with the forecasts provided in the March 4, 2015 *Traffic Impact and Parking Study* prepared by Stantec for the project. The TDMP lists transportation related performance goals for the project and describes measures that NETA will employ to meet these goals. A traffic monitoring program is defined describing how project performance will be measured. Remedial actions to be taken by NETA should the project fail to meet its performance goals are also identified. The plan outlines an iterative process of implementing management strategies, measuring results, and proposing new strategies as warranted that NETA will undertake to meet the transportation performance goals.

PROJECT DESCRIPTION

The proposed project is the development of a medical marijuana dispensary at the site of a former bank at 160 Washington Street in Brookline. The 10,000 square-foot former bank building is supported by 13 on-site parking spaces accessed by way of a curb cut and driveway on Boylston Street just west of its intersection with Washington Street. A raised center median on Boylston Street limits turning movements at this driveway to right-turns in and right-turns out only. The attached site plan shows the parking layout and access driveway. The project site is located within Brookline Village and approximately 800 feet from the MBTA Green Line Brookline Village Station. Multiple MBTA bus routes service the project area. In Brookline Village metered parking is provided on most streets and sidewalks are provided along both sides of roadways to serve local businesses and residents.

This proposed land use is the retail distribution of medicinal marijuana, “the product”, to qualified patients and patient counseling. The product will be cultivated in Franklin, Massachusetts and delivered to the dispensary once daily. An estimated 4,000 pounds of product (raw flower or flower converted to other projects) will be distributed per year through this facility. The proposed hours of operation for the dispensary are 10:00 AM to 7:00 PM seven days a week.

MANAGEMENT PLAN

NETA seeks to limit the number of vehicle trips generated to and from the project site while still providing an appropriate level of service and convenience for patients and employees.

Independent of the environmental and health benefits associated with travel by alternative modes, limiting the number of vehicle trips generated will help ensure that:

- The project has nominal impacts on area traffic operations and traffic safety;
- The proposed 13 on-site parking spaces adequately serve patient demands without causing traffic back-ups onto streets adjacent to the site; and,
- The amount of on-street parking available to serve other land uses in the area is maximized.

NETA is committed to limit vehicle trip generation associated with the project by:

- Designating a transportation coordinator for the site who will be responsible for promoting the use of alternative travel modes, communicating with the Town on transportation matters and implementing this TDMP;
- Prohibiting employees from parking on the project site;
- Discouraging employees from parking on adjacent streets;
- Providing a subsidy of at least 30 percent for employee transit passes;
- Offering a guaranteed ride home to employees who choose not to drive to work;
- Providing an on-site bike rack as shown on the project site plan; the bike rack will be sheltered as long as the proposed shelter does not create project delays;
- Favoring potential employees in the hiring process who have ready access to the MBTA system;
- Providing scheduled appointments to patients who desire in-depth discussions; and,
- Providing product delivery to patients as needed and upon approved request.

NETA is committed to safely and effectively operate its on-site parking facility on a continuous basis by:

- Restriping the lot as shown on the attached site plan and maintaining the proposed pavement markings to clearly designate all parking stalls, loading spaces and circulation patterns;
- Installing and maintaining the signage noted on the attached site plan defining site circulation and parking restrictions;

- Providing visual monitoring of parking conditions to ensure that only patients are parking in the on-site lot;
- Providing warnings to drivers who violate parking policy and, if appropriate after sufficient warning, removing vehicles from the site that are parked in violation of the policy;
- Removing snow from the site as necessary to ensure that all spaces are accessible within a reasonable amount of time following a snowstorm;
- Developing and implementing a temporary parking plan, approved by the City, prior to any construction on site that may limit the number of spaces available to patients;
- Providing parking subsidies of at least 30% for employees who must drive but use off-street parking at nearby private facilities;

Additionally, during the initial start-up period for the project NETA is committed to the following on an as-needed basis.

- Providing in-person education for patients before the official opening date;
- Hiring a parking attendant to aid patients using the lot during peak periods; and,
- Hiring a police officer to aid patients entering and exiting the site driveway at Boylston Street during peak periods.

The start-up period can be as short as one to two weeks and is expected to last no more than eight weeks however, proposed measures may be employed, if necessary, beyond the start-up period to address any operational or safety issues observed.

PERFORMANCE GOALS

Performance goals for the proposed RMD from a transportation perspective relate to vehicle trip generation and parking demand. The goals are based on forecasts prepared for the project during the local permitting phase and presented in the March 4, 2015 traffic impact and parking study prepared by Stantec. Traffic forecasts and current goals for the project include:

- 63 vehicle trips generated to or from the site during the midday peak hour;
- 53 vehicle trips generated to or from the site during the afternoon commuter peak hour; and,
- Peak parking demand of eight vehicles.

The traffic impact and parking study indicates that if these goals are met the project will have only a nominal impact on area traffic operations and the proposed 13 space on-site parking lot can

safely and efficiently serve the parking demand without causing traffic queues to spill back onto adjacent streets.

PERFORMANCE MONITORING

The performance of the proposed facility from a transportation perspective will be monitored periodically to determine if the above referenced goals are being met. Monitoring will be conducted by a qualified transportation consultant beginning 15 minutes before the facility opens and ending 15 minutes after the facility closes and include:

- A count of vehicles entering and exiting the site by 15-minute intervals;
- Observations of any vehicles queuing on Boylston Street to enter the site driveway using video technology; and,
- A count of the number of vehicles parked or circulating on site at 15-minute intervals.

The count program will be conducted on two typical weekdays on dates to be approved by the Town in advance of the study. The study data and findings will be presented in written form to the Town within 30 days of completing the study. In the event that the project is found to not be meeting the performance goals, the study shall describe steps to be taken to meet the goals as described in greater detail below.

The traffic study will be conducted approximately three months following the issuance of a certificate of occupancy and repeated again approximately 15 months following receipt of a certificate of occupancy.

In addition to completing the traffic monitoring the following material will be submitted to the Town on an annual basis:

- Number of annual on-site transactions (an indication of the number of patient visits);
- Number of annual off-site transactions (deliveries);
- Number of monthly MBTA passes purchased or subsidized for employees.

The site's transportation coordinator will be responsible for submitting this information to the Town. The current transportation coordinator's name and contact information are provided below. The Town will be notified within 30 days of any change in the site's transportation coordinator.

Mr. Arnon Vered

NETA

Phone: 617 838 2168

arnon@netacare.org

REMEDIAL ACTIONS

NETA will take additional actions to manage site traffic and parking conditions should the initial monitoring study or any subsequent monitoring study indicate that the performance goals are not being met. Triggers requiring further action include:

- The average number of vehicle trips generated during the midday site peak traffic hour exceeds the stated goal by more than 25 percent;
- The average number of vehicle trips generated during the adjacent street PM commuter peak hour exceeds the stated goal by more than 25 percent;
- The number of vehicles observed parked or circulating on the site exceeds the stated goal by more than 25 percent for more than ten percent of the time (11 or more cars are observed for at least eight of the 74 observations made over the two-day survey); and,
- One or more vehicles are observed stopped on Boylston Street waiting to enter the site for more than five percent of the time during any one hour period.

Further actions will include measures aimed at addressing the performance criteria that are not met and may include but are not limited to:

- Reinstating management procedures used during the start-up period;
- Encouraging patients to use public transportation;
- Scheduling patient visits by appointment to spread out peak hour demands; and,
- Securing additional off-site parking in private lots.

Proposed actions will be implemented within 30 days of submittal of the traffic report to the Town that indicated that one or more performance measures were not met. A follow-up traffic study will be completed and submitted to the Town within 60 days of implementing the proposed actions. If the follow-up study indicates that the remedial measures have been effective and that none of the above triggers are met then a second follow-up study will be conducted approximately six months following completion of the first follow-up study. Should the second follow-up study indicate that none of the above triggers are met then this will be the last study prepared until such time that any significant change in the use or operation of the site is proposed by NETA.

Site Plans for Proposed Site Improvements

NEW ENGLAND TREATMENT ACCESS DISPENSARY

160 WASHINGTON STREET
BROOKLINE, MASSACHUSETTS
IA 2, AP 185, LOTS 1, 2 & 3

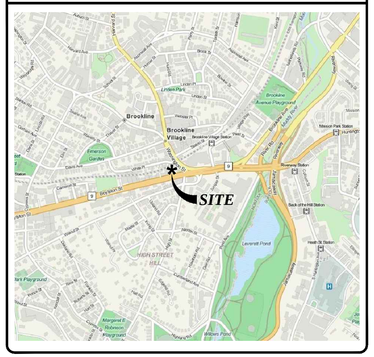
ZONING: G-2.0 (GENERAL BUSINESS)

APPLICANT	ARCHITECT
NEW ENGLAND TREATMENT ACCESS, INC. 160 WASHINGTON STREET BROOKLINE, MA 02445	VISION 3 ARCHITECTS 225 CHAPMAN STREET #300 PROVIDENCE, RI 02905 (401) 461-7771 phone (401) 461-7772 fax
CIVIL ENGINEER	**SURVEYOR**
JOE CASALI ENGINEERING, INC. 300 POST ROAD WARWICK, RI 02888 (401) 944-1300 phone (401) 944-1313 fax	J.F. HENNESSY CO. P.O. BOX 909 BROOKLINE, MA 02446 (617) 566-3860 phone

GENERAL NOTES:

1. BOUNDARY SURVEY AND EXISTING CONDITIONS SURVEY COMPLETED BY J.F. HENNESSY CO., P.O. BOX 909, BROOKLINE, MA IN SEPTEMBER 2014 (REFERENCE PLAN 1).
2. THE LOCATION AND DEPTH OF EXISTING UTILITIES ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM THE LATEST AVAILABLE INFORMATION. THE UTILITY LOCATIONS ARE APPROXIMATE AND MAY NOT BE ALL INCLUSIVE. THE CONTRACTOR SHALL CHECK AND VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES, BOTH OVERHEAD AND UNDERGROUND, AND "DIG-SAFE" MUST BE NOTIFIED PRIOR TO COMMENCING ANY CONSTRUCTION OPERATIONS. RESTORATION AND REPAIR OF DAMAGE TO EXISTING UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR WITH NO ADDITIONAL COST THE OWNER. NO EXCAVATION SHALL COMMENCE UNTIL ALL INVOLVED UTILITY COMPANIES AND/OR CITY WHOSE FACILITIES MIGHT BE AFFECTED BY ANY WORK TO BE PERFORMED BY THE CONTRACTOR ARE NOTIFIED AT LEAST 72 HOURS IN ADVANCE.
3. THE SITE LIES IN ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AS SHOWN ON THE FIRM PANEL NO. 28049C0307H FOR NORFOLK COUNTY, EFFECTIVE DATE JULY 17, 2012.
4. THE LAYOUT SHOWN REPRESENTS A GRAPHICAL DESIGN, AND PRIOR TO THE CONSTRUCTION, THE CONTRACTOR SHALL ENGAGE A PROFESSIONAL LAND SURVEYOR (PLS) REGISTERED IN THE STATE OF MASSACHUSETTS TO SET AND VERIFY ALL LINES AND GRADES. ALL EXISTING UTILITY LOCATIONS AND ELEVATIONS ARE TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY ITEMS FOUND WHICH DO NOT MATCH THE PLANS MUST BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO CONSTRUCTION FOR REVIEW. NO WORK SHALL PROCEED UNTIL AUTHORIZED BY THE ENGINEER.

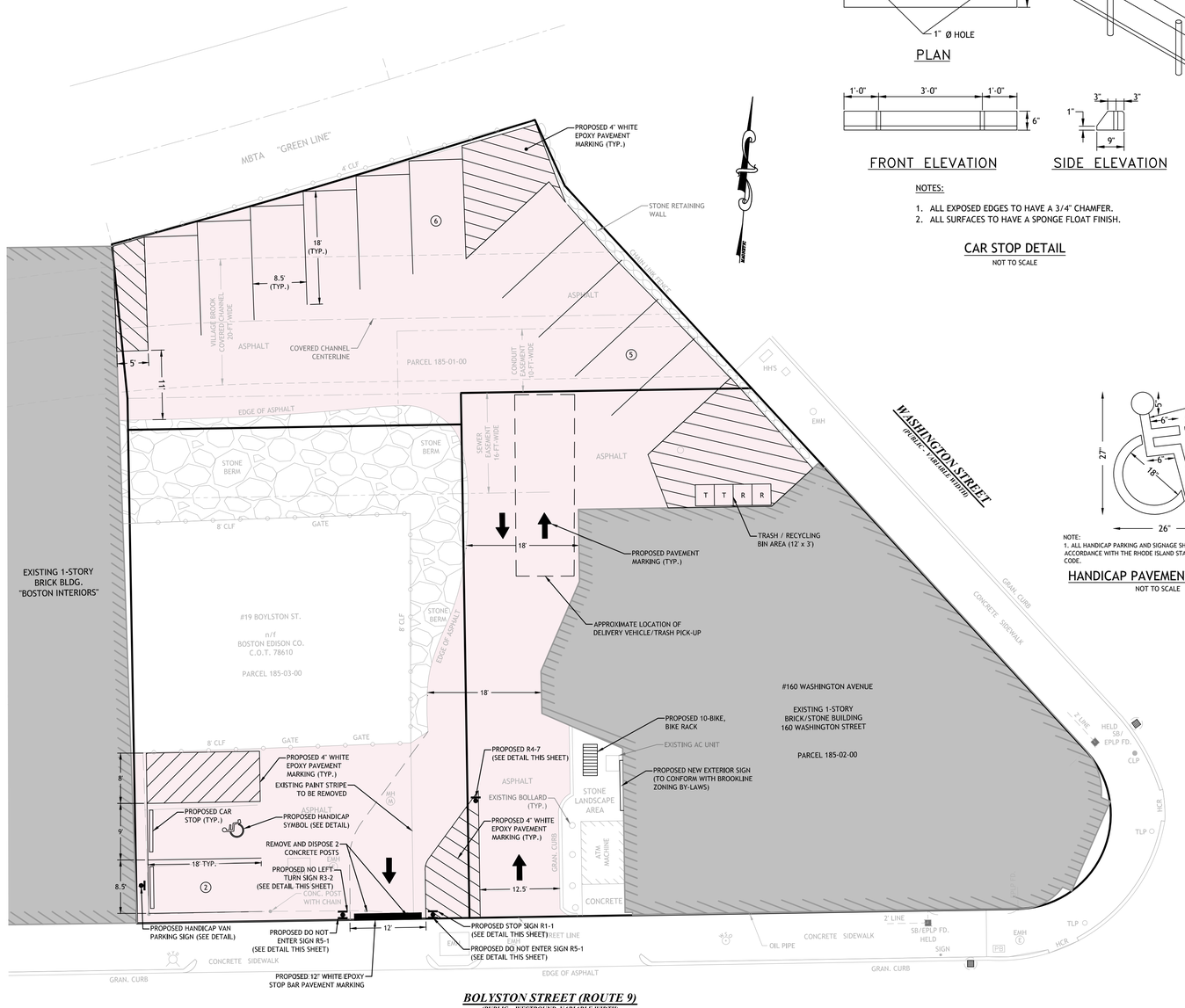
LOCUS MAP (NOT TO SCALE) N



INDEX OF DRAWINGS

1-888-DIG-SAFE
PROTECT YOURSELF, GIVE THREE WORKING DAYS NOTICE

LOCATION OF EXISTING UTILITIES SHOWN, ARE FROM GATE LOCATION AND EXISTING DOCUMENTATION AND MAY NOT BE ACCURATE. EXACT LOCATION TO BE DONE BY THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY PRIOR TO ANY EXCAVATION CALL DIGSAFE AT: 1-888-DIG-SAFE 1-888-344-7233



BOLYSTON STREET (ROUTE 9)
(PUBLIC - WESTBOUND, VARIABLE WIDTH)

SITE PLAN

SCALE: 1" = 10'

LEGEND:

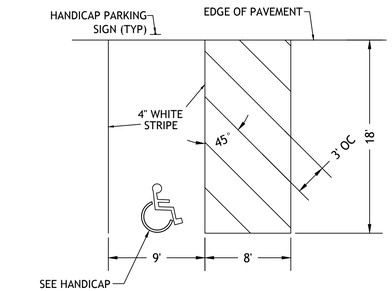
- EXISTING PROPERTY LINE
- EXISTING STONE WALL
- EXISTING CURB
- EXISTING METAL FENCE
- CHAIN LINK FENCE
- D EXISTING DRAIN LINE
- EXISTING DRAINAGE MANHOLE
- EXISTING CATCH BASIN
- WG EXISTING WATER GATE
- S EXISTING SEWER LINE
- EXISTING SEWER MANHOLE
- N/F NOW OR FORMERLY

SIGN NUMBER		R1-1				R3-2	R4-7	R5-1		
LEGEND		STOP						DO NOT ENTER (RED / RED / WHITE)		
COLOR	BACKGROUND	RED				WHITE	WHITE	RED		
	COPY	WHITE				RED (BLACK ARROW)	BLACK	WHITE		
SIGN DIMENSION	WIDTH	24"	30"	36"	48"	24"	24"	30"	36"	48"
	HEIGHT	24"	30"	36"	48"	24"	30"	30"	36"	48"

TRAFFIC SIGN DETAIL
NOT TO SCALE

NOTES:
1. ALL EXPOSED EDGES TO HAVE A 3/4" CHAMFER.
2. ALL SURFACES TO HAVE A SPONGE FLOAT FINISH.

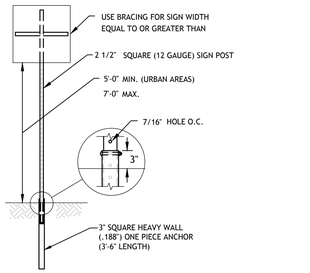
CAR STOP DETAIL
NOT TO SCALE



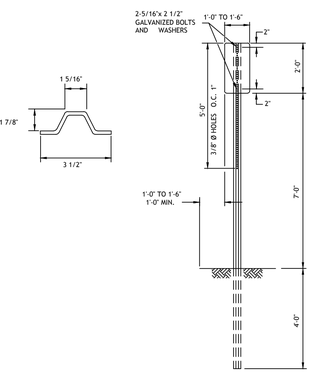
HANDICAP PARKING STALL DETAIL
NOT TO SCALE

NOTE:
1. ALL HANDICAP PARKING AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE RHODE ISLAND STAT BUILDING CODE.

HANDICAP PAVEMENT MARKING
NOT TO SCALE



TRAFFIC SIGN INSTALLATION DETAIL
NOT TO SCALE



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION T.15 OF THE STANDARD SPECIFICATIONS. 2. PARKING SIGNS SHALL BE SET AT AN ANGLE OF NOT LESS THAN 30° NOR MORE 1'-0" 1'-6" THAN 45° WITH A LINE PARALLEL TO FLOW OF TRAFFIC, 1'-6" FROM EDGE OF CURB FACE.

HANDICAP PARKING SIGN INSTALLATION DETAIL
NOT TO SCALE

HANDICAPPED PARKING
CERTIFICATE REQUIRED
TOWING ENFORCED $50.00 FINE
VAN

NOTE:
SIGNS ARE TO CONFORM WITH THE MOST RECENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

* VAN ACCESSIBLE SIGNS FOR SPACES ADJACENT TO THE 8' STRIPED ISLE.

SIGN NOTES:
1. SIGN POSTS SHALL BE GALVANIZED STEEL U-CHANNEL (3 1/2" WIDE-MIN) AND INSTALLED IN CONFORMANCE TO M.U.T.C.D. AND MASSACHUSETTS STANDARD SPECIFICATIONS.
2. POSTS SHALL BE DRIVEN TO A DEPTH OF 4 FEET (MIN).
3. THE EDGE OF THE SIGN SHALL BE 18" FROM THE FACE OF THE CURB.
4. WITHIN SIDEWALK LOCATIONS THE SIGN POST WILL BE INSTALLED WITHIN A 8'X8'X6" SQUARE BOX FORM.

HANDICAP PARKING SIGN DETAIL
NOT TO SCALE

SCALE (FEET)
0 5 10 20 40
1 INCH = 10 FT

JCE
JOE CASALI ENGINEERING, INC.
CIVIL, SITE DEVELOPMENT, TRANSPORTATION
DRAINAGE, WATER & SEWER SYSTEMS, FLOOD STUDIES
300 POST ROAD, WARWICK, RI 02888
(401) 944-1300 (401)944-1313 FAX WWW.JOECASALI.COM

COMMONWEALTH OF MASSACHUSETTS
JOSEPH CASALI
CIVIL
No. 47528
REGISTERED PROFESSIONAL ENGINEER
2.26.15

NEW ENGLAND TREATMENT ACCESS DISPENSARY
160 WASHINGTON STREET
BROOKLINE, MASSACHUSETTS
IA 2, AP 185, LOTS 1, 2 & 3

REVISIONS:

NO.	DATE.	DESCRIPTION

DESIGNED BY:	DRD
DRAWN BY:	JMM
CHECKED BY:	JAC
DATE:	FEB. 2015
PROJECT NO:	12-18b

PRELIMINARY, NOT FOR CONSTRUCTION

SITE PLAN

SHEET 1 OF 1

Stantec Consulting Services Inc.
5 LAN Drive, Suite 300, Westford MA 01886-3538

March 4, 2015
File: 195310950

Attention: Mr. Arnon Vered
New England Treatment Access
45 Orchard Road
Swampscott, MA 01907

Dear Arnon,

Reference: NETA Brookline Dispensary

We are pleased to submit our findings on the traffic and parking investigation we conducted for the proposed medical marijuana facility located at 160 Washington Street in Brookline, Massachusetts. Our findings indicate that the proposed development will have a negligible impact on area traffic operations. We also find that there is adequate on-site parking available to serve anticipated patient parking demands.

