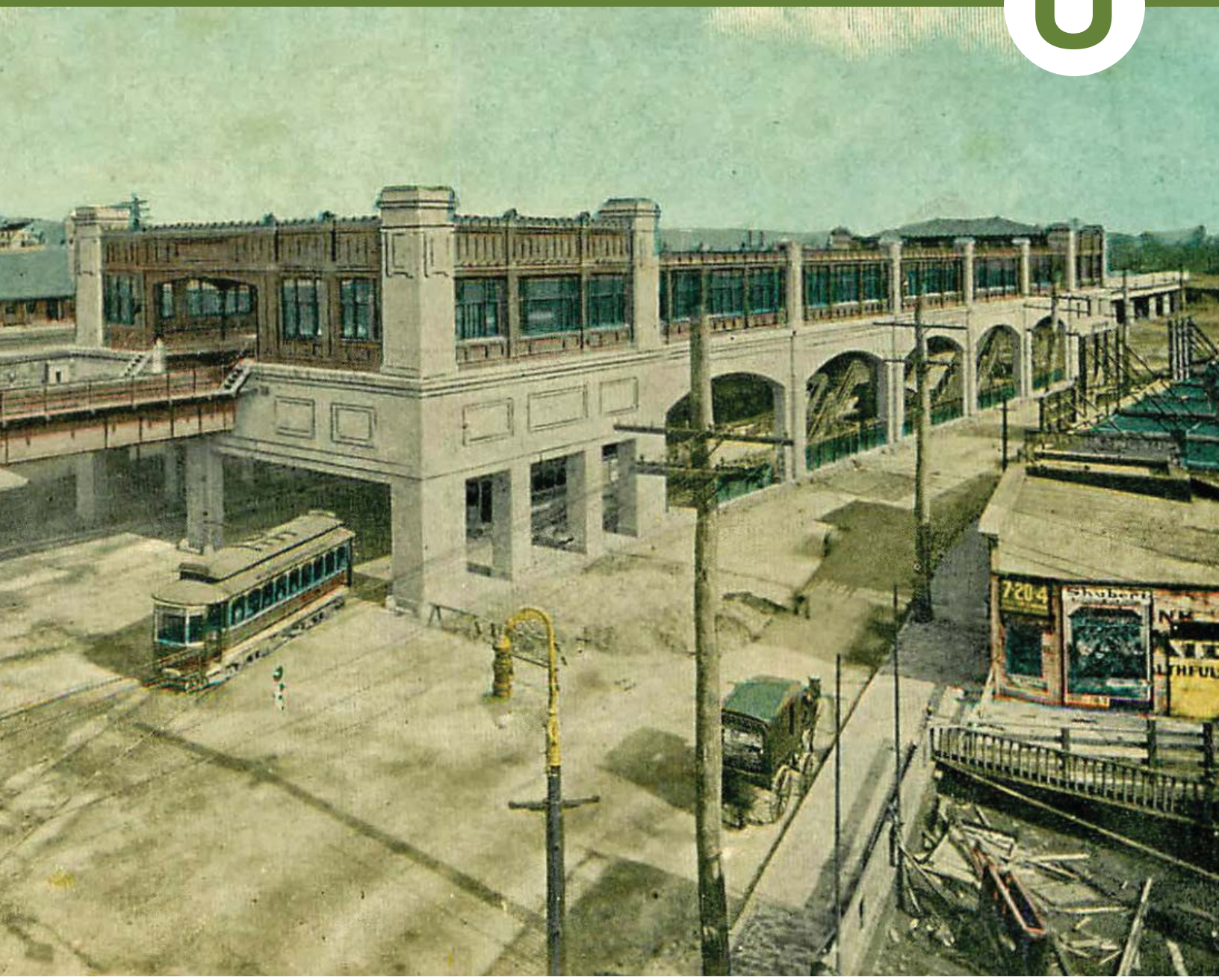
Parcel U | FOREST HILLS

Expanded Project Notification Form

August 1, 2014



The Community Builders, Inc.

URBANICA

PARCEL U | FOREST HILLS

Expanded Project Notification Form

August 1, 2014

SUBMITTED TO

Boston Redevelopment Authority
One City Hall Square
Boston, MA 02210

SUBMITTED BY

JP Parcel U, LLC
c/o Urbanica, Inc
142 Berkeley Street, Suite 402
Boston, MA 02116

PREPARED BY

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41 Brush Hill Road,
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IN ASSOCIATION WITH

Urbanica Design
Urbanica Construction
Ground, Inc
Conservation Services Group
Nitsch Engineering
Howard/Stein-Hudson Associates, Inc
Tech Environmental, Inc
KMM Geotechnical Consultants, LLC
IES Environmental Consultants, Inc
Mackenzie & Associates, P.C.

URBANICA
DESIGN + DEVELOPMENT

August 1, 2014

Mr. Brian Golden,
Acting Director
Boston Redevelopment Authority
One City Hall Square, 9th Floor
Boston, MA 02201

Subject: Expanded Project Notification Form (EPNF)
Parcel U, Hyde Park Avenue at Ukraine Way, Jamaica Plain

Dear Mr. Golden:

On behalf of JP Parcel U LLC (managed by Urbanica Inc), I am pleased to submit the enclosed Expanded Project Notification Form (EPNF) for the proposed development at Parcel U, Hyde Park Avenue. The Proponent intends to develop a new project with landscaping and open space that offers a mix of homeownership townhouses and rental apartment building which includes 24 Townhouses (48 condominium units +/-) and one block of 76 unit +/- of Multifamily Mixed-income rental apartments totaling approximately 190,000 square feet of gross floor area (inclusive of parking and utility areas), which in total will contain approximately 124 dwelling units +/-, a ground floor retail space and a community room ('Proposed Project") on Parcel "U", with approximately 126,070 s.f. +/- of land in the Jamaica Plain neighborhood, and bounded by Hyde Park Avenue, Ukraine Way, Toll Gate Cemetery, and the MBTA Commuter Rail tracks on a surplus parcel currently owned by the MBTA and on part of the remaining land after completion of the Southwest Corridor project ("Project Site").

The Proponent was selected by the Massachusetts Bay Transportation Authority [MBTA] through its real estate representative, Transit Realty Associates [TRA] from a two phase "Invitation to Bid" process that closed on November 15, 2012. Phase I was an eligibility prequalification round that included categories such as Experience and Qualification, Financial Capability, Diversity and M/WBE and Project Program Compatibility. Phase II was a review of financial bids whereby the highest offer was awarded the bid. JP Parcel U, LLC was highest qualified bidder and was designated by the MBTA as the designated developer of the Site.

The Proposed Project will also far exceed the requirements of the City's Inclusionary Development Policy by offering approximately 44 affordable units (approximately 55% of market rate units). The Proposed Project's program mix will include a mix of bedroom sizes from studios to three bedroom dwelling units.

As a Transit Oriented Development (T.O.D.) located only a five-minute walk from the Forest Hills MBTA Intermodal Transit Hub, and its close proximity to the Southwest Corridor – which contains a bike path running all the way to Back Bay – the Proposed Project will offer adequate bike storage and a lower automotive parking ratio in order to promote the use of alternative means of transportation. The overall project-wide parking ratio will be at 1: 0.73 dwelling unit to parking spaces.

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The Project Site's Zoning Sub-district was amended on April 9, 2014 by the Boston Zoning Commission to "Multifamily Residential" following a petition by JP Parcel U, LLC. The Proposed Project still anticipates the need for zoning relief for the proposed use of retail and community space located at the ground floor of the rental apartment, as well as for a number of dimensional variances and parking variances. The Proposed Project will comply with the provisions of Boston Zoning Code Article 37: Green Buildings and with the City's Inclusionary Development Policy.

By closely adopting the comprehensive planning study of the 2008 Forest Hills Improvement Initiative, the Proposed Project aims to supply much needed additional housing for Jamaica Plain in close proximity to the Forest Hills MBTA Station while respecting the residential scale and unique feel of the Forest Hills area. The Proposed Project will also contribute towards meeting the City of Boston's goal of adding 30,000 new housing units by 2020.

Urbanica, Inc, in collaboration with The Community Builders, the Mixed Income Housing Partner for the multi-family rental apartments leads a team of professional designers, planners, engineers and consultants with extensive experience in the development of mixed-use projects. The team has already conducted a number of pre-review planning meetings with the BRA staff members, and has undertaken significant outreach with abutters and relevant neighborhood groups. The team also has worked closely with the neighborhood groups and BRA staff members leading to the approval of the zoning map amendment by the Boston Zoning Commission on April 9, 2014.

Urbanica, Inc., looks forward to continuing working with you, your staff, elected officials, community leaders, and neighborhood groups to create a 21st century T.O.D. project that will greatly benefit Jamaica Plain and the City of Boston. Thank you for all the assistance provided by you and your staff to date.

Sincerely,

Kamran Zahedi
Principal of Urbanica, Inc
Manager of JP Parcel U, LLC

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EXECUTIVE SUMMARY

1.0 EXECUTIVE SUMMARY

1.1 Introduction

Urbanica, Inc., Manager of JP Parcel U , LLC (the "Proponent") is submitting, this Project Notification Form ("PNF") for the Parcel U Project in accordance with the Article 80B-1 Large Project Review requirements of the Boston Zoning Code ("Code"). The Project involves development in three phases of a new project with landscaping and open space that offers a mix of homeownership townhouses and rental apartment building which includes 24 Energy Efficient Townhouses (48 condominium units +/-) and one block of 76 units +/- of Multifamily Mixed-income rental apartments totaling approximately 190,000 square feet of gross floor area (inclusive of parking and utility support areas), which in total will contain approximately 124 dwelling units +/-, ground floor retail space and a community room ('Proposed Project or "Project")") on Parcel "U", with approximately 126,070 s.f. +/- of land in the Jamaica Plain neighborhood, and bounded by Hyde Park Avenue, Ukraine Way, Toll Gate Cemetery, and the MBTA Commuter Rail tracks on a surplus parcel currently owned by the MBTA and on part of the remaining land after completion of the Southwest Corridor project ("Project Site"). The Proponent is committed that the Proposed Project will far exceed the requirements of the City's Inclusionary Development Policy by offering approximately 44 affordable units (approximately 55 % of the total market rate units). The Proposed Project's program will include a mix of bedroom sizes from studios to three bedroom units.

Urbanica, Inc, in collaboration with The Community Builders, the Mixed Income Housing Partner for the mixed-Income rental apartments, will lead a team of professional designers, planners, engineers and consultants with extensive experience in the development of mixed-use projects. The team has already conducted a number of pre-review planning meetings with the BRA staff members, and has undertaken significant outreach with abutters and relevant neighborhood groups. The team also has worked closely with the neighborhood groups and BRA staff members leading to the unanimous approval of a zoning map amendment allowing for the type of development Urbanica is proposing.

The Proposed Project is expected to exceed the 50,000 square foot total build-out size requirement for a project in a Boston neighborhood, and, therefore, will require preparation of filing(s) under the Large Project Review regulations, pursuant to Article 80 of the Boston Zoning Code. Please see **Figures 1-1, 1-2,** and **1-3**.

A Letter of Intent ("LOI") to file a Project Notification Form was filed with the Boston Redevelopment Authority for the proposed mixed use residential project on May 1, 2014 (See **Appendix A**).

The Proponent was selected by the Massachusetts Bay Transportation Authority [MBTA] through its real estate representative; Transit Realty Associates [TRA] from a two phase "Invitation to Bid" process that closed on November 15, 2012. The initial review was an eligibility prequalification round that included

categories such as Experience and Qualification, Financial Capability, Diversity and M/WBE and Project Program Compatibility. There was also a review of financial bids whereby the highest offer was awarded the bid. JP Parcel U, LLC, the Project Proponent, was highest qualified bidder and was selected by the MBTA as the designated developer of the Site.

As a Transit Oriented Development ("TOD"), located only a five-minute walk from the Forest Hills MBTA Intermodal Transit Hub, and its close proximity to the Southwest Corridor – which contains a bike path running all the way to Back Bay – the Proposed Project will offer adequate bike storage and a lower automobile parking ratio in order to promote the use of alternative means of transportation. There are also plans to provide a modest number of exterior curbside parking spaces along Hyde Park Avenue to support the ground floor uses of retail and community space. The overall project-wide parking ratio will be at 1: 0.73.

The Proposed Project anticipates the need for zoning relief for the proposed use of retail and community space located at the ground floor of the rental apartment, as well as for a number of dimensional variances and parking variances.

By closely adopting the recommendations of the 2008 Forest Hills Improvement Initiative comprehensive planning study, the Proposed Project aims to supply much needed additional housing for Jamaica Plain in close proximity to the Forest Hills MBTA Station while respecting the residential scale and unique feel of the Forest Hills area. The Proposed Project will also contribute towards meeting the City of Boston's goal of adding 30,000 new housing units by 2020.

1.2 Proposed Project

1.2.1 Project Site and Surroundings

Parcel "U", with approximately 126,070 s.f. +/- of land in the Jamaica Plain neighborhood, is bounded by Hyde Park Avenue, Ukraine Way, Toll Gate Cemetery, and the MBTA Commuter Rail tracks on a surplus parcel currently owned by the MBTA and on part of the remaining land after completion of the Southwest Corridor project.

The Project Site was formerly located within the "Open Space-Parkland" Zoning Sub-district of Article 55: Jamaica Plain Neighborhood District. The Zoning Sub-district was amended on April 9, 2014 by the Boston Zoning Commission to "Multifamily Residential" following a petition by JP Parcel U, LLC.