PROJECT DESCRIPTION

The proposed project is the development of a medical marijuana dispensary at the site of a former bank at the corner of Route 9 (Boylston Street) and Washington Street in Brookline. The former bank building included 10,000 square feet of floor space. Vehicular access to the site is by way of a curb cut on Boylston Street. A raised center median on Boylston Street limits turning movements at this driveway to right-turns in and right-turns out only. The driveway provides access to13 parking spaces. This proposed land use is limited to the distribution of medicinal marijuana, “the product”, to qualified patients. Some patient counseling will also be provided at the facility. The product will be cultivated in Franklin, Massachusetts and delivered to the dispensary daily. Up to 4,000 pounds of product may be distributed per year through this facility which would serve approximately 4,000 patients. The proposed hours of operation for the dispensary are 10:00 AM to 7:00 PM seven days a week. Up to eight employees are expected to be working at the dispensary at any given time.

EXISTING CONDITIONS

The traffic study area for the proposed project consists of four signalized intersections:

1. Route 9 at High Street/Washington Street
2. Route 9 at Walnut Street
3. Walnut Street at High Street

Reference: NETA Brookline Dispensary

4. Route 9 at Cypress Street

The study area intersections are shown in Figure 1.

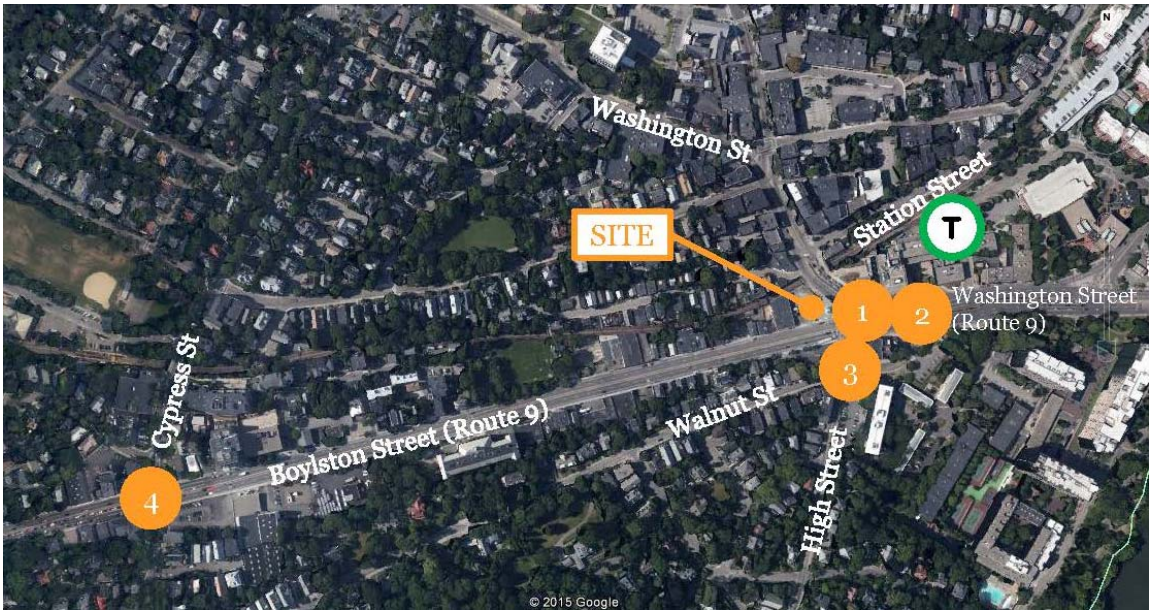


Figure 1 Study Area Intersections

ROADWAYS AND TRAFFIC CONTROL

Route 9, known as Washington Street east of the project site and Boylston Street west of the project site is a Principal Arterial. It operates with two through travel lanes eastbound and westbound in the site vicinity with on-street parking allowed in some areas. At the project site Washington Street continues north through Brookline Village crossing over the MBTA Green Line-Riverside Branch tracks and meeting Station Street at a signalized intersection. Station Street is one-way eastbound, away from Washington Street, providing access to the Brookline Village MBTA station. Washington Street southbound, from Brookline Village, meets Route 9 opposite High Street. The Washington Street southbound approach provides three lanes with a left-turn lane, a shared through/left-turn lane, and a shared right-turn/through lane. High Street operates with two short approach lanes, a through/left-turn lane and a through/right-turn lane. Washington Street westbound provides two right-turn lanes into Brookline Village and two through lanes to Boylston Street westbound at High Street. Two lanes eastbound are provided on Boylston Street at High Street.

Left-turns are not permitted directly to High Street from Washington Street westbound. Likewise, left-turns are not allowed from Washington Street directly from eastbound Boylston Street. The left-turn from Boylston Street eastbound to Washington Street is made by way of a “jughandle”

comprised of Walnut Street and High Street. Walnut Street runs generally parallel to and south of Route 9 crossing High Street within 150 feet of Route 9 and meeting Washington Street approximately 200 feet east of High Street. The Walnut Street/Washington Street intersection is under signal control with left-turns permitted into Walnut Street from a dedicated left-turn lane on Washington Street westbound. Traffic from Boylston Street eastbound destined to Brookline Village passes through the Route 9/High Street intersection then turns right onto Walnut Street and then right again on High Street to head north on Washington Street into Brookline Village. The High Street/Walnut Street intersection and Washington Street/Walnut Street intersection each operate as two-phase signals coordinated with the Route 9/High Street signals. Signal timing plans for the intersections are attached.

There is a fire station on the block surrounded by Washington Street, Walnut Street and High Street. The fire station driveways enter onto Washington Street. The signal system that controls traffic movements at the three interconnected intersections (Route 9/High Street, High Street/Walnut Street and Washington Street/Walnut Street) can be overridden by fire station personnel. All traffic movements entering the three intersections can be stopped allowing fire trucks to safely exit the station in any direction. Signal operations are also overridden when fire trucks return to and back into the station.

Pedestrians are accommodated within crosswalks on three legs of the Route 9/High Street intersection each offering push buttons to activate the "walk" signal. A Boylston Street crosswalk is provided west of High Street. Pedestrian movements are allowed in this crosswalk concurrent with the signal green phases provided for the Washington Street southbound approach and the High Street northbound approach. (These two traffic movements operate during separate phases. Left-turns into Walnut Street are permitted only while the High Street approach has a green indication.) Pedestrians may cross High Street during the green signal phase for Route 9 eastbound and westbound. The crosswalk across the north leg of the intersection, Washington Street, is the longest at the intersection and operates with an exclusive pedestrian crossing phase. Pedestrians may cross Washington Street during a protected signal phase while eastbound and westbound traffic moves on Route 9. Right-turns from Washington Street eastbound to Brookline Village are given a red signal indication during the pedestrian walk phase. If the walk phase is not actuated by pedestrians the right-turn movement on Washington Street operates concurrent with the eastbound and westbound through movements on Route 9.

The intersection of Route 9 and Cypress Street is a four-legged, signalized intersection nearly 2,400 feet west of the Route 9/Washington Street/High Street intersection. At the intersection of Route 9 and Cypress Street, the Route 9 eastbound and westbound approaches both consist of three lanes: a dedicated left-turn lane and two general purpose lanes. A median divides the eastbound and westbound traffic along this section of Route 9. The Cypress Street northbound and southbound approaches both consist of two lanes, used as a shared left/through lane and a right-turn lane. U-turns are prohibited along Route 9 at Cypress Street. The traffic signal operates in four general phases:

Reference: NETA Brookline Dispensary

1. Route 9 eastbound and westbound left turn lead phases
2. Route 9 eastbound and westbound
3. Exclusive pedestrian phase (upon actuation only)
4. Cypress Street northbound and southbound

PARKING

As noted above, 13 parking spaces are provided on the project site. However, significant on-street parking is also available in the immediate site vicinity. Parking is prohibited within the Route 9/High Street intersection but is allowed just upstream and downstream of the intersection. Free parking with a two-hour limit is allowed on both sides of Boylston Street west of the intersection. Metered parking is allowed on both sides of Washington Street north of Station Street and along Station Street in Brookline Village. Parking is allowed on the north side of Walnut Street just west of High Street with 30 minute and two-hour time limits. Two-hour metered parking is also provided on Washington Street westbound just east of Pearl Street and along Pearl Street. Pearl Street is a local road providing access to the Brookline Village MBTA station and entering Washington Street from the north approximately 300 feet east of the project site. Field observations made at the site on Tuesday, July 8, 2014 between 5 and 6 PM indicated that approximately 30 to 40 percent of the parking spaces observed in the site vicinity were vacant.

TRANSIT

The MBTA Green Line "D" branch runs parallel to Route 9 in back of the project site and then bends to the north to run parallel to Station Street to the east of the proposed site. The Brookline Village station is approximately 500 feet to the northeast of the proposed site, approximately a three-minute walk. The "D" branch connects Riverside Station in Newton to Lechmere Station in Cambridge, passing through downtown Boston. Trains run every seven minutes during rush hours (6:30 AM to 9:00 AM and 3:30 PM to 6:30 PM), every 11 minutes during the midday hours, and every seven minutes in the evening. In addition to the "D" branch of the Green Line, there are three MBTA bus routes in close proximity to the proposed site:

- Route 60: Chestnut Hill – Kenmore Station via Brookline Village and Cypress Street (20-35 minute peak hour headways)
- Route 65: Brighton Center – Kenmore Station via Washington Street, Brookline Village, and Brookline Avenue (12-25 minute peak hour headways)
- Route 66: Harvard Square – Dudley Station via Allston and Brookline Village (eight to 11 minute peak hour headways)

Reference: NETA Brookline Dispensary

TRAFFIC COUNTS

Existing traffic counts were taken from a recent traffic study prepared by Vanasse and Associates, Inc. (VAI) for a proposed extended stay hotel located at 111 Boylston Street, just to the west of the proposed dispensary. Existing traffic volumes from the VAI study were counted in June 2013. Since the counts are so recent, new counts were not collected for this study. The VAI existing conditions volumes are used as the existing conditions volumes for this study. The intersection of Route 9 and Washington Street/High Street carries approximately 3,540 vehicles during the weekday evening peak hour. During this hour, nearly 835 vehicles traveled eastbound on Route 9 while nearly 1,620 traveled westbound on Route 9. Existing traffic volumes from the VAI study are attached.

TRAFFIC OPERATIONS

Intersection capacity analyses were completed to determine the existing PM peak hour operating level of service for the study area intersections. Level of service (LOS) is a term used to describe the quality of the traffic flow on a roadway facility at a particular point in time. It is an aggregate measure of travel delay, travel speed, congestion, driver discomfort, convenience, and safety based on a comparison of roadway system capacity to roadway system travel demand. Operating levels of service are reported on a scale of A to F, with A representing the best operating conditions with little or no delay to motorists, and F representing the worst operating conditions with long delays and traffic demands sometimes exceeding roadway capacity.

Intersection operating levels of service are calculated following procedures defined in the *Highway Capacity Manual*, published by the Transportation Research Board. For signalized intersections the operating level of service is based on travel delays. Delays can be measured in the field but generally are calculated as a function of traffic volume; peaking characteristic of traffic flow; percentage of heavy vehicles in the traffic stream; type of traffic control; number of travel lanes and lane use; intersection approach grades; and, pedestrian activity. Through this analysis volume-to-capacity ratios can be calculated for individual movements or for the intersection as a whole. A volume-to-capacity ratio of 1.0 indicates that a movement or intersection is operating at its theoretical capacity. The specific delay criteria applied per the *2000 Highway Capacity Manual* to determine operating levels of service are summarized in Table 1.

Reference: NETA Brookline Dispensary

Table 1 Intersection Level of Service Criteria

	Average Delay per Vehicle (Seconds)	
Level of Service	**Signalized Intersections**	**Unsignalized Intersections**
A	≤10.0	≤10.0
B	10.1 to 20.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0
D	35.1 to 55.0	25.1 to 35.0
E	55.1 to 80.0	35.1 to 50.0
F[1]	>80.0	>50.0

[1]Level of Service F is also assigned to movements if the volume-to-capacity ratio exceeds 1.0.

Source: *HCM 2010 Highway Capacity Manual*, Transportation Research Board, National Academy of Sciences, Washington, DC, 2010.

Capacity analysis results for the study area intersection are presented in Table 2 below. The intersections of Route 9/Washington Street/High Street High Street/Walnut Street both operate at LOS C overall during the afternoon peak hour. The intersection of Route 9/Walnut Street operates at LOS A overall. The intersection of Route 9/Cypress Street operates at LOS D overall during the afternoon peak hour. The intersections are all operating below capacity. The Route 9/Washington Street/High Street intersection is operating at about 91 percent of the intersection's capacity and the Route 9/Cypress Street intersection is operating at about 86 percent of capacity, while the other two intersections operate at about 42 percent of their capacities. Analysis results are attached and detailed level of service results by lane group are provided in Table 2.

Reference: NETA Brookline Dispensary

Table 2 Existing PM Peak Hour Intersection Level of Service

Intersection	LOS[1]	Delay[2]	V/C[3]
Route 9/High Street/Washington Street	C	35	0.91
Route 9 Eastbound T/TR	C	27	0.69
Route 9 Westbound T/T	D	47	0.97
Route 9 Westbound R	C	21	0.18
High Street Northbound LT/TR	C	32	0.88
Washington Street Southbound L	D	37	0.69
Washington Street Southbound LT/TR	C	34	0.67
Route 9/Walnut Street	A	3	0.42
Route 9 Eastbound T/T/TR	A	0	0.36
Route 9 WB UL	D	41	0.53
Route 9 WB T/T/TR	A	0	0.38
Walnut Street Northbound R	D	36	0.03
Walnut Street/High Street	C	28	0.42
Walnut Street Eastbound LTR	C	29	0.29
Walnut Street Westbound LTR	D	39	0.38
High Street Northbound LTR	E	55	0.75
High Street Southbound LTR	A	2	0.30
Route 9/Cypress Street	D	43	0.86
Route 9 Eastbound L	F	86	0.92
Route 9 Eastbound T/TR	C	20	0.51
Route 9 Westbound L	E	70	0.65
Route 9 Westbound T/TR	D	44	0.92
Cypress Street Northbound LT	E	60	0.81
Cypress Street Northbound R	D	38	0.05
Cypress Street Southbound LT	D	51	0.71
Cypress Street Southbound R	D	45	0.55

[1] LOS= Level of Service
[2] Delay = Average delay expressed in seconds per vehicle
[3] V/C = Volume-to-capacity ratio
U=U-turn, L = Left, T = Through, R = Right

Reference: NETA Brookline Dispensary

NO-BUILD

The future conditions without the proposed dispensary are referred to as the No-Build condition for this project. Build conditions for the proposed extended stay hotel project are assumed as the No-Build conditions for this study. This includes project traffic for the proposed extended stay hotel, in addition to a number of other background projects noted in the VAI study, as well as an overall background growth rate. The background projects included in the VAI study are:

- Children's Hospital building – 2-4 Brookline Place, medical office, office, and retail space
- Chestnut Hill Square – Boylston Street, Newton – retail, restaurant, medical office, and residential development
- The Street at Chestnut Hill – expansion to include cinema and health center

Changes to the geometry as part of the Gateway East improvement project are also included as part of the No-Build scenario. The Gateway East project includes improvements to Route 9 (Washington Street) between High Street and Pond Street. Changes specific to the intersections in this study include:

- Extending Walnut Street to align with Pearl Street at Route 9
- Modifying the signal at Route 9/High Street/Washington Street to remove the split phasing for the northbound and southbound approaches
- Making travel lanes 11 feet wide and widening the sidewalks

The VAI study with the future traffic volumes with the proposed extended stay hotel is also attached, along with the 25 percent design plans for the Gateway East improvements.

Capacity analyses were performed for the No-Build scenario and the results are shown in Table 3. The improvements in level of service over existing conditions at the High Street/Walnut Street signal is largely due to the Gateway East improvements. The Route 9/High Street/Washington Street signal is expected to operate similarly to existing conditions, although a change in level of service is shown as the LOS C/D threshold is 35 seconds and the overall intersection delay is expected to increase from 35 to 36 seconds. At the intersection of Route 9/Cypress Street, the intersection is expected to degrade from LOS D under existing conditions to LOS E under No-Build conditions.

Reference: NETA Brookline Dispensary

Table 3 No-Build PM Peak Hour Intersection Level of Service

Intersection	LOS[1]	Delay[2]	V/C[3]
Route 9/High Street/Washington Street	D	36	0.91
Route 9 Eastbound T/TR	C	22	0.64
Route 9 Westbound T/T	C	25	0.90
Route 9 Westbound R	D	54	0.36
High Street Northbound LT/TR	E	62	0.90
Washington Street Southbound L/L	D	35	0.67
Washington Street Southbound TR	E	64	0.94
Route 9/Walnut Street	B	12	0.70
Route 9 Eastbound L	E	60	0.47
Route 9 Eastbound T/TR	A	10	0.80
Route 9 Westbound L	D	39	0.59
Route 9 Westbound T/T/TR	A	7	0.56
Walnut Street Northbound R	B	14	0.14
Pearl Street Southbound R	D	42	0.25
Walnut Street/High Street	B	17	0.37
Walnut Street Eastbound LTR	D	45	0.66
Walnut Street Westbound LTR	D	43	0.75
High Street Northbound LTR	A	5	0.19
High Street Southbound LTR	A	1	0.27
Route 9/Cypress Street	E	61	0.97
Route 9 Eastbound L	F	93	0.96
Route 9 Eastbound T/TR	C	23	0.61
Route 9 Westbound L	E	61	0.58
Route 9 Westbound T/TR	F	85	1.08
Cypress Street Northbound LT	E	71	0.88
Cypress Street Northbound R	D	37	0.05
Cypress Street Southbound LT	D	55	0.77
Cypress Street Southbound R	D	45	0.59

[1] LOS= Level of Service, [2] Delay = Average delay expressed in seconds per vehicle
[3] V/C = Volume-to-capacity ratio, U=U-turn, L = Left, T = Through, R = Right

Reference: NETA Brookline Dispensary

TRIP GENERATION

Medical marijuana facilities are relatively new land uses that have not been studied extensively by the Institute of Transportation Engineers (ITE). Consequently, the ITE's *Trip Generation* manual does not currently provide data for this land use. In addition, the proposed dispensary would be one of the first in the Commonwealth of Massachusetts. Therefore, existing facilities cannot be monitored to collect local trip generation data. Consequently in order to estimate the number of vehicle trips to be generated by the proposed Massachusetts facility, transaction data from an existing dispensary in Colorado, where the legal distribution of medical marijuana has been in place for some time, was analyzed.

COLORADO DATA

The Colorado study site is Rocky Mountain Remedies (RMR) located in Steamboat Springs, Colorado. It serves approximately 850 patients and distributes 850pounds of product annually. According to RMR, over four years of operations, the number of transactions average 73per day. RMR provided Stantec with transaction data for the entire month of June 2013. Hours of operation at this facility are 10:00 AM to 7:00 PM, seven days per week. During the month, hourly transactions are fairly steady over the hours of operation, ranging from ten to 13 percent of the daily transactions during any given hour. The busiest hour is from noon to 1:00 PM, with 13 percent of the transactions occurring during that hour. During the afternoon commuter peak period, 4 to 6 PM, the busiest hour was from 4:15 to 5:15 PM with approximately eight, or 11 percent of the total daily transactions, occurring during that hour. Assuming that each transaction involves two patient trips, one arriving and one departing, the Colorado facility generates 16 patient trips during the evening commuter peak hour. This represents 19 PM peak hour patient trips per 1000 pounds of product distributed annually. Applying this rate to the proposed Brookline facility suggests that the Brookline facility, with the potential to distribute up to 4000 pounds of product per year, would generate 76 patient trips during the PM commuter peak hour.

The rates for the midday peak hour (noon to 1:00 PM) and a weekday were calculated similarly to the weekday evening commuter peak hour. The trip generation rates and total number of trips projected to be generated by the proposed dispensary are shown in Table 4.

Table 4 Dispensary Patient Trip Generation

	Calculated Trip Rate	Trips		
Time	(per 1000 lbs product)	Entering	Exiting	Total
Midday Peak (noon to 1:00 PM)	22	45	45	90
Afternoon Peak (4:15 to 5:15 PM)	19	38	38	76
Daily	172	344	344	688

The actual number of vehicle trips generated by patients will depend upon patient travel mode choice and the use of the proposed delivery service. The proposed Brookline site is readily

accessible by public transportation and by walking. The facility will also include a delivery service to bring product to patients who may not be able to or not choose to travel to the dispensary.