Figure 1-1. Project Locus

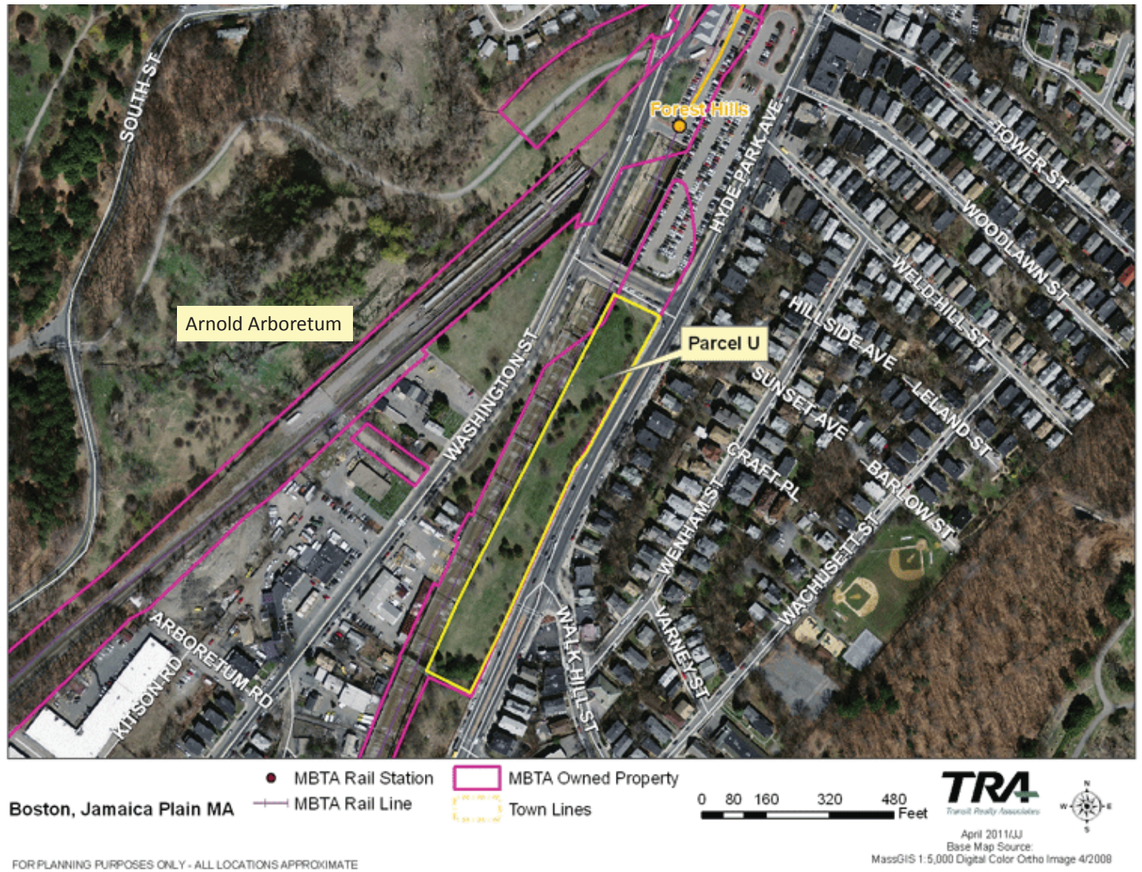


Figure 1-2. USGS Locus

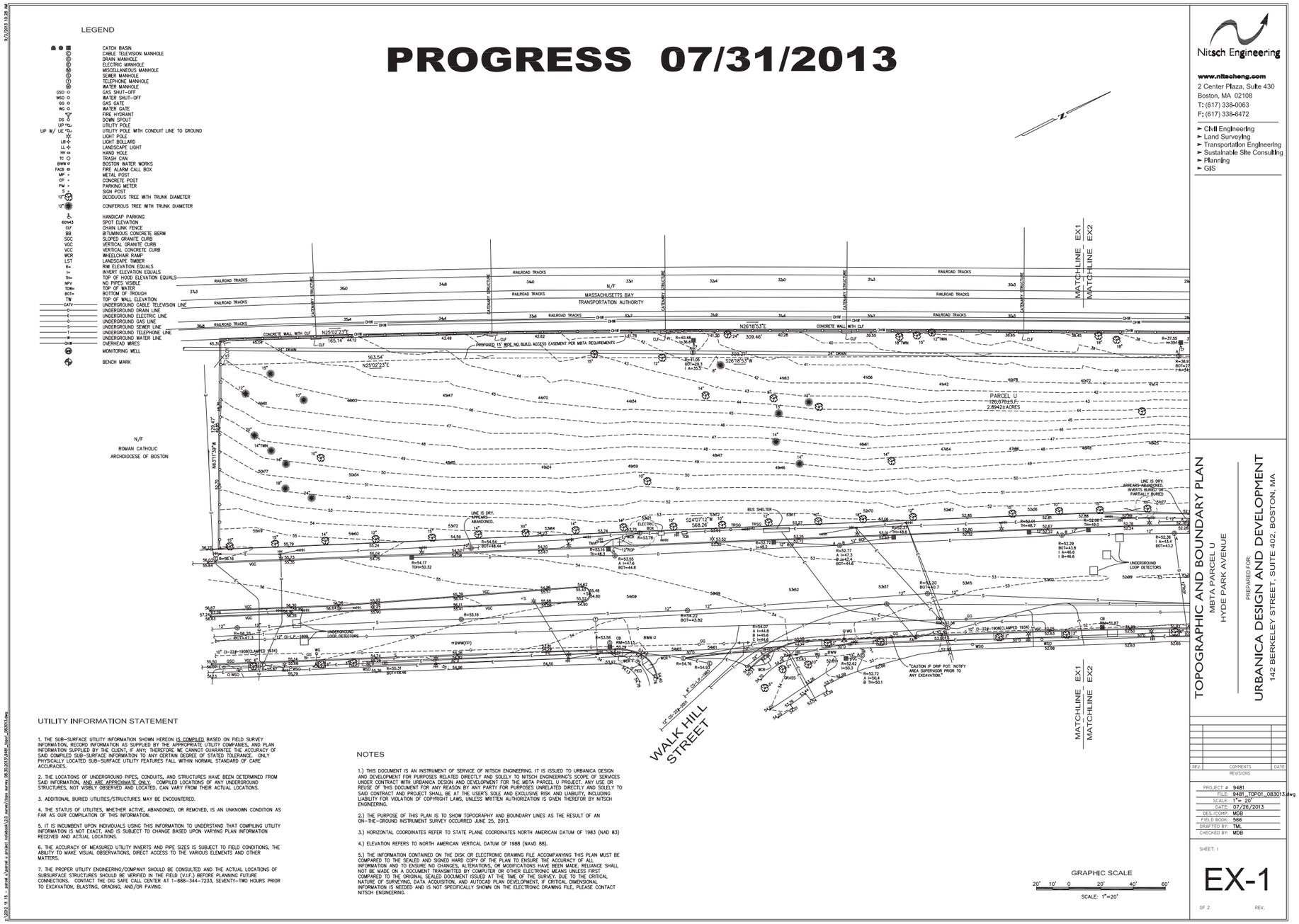
Figure 1-2:USGS Locus
MBTA Parcel U
Boston, Massachussetts

Data Source: MassGIS
Nitsch Project #9481.1

Nitsch Engineering

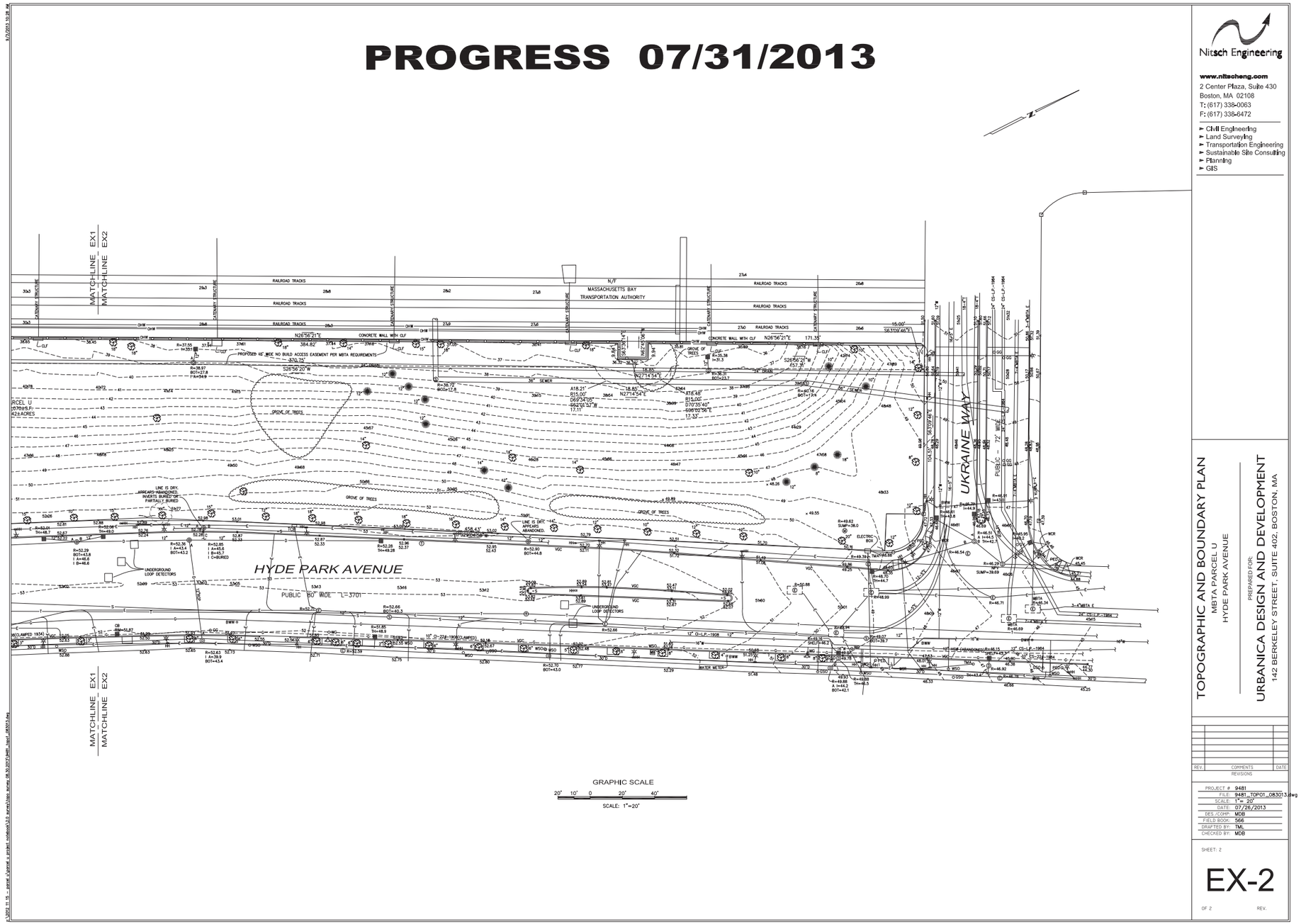
PARCEL U | FOREST HILLS

Figure 1-3. Survey Plan



PARCEL U | FOREST HILLS

Figure 1-3. Survey Plan



1.2.2 Detailed Project Description

The Proposed Project involves new development in three phases with landscaping and open space that offers a mix of homeownership townhouses and rental apartment building which includes 24 Energy Efficient Townhouses (48 condominium units +/-) and one block of 76 units of Multifamily Mixed-income rental apartments totaling approximately 193,310 square feet of gross floor area (inclusive of parking and utility areas), which in total will contain approximately 124 dwelling units +/-, a ground floor retail space and a community room. (See **Tables 1-1A, 1-2A, 1-3A**.)

The new construction for the Phase A development program of 49,260 gsf includes 24 homeownership units in townhouse configuration. The Phase B new construction development program of 49,260 gsf to follow includes 24 homeownership units in townhouse configuration. After discussions with the BRA, 6 units in the two initial phases will be designated as affordable units.

The final Phase C new development program of 94,030 includes 76 rental units, 1,620 gsf of retail space, 1,040 gsf of community space and 42 basement level parking spaces are proposed in an apartment block configuration, with 38 units as affordable units.

The Site circulation plan is designed to create a safe and pleasant entry to the Proposed Project from Hyde Park Avenue through 2-driveway ramps. On-site parking will be located in the basement garages of the townhouses and the basement level of the apartment building.

There are three major open spaces within the three phases that will provide a variety of urban outdoor experiences. The green spaces include a buffer zone between Tollgate Cemetery and Phase A development, a pocket park at Walk Hill intersection and a public park adjacent to Phase C development. These open spaces are conceived for allowing view, light and air for the residents and pedestrians along Hyde Park Avenue.

By closely following the recommendations of the 2008 Forest Hills Improvement Initiative comprehensive planning study, as discussed, the Proposed Project aims to supply much needed additional housing for Jamaica Plain in close proximity to the Forest Hills MBTA Station while respecting the residential scale and unique feel of the Forest Hills area. The Proposed Project will also contribute towards meeting the City of Boston's goal of adding 30,000 new housing units by 2020.