In order to estimate peak hour vehicle trip generation for the proposed facility the above patient trip estimates were adjusted to account for the delivery service and non-automobile travel. First, NETA is planning to provide home delivery to patients who cannot get to the dispensary. It is conservatively estimated that five percent of patients will use this option. Second, site proximity to the MBTA and its location within a densely populated urban area indicate that not all visits to the dispensary will be made by car. Journey-to-work data from the 2000 Census shows that 53 percent of people living in Brookline get to work by way of a car, truck, or van. The other 47 percent use public transportation or bicycles, walk to work, or work from home. It is assumed that only 25 percent of the patient trips to the dispensary will be made by "alternative modes" to provide a conservative analysis. Consequently, the vehicle trip generation for the site was assumed to equal 70 percent of the projected patient trips or 53 vehicle trips during the PM peak commuter hour, 63 trips during the site peak hour, and 482 trips over the course of the day. The anticipated patient vehicle trip generation is shown in Table 5.

Table 5 Dispensary Patient Vehicle Trip Generation

	Patient Trips		
Time	**Entering**	**Exiting**	**Total**
Midday Peak	32	31	63
Afternoon Peak	27	26	53
Daily	241	241	482

The above PM commuter peak hour trip estimates only include patient trips as delivery traffic and employee traffic are not expected to be significant during the PM commuter peak hour. Deliveries of product from the Franklin cultivation plant will be made once per day at random times per statute. A small van, capable of fitting into any existing on-street parking or loading space or in the on-site parking spaces will be used to make the deliveries. As noted earlier, up to eight employees may be working at the site at any given time. They would likely all be entering just prior to the opening of the dispensary and exiting at the end of the day when the dispensary closes. Given the late opening and closing times relative to typical commuter peak hours employee traffic will not be significant during commuter peak hours.

The above trip estimates based on observed conditions in Colorado are likely conservative (trip estimates are high) due to differences in the applicable Colorado and Massachusetts statutes. In Colorado, patients are limited to two ounces of product per visit with patients typically visiting a facility 2.5 times per month on average. In Massachusetts, it is anticipated that patients would be able to purchase up to ten ounces of product per visit. Consequently, a patient requiring five ounces of product per month would make five visits over two months in Colorado while the same patient would only have to make one visit over two months to a facility in Massachusetts.

Reference: NETA Brookline Dispensary

Consequently, the actual number of patient vehicle trips generated at the Brookline site could be only one-fifth of the above estimates or approximately ten trips per hour and 100 trips per day.

This dispensary will replace a bank that was formerly in the space. Based on ITE data, a 10,000 square foot bank could generate 121 afternoon peak hour trips. Assuming 70 percent automobile use as assumed for the marijuana dispensary indicates that a bank would generate 85 PM commuter peak hour vehicle trips. Consequently, the proposed dispensary is expected to generate far fewer vehicle trips than the former bank would have generated.

TRAFFIC INCREASES

As noted earlier, the proposed dispensary is expected to generate up to 53 vehicle trips during the weekday evening peak hour, including 27 entering trips and 26 exiting trips. These anticipated trips were assigned to the existing roadway network in order to anticipate changes in traffic volume levels and traffic operations. The trip distribution pattern assumed for these trips is consistent with the VAI study and is shown in Table 6.

Table 6 Trip Distribution

Direction	Percentage
To/From West via Route 9	35%
To/From East via Route 9	60%
To/From North via Washington Street	5%
Total	100%

Given that Route 9 is median divided in the vicinity of the site, all of the entering site traffic will have to travel through the Route 9/High Street/Washington Street intersection. Some trips, like those entering from the west on Route 9, will have to travel through twice (once as an eastbound through move and again as a northbound left turn after traveling through the "jughandle"). The median also prevents traffic exiting the site from turning left onto Route 9 eastbound, so it was assumed that exiting site traffic destined to the east will turn right out of the site and then right onto Cypress Street. From Cypress Street, the traffic is assumed to make its way back to Washington Street southbound, where it would turn left onto Route 9 eastbound. The intersection volume increases as a result of the proposed dispensary are shown in Table 7.

Reference: NETA Brookline Dispensary

Table 7 Traffic Volume Increases

Intersection	No-Build Volume	Project Trips	% Increase
Route 9/High St/Washington St	3,980	53	1.3%
Route 9/Walnut St	3,419	42	1.2%
High St/Walnut St	903	10	1.1%
Route 9/Cypress Street	3,669	36	1.0%

As shown in Table 7, the intersection of Route 9/High Street/Washington Street is expected to carry 3,980 vehicles in the No-Build condition and 53 new project trips are expected to be added to this as a result of the proposed dispensary. This results in an increase of 1.3 percent. The percent increase at the other three intersections is similar, approximately one percent.

BUILD

The Build conditions for the proposed dispensary are comprised of the No-Build traffic volumes and the expected increase in traffic volumes as a result of the proposed dispensary which are noted above. Capacity analysis was performed for the Build condition and the results are similar to those under No-Build conditions. The level of service results for the No build and Build conditions are shown in Table 8. As shown, the project will use only one percent of the capacity of the main intersection, Route 9/High Street/Washington Street, increasing the intersection volume-to-capacity ratio to 0.92. This indicates that the intersection will still operate below capacity with the proposed project built. At the Route 9/Cypress Street intersection, the volume-to-capacity ratio will also increase by one percent as a result of the additional project traffic. The intersection volume-to-capacity ratio is projected to be 0.98, just under its capacity.

Reference: NETA Brookline Dispensary

Table 8 Future PM Peak Hour Intersection Level of Service

	No-Build			Build		
Intersection	**LOS[1]**	**Delay[2]**	**V/C[3]**	**LOS**	**Delay**	**V/C**
Route 9/High Street/Washington Street	D	36	0.91	D	36	0.92
Route 9 Eastbound T/TR	C	22	0.64	C	22	0.65
Route 9 Westbound T/T	C	25	0.90	C	27	0.91
Route 9 Westbound R	D	54	0.36	D	53	0.36
High Street Northbound LT/TR	E	62	0.90	E	66	0.93
Washington Street Southbound L/L	D	35	0.67	D	36	0.70
Washington Street Southbound TR	E	64	0.94	E	65	0.94
Route 9/Walnut Street	B	12	0.70	B	12	0.70
Route 9 Eastbound L	E	60	0.47	E	60	0.47
Route 9 Eastbound T/TR	A	10	0.80	A	9	0.79
Route 9 Westbound L	D	39	0.59	D	42	0.64
Route 9 Westbound T/T/TR	A	7	0.56	A	7	0.56
Walnut Street Northbound R	B	14	0.14	B	15	0.14
Pearl Street Southbound R	D	42	0.25	D	42	0.26
Walnut Street/High Street	B	17	0.37	B	19	0.37
Walnut Street Eastbound LTR	D	45	0.66	D	44	0.65
Walnut Street Westbound LTR	D	43	0.75	D	47	0.75
High Street Northbound LTR	A	5	0.19	A	5	0.19
High Street Southbound LTR	A	1	0.27	A	1	0.27
Route 9/Cypress Street	E	61	0.97	E	64	0.98
Route 9 Eastbound L	F	93	0.96	F	94	0.96
Route 9 Eastbound T/TR	C	23	0.61	C	23	0.62
Route 9 Westbound L	E	61	0.58	E	61	0.58
Route 9 Westbound T/TR	F	85	1.08	F	92	1.10
Cypress Street Northbound LT	E	71	0.88	E	71	0.88
Cypress Street Northbound R	D	37	0.05	D	37	0.05
Cypress Street Southbound LT	D	55	0.77	D	55	0.77
Cypress Street Southbound R	D	45	0.59	D	45	0.59

[1] LOS= Level of Service, [2] Delay = Average delay expressed in seconds per vehicle
[3] V/C = Volume-to-capacity ratio, U=U-turn, L = Left, T = Through, R = Right

Reference: NETA Brookline Dispensary

PARKING GENERATION

As with the traffic generation, there are no industry standards for parking generation of a medical marijuana dispensary. Therefore, the calculation of parking spaces needed for the proposed dispensary is based on the vehicular traffic forecasts developed above. As noted, the patient activity is expected to generate 27 vehicle visits during the afternoon commuter peak hour and 32 vehicle visits during the site peak hour. Based on experience at Rocky Mountain Remedies, a typical visit to a dispensary lasts approximately 15 minutes. Therefore, 32 trips over the course of an hour would generate a demand for approximately eight parking spaces. During the afternoon commuter peak hour the expected patient parking demand is only seven spaces.

The total project related parking demand must also consider employee vehicles. NETA is proposing to encourage the use of alternative modes by employees. This policy will include subsidizing MBTA passes for employees. Assuming that commuting patterns for employees at this site match those of other Brookline residents, that is, approximately 50 percent commute by alternative modes, the maximum shift of eight employees will generate a demand for only four parking spaces. Employee parking is expected to be off-site, in other nearby lots in order to ensure adequate parking for patients in the on-site parking lot.

PARKING ADEQUACY

As noted above, there are 13 parking spaces at the site. This is more than the projected peak demand for eight patient spaces. Consequently, adequate parking is available on the proposed site. However, convenient on-street parking is also readily available to serve patient needs as well.

MITIGATION

As noted above, project related traffic impacts are nominal and the roadway system has adequate capacity to readily absorb the anticipated project-related traffic increases. Consequently, no traffic mitigation measures appear warranted. Similarly, there is adequate parking capacity to accommodate project-related patient parking demands on the proposed site.

A site visit indicates that striping to designate on-site parking stalls is well worn and should be replaced prior to the project opening. Also, sight lines looking east for traffic exiting the site onto Boylston Street are limited by the existing bank building on the site. Installation of a mirror on a post next to this driveway may better assist drivers exiting the site in viewing traffic approaching from the east on Route 9.

SUMMARY

In general, the proposed dispensary will not add a significant amount of traffic to the area. Based on a conservative analysis, an estimated 32 additional cars may enter the area during the site peak hour (from noon to 1:00 PM). The additional 53 vehicle trips added during the PM commuter

Reference: NETA Brookline Dispensary

hour amount to approximately one percent of the peak hour traffic volumes at the intersection of Route 9 and Washington Street/High Street.

Approximately eight parking spaces are needed for patient parking. The 13 parking spaces at the site are more than adequate to accommodate the projected patient parking needs. Employees who drive will be expected to park in other off-site parking lots, so all on-site parking spaces will be available for patients.

We trust that this letter addresses the traffic and parking issues that may arise as you move your project through the permitting phase. Please do not hesitate to contact us should you have any questions or concerns or need additional information.

Regards,

STANTEC CONSULTING SERVICES INC.

Richard S. Bryant, Senior Project Manager

Stantec Consulting
55 Green Mountain Drive
S. Burlington, VT 05401

Attachments: Traffic Signal Plans
Existing Peak Hour Capacity Analysis
No-Build Peak Hour Capacity Analysis
Build Peak Hour Capacity Analysis
VAI Traffic Study Sections
25% Design Plans for Washington Street

c. Kevin Fisher, NETA

slwv:\1953\active\195310950\transportation\report\2015-03-04-neta traffic summary.docx

Traffic Signal Plans

BROOKLINE – BROOKLINE VILLAGE

PUB.RD. DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	MASS.		1984	19	25

TRAFFIC CONTROL PLAN
WASHINGTON STREET

SIGNAL HEAD DATA
WASHINGTON ST. / BOYLSTON ST. / HIGH ST.
ALL SIGNALS EXISTING

A1	A2	B,C	D,F	E	P1,P2,P3
12" LENS	12" LENS	12" LENS	12" LENS	12" LENS OPTICALLY PROGRAMMED	3" LETTER HEIGHT (MIN) *

* HEADS P2 & P3 TO BE REPLACED

P2, P3: DONT WALK / WALK — 4 1/2" LETTER HEIGHT (MIN)

PROPOSED PHASING
WASHINGTON ST. / BOYLSTON ST. / HIGH ST.

ØA 11-17 | ØB 18-110 | ØC 111-114

w/ PEDESTRIAN ACTUATION | FIRE RUN (#1, #2)

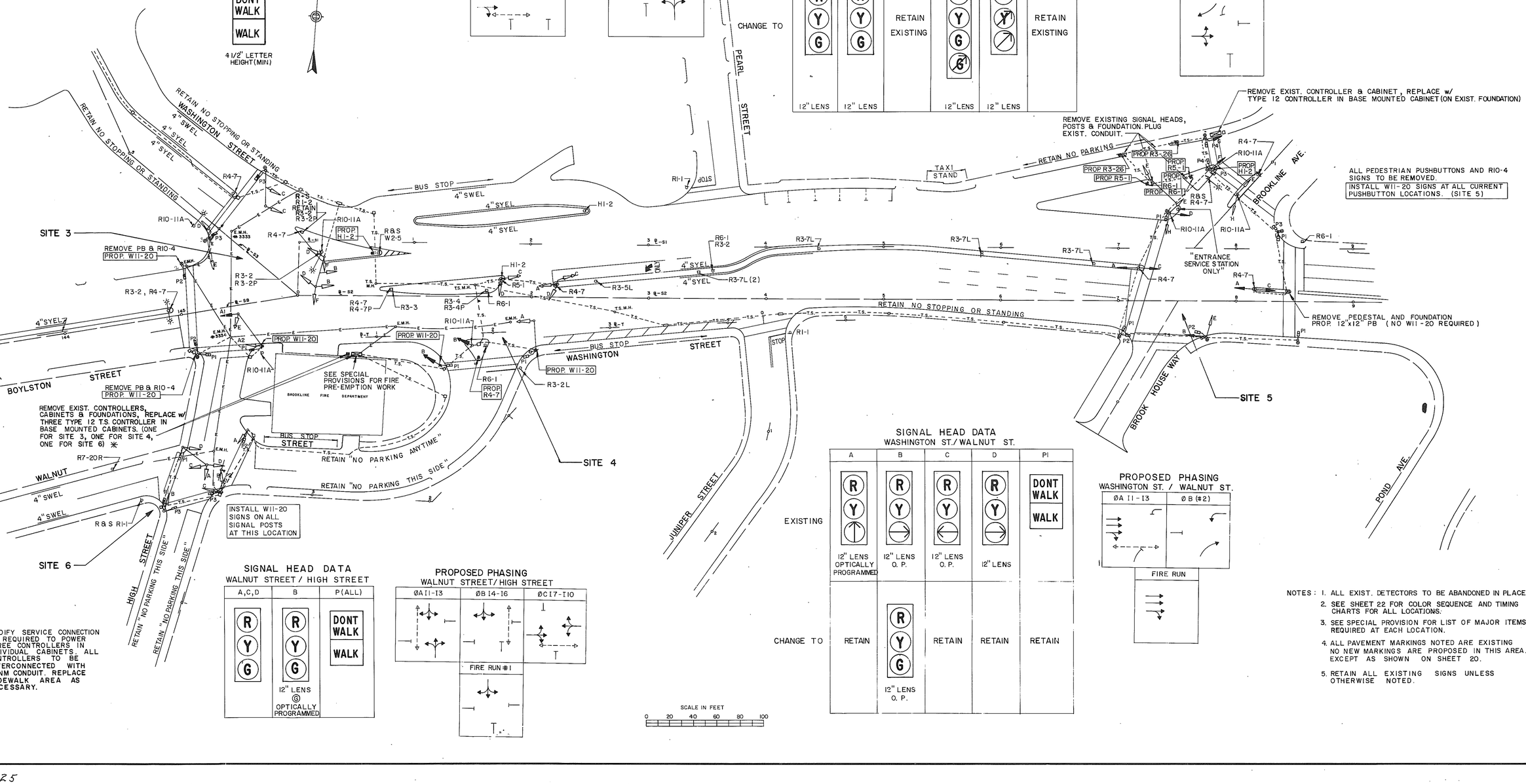
SIGNAL HEAD DATA
WASHINGTON ST. / BROOKLINE AVE. / BROOK HOUSE WAY

	A,C	B,D	E,H	F	G	P(ALL)
EXISTING	12" LENS	12" LENS	12" LENS	12" LENS	12" LENS	DONT WALK / WALK — 4 1/2" LETTER HEIGHT
CHANGE TO	12" LENS	12" LENS	RETAIN EXISTING	12" LENS	12" LENS	RETAIN EXISTING

PROPOSED PHASING
WASHINGTON ST. / BROOKLINE AVE. / BROOK HOUSE WAY

ØA 11-14 | ØC 15-18 | ØB 19-112

FIRE RUN (#2)



* MODIFY SERVICE CONNECTION AS REQUIRED TO POWER THREE CONTROLLERS IN INDIVIDUAL CABINETS. ALL CONTROLLERS TO BE INTERCONNECTED WITH 3" NM CONDUIT. REPLACE SIDEWALK AREA AS NECESSARY.

SIGNAL HEAD DATA
WALNUT STREET / HIGH STREET

A,C,D	B	P(ALL)
	12" LENS @ OPTICALLY PROGRAMMED	DONT WALK / WALK

PROPOSED PHASING
WALNUT STREET / HIGH STREET

ØA 11-13 | ØB 14-16 | ØC 17-110

FIRE RUN #1

SIGNAL HEAD DATA
WASHINGTON ST. / WALNUT ST.

	A	B	C	D	P1
EXISTING	12" LENS OPTICALLY PROGRAMMED	12" LENS O. P.	12" LENS O. P.	12" LENS	DONT WALK / WALK
CHANGE TO	RETAIN	12" LENS O. P.	RETAIN	RETAIN	RETAIN

PROPOSED PHASING
WASHINGTON ST. / WALNUT ST.

ØA 11-13 | ØB (#2)

FIRE RUN

NOTES:
1. ALL EXIST. DETECTORS TO BE ABANDONED IN PLACE.
2. SEE SHEET 22 FOR COLOR SEQUENCE AND TIMING CHARTS FOR ALL LOCATIONS.
3. SEE SPECIAL PROVISION FOR LIST OF MAJOR ITEMS REQUIRED AT EACH LOCATION.
4. ALL PAVEMENT MARKINGS NOTED ARE EXISTING NO NEW MARKINGS ARE PROPOSED IN THIS AREA. EXCEPT AS SHOWN ON SHEET 20.
5. RETAIN ALL EXISTING SIGNS UNLESS OTHERWISE NOTED.

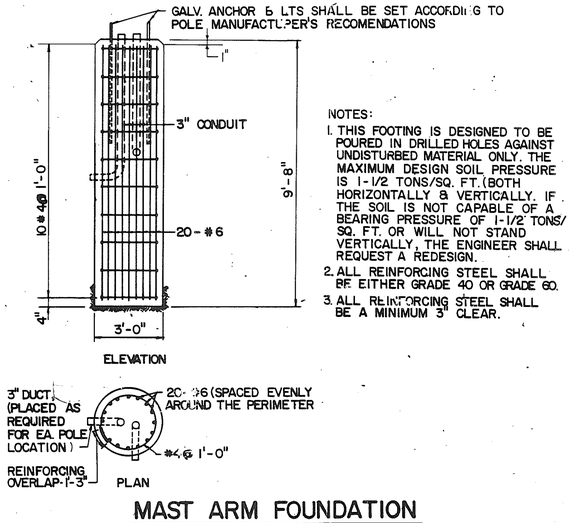
TRAFFIC CONTROL PLAN

COLOR SEQUENCE AND TIMING CHART
WALNUT STREET AT HIGH STREET

APPROACH	DIRECTION	SIGNAL HEAD	INTERVAL 1	2	3	4	5	6	7	8	9	10	FIRE PRE-EMPT	FLASH OPERATION
HIGH STREET	NB	A	G	Y	R	R	R	R	R	R	R	R	R	Y
HIGH STREET	SB	B	G	G	G	G	Y	R	R	R	R	R	G	Y
WALNUT STREET	EB, WB	C,D	R	R	R	R	R	R	G	G	Y	R	R	R
PEDESTRIANS	N-S	P1	W	W	W	FDW	FDW	DW	DW	DW	DW	DW	DW	OUT
PEDESTRIANS	N-S	P2	DW	DW	W	FDW	FDW	DW	DW	DW	DW	DW	DW	OUT
PEDESTRIANS	E-W	P3	DW	DW	DW	DW	DW	DW	W	FDW	FDW	DW	DW	OUT
TIMING														
CYCLE 1 - 80 SECONDS TIME (SECS)			21	3	13	8	3	1	20	7	3	1		
CYCLE 2 - 90 SECONDS TIME (SECS)			18	3	31	7	4	1	14	7	4	1		
CYCLE 3 - 100 SECONDS TIME (SECS)			17	3	36	8	3	1	21	7	3	1		
			ØA			ØB			ØC					

COLOR SEQUENCE AND TIMING CHART
WASHINGTON STREET AT WALNUT STREET

APPROACH	DIRECTION	SIGNAL HEAD	INTERVAL 1	2	3	4	5	6	7	FIRE PRE-EMPT	FLASH OPERATION
WASHINGTON ST.	EB	A	GVA	GVA	Y	R	R	R	R	GVA	Y
		B	G	G	Y	R	R*	R	R	G	Y
WASHINGTON ST.	WB (LEFT)	C	R	R	R	R	G	Y	R	R	R
WALNUT ST.	NB	D	R	R	R	R	G	Y	R	R	R
PEDESTRIAN	E-W	P1	W	FDW	FDW	DW	DW	DW	DW	DW	OUT
TIMING											
CYCLE 1 - 80 SECONDS TIME (SECS)			42	11	4	1	17	4	1		
CYCLE 2 - 90 SECONDS TIME (SECS)			56	10	4	1	14	4	1		
CYCLE 3 - 100 SECONDS TIME (SECS)			64	10	5	1	15	4	1		
			ØA				ØB				



NOTES:
1. THIS FOOTING IS DESIGNED TO BE POURED IN DRILLED HOLES AGAINST UNDISTURBED MATERIAL ONLY. THE MAXIMUM DESIGN SOIL PRESSURE IS 1-1/2 TONS/SQ. FT. (BOTH HORIZONTALLY & VERTICALLY. IF THE SOIL IS NOT CAPABLE OF A BEARING PRESSURE OF 1-1/2 TONS/SQ. FT. OR WILL NOT STAND VERTICALLY, THE ENGINEER SHALL REQUEST A REDESIGN.
2. ALL REINFORCING STEEL SHALL BE EITHER GRADE 40 OR GRADE 60.
3. ALL REINFORCING STEEL SHALL BE A MINIMUM 3" CLEAR.

MAST ARM FOUNDATION
NOT TO SCALE

COLOR SEQUENCE AND TIMING CHART
WASHINGTON STREET/HARVARD STREET/KENT STREET/DAVIS AVENUE/ANDEM PLACE

APPROACH	DIRECTION	SIGNAL HEAD	INTERVAL 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	FIRE PRE-EMPT	FLASH OPERATION
WASHINGTON ST.	NB (LEFT)	A	G	YLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	G	Y
		B	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y
WASHINGTON ST.	NB	C,E	GVA	GVA	GVA	GVA	Y	R	R	R	R	R	R	R	R	R	R	R	GVA	Y
		D	G	G	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	G	Y
WASHINGTON ST.	NB	F,G	GVA	GVA	GVA	GVA	GVA	GVA	Y	R	R	R	R	R	R	R	R	R	GVA	Y
WASHINGTON ST.	SEB	H,J,K	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
HARVARD ST.	SB	L,M	R	R	GVA	GVA	GVA	GVA	Y	R	R	R	R	R	R	R	R	R	R	Y
		N	R	R	R	G	G	G	G	G	G	Y	R	R	R	R	R	R	R	Y
KENT ST.	WB	Q,R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R
DAVIS AVENUE	EB	S,T	R	R	R	R	R	R	R	R	R	R	G	G	G	Y	R	R	R	R
ANDEM PLACE	WB	U,V	R	R	R	R	R	R	R	R	R	R	G	G	G	Y	R	R	R	R
PEDESTRIANS	N-S	P1	W	W	W	W	FDW	FDW	DW	DW	DW	DW	W	W	W	W	W	W	W	OUT
	E-W	P2,P3	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	W	W	FDW	FDW	FDW	DW	OUT
	E-W	P5	DW	DW	DW	W	W	W	W	W	FDW	FDW	FDW	DW	DW	DW	FDW	DW	DW	OUT
	E-W	P4	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	FDW	FDW	DW	DW	OUT
TIMING																				
CYCLE 1 - 80 SECONDS TIME (SECS)			1 20	2 3	3 1	4 14	5 3	6 4	7 4	8 5	9 4	10 3	11 3	12 4	13 5	14 3	15 3	16 1		
CYCLE 2 - 90 SECONDS TIME (SECS)			19	3	1	21	3	4	3	7	6	3	3	6	3	4	3	1		
CYCLE 3 - 100 SECONDS TIME (SECS)			23	4	2	19	4	2	4	12	5	3	3	7	3	5	3	1		

COLOR SEQUENCE AND TIMING CHART
WASHINGTON STREET/BROOKLINE AVENUE/BROOKHOUSE WAY

APPROACH	DIRECTION	SIGNAL HEAD	INTERVAL 1	2	3	4	5	6	7	8	9	10	11	12	FIRE	FLASH
WASHINGTON ST.	EB	A,B	G	G	Y	R	R	R	R	R	R	R	R	R	G	Y
WASHINGTON ST.	WB	C,D	R	R	R	R	R	R	R	R	G	G	Y	R	R	Y
BROOKLINE AVE.	SB	F	R/GRA	R/GRA	R/GRA	R/GRA	G/GRA	G/GRA	Y	R	R	R	R	R	R	R
		G	GRA	GRA	GRA	GRA	GRA	GRA	Y	R	R	R	R	R	R	R
BROOKLINE AVE.	SB	E	R	R	R	R	G	G	Y	R	R	R	R	R	R	R
BROOKHOUSE WAY	NB	H	R	R	R	R	G	G	Y	R	R	R	R	R	R	R
PEDESTRIANS	N-S	P1	DW	DW	DW	DW	W	FDW	FDW	DW	DW	DW	DW	DW	DW	OUT
	E-W	P2	W	FDW	FDW	DW	DW	DW	DW	DW	W	W	W	W	DW	OUT
	E-W	P3	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	FDW	DW	DW	OUT
	E-W	P4	DW	DW	DW	DW	DW	DW	DW	DW	W	W	FDW	DW	DW	OUT
TIMING																
CYCLE 1 - 80 SECONDS TIME (SECS)			26	6	3	2	4	14	3	2	5	10	3	2		
CYCLE 2 - 90 SECONDS TIME (SECS)			26	6	3	2	5	15	3	2	13	10	3	2		
CYCLE 3 - 100 SECONDS TIME (SECS)			24	6	3	2	8	17	3	2	23	10	3	2		
CYCLE 4 - 60 SECONDS TIME (SECS)			9	6	3	2	4	11	3	2	5	10	3	2		
			ØA				ØB				ØC					

NOTE: FIRE PRE-EMPTION SHALL CALL NORMAL CLEARANCE SEQUENCES AND TIMINGS FROM PHASES IN OPERATION TO FIRE PRE-EMPT PHASE.

COLOR SEQUENCE AND TIMING CHART
WASHINGTON STREET/BOYLSTON STREET/HIGH STREET

APPROACH	DIRECTION	SIGNAL HEAD	INTERVAL 1	2	3	4	5	6	7	8	9	10	11	12	13	14	FLASH	FIRE
NORMAL OPERATIONS																		
BOYLSTON ST.	EB	A1	GVA	GVA	GVA	GVA	GVA	Y	R	R	R	R	R	R	R	R	Y	R
		A2	GVA/GRA	GVA/GRA	GVA/GRA	GVA/GRA	GVA/GRA	Y	R	R	R	R	R	R	R	R	Y	R
WASHINGTON ST.	WB	B	GVA	GVA	GVA	GVA	GVA	Y	R	R	R	R	R	R	R	R	Y	R
WASHINGTON ST.	WB	C	GVA	GVA	GVA	GVA	GVA	Y	R	R	R	R	GVA	GVA	GVA	GVA	Y	R
WASHINGTON ST.	SB	D	R	R	R	R	R	R	R	R	R	R	G	G	Y	R	R	R
HIGH ST.	NB	E	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R
FIRE STA. DRIVE	NB	F	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G
PEDESTRIAN	E-W	P1	W	W	W	W	FDW	FDW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	DW
PEDESTRIAN	N-S	P2	DW	DW	DW	DW	DW	DW	DW	W	W	W	W	FDW	FDW	FDW	OUT	DW
PEDESTRIAN	E-W	P3	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	DW
WITH PEDESTRIAN ACTUATION																		
BOYLSTON ST.	EB	A1	GVA	GVA	GVA	GVA	GVA	Y	R	R	R	R	R	R	R	R		
		A2	GVA/GRA	GVA/GRA	GVA/GRA	GVA/GRA	GVA/GRA	Y	R	R	R	R	R	R	R	R		
WASHINGTON ST.	WB	B	GVA	GVA	GVA	GVA	GVA	Y	R	R	R	R	R	R	R	R		
WASHINGTON ST.	WB	C	GVA	Y	R	R	R	R	R	R	R	R	GVA	GVA	GVA	GVA		
WASHINGTON ST.	SB	D	R	R	R	R	R	R	R	R	R	R	G	G	Y	R		
HIGH ST.	NB	E	R	R	R	R	R	R	R	G	Y	R	R	R	R	R		
FIRE STA. DRIVE	NB	F	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
PEDESTRIAN	E-W	P1	W	W	W	W	FDW	FDW	DW	DW	DW	DW	DW	DW	DW	DW		
PEDESTRIAN	N-S	P2	DW	DW	DW	DW	DW	DW	DW	W	W	W	W	FDW	FDW	DW		
PEDESTRIAN	E-W	P3	DW	DW	DW	W	FDW	FDW	DW	DW	DW	DW	DW	DW	DW	DW		
TIMING																		
CYCLE 1 - 80 SECONDS TIME			6	3	1	5	11	3	2	24	3	1	5	12	3	1		
CYCLE 2 - 90 SECONDS TIME			7	4	1	7	10	3	2	18	3	2	16	12	3	2		
CYCLE 3 - 100 SECONDS TIME			10	4	1	10	10	3	2	19	3	2	20	11	3	2		
FIRE PRE-EMPT OPERATION IS ALL RED AND "DON'T WALK" EXCEPT SIGNAL HEAD "F" WHICH IS GREEN																		
CYCLE 4 - 60 SECS			3	3	1	5	8	3	2	12	3	2	1	12	3	2		
			ØA							ØB			ØC					
			ØA			PEDS.				ØB			ØC					

COORDINATION DATA PERIODS OF OPERATION ETC. ON SHEETS 23 AND 24.

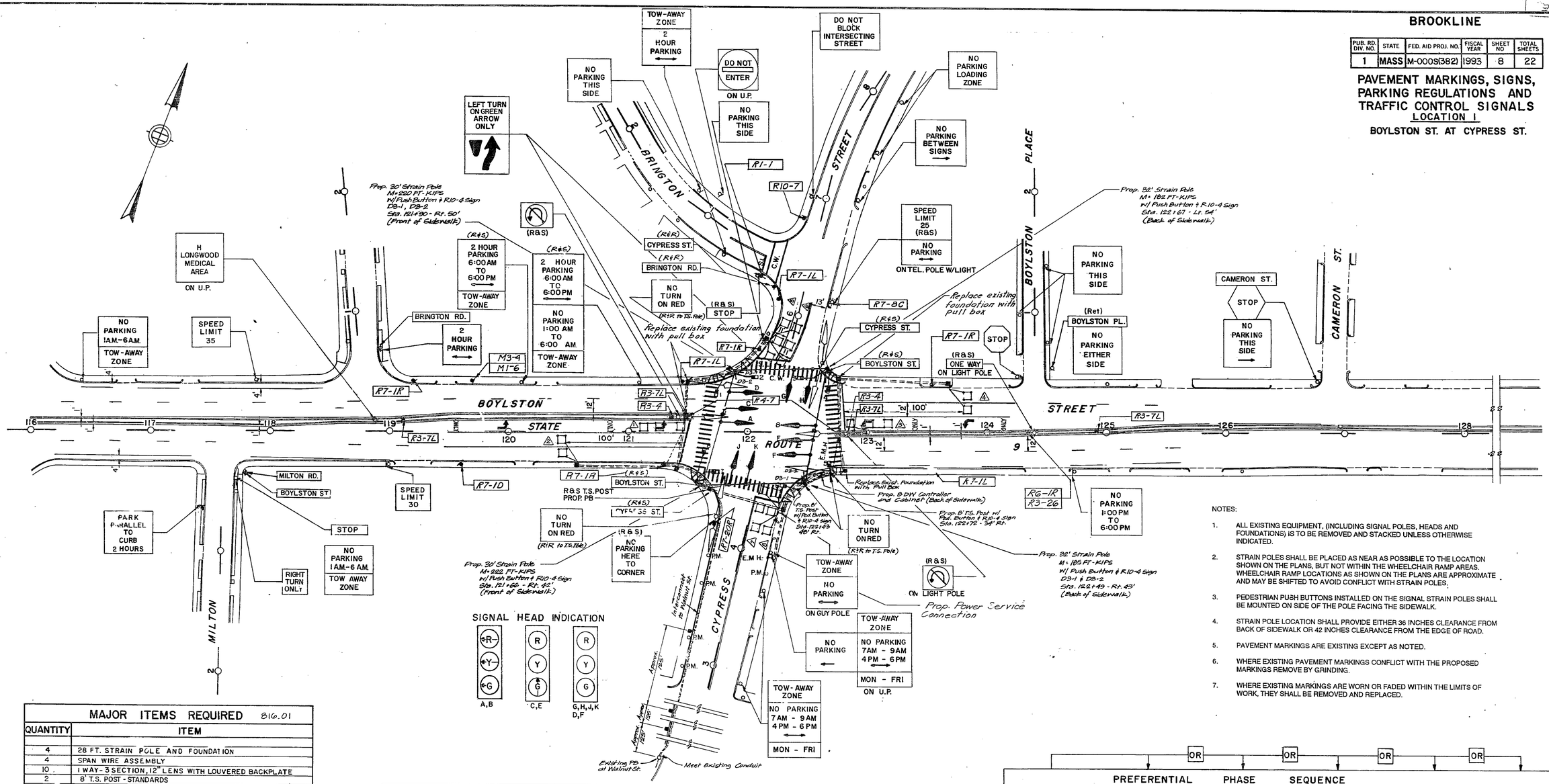
BROOKLINE

PUB. RD. DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO	TOTAL SHEETS
1	MASS	M-000S(382)	1993	8	22

PAVEMENT MARKINGS, SIGNS, PARKING REGULATIONS AND TRAFFIC CONTROL SIGNALS

LOCATION I

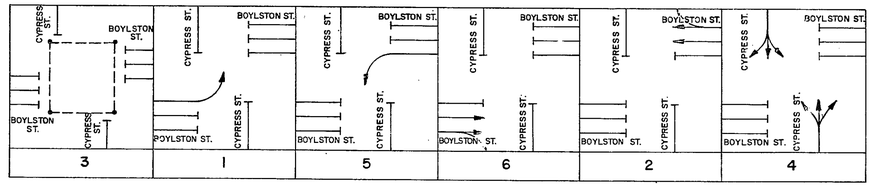
BOYLSTON ST. AT CYPRESS ST.

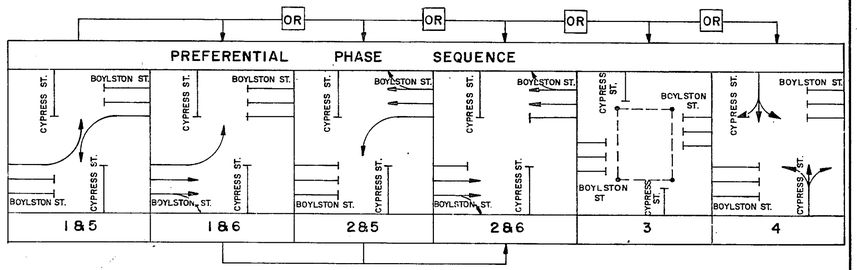


SIGNAL HEAD INDICATION

MAJOR ITEMS REQUIRED 816.01

QUANTITY	ITEM
4	28 FT. STRAIN POLE AND FOUNDATION
4	SPAN WIRE ASSEMBLY
10	1 WAY-3 SECTION, 12" LENS WITH LOUVERED BACKPLATE
2	8' T.S. POST - STANDARDS
20	PULL BOX 12"X12"
22	WIRE LOOP (6'X6")
4	LOOP DETECTOR AMPLIFIER
1	CONTROLLER TYPE 8W
1	CONTROLLER CABINET - BASE MOUNTED
8	PEDESTRIAN HOUSING-TYPE B
4	PEDESTRIAN PUSH BUTTON
1	COORDINATING UNIT (TBCU)
1	POWER SERVICE CONNECTION
	NECESSARY DUCT, CABLE, LABOR, MISCELLANEOUS MATERIAL, AND EQUIPMENT TO COMPLETE THE INSTALLATION





SCALE IN FEET

0 40 80 120 160 200

NOTES:

1. ALL EXISTING EQUIPMENT, (INCLUDING SIGNAL POLES, HEADS AND FOUNDATIONS) IS TO BE REMOVED AND STACKED UNLESS OTHERWISE INDICATED.
2. STRAIN POLES SHALL BE PLACED AS NEAR AS POSSIBLE TO THE LOCATION SHOWN ON THE PLANS, BUT NOT WITHIN THE WHEELCHAIR RAMP AREAS. WHEELCHAIR RAMP LOCATIONS AS SHOWN ON THE PLANS ARE APPROXIMATE AND MAY BE SHIFTED TO AVOID CONFLICT WITH STRAIN POLES.
3. PEDESTRIAN PUSH BUTTONS INSTALLED ON THE SIGNAL STRAIN POLES SHALL BE MOUNTED ON SIDE OF THE POLE FACING THE SIDEWALK.
4. STRAIN POLE LOCATION SHALL PROVIDE EITHER 36 INCHES CLEARANCE FROM BACK OF SIDEWALK OR 42 INCHES CLEARANCE FROM THE EDGE OF ROAD.
5. PAVEMENT MARKINGS ARE EXISTING EXCEPT AS NOTED.
6. WHERE EXISTING PAVEMENT MARKINGS CONFLICT WITH THE PROPOSED MARKINGS REMOVE BY GRINDING.
7. WHERE EXISTING MARKINGS ARE WORN OR FADED WITHIN THE LIMITS OF WORK, THEY SHALL BE REMOVED AND REPLACED.

E. LIONEL PAVLO ENGINEERING CO., INC.

In Charge of R.M.F.
Designed by R.J.M.
Drawn by J.M. & S.S.
Checked by J.W.M.

SEC. 15
DR. 155 8/22
PL. 65
ND. 8533

ITEM 816.01
BOYLSTON STREET AT CYPRESS STREET

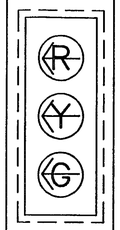
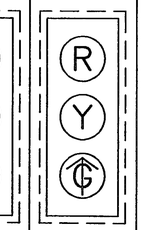
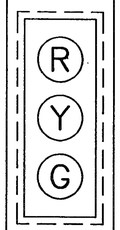
SEQUENCE AND TIMING																			
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	FLASHING OPERATION
MINIMUM INTERVAL			6			6			40			40						6			
VEHICLE EXTENSION			3			3			2			2						3			
MAXIMUM 1			15			10			60			60						20			
MAXIMUM 2			20			15			60			60						30			
YELLOW CLEARANCE				4			4			4			4						4		
RED CLEARANCE					1			1			2			2						1	
WALK															4						
PED. CLEARANCE															14	3					
BOYLSTON STREET	WB	A	~~R~~	~~R~~	~~R~~	~~G~~	~~Y~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~		~~R~~	~~R~~	~~R~~	F~~R~~
BOYLSTON STREET	EB	B	~~G~~	~~Y~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~		~~R~~	~~R~~	~~R~~	F~~R~~
BOYLSTON STREET	WB	C	R	R	R	R	R	R	↑	Y	R	R	R	R	R	R		R	R	R	FY
BOYLSTON STREET	WB	D	R	R	R	R	R	R	G	Y	R	R	R	R	R	R		R	R	R	FY
BOYLSTON STREET	EB	E	R	R	R	R	R	R	R	R	R	↑	Y	R	R	R		R	R	R	FY
BOYLSTON STREET	EB	F	R	R	R	R	R	R	R	R	R	G	Y	R	R	R		R	R	R	FY
CYPRESS STREET	NB	G,H	R	R	R	R	R	R	R	R	R	R	R	R	R	R		G	Y	R	FR
CYPRESS STREET	SB	J,K	R	R	R	R	R	R	R	R	R	R	R	R	R	R		G	Y	R	FR
PEDESTRIAN		P1–P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W/FDW*	DW		DW	DW	DW	OUT
DETECTOR			NON–LOCK			NON–LOCK			LOCK			LOCK			NON–LOCK			NON–LOCK			
RECALL			OFF			OFF			ON–MIN.			ON–MIN.			OFF			OFF			
			ø1			ø5			ø2			ø6			ø3			ø4			

NOTE: FLASHING OPERATION PER M.U.T.C.D. SECTION 4B–18.

MAX I – NORMAL OPERATION
MAX II – NON-PEAK 7-9 AM 4-6PM

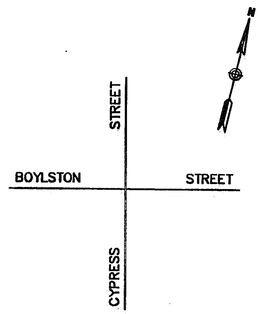
* DW NORMAL DISPLAY, W/FDW ON PUSHBUTTON ACTUATION ONLY

BOYLSTON STREET AT CYPRESS STREET

SIGNAL HEAD DATA **			
A,B	C,E	D,F,G,H,J,K	P1,P8
			DONT WALK 4 1/2" MIN. LETTER HEIGHT
ALL 12" LENS			FIBER–OPTIC

** ALL SIGNAL HEADS SHALL HAVE 5" BACKPLATES

NOTE:
1. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE, OR ANY COMBINATION OF NON–CONFLICTING PHASES.
3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE LOCATED ON SHEET 8.