Table 1-1A. Phase A: Homeownership Townhouses

Lot Area:	50,528 sf +/-
Gross Building Footprint Area:	17, 034 sf +/-
Gross Square Feet:	49,260 sf +/- (including basement) 37,206 sf +/- (excluding basement)
F.A.R.:	0.74 +/-
No. of Floors:	3 and 4 floors with basement
Heights*:	42'-6" +/- and 55'-0" +/-

Table 1-1B. Phase B: Homeownership Townhouses

Lot Area:	37,180 sf +/-
Gross Building Footprint Area:	17,034 sf+/-
Gross Square Feet:	49,260 sf +/- (including basement) 37,206 sf +/- (excluding basement)
F.A.R.:	1.00 +/-
No. of Floors:	3 and 4 floors over basement
Heights*:	42'-6" +/- and 55'-0" +/-

Table 1-1C. Phase C: Rental Apartments

Lot Area:	38,362 sf +/-
Gross Building Footprint Area:	15,500 sf +/-
Gross Square Feet:	94,790 sf +/- (including basement) 78,715 sf +/- (excluding basement)
F.A.R.:	2.05 +/-
No. of Floors:	5 floors over a basement level
Height*:	65'-0" +/-

*In accordance with Boston Zoning Code

1.3 Summary of Project Impacts and Mitigation

1.3.1 Urban Design

Parcel U (the "Project") is conceived as a continuation of the long term revitalization of the Jamaica Plain's Washington Street and Hyde Park Avenue. The Proposed Project will be among the first few larger MBTA parcels to be developed from a vacant non-productive site into a lively and urban residential community with some community and retail spaces. The Project aims to bridge the different scales of the surrounding context. The Project Site is located at the Southwest corner of the Forest Hills T Station, directly bounded by the MBTA commuter rail tracks, Hyde Park Avenue, Ukraine Way and the Tollgate Cemetery.

Occupying a challenging site that mediates between Hyde Park Avenue and the MBTA Commuter Rail and Amtrak lines, two busy traffic lines, the building's design is required to be robust and to be able to convey the dynamic qualities of the two through-fares. The Site is also located at transitional zone of finer grain residential scales and urban configurations along Washington Street and Hyde Park Avenue.

The development of this parcel owned by the Massachusetts Bay Transportation Authority will provide 124 residential units, in a variety of unit types ranging from studios, 1-bedroom, 2-bedrooms and 3-bedrooms, in a couple types of urban typology: a townhouse type and a multifamily apartment building type. The Proponent has already made a number of presentations of the Proposed Project's conceptual design to the neighborhood and Boston Redevelopment Authority staff as it has continued to modify its schematic design plans.

1.3.2 Sustainable Design

The Proponent and the Project design team are committed to an integrated design approach and is using the LEED for Homes 2008 rating system and intends to meet certification as presented in **Section 3.8** and in **Figures 3-30** and **3-31** at the end of **Section 3.0**. This rating will meet or exceed Boston's Green Building standard. The LEED rating system tracks the sustainable features of the project by achieving points in following categories: Innovation and Design Process; Locations and Linkage; Sustainable Sites; Water Efficiency; Energy and Atmosphere; Material and Resources; Indoor Environmental Quality; Awareness and Education.

1.3.3 Wind

The heights of the structures in the three phases will not exceed a 65 feet. The Phase C: Rental Apartments will be the highest at 65 feet with the Phases A and B development heights not exceeding 55 feet. Wind conditions are expected to be similar to the existing conditions with the nearby 3-4 story buildings across Hyde Park Avenue; therefore, no new pedestrian level wind impacts are anticipated.

1.3.4 Shadow

Section 4-1 of this PNF provides a shadow analysis describing and graphically depicting the anticipated shadow impacts from the Proposed Project for the No Build and Build conditions.

The Project's shadow impacts are minimal and do not overcast existing buildings during the daytime hours. New shadow is generally limited to the streets surrounding the Site, with afternoon shadows reaching Ukraine Way, and late-afternoon/early-evening shadows on Hyde Park Ave. The Project's comparable height with its context and the downward slope of the Site help to keep shadows from extending much beyond Hyde Park Ave. and front yards of homes until evening hours. Overall, the Project's shadow impacts will generally be consistent with current patterns and will not adversely impact the Project Site and surroundings.

1.3.5 Daylight

Although the Proposed Project would cause an increase in daylight obstruction when compared to the existing conditions at the vacant site, the Proposed Project was designed to be of a similar massing to existing buildings along Hyde Park Avenue. The PNF Project would have reached a maximum of 65 feet in height, which is somewhat higher than the existing buildings along Hyde Park Avenue Street as well as the existing zoning, but any new obstruction is mitigated by the large width of Hyde Park Avenue, and the location of the site along the MBTA tracks at the rear of the lots. As a result, daylight obstruction values from the Proposed Project were expected to be consistent with and typical of the surrounding neighborhood.

1.3.6 Solar Glare

It is not expected that the Proposed Project will include the use of reflective glass or other reflective materials on the building facades that would result in adverse impacts from reflected solar glare.

1.3.7 Air Quality Analysis

Tech Environmental, Inc., the Project's air quality consultant, conducted analyses to evaluate the existing air quality in the Project area, predict the worst-case air quality impacts from the Project's parking garage, and evaluate the potential impacts of Project-generated traffic on the air quality at the most congested local intersections (See **Section 4.4**).

Recent representative air quality measurements from the Massachusetts Department of Environmental Protection (DEP) monitors reveal that the existing air quality in the Project area is in compliance with Massachusetts and National Ambient Air Quality Standards (NAAQS) for all of the criteria air pollutants.

The worst-case air quality impacts from the Proposed Project's parking garage will not have an adverse impact on air quality. The maximum one-hour and eight-hour ambient CO impacts from the parking garage, at all locations around the Project site, including background CO concentrations, are predicted to be safely in compliance with the NAAQS for CO.

A microscale air quality analysis was not performed for the Proposed Project due to its extremely small motor vehicle trip generation. The extremely small number of motor vehicle trips generated by the Project will not have a significant impact on the delays or the level of service at the local intersections. Therefore, the motor vehicle traffic generated by the project will not have a significant impact on air quality at any intersection in the Project area and a microscale air quality analysis is not necessary for this Project. The air quality in the Project area will remain safely in compliance with the NAAQS for CO after the Project is built.

1.3.8 Noise Analysis

Tech Environmental, Inc., the Project's noise consultant, conducted a noise study to determine whether the operation of the proposed Project will comply with the Massachusetts DEP Noise Policy and City of Boston Noise Regulations (See **Section 4.5**).

This acoustical analysis involved five steps: (1) establishment of pre-construction ambient sound levels in the vicinity of the Site; (2) identification of potential major noise sources; (3) development of noise source terms based on manufacturer specifications (where available) and similar project designs; (4) conservative predictions of maximum sound level impacts at sensitive locations using industry standard acoustic methodology; and (5) the incorporation of mitigation measures to ensure compliance with applicable City of Boston noise regulations, ordinances and guidelines and with the DEP Noise Policy.

Nighttime ambient baseline sound level (L_{90}) monitoring conducted at two locations deemed to be representative of the nearby residential areas, during the time period when human activity is at a minimum and any future noise would be most noticeable. The lowest nighttime L_{90} measured in the Project area was 49 dBA.

The potential significant sources of exterior sound from the Project have been identified as:

- Ductless Mini Splits Units with rooftop condensers on the 24 townhomes.
- VRV/VRF units or Multi zoned Minisplits with rooftop condensers on the apartment building.

The Parcel U project will not create a noise nuisance condition and will fully comply with the most stringent sound level limits set by the Massachusetts DEP Noise Policy, City of Boston Noise Regulations, and HUD's Residential Site Acceptability Standards.

1.3.9 Stormwater Management and Water Quality

The existing storm drain utility infrastructure surrounding the proposed Parcel U site appears to be of adequate capacity to service the needs of the project. Best management practices and sustainable design will be incorporated into the Project wherever practical and applicable.

Stormwater management systems will be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). Utility connections will be designed to minimize impacts to the surrounding area and all appropriate permits and approvals will be acquired prior to construction.

The proposed stormwater management systems will include water quality units and groundwater recharge systems. The Project will increase the amount of impervious area at the site compared to the existing condition. It is anticipated that the stormwater recharge systems will work to passively infiltrate runoff into the ground with a gravity recharge system. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate of stormwater discharge from the Project site in the developed condition compared to the existing condition. In addition, water quality units will be installed to reduce pollutants prior to discharging to the groundwater recharge systems.

All improvements and connections to BWSC infrastructure will be reviewed as part of the Commission's site plan review process. The process includes a comprehensive design review of the proposed service connections, assessment of project demands and system capacity.

1.3.10 Solid and Hazardous Waste

Solid Waste

During the preparation of the Site, debris, including asphalt, trash, and demolition debris will be removed from the Project Site. The Proponent will ensure that waste removal and disposal during construction and operation will be in conformance with the City and DEP's Regulations for Solid Waste.

Hazardous Waste

Based on a historical review and research of state and local files completed by IES Inc. in its Phase I Environmental Site Assessment for Parcel U (May 14, 2014), the project site is not listed on any EPA or DEP data bases, and there were no recognized environmental conditions (REC's), identified hazardous substances or petroleum products, on the Site. Nevertheless, due to the potential on-site and off-site threats of contamination, IES classifies the Site as a "Moderate/High Cleanup Risk" due to potential for groundwater contamination from adjoining properties and to historical use of the Site for storage and maintenance of railways cars.