BOYLSTON STREET AT CYPRESS STREET

DETECTOR DATA						
DETECTOR NO.	NO. SECTION/ SIZE	NO. OF TURNS	OPERATIONS	CALL DELAY	CALL PHASE	LOOP CONNECTION
1	3–6'x6'	3	PRESENCE	0	ø1	SERIES/ PARALLEL
2	2–6'x6'	3	PRESENCE	0	ø6	SERIES
3	3–6'x6'	3	PRESENCE	0	ø5	SERIES/ PARALLEL
4	2–6'x6'	3	PRESENCE	0	ø2	SERIES
5	3–6'x6'	3	PRESENCE	5	ø4	SERIES/ PARALLEL
6	3–6'x6'	3	PRESENCE	0	ø4	SERIES/ PARALLEL
7	3–6'x6'	3	PRESENCE	0	ø4	SERIES/ PARALLEL
8	3–6'x6'	3	PRESENCE	5	ø4	SERIES/ PARALLEL

BROOKLINE
BOYLSTON STREET AT CYPRESS STREET

PUB. RD. DIV. NO.	STATE	FED AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	MASS.	M-000S(382)	1993	9	22

TRAFFIC SIGNAL CHARTS

LOCATION 1
BOYLSTON ST. AT CYPRESS RD.

SEQ. E
DR. 15
PL. 65 9/22
NO. 8533

VHB CAD 3205CYP.DWG

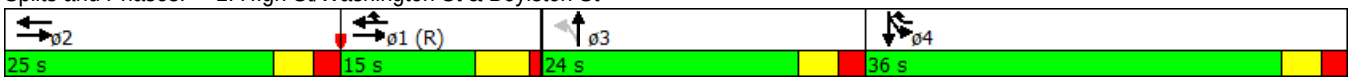
Existing Peak Hour Capacity Analysis

Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	ø1	ø2
Lane Configurations									
Volume (vph)	795	1178	440	60	223	436	286		
Lane Group Flow (vph)	906	1280	478	0	317	289	579		
Turn Type	NA	NA	custom	Perm	NA	Split	NA		
Protected Phases	1 2	1 2	1 4		3	4	4	1	2
Permitted Phases				3					
Detector Phase	1 2	1 2	1 4	3	3	4	4		
Switch Phase									
Minimum Initial (s)				4.0	4.0	19.0	19.0	10.0	10.0
Minimum Split (s)				24.0	24.0	36.0	36.0	15.0	25.0
Total Split (s)				24.0	24.0	36.0	36.0	15.0	25.0
Total Split (%)				24.0%	24.0%	36.0%	36.0%	15%	25%
Yellow Time (s)				3.0	3.0	3.0	3.0	4.0	3.0
All-Red Time (s)				2.0	2.0	2.0	2.0	1.0	2.0
Lost Time Adjust (s)					0.0	0.0	0.0		
Total Lost Time (s)					5.0	5.0	5.0		
Lead/Lag				Lead	Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode				None	None	None	None	C-Max	None
v/c Ratio	0.69	0.97	0.36		0.89	0.69	0.67		
Control Delay	29.8	49.5	1.7		37.3	40.9	34.7		
Queue Delay	0.0	41.9	0.1		18.3	0.0	0.0		
Total Delay	29.8	91.4	1.8		55.6	40.9	34.7		
Queue Length 50th (ft)	265	~478	0		44	172	165		
Queue Length 95th (ft)	341	#611	14		m#154	272	226		
Internal Link Dist (ft)	275	168			71		206		
Turn Bay Length (ft)									
Base Capacity (vph)	1318	1324	1385		370	465	956		
Starvation Cap Reductn	0	188	254		51	0	0		
Spillback Cap Reductn	0	0	0		0	0	0		
Storage Cap Reductn	0	0	0		0	0	0		
Reduced v/c Ratio	0.69	1.13	0.42		0.99	0.62	0.61		

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 73 (73%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: HIgh St/Washington St & Boylston St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	795	39	0	1178	440	60	223	9	436	286	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	12	11	12	10	10	12
Total Lost time (s)		5.0			5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor		0.95			0.95	0.88		0.95		0.91	0.91	
Frt		0.99			1.00	0.85		1.00		1.00	0.98	
Flt Protected		1.00			1.00	1.00		0.99		0.95	0.98	
Satd. Flow (prot)		3397			3421	2694		3370		1503	3047	
Flt Permitted		1.00			1.00	1.00		0.57		0.95	0.98	
Satd. Flow (perm)		3397			3421	2694		1937		1503	3047	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	864	42	0	1280	478	65	242	10	474	311	83
RTOR Reduction (vph)	0	3	0	0	0	296	0	2	0	0	13	0
Lane Group Flow (vph)	0	903	0	0	1280	182	0	315	0	289	566	0
Turn Type		NA			NA	custom	Perm	NA		Split	NA	
Protected Phases		1 2			1 2	1 4		3		4	4	
Permitted Phases							3					
Actuated Green, G (s)		38.7			38.7	37.9		18.4		27.9	27.9	
Effective Green, g (s)		38.7			38.7	37.9		18.4		27.9	27.9	
Actuated g/C Ratio		0.39			0.39	0.38		0.18		0.28	0.28	
Clearance Time (s)								5.0		5.0	5.0	
Vehicle Extension (s)								3.0		3.0	3.0	
Lane Grp Cap (vph)		1314			1323	1021		356		419	850	
v/s Ratio Prot		0.27			c0.37	0.07				c0.19	0.19	
v/s Ratio Perm								c0.16				
v/c Ratio		0.69			0.97	0.18		0.88		0.69	0.67	
Uniform Delay, d1		25.6			30.0	20.7		39.8		32.2	31.9	
Progression Factor		1.00			1.00	1.00		0.33		1.00	1.00	
Incremental Delay, d2		1.5			16.8	0.1		18.3		4.7	2.0	
Delay (s)		27.1			46.8	20.8		31.5		36.9	33.9	
Level of Service		C			D	C		C		D	C	
Approach Delay (s)		27.1			39.7			31.5			34.9	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBR
Lane Configurations				
Volume (vph)	1179	118	1618	40
Lane Group Flow (vph)	1348	135	1759	43
Turn Type	NA	Prot	NA	Perm
Protected Phases	2	4	2 4	
Permitted Phases				4
Detector Phase	2	4	2 4	4
Switch Phase				
Minimum Initial (s)	4.0	4.0		4.0
Minimum Split (s)	80.0	10.0		10.0
Total Split (s)	80.0	20.0		20.0
Total Split (%)	80.0%	20.0%		20.0%
Yellow Time (s)	5.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0		0.0
Total Lost Time (s)	6.0	5.0		5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	None		None
v/c Ratio	0.36	0.53	0.36	0.13
Control Delay	0.4	47.5	0.2	6.0
Queue Delay	0.3	0.0	0.1	0.0
Total Delay	0.7	47.5	0.3	6.0
Queue Length 50th (ft)	0	80	0	0
Queue Length 95th (ft)	0	142	0	m10
Internal Link Dist (ft)	168		178	
Turn Bay Length (ft)				
Base Capacity (vph)	3742	256	4916	335
Starvation Cap Reductn	1563	0	0	0
Spillback Cap Reductn	0	0	1125	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	0.53	0.46	0.13

Intersection Summary
Cycle Length: 100
Actual Cycle Length: 100
Offset: 19 (19%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

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

Splits and Phases: 2: Walnut St & Washington St (Route 9)

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Volume (vph)	1179	61	6	118	1618	0	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	12	12
Total Lost time (s)	6.0			5.0	6.0		5.0
Lane Util. Factor	0.91			1.00	0.91		1.00
Frt	0.99			1.00	1.00		0.86
Flt Protected	1.00			0.95	1.00		1.00
Satd. Flow (prot)	5048			1711	4916		1611
Flt Permitted	1.00			0.95	1.00		1.00
Satd. Flow (perm)	5048			1711	4916		1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1282	66	7	128	1759	0	43
RTOR Reduction (vph)	5	0	0	0	0	0	37
Lane Group Flow (vph)	1343	0	0	135	1759	0	6
Turn Type	NA		Prot	Prot	NA		Perm
Protected Phases	2		4	4	2 4		
Permitted Phases							4
Actuated Green, G (s)	74.0			15.0	100.0		15.0
Effective Green, g (s)	74.0			15.0	95.0		15.0
Actuated g/C Ratio	0.74			0.15	0.95		0.15
Clearance Time (s)	6.0			5.0			5.0
Vehicle Extension (s)	3.0			3.0			3.0
Lane Grp Cap (vph)	3735			256	4670		241
v/s Ratio Prot	0.27			c0.08	c0.36		
v/s Ratio Perm							0.00
v/c Ratio	0.36			0.53	0.38		0.03
Uniform Delay, d1	4.6			39.2	0.2		36.3
Progression Factor	0.04			1.00	1.00		1.00
Incremental Delay, d2	0.2			2.0	0.1		0.0
Delay (s)	0.4			41.2	0.2		36.3
Level of Service	A			D	A		D
Approach Delay (s)	0.4				3.2	36.3	
Approach LOS	A				A	D	

Intersection Summary			
HCM 2000 Control Delay	2.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

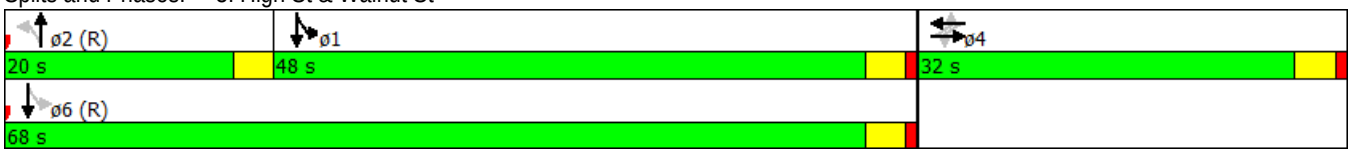
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø6
Lane Configurations									
Volume (vph)	48	50	35	102	1	183	4	255	
Lane Group Flow (vph)	0	113	0	215	0	239	0	353	
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	
Protected Phases		4		4		2	1	1 6	6
Permitted Phases	4		4		2		1 6		
Detector Phase	4	4	4	4	2	2	1	1 6	
Switch Phase									
Minimum Initial (s)	28.0	28.0	28.0	28.0	17.0	17.0	44.0		64.0
Minimum Split (s)	32.0	32.0	32.0	32.0	20.0	20.0	48.0		68.0
Total Split (s)	32.0	32.0	32.0	32.0	20.0	20.0	48.0		68.0
Total Split (%)	32.0%	32.0%	32.0%	32.0%	20.0%	20.0%	48.0%		68%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	0.0	1.0		1.0
Lost Time Adjust (s)		0.0		0.0		0.0			
Total Lost Time (s)		4.0		4.0		3.0			
Lead/Lag					Lead	Lead	Lag		
Lead-Lag Optimize?					Yes	Yes			
Recall Mode	None	None	None	None	C-Max	C-Max	None		C-Max
v/c Ratio		0.29		0.39		0.76		0.30	
Control Delay		30.0		37.1		54.7		2.5	
Queue Delay		0.4		0.5		11.2		1.0	
Total Delay		30.5		37.6		66.0		3.6	
Queue Length 50th (ft)		55		111		142		24	
Queue Length 95th (ft)		103		184		#257		34	
Internal Link Dist (ft)		261		304		129		71	
Turn Bay Length (ft)									
Base Capacity (vph)		385		545		316		1168	
Starvation Cap Reductn		0		0		0		563	
Spillback Cap Reductn		77		107		56		0	
Storage Cap Reductn		0		0		0		0	
Reduced v/c Ratio		0.37		0.49		0.92		0.58	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 88 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: High St & Walnut St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	50	6	35	102	61	1	183	36	4	255	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			3.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			0.98			0.97	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1685			2006			1821			1810	
Flt Permitted		0.79			0.94			1.00			1.00	
Satd. Flow (perm)		1368			1892			1820			1811	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	54	7	38	111	66	1	199	39	4	277	72
RTOR Reduction (vph)	0	2	0	0	16	0	0	7	0	0	9	0
Lane Group Flow (vph)	0	111	0	0	199	0	0	232	0	0	344	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			2		1	1 6	
Permitted Phases	4			4			2			1 6		
Actuated Green, G (s)		28.0			28.0			17.0			64.0	
Effective Green, g (s)		28.0			28.0			17.0			64.0	
Actuated g/C Ratio		0.28			0.28			0.17			0.64	
Clearance Time (s)		4.0			4.0			3.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		383			529			309			1159	
v/s Ratio Prot											0.13	
v/s Ratio Perm		0.08			c0.11			c0.13			c0.06	
v/c Ratio		0.29			0.38			0.75			0.30	
Uniform Delay, d1		28.2			29.0			39.5			8.0	
Progression Factor		1.00			1.33			1.00			0.27	
Incremental Delay, d2		0.4			0.4			15.5			0.1	
Delay (s)		28.6			38.9			55.0			2.2	
Level of Service		C			D			E			A	
Approach Delay (s)		28.6			38.9			55.0			2.2	
Approach LOS		C			D			E			A	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations											
Volume (vph)	239	812	72	1242	32	207	64	22	219	291	
Lane Group Flow (vph)	260	934	78	1380	0	260	70	0	262	316	
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	1	6	5	2		4			4		3
Permitted Phases					4		4	4		4	
Detector Phase	1	6	5	2	4	4	4	4	4	4	
Switch Phase											
Minimum Initial (s)	6.0	40.0	6.0	40.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0
Minimum Split (s)	11.0	46.0	11.0	46.0	11.0	11.0	11.0	11.0	11.0	11.0	21.0
Total Split (s)	26.0	67.0	18.0	59.0	35.0	35.0	35.0	35.0	35.0	35.0	21.0
Total Split (%)	18.4%	47.5%	12.8%	41.8%	24.8%	24.8%	24.8%	24.8%	24.8%	24.8%	15%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0	5.0	6.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	None	None	None	None	None	None	None
v/c Ratio	0.90	0.50	0.55	0.91		0.78	0.15		0.69	0.65	
Control Delay	83.1	21.4	70.2	43.9		62.3	0.7		54.5	28.6	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	83.1	21.4	70.2	43.9		62.3	0.7		54.5	28.6	
Queue Length 50th (ft)	198	234	59	504		187	0		184	110	
Queue Length 95th (ft)	#433	413	125	#860		#398	1		#362	254	
Internal Link Dist (ft)		336		2074		467			361		
Turn Bay Length (ft)	200		150				75			75	
Base Capacity (vph)	290	1879	179	1513		332	465		379	489	
Starvation Cap Reductn	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.90	0.50	0.44	0.91		0.78	0.15		0.69	0.65	

Intersection Summary

Cycle Length: 141
Actuated Cycle Length: 124.2
Natural Cycle: 140
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Cypress Street & Route 9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	239	812	47	72	1242	28	32	207	64	22	219	291
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	11	11	12	11	11
Total Lost time (s)	5.0	6.0		5.0	6.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	1.00
Satd. Flow (prot)	1711	3510		1711	3528			1789	1531		1792	1531
Flt Permitted	0.95	1.00		0.95	1.00			0.76	1.00		0.87	1.00
Satd. Flow (perm)	1711	3510		1711	3528			1370	1531		1566	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	260	883	51	78	1350	30	35	225	70	24	238	316
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	54	0	0	119
Lane Group Flow (vph)	260	932	0	78	1379	0	0	260	16	0	262	197
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4		4	4		4
Actuated Green, G (s)	21.1	66.4		9.0	54.3			30.1	30.1		30.1	30.1
Effective Green, g (s)	21.1	66.4		9.0	54.3			30.1	30.1		30.1	30.1
Actuated g/C Ratio	0.17	0.52		0.07	0.43			0.24	0.24		0.24	0.24
Clearance Time (s)	5.0	6.0		5.0	6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	282	1825		120	1500			322	360		369	360
v/s Ratio Prot	c0.15	0.27		0.05	c0.39							
v/s Ratio Perm								c0.19	0.01		0.17	0.13
v/c Ratio	0.92	0.51		0.65	0.92			0.81	0.05		0.71	0.55
Uniform Delay, d1	52.5	20.0		57.8	34.6			46.1	37.7		44.8	42.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	33.6	0.2		11.9	9.3			13.8	0.1		6.3	1.7
Delay (s)	86.1	20.3		69.7	43.9			59.8	37.8		51.1	44.5
Level of Service	F	C		E	D			E	D		D	D
Approach Delay (s)		34.6			45.3			55.1			47.5	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	43.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	127.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

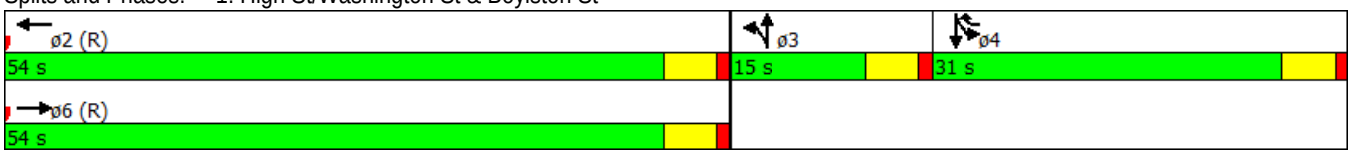
No-Build Peak Hour Capacity Analysis

Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	925	1359	468	234	485	301
Lane Group Flow (vph)	1050	1477	509	348	527	415
Turn Type	NA	NA	Over	NA	Split	NA
Protected Phases	6	2	4	3	4	4
Permitted Phases						
Detector Phase	6	2	4	3	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	8.0	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	28.0	13.0	28.0	28.0
Total Split (s)	54.0	54.0	31.0	15.0	31.0	31.0
Total Split (%)	54.0%	54.0%	31.0%	15.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag			Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	None	None	None
v/c Ratio	0.64	0.90	0.53	0.91	0.67	0.94
Control Delay	21.5	25.6	18.9	67.9	38.4	66.8
Queue Delay	0.0	0.2	0.0	53.1	0.0	0.0
Total Delay	21.5	25.8	18.9	121.0	38.4	66.8
Queue Length 50th (ft)	248	431	38	~114	155	251
Queue Length 95th (ft)	316	118	175	#215	212	#437
Internal Link Dist (ft)	275	316		71		206
Turn Bay Length (ft)						
Base Capacity (vph)	1669	1676	960	384	791	447
Starvation Cap Reductn	0	18	0	163	0	0
Spillback Cap Reductn	13	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.89	0.53	1.57	0.67	0.93

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: High St/Washington St & Boylston St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	925	41	0	1359	468	77	234	9	485	301	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	12	11	12	10	10	12
Total Lost time (s)		5.0			5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor		0.95			0.95	0.88		0.95		0.97	1.00	
Frt		0.99			1.00	0.85		1.00		1.00	0.97	
Flt Protected		1.00			1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)		3399			3421	2694		3366		3044	1683	
Flt Permitted		1.00			1.00	1.00		0.99		0.95	1.00	
Satd. Flow (perm)		3399			3421	2694		3366		3044	1683	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1005	45	0	1477	509	84	254	10	527	327	88
RTOR Reduction (vph)	0	3	0	0	0	261	0	2	0	0	10	0
Lane Group Flow (vph)	0	1047	0	0	1477	248	0	346	0	527	405	0
Parking (#/hr)										0		
Turn Type		NA			NA	Over	Split	NA		Split	NA	
Protected Phases		6			2	4	3	3		4	4	
Permitted Phases												
Actuated Green, G (s)		47.9			47.9	25.7		11.4		25.7	25.7	
Effective Green, g (s)		47.9			47.9	25.7		11.4		25.7	25.7	
Actuated g/C Ratio		0.48			0.48	0.26		0.11		0.26	0.26	
Clearance Time (s)		5.0			5.0	5.0		5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0	2.0	
Lane Grp Cap (vph)		1628			1638	692		383		782	432	
v/s Ratio Prot		0.31			c0.43	0.09		c0.10		0.17	c0.24	
v/s Ratio Perm												
v/c Ratio		0.64			0.90	0.36		0.90		0.67	0.94	
Uniform Delay, d1		19.6			23.9	30.4		43.8		33.4	36.4	
Progression Factor		1.00			0.74	1.76		0.88		1.00	1.00	
Incremental Delay, d2		2.0			7.5	0.1		23.2		1.8	27.7	
Delay (s)		21.6			25.2	53.6		61.6		35.2	64.1	
Level of Service		C			C	D		E		D	E	
Approach Delay (s)		21.6			32.5			61.6			47.9	
Approach LOS		C			C			E			D	

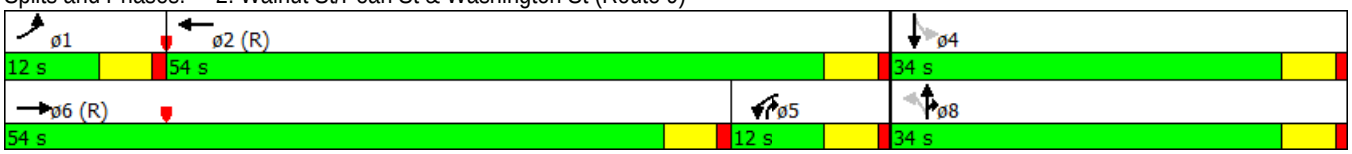
Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBR	SBT	ø8
Lane Configurations							
Volume (vph)	20	1300	165	1650	110	0	
Lane Group Flow (vph)	22	1533	179	1956	120	185	
Turn Type	Prot	NA	Prot	NA	pt+ov	NA	
Protected Phases	1	6	5	2	5 8	4	8
Permitted Phases							
Detector Phase	1	6	5	2	5 8	4	
Switch Phase							
Minimum Initial (s)	6.0	10.0	6.0	10.0		6.0	6.0
Minimum Split (s)	11.0	31.0	11.0	31.0		11.0	28.0
Total Split (s)	12.0	54.0	12.0	54.0		34.0	34.0
Total Split (%)	12.0%	54.0%	12.0%	54.0%		34.0%	34%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	
Lead/Lag	Lead	Lead	Lag	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	C-Min	None	C-Min		None	None
v/c Ratio	0.21	0.76	0.70	0.54	0.23	0.58	
Control Delay	57.5	8.4	60.4	8.0	7.9	17.1	
Queue Delay	0.0	0.6	0.0	0.1	0.0	0.0	
Total Delay	57.5	9.0	60.4	8.1	7.9	17.1	
Queue Length 50th (ft)	15	97	108	83	0	18	
Queue Length 95th (ft)	m20	286	#296	389	32	70	
Internal Link Dist (ft)		316		178		157	
Turn Bay Length (ft)							
Base Capacity (vph)	118	2018	254	3648	794	624	
Starvation Cap Reductn	0	180	0	0	0	0	
Spillback Cap Reductn	0	0	0	318	0	10	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.19	0.83	0.70	0.59	0.15	0.30	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 4 (4%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Walnut St/Pearl St & Washington St (Route 9)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1300	110	165	1650	150	0	0	110	0	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	10	11	12	12	11	11	12	15	12
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0		5.0	
Lane Util. Factor	1.00	0.95		1.00	0.91				1.00		1.00	
Frt	1.00	0.99		1.00	0.99				0.85		0.86	
Flt Protected	0.95	1.00		0.95	1.00				1.00		1.00	
Satd. Flow (prot)	1652	3381		1652	4854				1531		1772	
Flt Permitted	0.95	1.00		0.95	1.00				1.00		1.00	
Satd. Flow (perm)	1652	3381		1652	4854				1531		1772	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1413	120	179	1793	163	0	0	120	0	0	185
RTOR Reduction (vph)	0	5	0	0	6	0	0	0	51	0	140	0
Lane Group Flow (vph)	22	1528	0	179	1950	0	0	0	69	0	45	0
Turn Type	Prot	NA		Prot	NA				pt+ov		NA	
Protected Phases	1	6		5	2			8	5 8		4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.9	56.6		18.4	72.1				33.4		10.0	
Effective Green, g (s)	2.9	56.6		18.4	72.1				33.4		10.0	
Actuated g/C Ratio	0.03	0.57		0.18	0.72				0.33		0.10	
Clearance Time (s)	5.0	5.0		5.0	5.0						5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)	47	1913		303	3499				511		177	
v/s Ratio Prot	0.01	c0.45		0.11	c0.40				0.05		c0.03	
v/s Ratio Perm												
v/c Ratio	0.47	0.80		0.59	0.56				0.14		0.25	
Uniform Delay, d1	47.8	17.2		37.4	6.5				23.2		41.5	
Progression Factor	1.22	0.41		1.00	1.00				0.60		1.00	
Incremental Delay, d2	2.1	2.8		2.1	0.6				0.0		0.3	
Delay (s)	60.4	9.8		39.4	7.2				14.0		41.8	
Level of Service	E	A		D	A				B		D	
Approach Delay (s)		10.5			9.9			14.0			41.8	
Approach LOS		B			A			B			D	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

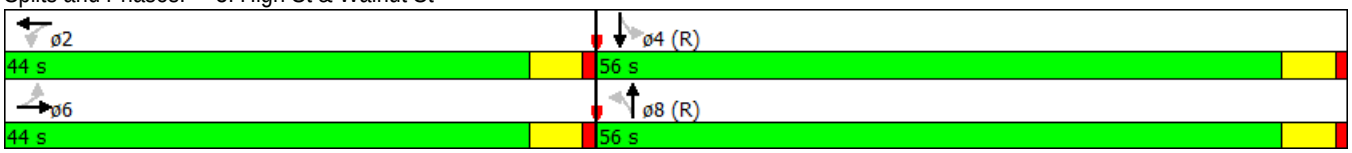
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	50	53	37	107	1	192	4	268
Lane Group Flow (vph)	0	119	0	241	0	251	0	370
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	19.0	19.0	19.0	19.0
Total Split (s)	44.0	44.0	44.0	44.0	56.0	56.0	56.0	56.0
Total Split (%)	44.0%	44.0%	44.0%	44.0%	56.0%	56.0%	56.0%	56.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.0		5.0		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.66		0.77		0.19		0.27
Control Delay		53.6		42.6		5.5		0.6
Queue Delay		3.1		3.3		0.2		2.7
Total Delay		56.6		45.9		5.7		3.3
Queue Length 50th (ft)		69		100		42		4
Queue Length 95th (ft)		120		m101		90		m3
Internal Link Dist (ft)		261		433		129		71
Turn Bay Length (ft)								
Base Capacity (vph)		383		642		1314		1351
Starvation Cap Reductn		0		0		0		847
Spillback Cap Reductn		180		303		487		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.59		0.71		0.30		0.73

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 19 (19%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

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

Splits and Phases: 3: High St & Walnut St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	53	6	37	107	78	1	192	38	4	268	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	12	12	11	12	12	12	12	12	13	12
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.95			0.98			0.97	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1686			1701			1821			1871	
Flt Permitted		0.57			0.93			1.00			1.00	
Satd. Flow (perm)		978			1598			1821			1868	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	58	7	40	116	85	1	209	41	4	291	75
RTOR Reduction (vph)	0	3	0	0	26	0	0	4	0	0	5	0
Lane Group Flow (vph)	0	116	0	0	215	0	0	247	0	0	365	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)		18.0			18.0			72.0			72.0	
Effective Green, g (s)		18.0			18.0			72.0			72.0	
Actuated g/C Ratio		0.18			0.18			0.72			0.72	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		176			287			1311			1344	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.13			0.14			c0.20	
v/c Ratio		0.66			0.75			0.19			0.27	
Uniform Delay, d1		38.1			38.9			4.5			4.9	
Progression Factor		1.00			0.95			1.00			0.07	
Incremental Delay, d2		6.6			6.2			0.3			0.2	
Delay (s)		44.7			43.0			4.9			0.5	
Level of Service		D			D			A			A	
Approach Delay (s)		44.7			43.0			4.9			0.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations											
Volume (vph)	251	942	76	1412	34	218	67	23	230	306	
Lane Group Flow (vph)	273	1077	83	1596	0	274	73	0	275	333	
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	1	6	5	2		4			4		3
Permitted Phases					4		4	4		4	
Detector Phase	1	6	5	2	4	4	4	4	4	4	
Switch Phase											
Minimum Initial (s)	6.0	40.0	6.0	40.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0
Minimum Split (s)	11.0	46.0	11.0	46.0	11.0	11.0	11.0	11.0	11.0	11.0	21.0
Total Split (s)	26.0	67.0	18.0	59.0	35.0	35.0	35.0	35.0	35.0	35.0	21.0
Total Split (%)	18.4%	47.5%	12.8%	41.8%	24.8%	24.8%	24.8%	24.8%	24.8%	24.8%	15%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0	5.0	6.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	None	None	None	None	None	None	None
v/c Ratio	0.94	0.60	0.56	1.06		0.87	0.16		0.75	0.68	
Control Delay	91.2	24.3	70.7	74.9		72.1	1.2		58.7	30.8	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	91.2	24.3	70.7	74.9		72.1	1.2		58.7	30.8	
Queue Length 50th (ft)	210	288	62	~694		202	0		196	123	
Queue Length 95th (ft)	#460	500	132	#1080		#442	4		#404	277	
Internal Link Dist (ft)		336		2074		467			361		
Turn Bay Length (ft)	200		150				75			75	
Base Capacity (vph)	290	1803	179	1509		316	465		365	490	
Starvation Cap Reductn	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.94	0.60	0.46	1.06		0.87	0.16		0.75	0.68	

Intersection Summary

Cycle Length: 141
Actuated Cycle Length: 124.2
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: Cypress Street & Route 9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	251	942	49	76	1412	56	34	218	67	23	230	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	11	11	12	11	11
Total Lost time (s)	5.0	6.0		5.0	6.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	1.00
Satd. Flow (prot)	1711	3513		1711	3519			1789	1531		1793	1531
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.84	1.00
Satd. Flow (perm)	1711	3513		1711	3519			1305	1531		1504	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	273	1024	53	83	1535	61	37	237	73	25	250	333
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	56	0	0	120
Lane Group Flow (vph)	273	1075	0	83	1594	0	0	274	17	0	275	213
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4		4	4		4
Actuated Green, G (s)	21.1	63.6		10.7	53.2			30.1	30.1		30.1	30.1
Effective Green, g (s)	21.1	63.6		10.7	53.2			30.1	30.1		30.1	30.1
Actuated g/C Ratio	0.17	0.50		0.08	0.42			0.24	0.24		0.24	0.24
Clearance Time (s)	5.0	6.0		5.0	6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	285	1764		144	1478			310	364		357	364
v/s Ratio Prot	c0.16	0.31		0.05	c0.45							
v/s Ratio Perm								c0.21	0.01		0.18	0.14
v/c Ratio	0.96	0.61		0.58	1.08			0.88	0.05		0.77	0.59
Uniform Delay, d1	52.3	22.6		55.8	36.7			46.6	37.2		45.0	42.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	41.5	0.6		5.5	47.8			24.4	0.1		9.8	2.4
Delay (s)	93.8	23.2		61.3	84.5			70.9	37.3		54.9	45.1
Level of Service	F	C		E	F			E	D		D	D
Approach Delay (s)		37.5			83.3			63.8			49.5	
Approach LOS		D			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	60.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	126.6	Sum of lost time (s)	19.0
Intersection Capacity Utilization	98.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

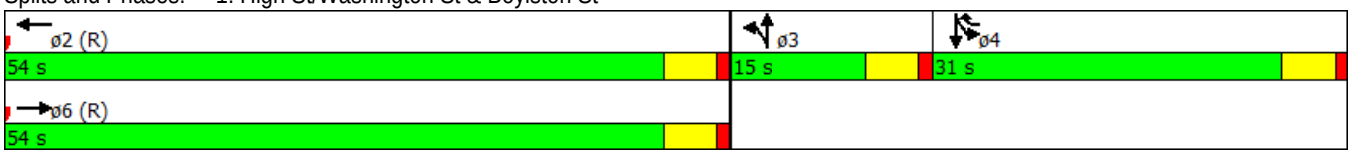
Build Peak Hour Capacity Analysis

Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Configurations						
Volume (vph)	935	1375	468	234	501	301
Lane Group Flow (vph)	1061	1495	509	359	545	416
Turn Type	NA	NA	Over	NA	Split	NA
Protected Phases	6	2	4	3	4	4
Permitted Phases						
Detector Phase	6	2	4	3	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	8.0	8.0	8.0	8.0
Minimum Split (s)	31.0	31.0	28.0	13.0	28.0	28.0
Total Split (s)	54.0	54.0	31.0	15.0	31.0	31.0
Total Split (%)	54.0%	54.0%	31.0%	15.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag			Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	None	None	None
v/c Ratio	0.65	0.91	0.54	0.93	0.70	0.94
Control Delay	21.8	27.0	19.1	71.2	39.1	66.9
Queue Delay	0.0	0.2	0.0	51.2	0.0	0.5
Total Delay	21.8	27.2	19.1	122.4	39.1	67.4
Queue Length 50th (ft)	252	440	39	~126	161	252
Queue Length 95th (ft)	321	#126	177	#224	220	#438
Internal Link Dist (ft)	275	316		71		206
Turn Bay Length (ft)						
Base Capacity (vph)	1669	1676	956	388	791	447
Starvation Cap Reductn	0	11	0	164	0	0
Spillback Cap Reductn	18	0	0	0	0	2
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.90	0.53	1.60	0.69	0.93

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: High St/Washington St & Boylston St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	935	41	0	1375	468	87	234	9	501	301	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	11	12	11	12	10	10	12
Total Lost time (s)		5.0			5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor		0.95			0.95	0.88		0.95		0.97	1.00	
Frt		0.99			1.00	0.85		1.00		1.00	0.97	
Flt Protected		1.00			1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)		3399			3421	2694		3362		3044	1683	
Flt Permitted		1.00			1.00	1.00		0.99		0.95	1.00	
Satd. Flow (perm)		3399			3421	2694		3362		3044	1683	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1016	45	0	1495	509	95	254	10	545	327	89
RTOR Reduction (vph)	0	3	0	0	0	257	0	2	0	0	10	0
Lane Group Flow (vph)	0	1058	0	0	1495	252	0	357	0	545	406	0
Parking (#/hr)										0		
Turn Type		NA			NA	Over	Split	NA		Split	NA	
Protected Phases		6			2	4	3	3		4	4	
Permitted Phases												
Actuated Green, G (s)		47.8			47.8	25.7		11.5		25.7	25.7	
Effective Green, g (s)		47.8			47.8	25.7		11.5		25.7	25.7	
Actuated g/C Ratio		0.48			0.48	0.26		0.12		0.26	0.26	
Clearance Time (s)		5.0			5.0	5.0		5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0	2.0	
Lane Grp Cap (vph)		1624			1635	692		386		782	432	
v/s Ratio Prot		0.31			c0.44	0.09		c0.11		0.18	c0.24	
v/s Ratio Perm												
v/c Ratio		0.65			0.91	0.36		0.93		0.70	0.94	
Uniform Delay, d1		19.8			24.2	30.5		43.8		33.6	36.4	
Progression Factor		1.00			0.75	1.73		0.88		1.00	1.00	
Incremental Delay, d2		2.0			8.4	0.1		26.9		2.2	28.5	
Delay (s)		21.8			26.5	52.9		65.6		35.8	64.9	
Level of Service		C			C	D		E		D	E	
Approach Delay (s)		21.8			33.2			65.6			48.4	
Approach LOS		C			C			E			D	

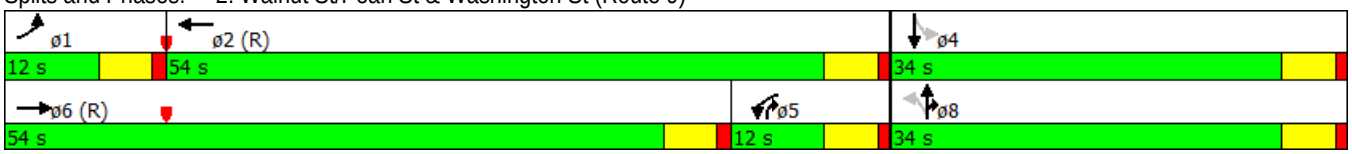
Intersection Summary			
HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBR	SBT	ø8
Lane Configurations							
Volume (vph)	20	1316	165	1666	110	0	
Lane Group Flow (vph)	22	1560	179	1974	120	185	
Turn Type	Prot	NA	Prot	NA	pt+ov	NA	
Protected Phases	1	6	5	2	5 8	4	8
Permitted Phases							
Detector Phase	1	6	5	2	5 8	4	
Switch Phase							
Minimum Initial (s)	6.0	10.0	6.0	10.0		6.0	6.0
Minimum Split (s)	11.0	31.0	11.0	31.0		11.0	28.0
Total Split (s)	12.0	54.0	12.0	54.0		34.0	34.0
Total Split (%)	12.0%	54.0%	12.0%	54.0%		34.0%	34%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	
Lead/Lag	Lead	Lead	Lag	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	C-Min	None	C-Min		None	None
v/c Ratio	0.21	0.76	0.78	0.54	0.24	0.58	
Control Delay	57.3	7.7	69.1	8.1	8.1	17.3	
Queue Delay	0.0	0.6	0.0	0.1	0.0	0.0	
Total Delay	57.3	8.2	69.1	8.2	8.1	17.3	
Queue Length 50th (ft)	15	87	112	85	0	19	
Queue Length 95th (ft)	m19	295	#296	394	32	70	
Internal Link Dist (ft)		316		178		157	
Turn Bay Length (ft)							
Base Capacity (vph)	118	2065	230	3651	773	623	
Starvation Cap Reductn	0	182	0	0	0	0	
Spillback Cap Reductn	0	0	0	330	0	10	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.19	0.83	0.78	0.59	0.16	0.30	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 4 (4%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Walnut St/Pearl St & Washington St (Route 9)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1316	120	165	1666	150	0	0	110	0	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	10	11	12	12	11	11	12	15	12
Total Lost time (s)	5.0	5.0		5.0	5.0				5.0		5.0	
Lane Util. Factor	1.00	0.95		1.00	0.91				1.00		1.00	
Frt	1.00	0.99		1.00	0.99				0.85		0.86	
Flt Protected	0.95	1.00		0.95	1.00				1.00		1.00	
Satd. Flow (prot)	1652	3378		1652	4855				1531		1772	
Flt Permitted	0.95	1.00		0.95	1.00				1.00		1.00	
Satd. Flow (perm)	1652	3378		1652	4855				1531		1772	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1430	130	179	1811	163	0	0	120	0	0	185
RTOR Reduction (vph)	0	5	0	0	6	0	0	0	52	0	140	0
Lane Group Flow (vph)	22	1555	0	179	1968	0	0	0	68	0	46	0
Turn Type	Prot	NA		Prot	NA				pt+ov		NA	
Protected Phases	1	6		5	2			8	5 8		4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.9	58.0		17.0	72.1				32.0		10.0	
Effective Green, g (s)	2.9	58.0		17.0	72.1				32.0		10.0	
Actuated g/C Ratio	0.03	0.58		0.17	0.72				0.32		0.10	
Clearance Time (s)	5.0	5.0		5.0	5.0						5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)	47	1959		280	3500				489		177	
v/s Ratio Prot	0.01	c0.46		0.11	c0.41				0.04		c0.03	
v/s Ratio Perm												
v/c Ratio	0.47	0.79		0.64	0.56				0.14		0.26	
Uniform Delay, d1	47.8	16.3		38.6	6.5				24.2		41.6	
Progression Factor	1.22	0.39		1.00	1.00				0.60		1.00	
Incremental Delay, d2	2.0	2.6		3.5	0.7				0.0		0.3	
Delay (s)	60.3	8.9		42.1	7.2				14.5		41.8	
Level of Service	E	A		D	A				B		D	
Approach Delay (s)		9.6			10.1			14.5			41.8	
Approach LOS		A			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

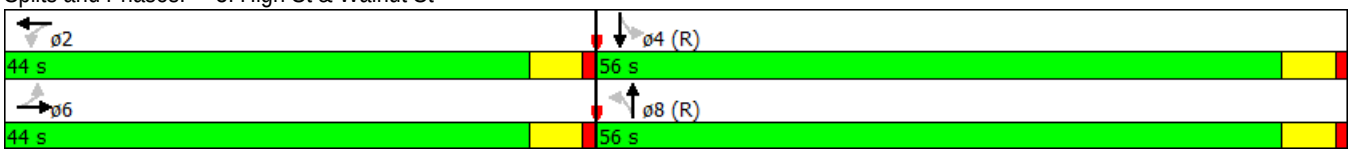
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	50	53	37	107	1	192	4	268
Lane Group Flow (vph)	0	119	0	252	0	251	0	370
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	6.0	6.0	6.0	6.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	19.0	19.0	19.0	19.0
Total Split (s)	44.0	44.0	44.0	44.0	56.0	56.0	56.0	56.0
Total Split (%)	44.0%	44.0%	44.0%	44.0%	56.0%	56.0%	56.0%	56.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.0		5.0		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min	C-Min
v/c Ratio		0.65		0.78		0.19		0.28
Control Delay		52.0		45.2		5.7		0.6
Queue Delay		3.1		3.7		0.3		2.8
Total Delay		55.1		48.8		6.0		3.5
Queue Length 50th (ft)		69		130		43		4
Queue Length 95th (ft)		119		m80		93		m3
Internal Link Dist (ft)		261		433		129		71
Turn Bay Length (ft)								
Base Capacity (vph)		379		645		1305		1341
Starvation Cap Reductn		0		0		0		841
Spillback Cap Reductn		177		302		545		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.59		0.73		0.33		0.74

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 19 (19%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