The Proponent will provide Licensed Site Professional support services during property redevelopment activities to both maintain compliance with the MCP and to assist with planning and attaining site closure under the Massachusetts Contingency Plan (MCP).

1.3.11 Geotechnical/Groundwater Impacts Analysis

Based on a "Preliminary Groundwater Summary" completed by KMM Geotechnical Consultants, LLC on August 16, 2013, it is anticipated that there will be little or no impact to the groundwater table due to the Proposed Project. The foundations are expected to use a conventional spread footing foundation with very little subsurface work required with the below level garages, and no work below the water table. The subgrade conditions are generally considered suitable by the geotechnical consultant to support the proposed spread footing foundations. Based on eight test borings, many advanced to depths of 14 to 16 feet, indicated that fill was encountered in all test bores to depths of 9 to 12 feet. Soil character generally consisted of brown to dark brown, sand and gravel with little trace of silt. There was also trace amounts of rubble and urban fill, and boulders and stone from prior construction (which may have been residential) with some shallow concrete at one of the test borings. Groundwater was not encountered at the 10-16 feet exploration.

The proposed construction is not anticipated to have adverse effects on long-term groundwater levels because the lowest floor level in the fill areas is above the groundwater level. Roof drains and runoff from impermeable outdoor surfaces will be led to infiltration devices where there is sufficient capacity for percolation. In ledge areas, the drains will lead to detention cisterns of the required size and released gradually into storm drains. Construction mitigation measures will be incorporated into the Proposed Project to avoid any potential for ground movement and settlement.

Additional geotechnical exploration and engineering is expected to be completed as the project design progresses.

1.3.12 Construction Impacts Analysis

Section 4.7 presents impacts likely to result from the construction of the Parcel U Project and the steps that will be taken to avoid or minimize environmental and transportation-related impacts. Construction methodologies and scheduling will aim to minimize impacts on the surrounding environment. The Proponent will insure that the general contractors will be responsible for developing construction phasing and staging plans and for coordinating construction activities with all appropriate regulatory agencies. The Project's geotechnical consultant will also provide consulting services associated with foundation design recommendations, prepare geotechnical specifications, and review the construction contractor's proposed procedures.

The construction period for the Proposed Project is expected to extend for approximately 15 months for each of the three phases (A,B, and C), beginning in the 2nd Quarter 2015 and reaching completion in the 3rd Quarter 2018 for the Phase C (apartment rental) construction.

1.3.13 Historic Resources Component

The Project Site is not within, nor does it directly abut, any listed historic districts or resources. However, the Woodbourne Historic District is within one-quarter-mile radius of the Proposed Project.

The area surrounding the Project Site is a busy commercial district. Residential, retail and commercial uses characterize much of the area along Hyde Park Avenue and Washington Street. The nearby Arnold Arboretum is a United State National Landmark and 19 individual properties within one-quarter-mile radius of the Proposed Project are included in the National Register of Historic Properties (excluding properties within the Woodbourne Historic District).

It is not expected that the Project will cause adverse impacts on the historic or architectural elements of nearby historic resources outside the Project Site (see **Section 5.0**).

1.3.14 Infrastructure Systems Component

The Project's Civil and MEP Engineers will coordinate with the City agencies and private utility companies responsible for the area's utility systems as the design progresses. Utility connections will be designed to minimize impacts to the surrounding area and all appropriate permits and approvals will be acquired prior to construction.

Hyde Park Avenue contains a 12-inch sanitary sewer line, a dedicated 12-inch storm drain line, a high pressure 12-inch to 16-inch water main, a Massachusetts Water Resources Authority (MWRA) owned 24-inch water line, and various electric and telecommunication conduits.

There is a dedicated 24-inch storm drain line and a 36-inch sanitary sewer line within the site itself. The existing sewer system and water distribution and storm drain systems are shown in the figures in **Section 6.0.**

The Boston Water and Sewer Commission (BWSC) owns and operates the sanitary sewer, storm drain, and water distribution systems in the City of Boston, except as noted above. A BWSC approved Site Plan and General Service Application is required for the construction of proposed sewer, storm drain, and water connections to the main lines in Hyde Park Avenue. Proposed connections to the BWSC's sewer, storm drain, and water distribution systems will be designed in conformance with the BWSC's design standards, Sewer Use and Water Distribution System Regulations, and Requirements for Site Plans. The Proponent will submit the General Service Application and Site Plans to BWSC for review and approval prior to construction. The Site Plans will indicate the existing and proposed sewer lines, storm drain lines, and water mains within

the site and in the abutting public ways. The Site Plans will show any existing utilities to be abandoned, the locations of proposed connections, and the limit of work to be performed in the public ways. Abandoned services will be cut and capped at the main line according to BWSC standards.

The following items will be coordinated with the respective city agencies and utility companies:

- The Boston Fire Department reviews projects with respect to fire protection measures such as fire department connections, standpipes and hydrants.
- Energy and telecommunication system sizing and connections will be coordinated by the MEP Engineer with the respective utility providers.
- New utility connections are authorized by the City of Boston Public Works Department through the street opening permit process.

1.3.15 Transportation Component

Section 7.0 presents the comprehensive transportation study completed by HSH for the proposed Project in conformance with the BTD *Transportation Access Plan Guidelines* (2001). The study analyzes existing conditions within the Project study area, as well as conditions forecast to be in place under the five-year planning horizon of 2019.

The Project will provide a total of 90 parking spaces on-site, including 48 spaces for the 48 townhome units and 42 spaces for the 76 apartment units. The overall parking provision corresponds to a ratio of 0.73 parking spaces per unit, which is consistent with district-based parking goals developed by the Boston Transportation Department (BTD) for the Forest Hills area that call for a maximum of 0.75 to 1.25 spaces per residential unit.

Primary vehicular access to the site will be provided via a proposed driveway opposite Walk Hill Street along Hyde Park Avenue. This driveway is proposed to form the fourth leg of the signalized intersection. Secondary access will be provided by way of right-in entrance-only driveway in the northerly part of the site. The Project proposes to physically preclude left-turns into the northern driveway by extending the existing median on Hyde Park Avenue. Circulation throughout the site will be provided by way of an access driveway at the rear of the site that runs parallel to Hyde Park Avenue. All loading and service, including trash, recycling, and deliveries will occur on-site. In addition, adequate space has been provided on-site to accommodate residential move-in/move-out without impacting the public sidewalk, parking, or roadway. Primary pedestrian connectivity will be provided along Hyde Park Avenue.

The Proponent is committed to implementing a transportation demand management (“TDM”) program that supports the City’s efforts to reduce dependency on the automobile by encouraging alternatives to driving alone, especially during peak travel periods. Proposed measures include, but are not limited to, designating an on-site transportation coordinator,

secure covered bicycle parking, distribution of transit maps and schedules to residents, guests, and employees, and other measures.

The transportation analysis employed mode use data for the area surrounding the Project site based on 2000 U.S. Census data and BTD data for Area 6, and identifies the number of trips generated by the Project by mode. Due to the transit-oriented nature of the Project and non-auto alternatives such as ZipCar, and the Southwest Corridor, is anticipated. Many of the Project-generated trips will occur via transit, on foot, and by bicycle.

The overall Proposed Project is expected to generate only approximately 34 vehicle trips (8 in and 26 out) during the weekday morning peak hour and 45 vehicle trips (25 in and 20 out) during the weekday evening peak hour. This corresponds to an increase of less than one vehicle trip per minute on the adjacent roadway network during the peak periods.

Due to the low volume of vehicle trips generated by the Proposed Project, the overall LOS at the study area intersections will remain unchanged from No-Build Conditions. The Project proposes to add a fourth leg to the signalized intersection of Hyde Park Avenue/Walk Hill Street. This newly modified intersection will operate at an overall LOS C during both the a.m. and p.m. peak hours under the 2019 Build conditions, which is consistent with the 2019 No-Build operations. The intersection will also be provided an optimal traffic signal timing and phasing plan.

2

GENERAL INFORMATION

2.0 GENERAL INFORMATION

2.1 Applicant Information

The overall project development will be managed by Urbanica, Inc., representing JP Parcel U, LLC. Phase A and B (Townhouses) will be developed by Urbanica, Inc, and the Mixed Income Housing Partner for Phase C (Mixed Income Rental Apartments) will be The Community Builders, Inc.

2.2 Project Proponent: URBANICA

Urbanica, Inc is a design/development company specializing in the transformation of under-utilized buildings and sites into extraordinary living and working spaces in the metro-Boston area. Urbanica sees each project as a unique opportunity to enhance the social, economic and aesthetic conditions of the local environment. With its design-oriented focus, Urbanica believes that uncompromising progressive design is a critical component in this equation, “DIFFERENTIATION BY DESIGN”.

Specifically, the work involves the reuse of a historic structures and challenging urban sites. Urbanica seeks to infuse these buildings and places with a new life and purpose. Urbanica has an outstanding track record of successfully completed projects in both public and private ventures.