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

Splits and Phases: 3: High St & Walnut St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	53	6	37	107	88	1	192	38	4	268	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	12	12	11	12	12	12	12	12	13	12
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.95			0.98			0.97	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1686			1695			1821			1871	
Flt Permitted		0.56			0.94			1.00			1.00	
Satd. Flow (perm)		967			1599			1821			1868	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	58	7	40	116	96	1	209	41	4	291	75
RTOR Reduction (vph)	0	3	0	0	29	0	0	4	0	0	5	0
Lane Group Flow (vph)	0	116	0	0	223	0	0	247	0	0	365	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)		18.5			18.5			71.5			71.5	
Effective Green, g (s)		18.5			18.5			71.5			71.5	
Actuated g/C Ratio		0.18			0.18			0.72			0.72	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		178			295			1302			1335	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.14			0.14			c0.20	
v/c Ratio		0.65			0.75			0.19			0.27	
Uniform Delay, d1		37.8			38.6			4.7			5.0	
Progression Factor		1.00			1.07			1.00			0.07	
Incremental Delay, d2		6.3			5.9			0.3			0.2	
Delay (s)		44.1			47.4			5.0			0.6	
Level of Service		D			D			A			A	
Approach Delay (s)		44.1			47.4			5.0			0.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations											
Volume (vph)	251	952	76	1421	34	218	67	23	230	306	
Lane Group Flow (vph)	273	1088	83	1624	0	274	73	0	275	333	
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	1	6	5	2		4			4		3
Permitted Phases					4		4	4		4	
Detector Phase	1	6	5	2	4	4	4	4	4	4	
Switch Phase											
Minimum Initial (s)	6.0	40.0	6.0	40.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0
Minimum Split (s)	11.0	46.0	11.0	46.0	11.0	11.0	11.0	11.0	11.0	11.0	21.0
Total Split (s)	26.0	67.0	18.0	59.0	35.0	35.0	35.0	35.0	35.0	35.0	21.0
Total Split (%)	18.4%	47.5%	12.8%	41.8%	24.8%	24.8%	24.8%	24.8%	24.8%	24.8%	15%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0	5.0	6.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	Min	None	None	None	None	None	None	None
v/c Ratio	0.94	0.60	0.56	1.08		0.87	0.16		0.75	0.68	
Control Delay	91.2	24.4	70.7	81.4		72.1	1.2		58.7	30.8	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	91.2	24.4	70.7	81.4		72.1	1.2		58.7	30.8	
Queue Length 50th (ft)	210	292	62	~718		202	0		196	123	
Queue Length 95th (ft)	#460	506	132	#1108		#442	4		#404	277	
Internal Link Dist (ft)		336		2074		467			361		
Turn Bay Length (ft)	200		150				75			75	
Base Capacity (vph)	290	1803	179	1508		316	465		365	490	
Starvation Cap Reductn	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.94	0.60	0.46	1.08		0.87	0.16		0.75	0.68	

Intersection Summary

Cycle Length: 141
Actuated Cycle Length: 124.2
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: Cypress Street & Route 9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	251	952	49	76	1421	73	34	218	67	23	230	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	12	11	11	12	11	11
Total Lost time (s)	5.0	6.0		5.0	6.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	1.00
Satd. Flow (prot)	1711	3513		1711	3513			1789	1531		1793	1531
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.84	1.00
Satd. Flow (perm)	1711	3513		1711	3513			1305	1531		1504	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	273	1035	53	83	1545	79	37	237	73	25	250	333
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	56	0	0	120
Lane Group Flow (vph)	273	1086	0	83	1622	0	0	274	17	0	275	213
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4		4	4		4
Actuated Green, G (s)	21.1	63.6		10.7	53.2			30.1	30.1		30.1	30.1
Effective Green, g (s)	21.1	63.6		10.7	53.2			30.1	30.1		30.1	30.1
Actuated g/C Ratio	0.17	0.50		0.08	0.42			0.24	0.24		0.24	0.24
Clearance Time (s)	5.0	6.0		5.0	6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	285	1764		144	1476			310	364		357	364
v/s Ratio Prot	c0.16	0.31		0.05	c0.46							
v/s Ratio Perm								c0.21	0.01		0.18	0.14
v/c Ratio	0.96	0.62		0.58	1.10			0.88	0.05		0.77	0.59
Uniform Delay, d1	52.3	22.7		55.8	36.7			46.6	37.2		45.0	42.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	41.5	0.6		5.5	55.3			24.4	0.1		9.8	2.4
Delay (s)	93.8	23.3		61.3	92.0			70.9	37.3		54.9	45.1
Level of Service	F	C		E	F			E	D		D	D
Approach Delay (s)		37.5			90.5			63.8			49.5	
Approach LOS		D			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	64.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	126.6	Sum of lost time (s)	19.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

VAI Traffic Study Sections

Transportation Impact Study and Access Plan

Proposed Extended Stay Hotel

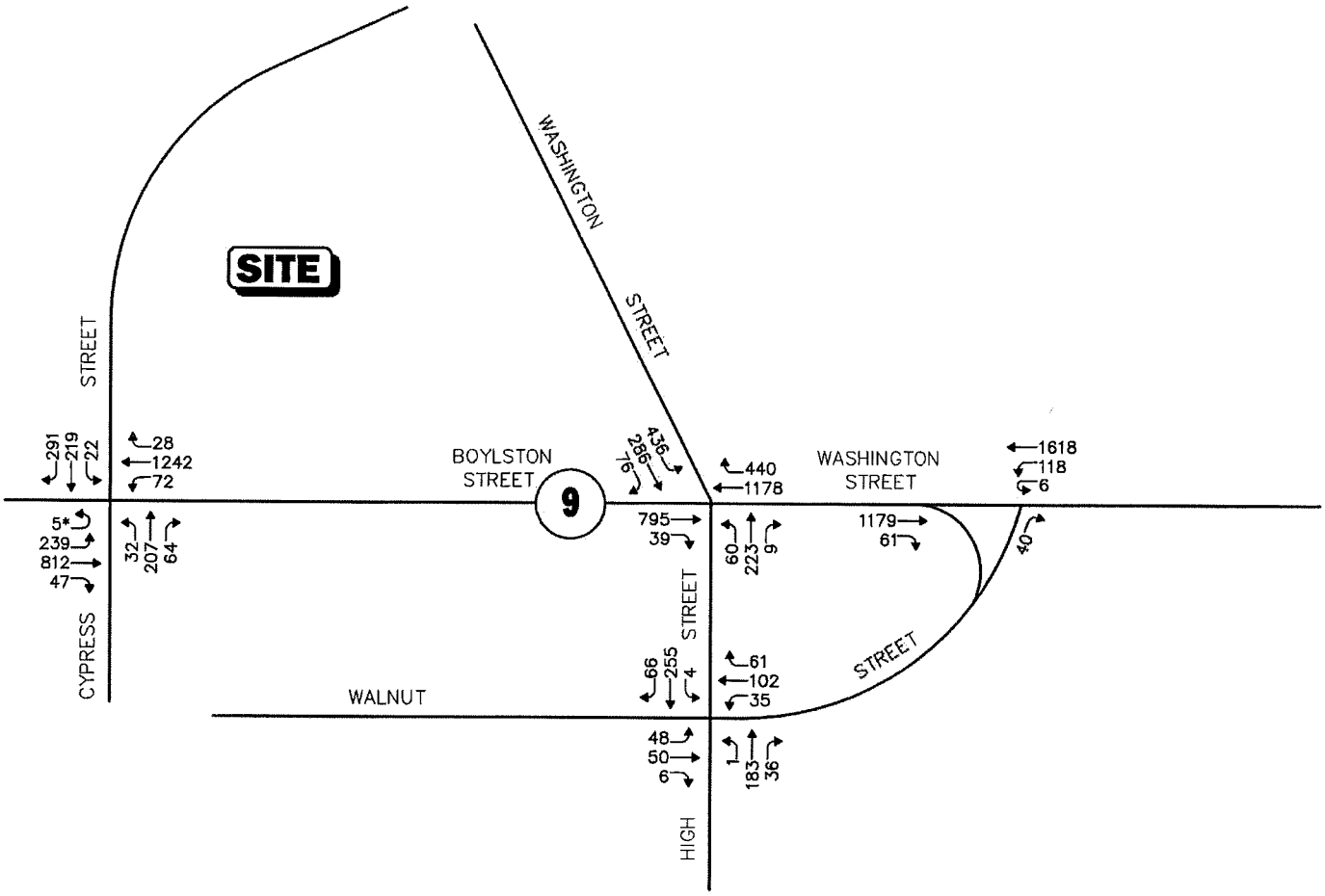
111 Boylston Street
Brookline, MA

September 11, 2013

Prepared for:

Claremont Brookline Suites, LLC
Bridgewater, MA

Vanasse & Associates, Inc.



Note:

1. * = Illegal movement.
2. Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 4

Vanasse & Associates, Inc.

2013 Existing Weekday Evening Peak Hour Traffic Volumes

R:\6514\6514nt3.dwg 9/11/2013 10:57:21 AM EDT

Specific Development by Others

There is currently one project planned in close proximity to the project site, the Children's Hospital building located at 2-4 Brookline Place on Pearl Street in Brookline. The Children's Brookline Place project consists of medical-office, office, and retail space. Traffic volumes expected to be generated by this project were obtained from the traffic study prepared for the project and included in the 2018 future traffic-volume projections[3]. This project is currently on hold.

In addition, Chestnut Hill Square, a mixed-use development consisting of retail, restaurant, medical-office and residential space is proposed on Boylston Street in Newton, located west of the project site. Traffic volumes expected to be generated by this project were obtained from the traffic study prepared for the project and included in the 2018 future traffic volume projections[4]. The Street at Chestnut Hill is undergoing an expansion to include a cinema and health club. This project is under construction.

No other projects were identified at this time that would impact future traffic volumes within the study area beyond the general background traffic growth rate.

No-Build Traffic Volumes

The 2018 No-Build weekday morning and weekday evening peak-hour traffic-volume networks were developed by applying a compounded 1.0 percent annual growth rate to the 2013 Baseline peak-hour traffic volumes and then superimposing the peak-hour traffic volumes expected to be generated by the specific developments by others. The resulting 2018 No-Build weekday morning and weekday evening peak-hour traffic-volume networks are shown on Figure 5 and Figure 6, respectively.

ROADWAY IMPROVEMENT PROJECTS

The Town of Brookline has plans for improvements in the Gateway East area of Brookline. The Gateway East area is basically comprised of Washington Street (Route 9), between High Street and Pond Avenue, and the existing roadways intersecting Route 9 in that area including Brookline Avenue, Walnut Street, Juniper Street, and Pearl Street, as well as the Brookline Village MBTA station. A Gateway East Public Realm Plan[5] was developed to identify roadway, pedestrian, and transit improvements. The improvements that will have an impact on the study area intersections are described below.

- Extend Walnut Street to realign opposite Pearl Street to create a new signalized intersection at Pearl Street, which will allow left-turns to access Pearl Street from Route 9.

---

[3] *Draft Traffic Impact Study*; Children's Brookline Place, Children's Hospital Boston; Howard/Stein-Hudson Associates, Inc.; March 2008.

[4] *Supplemental Traffic Impact Assessment* Memorandum; Chestnut Hill Square, Newton, Massachusetts; VAI; August 12, 2010.

[5] *Brookline's Gateway East Public Realm Plan*, Final Plan; Van Grossmann & Company (Rizzo Associates, Inc.); October 2006.

- Modify the existing signal timing by eliminating the split phasing at the Route 9 intersection with Washington Street and High Street.

- Narrow lanes to 11 feet wide and widen sidewalks, where practical.

- Provide a crosswalk on the east leg of Route 9 to High Street.

- Remove the existing pedestrian bridge on Route 9 and provide an at-grade, signal-protected crossing of Route 9 at the realigned Walnut Street and Pearl Street intersection.

This project is currently in the design stage and traffic that will be diverted due to the new traffic signal at Pearl Street and the realigned Walnut Street has not yet been identified. However, some assumptions were made for the proposed realignment and signalization of the Pearl Street and Walnut Street intersection, consistent with the prior TISAP prepared for the site. Future 2018 analyses were conducted with and without the Gateway East improvements.

SITE-GENERATED TRAFFIC

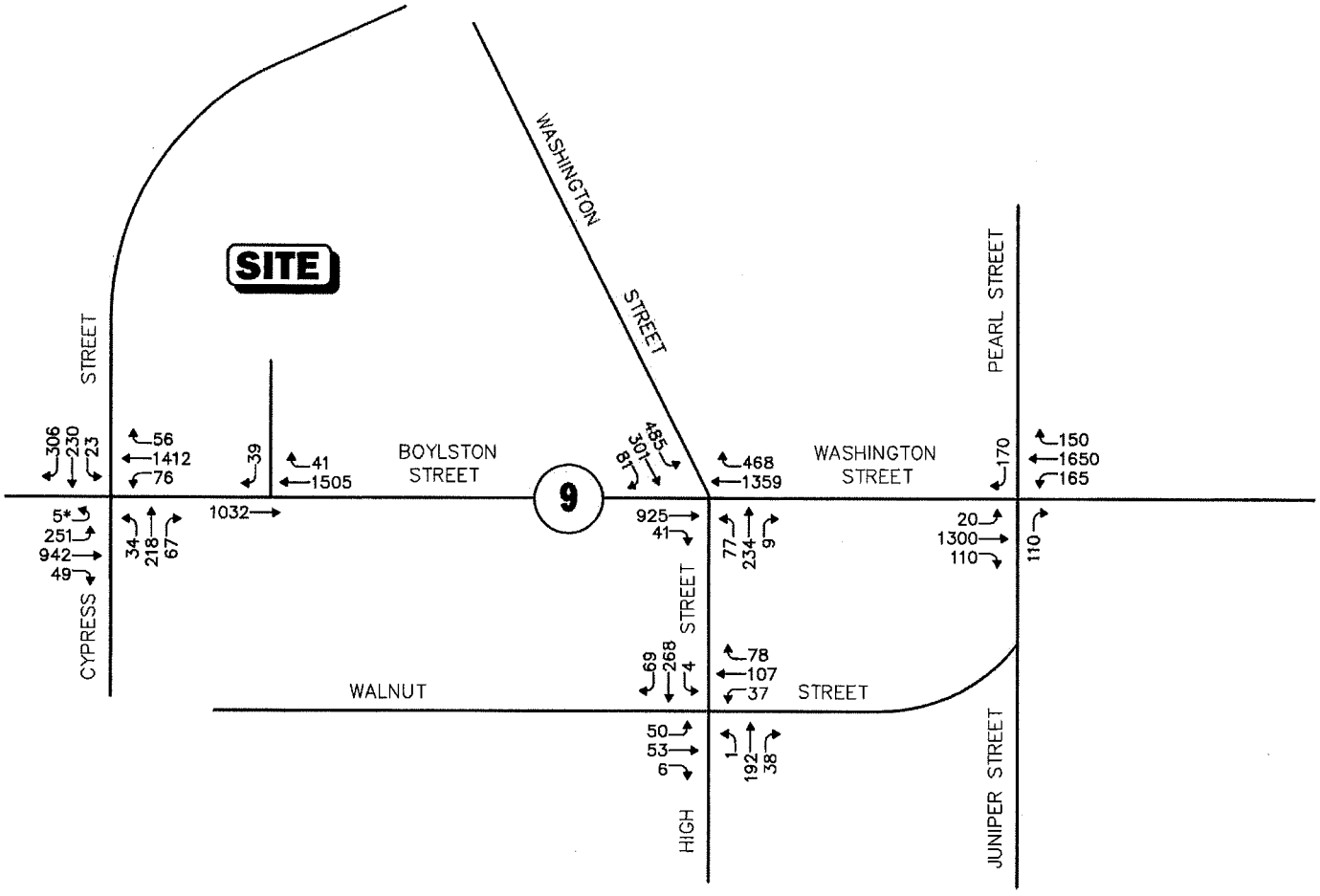
The proposed project will entail the construction of an approximate 97,755 sf hotel that will provide 130 rooms. In order to develop the traffic characteristics of the proposed project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)[6] for Land Use Code (LUC) 310, Hotel, the most appropriate category for the proposed development were utilized.

Non-Auto Trips

The project site is located in close proximity to the MBTA Brookline Village Station, which provides service to the Green subway line, as well as four bus routes. In addition, MASCO operates a shuttle service between the LMA area and Chestnut Hill via Route 9, passing by the project site. It is probable that the employees and guests of the proposed hotel will utilize available area transit for travel purposes. However, in order to provide a conservative assessment of project impacts, no reduction to the vehicle trip generation projections has been taken for transit trips.

The trip generation projections for the project are summarized in Table 4.

[6] *Trip Generation,* Ninth Edition; Institute of Transportation Engineers; Washington, DC; 2012.



Note:

1. * = Illegal movement.

2. Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 12

Vanasse & Associates, Inc.

2018 Build with Gateway East Improvements Weekday Evening Peak Hour Traffic Volumes

25% Design Plans for Washington Street

BROOKLINE
WASHINGTON ST. (ROUTE 9) & WALNUT ST.

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	-----	18	34
PROJECT FILE NO. 605110			

TRAFFIC PLANS

N

CONSTRUCTION NOTES:

1. SEE SHEET 19 FOR TRAFFIC SIGNAL DATA.
2. REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
3. EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
4. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.
5. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
6. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED 3"± BELOW FINISH GRADE. THE TOP OF THE FOUNDATION SHALL NOT BE EXPOSED TO THE SIDEWALK.
7. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S UNLESS OTHERWISE NOTED.
8. TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN ON SHEET X.

WASHINGTON STREET
STATION STREET
WHITE PLACE
MBTA GREENLINE (BELOW)
BOYLSTON STREET (ROUTE 9)
HIGH STREET
TOWN LAYOUT
WASHINGTON STREET (ROUTE 9)

PROP 8' TS POST W/PED SIGNAL HEAD W/APS PUSH BUTTON W/SADDLE & R10-3e(R)
PROP TS POLE W/25' MAST ARM
PROP TS POLE W/45' MAST ARM
PROP 10' TS POST
PROP 8' TS POST W/PED SIGNAL HEAD W/APS PUSH BUTTON W/SADDLE & R10-3e(L)
PROP TS POLE W/35' MAST ARM
PROP 10' TS POST
PROP 10' TS POST
R3-8DL R10-22
PROP 8' TS POST W/PED SIGNAL HEAD W/APS PUSH BUTTON W/SADDLE & R10-3e(R)
PROP 8' TS POST W/PED SIGNAL HEAD W/APS PUSH BUTTON W/SADDLE & R10-3e(L)
PROP 8' TS POST W/PED SIGNAL HEAD W/APS PUSH BUTTON W/SADDLE & R10-3e(L)
PROP PRE-EMPTION STROBE
PROP TS 2 TYPE 1 TS CONTROLLER W/TYPE 6 CABINET & FOUNDATION W/CONCRETE PAD W/TS SYSTEM MASTER CONTROLLER AND MODEM
PROP POWER SOURCE
PROP SERVICE CONNECTION
CONT. ON SHEET 20
CONT. ON SHEET 24

SCALE IN FEET
20 0 20 40

\\MAWATR\TS\11052.00\cad\te\planset\11052_TSIG.dwg

BROOKLINE
WASHINGTON ST. (ROUTE 9) & WALNUT ST.

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	----	19	34
PROJECT FILE NO. 605110			

TRAFFIC PLANS

SEQUENCE AND TIMING																	
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	FLASHING OPERATION	FIRE PRE-EMPTION		
MINIMUM INTERVAL			10			8			8			10				HOLD	CLEAR	ALL RED
VEHICLE EXTENSION			2			2			2			2						
MAXIMUM 1			39			26			23			39						
MAXIMUM 2			32			16			30			32						
YELLOW CLEARANCE				4			4			4			4					
RED CLEARANCE					1			1			1			1				
PEDESTRIAN INTERVAL			7/19						7/16			7/19						
																●	4	1
BOYLSTON STREET	EB	A	R	R	R	R	R	R	R	R	R	G	Y	R	FY	R	R	R
BOYLSTON STREET	EB	B	R	R	R	R	R	R	R	R	R	G	Y	R	FY	R	R	R
WASHINGTON STREET	WB	C,D	G	Y	R	R	R	R	R	R	R	R	R	R	FY	R	R	R
WASHINGTON STREET	WB	E,F	R	R	R	R	R	R	G	Y	R	R	R	R	FR	R	R	R
WASHINGTON STREET	SB	G,H	R	R	R	R	R	R	G	Y	R	R	R	R	FR	R	R	R
WASHINGTON STREET	SB	J,K	R	R	R	R	R	R	G	Y	R	R	R	R	FR	R	R	R
HIGH STREET	NB	L	R	R	R	G	G	Y	R	R	R	R	R	R	FR	R	R	R
HIGH STREET	NB	M	R	R	R	G	Y	R	R	R	R	R	R	R	FR	R	R	R
FIRE STATION	NB	N,P,Q,R	R	R	R	R	R	R	R	R	R	R	R	R	FR	G	Y	R
PEDESTRIAN X-ING	EB-WB	P1-P2	**	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	DW	DW	DW
PEDESTRIAN X-ING	EB-WB	P3-P4	DW	DW	DW	DW	DW	DW	DW	DW	DW	**	DW	DW	OUT	DW	DW	DW
PEDESTRIAN X-ING	NB-SB	P5-P6	DW	DW	DW	DW	DW	DW	**	DW	DW	DW	DW	DW	OUT	DW	DW	DW
DETECTOR			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK				_		
RECALL			SOFT			OFF			OFF			SOFT				_		
			ø2			ø3			ø4			ø6			ø1,ø5,ø7&ø8	HARDWIRE PRE-EMPTION ø		
															NOT USED			

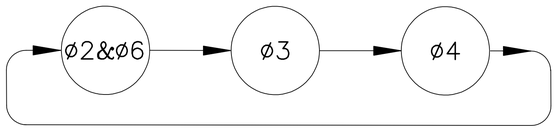
*FIRE STATION DRIVEWAY

NOTES:
1. AUTOMATIC FLASHING OPERATION PER
2. ** NORMALLY DW, W/FDW UPON PEDESTRIAN PUSH BUTTON ACTUATION
3. PERM = PERMISSIVE
4. MAXIMUM 1 = 6:00AM TO 10:00AM
5. MAXIMUM 2 = NORMAL OPERATION
6. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
7. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL BE IN EFFECT.
8. ● = HOLD PERIOD TO BE DETERMINED BY FIRE CHIEF.
9. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

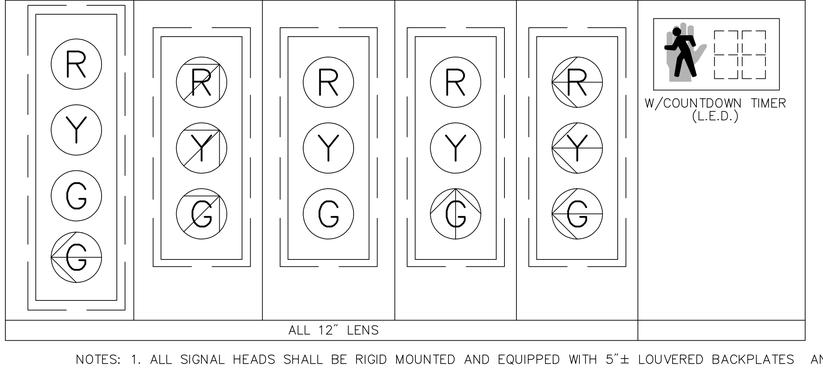
SEQUENCE & TIMING NOTES:

1. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
4. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.

PREFERENTIAL PHASE SEQUENCE



SIGNAL HEAD DATA



NOTES: 1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED AND EQUIPPED WITH 5"± LOUVERED BACKPLATES AND TUNNEL VISORS.
2. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES.

EMERGENCY VEHICLE PRE-EMPTION OPERATION.

1. EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
2. PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2, D3 OR D4 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D4 LOWEST)
3. IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
4. MINIMUM GREEN AND NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
5. PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.
6. EMERGENCY VEHICLE PRE-EMPTION SHALL OVERRIDE COORDINATION.
7. HARDWIRE EMERGENCY VEHICLE PRE-EMPTION SHALL OVERRIDE OPTICAL BASED PRE-EMPTION.
8. THE "CANCEL" FUNCTION SHALL ONLY OVERRIDE/CANCEL AN ACTIVE HARDWIRE FIRE PRE-EMPTION OPERATION. THE CANCEL FUNCTION SHALL NOT OVERRIDE AN ACTIVE OPTICAL BASE PRE-EMPTION OPERATION.

PRE-EMPTION PHASING & PRIORITY			
DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
HARDWIRE	1		øPRE-EMPTION
D1	2		ø2&ø4
D2	3		ø6
D3	4		ø4
D4	5		ø3

BROOKLINE
WASHINGTON ST. (ROUTE 9) & WALNUT ST.

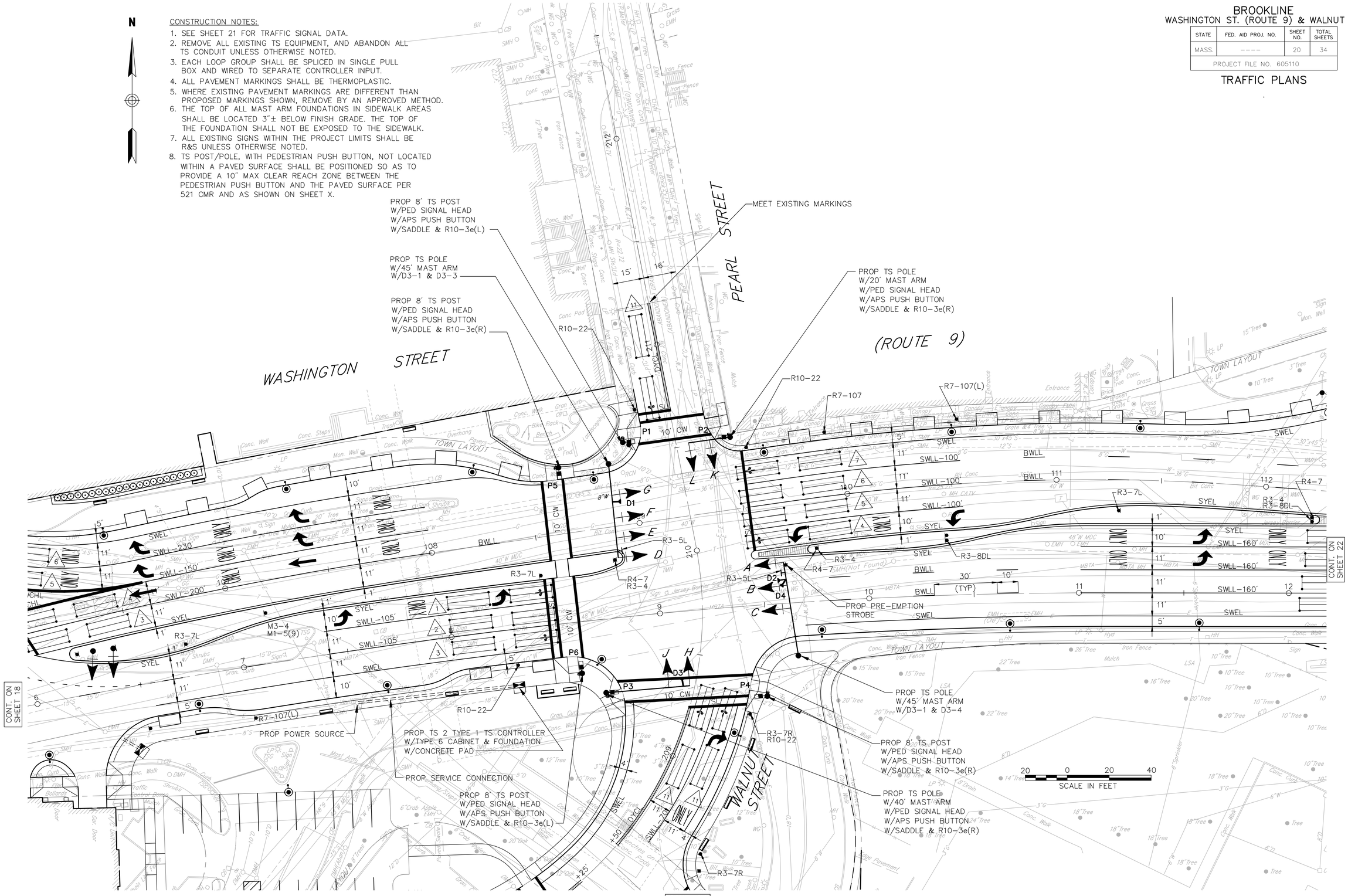
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	-----	20	34
PROJECT FILE NO. 605110			

TRAFFIC PLANS

N

CONSTRUCTION NOTES:

1. SEE SHEET 21 FOR TRAFFIC SIGNAL DATA.
2. REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
3. EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
4. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.
5. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
6. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED 3"± BELOW FINISH GRADE. THE TOP OF THE FOUNDATION SHALL NOT BE EXPOSED TO THE SIDEWALK.
7. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S UNLESS OTHERWISE NOTED.
8. TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN ON SHEET X.



\\MAWATR\TS\11052.00\cad\te\planset\11052_TSIG.dwg

BROOKLINE
WASHINGTON ST. (ROUTE 9) & WALNUT ST.

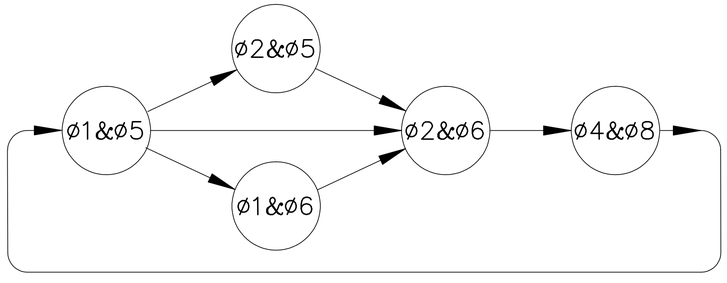
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	----	21	34
PROJECT FILE NO. 605110			

TRAFFIC PLANS

SEQUENCE AND TIMING																							
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	FLASHING OPERATION	FIRE PRE-EMPTION		
MINIMUM INTERVAL			6			10			6			6			10			6				HOLD	CLEAR	ALL RED
VEHICLE EXTENSION			2			2			2			2			2			2						
MAXIMUM 1			9			47			29			6			50			29						
MAXIMUM 2			7			49			29			7			49			29						
YELLOW CLEARANCE				4			4			4			4			4			4					
RED CLEARANCE					1			1			1			1			1			1				
PEDESTRIAN INTERVAL						7/19									7/19			7/16						
																						●	4	1
WASHINGTON STREET	EB	A	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FR	G	Y	R
WASHINGTON STREET	EB	B	R	R	R	R	R	R	R	R	R	R	R	R	⇧	Y	R	R	R	R	FY	⇧	Y	R
WASHINGTON STREET	EB	C	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FY	G	Y	R
WASHINGTON STREET	WB	D	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FR	R	R	R
WASHINGTON STREET	WB	E	R	R	R	⇧	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	R	R	R
WASHINGTON STREET	WB	F,G	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	R	R	R
PEARL STREET	SB	H,J	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FR	R	R	R
WALNUT STREET	NB	K	R	R	R	R	R	R	R	R	R	R–G	R–Y	R	R	R	R	G	Y	R	FR	R	R	R
WALNUT STREET	NB	L	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR	R	R	R
PEDESTRIAN X-ING	E-W	P1-P2	DW	DW	DW	**	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	DW	DW	DW
PEDESTRIAN X-ING	E-W	P3-P4	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	**	DW	DW	DW	DW	DW	OUT	DW	DW	DW
PEDESTRIAN X-ING	N-S	P5-P6	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	**	DW	DW	OUT	DW	DW	DW
DETECTOR			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK				–		
RECALL			OFF			SOFT			OFF			OFF			SOFT			OFF				–		
			ø1			ø2			ø4			ø5			ø6			ø8			ø3 & ø7	HARDWIRE PRE-EMPTION ø		
									PERM					OL						PERM	NOT USED			

NOTES:
1. AUTOMATIC FLASHING OPERATION PER M.U.T.C.D. SECTION 4D.12.
2. ** NORMALLY DW, W/FDW UPON PEDESTRIAN PUSH BUTTON ACTUATION
3. OL = OVERLAP
4. PERM = PERMISSIVE
5. ø4 & ø8 DUAL ENTRY
3. MAXIMUM 1 = 6:00AM TO 10:00AM
4. MAXIMUM 2 = NORMAL OPERATION
5. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
6. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL BE IN EFFECT.
7. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

PREFERENTIAL PHASE SEQUENCE



SEQUENCE & TIMING NOTES:

1. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
4. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.

PRE-EMPTION PHASING & PRIORITY

DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
HARDWIRE	1		ø1&ø6
D1	2		ø2&ø5
D2	3		ø1&ø6
D3	4		ø4
D4	5		ø8

SIGNAL HEAD DATA

A,D	B,E	C,F,G,H,J,L	K	P1-P6
R Y G	R Y G	R Y G	R Y Y G G	W/COUNTDOWN TIMER (L.E.D.)
ALL 12" LENS				

NOTES: 1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED AND EQUIPPED WITH 5"± LOUVERED BACKPLATES AND TUNNEL VISORS.
2. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES.

EMERGENCY VEHICLE PRE-EMPTION OPERATION.

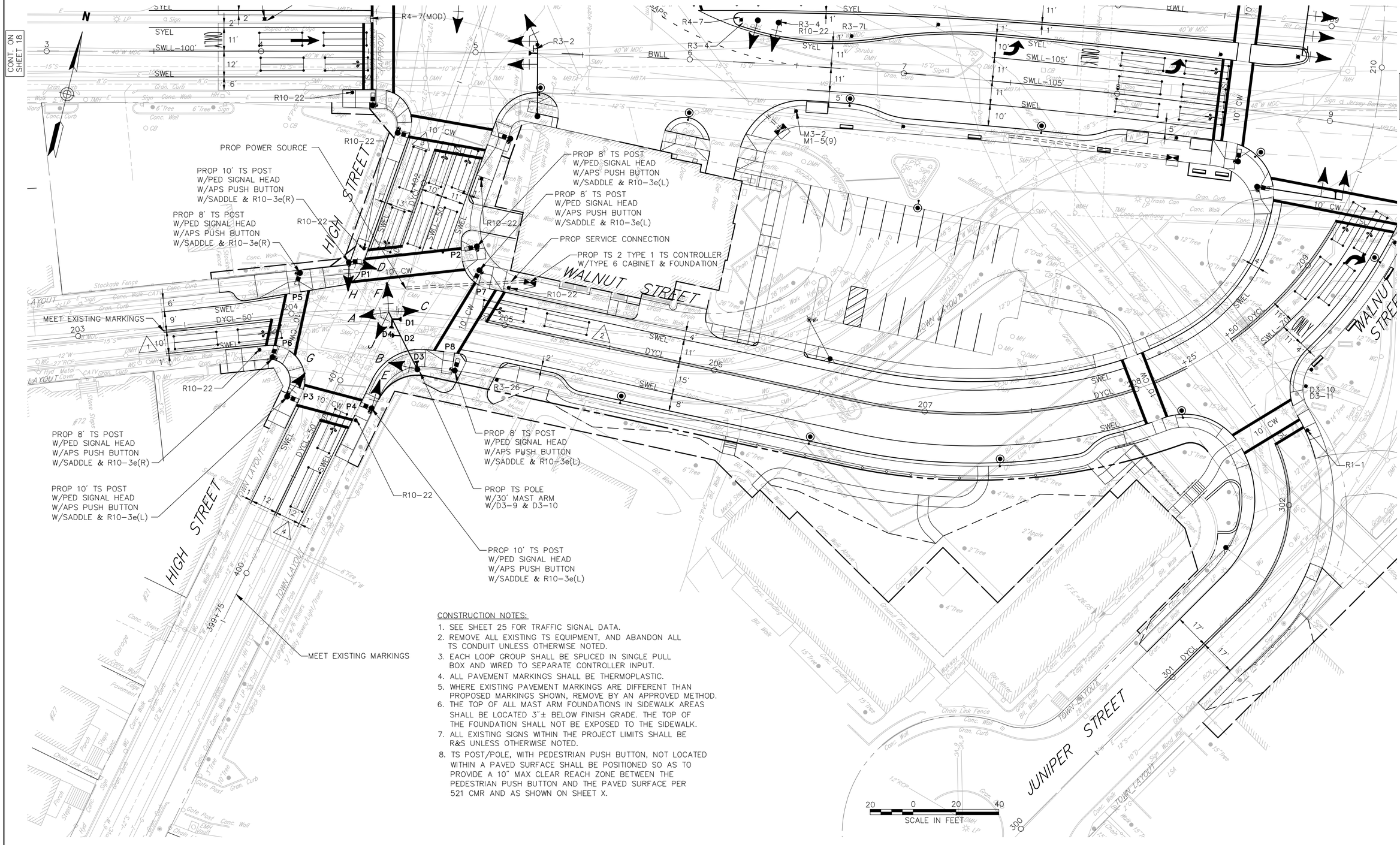
1. EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
2. PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2, D3 OR D4 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D4 LOWEST)
3. IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
4. MINIMUM GREEN AND NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
5. PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.
6. EMERGENCY VEHICLE PRE-EMPTION SHALL OVERRIDE COORDINATION.
7. HARDWIRE EMERGENCY VEHICLE PRE-EMPTION SHALL OVERRIDE OPTICAL BASED PRE-EMPTION.
8. THE "CANCEL" FUNCTION SHALL ONLY OVERRIDE/CANCEL AN ACTIVE HARDWIRE FIRE PRE-EMPTION OPERATION. THE CANCEL FUNCTION SHALL NOT OVERRIDE AN ACTIVE OPTICAL BASE PRE-EMPTION OPERATION.

\\MAWATR\TS\11052.00\cad\te\planset\11052_TSIG.dwg

BROOKLINE
WASHINGTON ST. (ROUTE 9) & WALNUT ST.

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	-----	24	34
PROJECT FILE NO. 605110			

TRAFFIC PLANS



CONSTRUCTION NOTES:

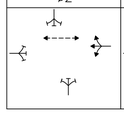
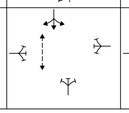
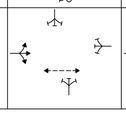
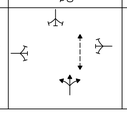
1. SEE SHEET 25 FOR TRAFFIC SIGNAL DATA.
2. REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
3. EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
4. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.
5. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
6. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED 3"± BELOW FINISH GRADE. THE TOP OF THE FOUNDATION SHALL NOT BE EXPOSED TO THE SIDEWALK.
7. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S UNLESS OTHERWISE NOTED.
8. TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN ON SHEET X.

\\MAWATR\TS\11052.00\cad\te\planset\11052_TSIG.dwg

BROOKLINE
WASHINGTON ST. (ROUTE 9) & WALNUT ST.

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	----	25	34
PROJECT FILE NO. 605110			

TRAFFIC PLANS

SEQUENCE AND TIMING														
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	FLASHING OPERATION
MINIMUM INTERVAL			6			10			6			10			
VEHICLE EXTENSION			2			2			2			2			
MAXIMUM 1			55			38			55			38			
MAXIMUM 2			46			46			46			46			
YELLOW CLEARANCE				4			4			4			4		
RED CLEARANCE					1			1			1			1	
PEDESTRIAN INTERVAL			7/9			7/7			7/9			7/7			
WALNUT STREET	EB	A,B	R	R	R	R	R	R	G	Y	R	R	R	R	FR
WALNUT STREET	WB	C,D	G	Y	R	R	R	R	R	R	R	R	R	R	FR
HIGH STREET	SB	E,F,G	R	R	R	G	Y	R	R	R	R	R	R	R	FY
HIGH STREET	NB	H,J	R	R	R	R	R	R	R	R	R	G	Y	R	FY
PEDESTRIAN X-ING	EB-WB	P1-P2	**	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT
PEDESTRIAN X-ING	EB-WB	P3-P4	DW	DW	DW	DW	DW	DW	**	DW	DW	DW	DW	DW	OUT
PEDESTRIAN X-ING	NB-SB	P5-P6	DW	DW	DW	**	DW	DW	DW	DW	DW	DW	DW	DW	OUT
PEDESTRIAN X-ING	NB-SB	P7-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	**	DW	DW	OUT
DETECTOR			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			
RECALL			OFF			SOFT			OFF			SOFT			
			ø2			ø4			ø6			ø8			ø1,ø3,ø5&ø7
															NOT USED

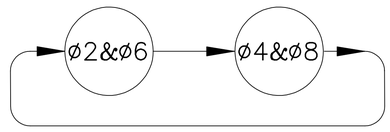
NOTES:
1. AUTOMATIC FLASHING OPERATION PER M.U.T.C.D. SECTION 4D.12.
2. ** NORMALLY DW, W/FDW UPON PEDESTRIAN PUSH BUTTON ACTUATION
3. PERM = PERMISSIVE
4. ø4 & ø8 DUAL ENTRY
3. MAXIMUM 1 = 6:00AM TO 10:00AM
4. MAXIMUM 2 = NORMAL OPERATION
5. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
6. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL BE IN EFFECT.
7. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

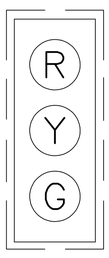
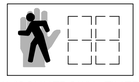
SEQUENCE & TIMING NOTES:

1. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
4. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.

PRE-EMPTION PHASING & PRIORITY			
DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		ø2
D2	2		ø6
D3	3		ø4
D4	4		ø8

PREFERENTIAL PHASE SEQUENCE



SIGNAL HEAD DATA	
A,B,C,D,E,F,G,H,J	P1-P8
	 W/COUNTDOWN TIMER (L.E.D.)
ALL 12" LENS	

NOTES: 1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED AND EQUIPPED WITH 5"± LOUVERED BACKPLATES AND TUNNEL VISORS.
2. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES.

EMERGENCY VEHICLE PRE-EMPTION OPERATION.

1. EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
2. PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2, D3 OR D4 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D4 LOWEST)
3. IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
4. MINIMUM GREEN AND NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
5. PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.
6. EMERGENCY VEHICLE PRE-EMPTION SHALL OVERRIDE COORDINATION.