Urbanica has successfully finished several publically awarded projects; a former police station in Somerville, the former Area D4 police station in Boston’s South End, and the Engine 1 Fire Station in Belmont as well as most recently, the 1st LEED Platinum certified Energy Positive Townhouses in the City of Boston.

In the past decade, Urbanica has also completed two Boston Redevelopment Authority (BRA) sponsored projects: a loft building conversion in the South End and the conversion of a warehouse into the Harborside Inn on State Street in Boston.

Each of Urbanica’s projects is uniquely developed through collaborations between designers, engineers, consultants, investors, financial institutions, legal advisors, real estate professionals and local leaders; each is brilliantly executed to the highest degree of quality and each resulted in highly desirable products for end users to live in and enjoy.

MISSION AND VISION

Public/Private Partnership: Urbanica specializes in converting city-owned properties and land parcels that are historically significant, underutilized or socio-economically strategic. By collaborating with all stakeholders - governmental agencies, zoning, planning and historical commissions, local neighborhood communities and business groups - Urbanica is able to create and complete transformative projects in emerging neighborhoods and challenging sites.

Vertically Integrated: By having a talented in-house development/design/construction team, Urbanica creates projects of multiple scales and complexities. The company does not believe in disciplinary boundaries. Each of the team members has a diverse range of skills and talents. The vertically-integrated approach also allows the company to take control of the entire process, ensuring top quality from concept to final execution.

Design-Oriented Development: Urbanica believes in using "Design" as a tool to improve our daily lives. The developments are distinguished by their design-oriented focus. Urbanica attempts to challenge the status quo of development and attempt to deliver a unique designer lifestyle.

Modern Contextual: Rather than taking an avant-garde approach, Urbanica is interested in working with the existing urban fabric and enhancing the culture of the community. The company strongly advocates for designs that are sensitively adapted to our contemporary milieu.

Social Entrepreneurship: The company believes in adding value to society and in sharing a common vision with the local community. The whole of the development is greater than the sum of its parts; the well-being of surrounding community is crucial for Urbanica's success as entrepreneurs in the built environment.

SCOPE OF SERVICES

Development: Urbanica identifies the potential in less-than-obvious places. The company has 30 years of experience in transforming these underutilized buildings and sites into icons of contemporary spaces. The projects range from single family homes to mixed-use high-rises.

Design Management: Urbanica adds value to the developments by combining astute design sensibilities. Partnering with cutting edge local and international designers, we create new interventions that are contextually sensitive yet innovative. We believe good design is essential not only financially but also for the well-being of society.

Investment: The Company initiates projects with solid financial investors, respected local business partners and governmental agencies, to help create wealth and growth in the local economy.

Construction Management: Urbanica manages a team of top-notch subcontractors and vendors who help translate our visions into reality using the latest technology and sustainable methods.

Brand And Marketing: Urbanica believes in the total package - creating a brand image that is consistent with the developer's vision and design intent through marketing using effective and visually striking campaigns.

KAMRAN ZAHEDI

The Principal of Urbanica is Kamran Zahedi. Over the past twenty five years, Mr. Zahedi has designed, developed and built many projects in metropolitan Boston. More recently, he has focused his efforts on RFPs of city-owned historic buildings and converting them into new residential uses.

To each venture, Mr. Zahedi brings a passion for urban form, progressive design, and a respect for the existing context. Graduating from MIT in 1980 with a degree in Architecture and Civil Engineering, Kamran made Boston as his home base and began his entrepreneurial ventures at a young age.

He traveled up north to work on renovating old mills in New Hampshire. For the past 30 years, by happenstance and by strategy, he has worked on more than a dozen renovations and new-built projects of various scale; each unique with its historical contexts and challenges.

Driven by a passion for reimagining a new future for urban living, a penchant for progressive design and a respect for existing context, Kamran has created a niche for transforming and revitalizing living, working and playing spaces in Boston and inspires his team to bring something entirely new to the table.

Today, Urbanica has grown from a company of one into a vertically integrated design-oriented development firm with a focus on private and public partnerships. With great energy, Kamran continues to search for new ideas and inspirations in creating great spaces.

EDUCATION

B.S. in Architecture and Civil Engineering from MIT, 1980
Certification, Center for Real Estate, MIT, 1991
Licensed Construction Supervisor, Boston, MA

EXPERIENCE

President of Urbanica, 2002 - Present
President of Urbanica Construction., 1996 - Present
Manager of Urbanica Design, LLC, 2001 - Present
President of Built Form Development, Design and Construction, 1981-96
General partner for various real estate partnerships since 1985
Former Faculty at the Boston Architectural Center, 1986

Selected Urbanica development projects include the following:

MELNEA HOTEL + RESIDENCES, Dudley Square, Boston, MA (Permitting Stage)

Melnea Hotel + Residences is a mixed use development for Parcel 9 at Melnea Cass Boulevard and Washington Street in Boston, MA. This exciting project will serve as an iconic gateway for the Roxbury and Dudley Square areas, connecting to the South End and the greater metropolitan Boston region. The project consists of ground floor commercial, 50 units of mixed income housing and over 100 units of parking underground. The anchor of the project will be a 145-room hotel. The project will bring a source of permanent job generation for the neighborhood as well as a buzz of urban activities.

50 SYMPHONY ROAD, Fenway, Boston, MA (Permitting Stage)

Urbanica, Inc and Urbanica Design are acting as development and design consultants on this interesting project at the Fenway neighborhood. The goal is to replicate the highly successful modern-contextual design formula of 691 Residences. The new construction will consist of 20 residential units on five levels and a basement parking level. The proposed project is inspired by the bow-front townhouses in the Symphony Road area. The bow, square or angular bay windows in the existing building stock defines the street edge. By smartly using contextual cues and rhythms, the design of 50 Symphony Road aims to be a subtle contemporary interpretation of a classical bow-front building.

74 HIGHLAND STREET EHOMES, Roxbury, Boston, MA (Construction start 2014)

The project is a public-private partnership between Urbanica and Boston Housing Authority. It is part of a series of energy efficient townhouses to be built in the Fort Hill/Highland Park neighborhood. The building consists of 7 units of townhouses. These units will be three bedroom units. Sited on a currently vacant parcel in a vibrant corner in the urban Roxbury neighborhood, the project will infill to the current neighborhood fabric. The project will follow best practices learned from the E+ prototype by offering energy efficient design.

226-232 HIGHLAND STREET E+ TOWNHOUSES, Roxbury, Boston, MA (Completed 2013)

The project was conceived as a replicable prototype of efficient and sustainable residential construction for the city of Boston. The building consists of four three bedroom townhouses, approximately 2,000 sf each. Sited on a currently vacant parcel in a vibrant urban neighborhood, the proposal will fill and densify the current neighborhood fabric. The building form and orientation serve to maximize natural daylight and solar gain for the photovoltaic array that will generate more electricity than is needed. Our approach includes two major strategies for energy reduction: first, a super insulated envelope minimizes heat transfer without relying on mechanical conditioning techniques; second, a feedback mechanism provides information and prompts to users in the house regarding their energy-related activity.

691 RESIDENCES, 691 Massachusetts Avenue, South End, Boston, MA (Completed 2011)

six9one Residences is one of the last new-built developments in South End, Boston, with approximately 45,000 sq ft of space including the basement garage. There are 40 residential units, ranging from 550 sf to 1,800 sf with unit types including studio, one bedroom and two bedrooms residences. There are also 30 deeded parking spaces available. Ground floor units are proposed as Small Office Home Office or “SoHo” units, taking advantage of the easy street access. These six ground floor units are intended to attract professionals with a home office, or artists who would like to house a small gallery.

D4 SOUTH END, 7 Warren Avenue, Boston, MA (Completed 2006)

This project involved the conversion of former D-4 police station into a new luxury condominium building with twenty five units. The existing shell was restored to its former state with only minor modifications on the principal elevations. The rear elevation consists of a new two-story block which taken together with the existing building envelope, forms a courtyard. The new courtyard is covered with a glass roof and conform to green building concepts. This project was awarded to Urbanica in response to an RFP sponsored by the BRA in 2003. Urbanica was selected over some of the most prominent developers in the city largely based on their growing reputation as “one of the top design/development companies in Boston.”

URBANICA 50 SOMERVILLE, 50 Bow Street , Somerville, MA (Completed 2005)

This project was awarded to Urbanica in response to an RFP in 2003. Urbanica was selected by the City of Somerville, in large part because of their experience in restoring and renovating historic buildings. The project is a renovation of a former police station into a fourteen unit residential building. Part of the work included rebuilding the mansard roof that was lost to a fire decades ago. The scope of exterior work also involved restoring the fine detail and character of the historic building. In contrast to the traditional exterior, the interior is characterized by open, light filled modern spaces. Here, a rich palette of natural materials such as mahogany wood and honed stone finishes was used to create the units interiors.

ENGINE 1 BELMONT, 445 Trapelo Road, Belmont (Completed 2005)

This project involved the conversion of the former fire station at Waverly Square, Belmont into six townhouse residences. Five of the condominiums is housed in the main building while the sixth residence is a new 1600sf addition. The new structure is comprised of a two-story townhouse built on top of the existing foundation of one wing of the former fire station. Its primary building materials are perforated copper panel and an aluminum curtain wall system. The interplay between existing and new addition brings a level of contemporary sophistication to the Waverly Square neighborhood.

Figure 2-1. Portfolio of Selected Urbanica Projects

Melnea Hotel and Residences
Roxbury, Boston, MA

50 Symphony Road,
Fenway, Boston, MA

D4 Condominiums
South End, Boston, MA

691 Residences
South End, Boston, MA

PARCEL U | FOREST HILLS

Figure 2-1. Portfolio of Selected Urbanica Projects

74 Highland/1-13 Dorr Street eHomes
Roxbury, Boston, MA

Engine 1 Residences
Belmont, MA

226-232 Highland St EPlus Homes
Roxbury, Boston, MA

Urbanica 50
Somerville, MA

2.3 Mixed Income Housing Partner: The Community Builders

The Community Builders (TCB) was founded in 1964 as South End Community Development with a focus on preserving and rehabilitating homes in Boston's South End to provide quality, affordable housing. From there, TCB has grown over 50 years to complete 26,000 units of housing in over 330 developments in 15 states with over $2.5 billion in project financing assembled from a wide variety of public and private sources. TCB is committed to the long-term success of our developments and our residents; we currently own and operate 10,000 units of mixed income housing. TCB's staff currently consists of 500 talented and experienced professionals located in 15 cities across the Mid-Atlantic, Northeast, and Midwest, including our regional hubs in Boston, Chicago and Washington, DC.

Development: TCB's development mission is to work with communities to develop and implement their visions for providing quality, diverse, stable neighborhoods. TCB has a proven track record of completing complex, community-driven projects on budget and on time. TCB's housing developments vary in scale and complexity from small rehabilitation projects to large master-planned communities. TCB works with a diverse group of partners including public housing authorities, resident groups, faith-based organizations, community development corporations, social service providers and universities. TCB builds or renovates all kinds of housing - family rental housing, senior and special needs housing, single room occupancy apartments, and home ownership opportunities for first-time homebuyers. TCB uses a wide variety of public and private financing sources - tax exempt bonds, conventional private debt financing, syndication of Low Income Housing Tax Credits, and a wide array of government grants and loans provided by local, state, and federal sources. TCB's ownership role enables it to be a long-term participant in the integration of housing and support services with resident participation.

In addition to TCB's extensive track record in residential housing development, it has also developed mixed-use projects that include offices, retail, restaurants, health centers, preschools, youth programs and community centers.

TCB has a tremendous track record of accomplishment in Massachusetts, including successful development projects for our own portfolio as well as consulting services to neighborhood and resident organizations. Since its founding in 1964, TCB has participated in the development of over 12,000 housing units in the Commonwealth, many of which are located in City of Boston, including such early signature projects as Tent City and Langham Court in the South End and more recent mixed-income, mixed-use developments such as the 240-unit mixed-income, mixed-use Charlesview in Allston-Brighton and the 103-unit 225 Centre Street in Jackson Square.

Property Management: TCB's property management department's mission is to fulfill our long-term commitment to our residents and neighborhoods. TCB does this by providing exceptional physical, fiscal and social oversight of our properties. TCB understands the need to create a strong sense of community at each property and also to fully integrate each property into the

greater neighborhood and community as a whole. This requires not only sound "bricks and mortar" management to ensure the fiscal viability of the properties but also the delivery and facilitation of services to our residents that enable them to maximize their potential and succeed both socially and financially. TCB is a long-term stakeholder in the communities we serve. This sets TCB aside from other typical property management entities. TCB has a proven track record and experience operating successful communities for over four decades.

Legal Capacity: TCB's legal department has unparalleled experience in permitting, structuring and negotiating complex real estate transactions involving multiple financing sources. TCB's in-house attorneys typically provide core services relating to the primary structuring and closing of complex transactions, including structuring and negotiating financing, title and real estate conveyance, zoning analysis and obtaining zoning relief, review of environmental matters, organization of ownership entities including nonprofit corporations and limited partnerships, and organizing closings on complex financings involving multiple private and public funding sources.

Asset Management: The complex financing structures and regulatory requirements inherent in affordable housing obligate owners to understand and respond to the needs of multiple funders, while making sure that properties live up to affordability commitments. TCB has a dedicated asset management team engaged in ongoing, proactive tracking of operating performance indicators and financial indicators, helping sustain the long-term economic and physical viability of each property in our affordable housing portfolio.

Construction Management: TCB has been managing housing development and construction for almost 50 years, and our extensive experience in this area of the industry enables us to provide services during all phases of development, from master planning through post construction. TCB's construction management department provides in-house support to projects owned by either TCB or an affiliate. TCB Construction Management's scope of work includes preparation of RFP's and RFQ's for procurement of professional services and general contractors. The 2013 construction pipeline included 8 active sites with a value of $178M. TCB consistently completes projects on time and within budget.

Figure 2-2. Portfolio of Selected TCB, Inc Projects

The **Community Builders**, *Inc.*

CHARLESVIEW RESIDENCES

The Community Builders, Inc. (TCB), on behalf of its development partner, Charlesview, Inc, has negotiated a land swap along with financial resources to effectuate the relocation and reconstruction of Charlesview Apartments. Charlesview Apartments, located in Allston, Massachusetts, is a 213 unit low- and moderate-income housing development created through Urban Renewal in 1970, supported by a 200-unit Section 8 Project Based Assistance Contract. The property is physically obsolete and in need of redevelopment. Charlesview Apartments is owned by Charlesview, Inc., an interdenominational faith-based, 501(c)(3) nonprofit organization having Charlesview Apartments as a single asset.

The relocation portion of the replacement strategy includes increasing the existing housing program to 240 family rental units, including a range of unit types from one-bedroom flats to four-bedroom townhouses, accommodating a variety of family types and sizes. The redevelopment site is less than a half mile from its current location, on an eight-acre portion of the site of the Brighton Mills Shopping Center.

The design incorporates the traditional neighborhood street grid and building types to seamlessly blend into the surrounding community. The overall redevelopment program includes significant infrastructure and open space. The program includes approximately 25,000 gsf of space for commercial and community uses, new streets and parks, and underground parking for 243 cars. One-hundred units of homeownership housing will be built on adjacent parcels as part of the future mixed-tenure community.

The financial packaging includes Tax Exempt Bond/4% LIHTC financing that will generate $27 million in LIHTC equity, a replacement cost contribution from Harvard University, approximately $45 million in debt leveraged from the portion of the Section 8 Contract to the new site and $2 million in soft gap financing from the State.

Charlesview Residences **at a Glance**

- The relocation and reconstruction of Charlesview Apartments, a 213 unit low- and moderate-income housing development, into a new 340-unit mixed-income, mixed-use community.
- **TCB Role**: Co-Developer
- **Financial Participants**: MassHousing, US Department of HUD, AEGON USA Realty Advisors, Harvard University, Life Initiative, Massachusetts DHCD, CEDAC
- **Total Development Cost**: $143 million

Charlesview Residences – Allston, MA

"This is a wonderful development for the residents of Charlesview, the Allston Brighton neighborhood, and the City of Boston. It will provide beautiful new homes for families, revitalize and enliven a section of our City and add much-needed jobs."

Boston Mayor Thomas M. Menino

Regional Hubs

BOSTON
95 Berkeley Street
Suite 500
Boston, MA 02116
P: 617-695-9595

WASHINGTON, DC
1602 L Street, NW
Suite 401
Washington, DC 20036
P: 202-552-2500

CHICAGO
135 South LaSalle Street
Suite 3350
Chicago, IL 60603
P: 312-577-5555

www.tcbinc.org

Figure 2-2. Portfolio of Selected TCB, Inc Projects

The **Community Builders**, *Inc.*

225 CENTRE STREET

Forty years ago, an ill-fated highway expansion project bulldozed homes and businesses in Jamaica Plain's Jackson Square, disrupting what had been a closely knit neighborhood and leaving much of it as vacant or underutilized land. In 1995, a consortium of community groups, including the Jamaica Plain Neighborhood Development Corporation, Urban Edge and the Hyde Square Task Force, began planning the comprehensive redevelopment of Jackson Square. Working closely with city and state officials and a private developer, Mitchell Properties, the team created a master plan that includes over 400 units of housing, 60,000 square feet of retail space, 13,000 square feet of office space and 50,000 square feet of community facilities. 225 Centre Street is the first phase of this new $250 million redevelopment effort.

A joint venture between The Community Builders, Inc. and Mitchell Properties, 225 Centre Street has received tremendous support from city, state and local officials and community stakeholders. The project will use $2.3 million in state issued low-income housing tax credits, $2 million in Department of Housing & Community Development (DHCD) program subsidies and another $503,988 in federal low-income housing tax credits.

The new mixed-use/mixed-income building will feature 103 rental units, including 35 affordable units, over 16,000 square feet of commercial/retail space, an underground parking structure and dramatic landscape improvements. Ten of the affordable rental units will be reserved for extremely low-income families. Overall project costs are estimated at approximately $50 million and construction is expected to start in April 2011.

225 Centre Street is a transit-oriented development and located immediately adjacent to the Jackson Square MBTA station. The site is less than 2.5 miles from downtown Boston, ½ mile from Northeastern University and the Longwood medical area. Roxbury Community College is located just two blocks from the site.

225 Centre Street **at a Glance**

- The first phase of an ambitious 14-building, $250 million redevelopment effort in the Jackson Square community of Boston's Jamaica Plain neighborhood.
- **TCB Role**: Co-Developer with Mitchell Properties
- **Total Development Cost**: $52 million

225 Centre Street – Boston, MA

Regional Hubs

BOSTON
95 Berkeley Street
Suite 500
Boston, MA 02116
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WASHINGTON, DC
1602 L Street, NW
Suite 401
Washington, DC 20036
P: 202-552-2500

CHICAGO
135 South LaSalle Street
Suite 3350
Chicago, IL 60603
P: 312-577-5555

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Figure 2-2. Portfolio of Selected TCB, Inc Projects

The **Community Builders**, Inc.

East Liberty Place North – Pittsburgh, PA

Photograph courtesy of STRADA

"Who would ever have thought that a group of low-income residents would give this much input and be heard. Promises were made, and promises are being kept."

Alethea Sims, President, Coalition of Organized Residents (COR)

Regional Hubs

BOSTON
95 Berkeley Street
Suite 500
Boston, MA 02116
P: 617-695-9595

WASHINGTON, DC
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Suite 401
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CHICAGO
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EAST LIBERTY PLACE NORTH

East Liberty Place North, located on the 5800 block of Penn Avenue in Pittsburgh, is the redevelopment of the north parcel of the former East Mall Apartments site on Penn Avenue in the East Liberty neighborhood, a neighborhood that is coming back to life after thirty years of decline and stagnation. This new, 54-unit mixed-income, mixed use, elevator building features three floors of environmentally-friendly apartments above an 11,000 s.f. ground-floor commercial space, management offices, and community activity areas. The residential and commercial components are structured as separate condominiums.

The community features attractive, spacious, and well-appointed apartments that meet or exceed local market-rate offerings. Building systems integrate green technologies such as ENERGY STAR rated appliances and lighting fixtures, high-efficiency heat-pumps, and a focus on air quality in the decisions on materials and finishes and ventilating where possible. The building achieved LEED Gold certification and is the region's first LEED for HOMES multifamily certified project and TCB's first LEED certified project.

The Community Builders, Inc. (TCB) is the property's management agent and was the designated developer by the Urban Redevelopment Authority of Pittsburgh (URA). TCB will also develop the site across Penn Avenue to the south. The property is near TCB's other transformative neighborhood properties: New Pennley Place, Pennley Commons, and Penn Manor. The design for East Liberty Place North emerged from a charrette process and was informed by advice from former residents, community organizations, City leaders, and other stakeholders. The building is in scale with East Liberty and the Penn Avenue streetscape and was designed to support additional redevelopment around it. The U-shaped, approximately 75,000 square foot building has contemporary craftsman styling with a masonry and metal-accented façade. East Liberty Place North is the western gateway to East Liberty's downtown district and provides a strong residential anchor and new street level commercial/retail opportunities.

East Liberty Place North continues the significant local commitment to replace three blighted, HUD-subsidized properties (the "Federal American" properties) with new mixed-income developments. It provides 54 new one- and two-bedroom apartments with 38 units reserved for low-income households, 11 units reserved for households with incomes between 60% and 80% AMI, and five market-rate units with no income restrictions. Former Federal American tenants have admissions priority.

East Liberty Place North at a Glance

- 54 new environmentally-friendly family rental homes above 11,000 s.f. of ground-floor commercial space.
- **TCB Role**: Developer, Owner, and Management Agent
- **Financial Participants**: PA Housing Finance Agency, Urban Redevelopment Authority of Pittsburgh (with funding via US Department of HUD), Dollar Bank, The Federal Home Loan Bank – Pittsburgh via Citizens Bank, The Pittsburgh and The Home Depot Foundations, and equity from AEGON USA Realty Advisors
- **Total Development Cost**: $12 million — Residential Condo: $10 million; Commercial Condo: $2 million

2.4 Project Team

Property Owner	**Massachusetts Bay Transportation Authority ("MBTA")**
Developer/ Proponent	**Urbanica, Inc (Manager of JP Parcel U, LLC)** 142 Berkeley Street, Suite 402 Boston, MA 02116 T. 617.654.8900 Kamran Zahedi, kzahedi@urbanicaboston.com Shawn Pang, shawn@urbanicaboston.com
Mixed Income Housing Partner	**The Community Builders, Inc** 95 Berkeley Street, Suite 500 Boston, MA 02116 T: 857.221.8672 Eliza Datta, edatta@TCBINC.ORG James Madden, jmadden@TCBINC.ORG
Article 80 Permitting Consultant	**Mitchell L. Fischman Consulting LLC ("MLF Consulting")** 41 Brush Hill Road Newton, MA 02461 T : 781.760.1726 Mitchell Fischman, mitchfischman@gmail.com
Legal Counsel	**Mackenzie & Associates, P.C.** 183 State Street, Suite 6 Boston, MA 02109 T: 781.408.1425 Joseph Feaster, jfeaster@mckenzielawpc.com

Architect	**Urbanica Design** 142 Berkeley Street, Suite 402 Boston, MA 02116 T: 617.654.8900 Stephen Chung, AIA, stephen@urbanicaboston.com Shawn Pang, shawn@urbanicaboston.com
Landscape Architect	**Ground, Inc** 6 Carlton Street, Somerville, MA 02143 T: 617.718.0889 Shauna Gillies-Smith, sgs@groundinc.com Olivera Berce, oberce@groundinc.com
LEED/Sustainable Consultant	**Conservation Services Group** 50 Washington Street, Suite 3000 Westborough, MA 01581 T: 508.365.3204 Michael Schofield, mike.schofield@csgrp.com
Transportation Planner/ Engineer	**Howard/Stein-Hudson Associates, Inc.** 38 Chauncy Street, 9th Floor Boston, MA 02111 T: 617.482.7080 Fax: 617- 482-7417 Joe SanClemente P.E., jscanclemente@hshassoc.com
Civil Engineer/Surveyor	**Nitsch Engineering** 2 Center Plaza, Suite 430 Boston, MA 02108 T:617.338.0063 William Maher, P.E., LSIT, WMaher@nitscheng.com

Geotechnical Engineer	**KMM Geotechnical Consultants, LLC** 7 Marshall Road Hampstead, NH 03841 T: 603.489.5556 Kevin Martin, P.E., kevinmartinpe@aol.com
Environmental/Hazardous Waste Engineer	**IES Environmental Consultants, Inc** 7 Kimball Lane, Building A Lynnfield, MA 01940 T: 617.623.8880 Steve Iorio, siorio@iesinc.com
Construction Manager	**Urbanica Construction** 142 Berkeley Street, Suite 402 Boston, MA 02116 T: 617.654.8900 Kamran Zahedi, kzahedi@urbanicaboston.com Justin Kreger, justin@urbanicaboston.com
Noise and Air Consultant	**Tech Environmental, Inc.** Hobbs Brook Office Park 303 Wyman Street, Suite 295 Waltham, MA 02451 Tel: 781-890-2220 x30 Mark C. Wallace, QEP, MWallace@techenv.com

2.5 Project Timeline*

Construction Commencement	**Phase A** – Anticipated for Spring 2015 **Phase B** – Anticipated for Spring 2016 or earlier **Phase C** – Anticipated for Spring 2017
Construction Completion	**Phase A** – Anticipated for Summer 2016 **Phase B** – Anticipated for Summer 2017 **Phase C** – Anticipated for Fall 2018
Status of Project Design	Schematic Design

*The timeline is subject to change due to timing of permits, approvals and grant application cycles.

2.6 Legal Information

Legal Judgments or Actions Pending Concerning the Proposed Project:

None.

History of Tax Arrears on Property Owned in Boston by the Applicant:

There is no current or past history of tax arrears on property owned by the Applicant.

Nature and Extent of Any and All Public Easements:

The Site is bounded by utility easements for sewer, electric, telephone and gas.

2.7 Public Benefits

The development of Parcel U includes housing creation, urban design improvements, job opportunities and additional tax revenues. By replacing an underutilized and challenging surplus parcel of land, the Proposed Project will substantially contribute to improving the pedestrian and neighborhood vitality, as well as the urban design and architectural character of the area. The Proposed Project will provide the following substantial benefits to the City and its residents:

- Redevelop an underutilized and surplus parcel of land leftover from the Southwest Corridor Improvement Initiatives into a vibrant transit oriented and energy efficient residential development that is consistent with the Forest Hills Improvement Initiative;
- Introduce 44 affordable housing units for rental and purchase;

- Introduce a number of residential types into the neighborhood, both rental and purchase, ranging from studio to 3 bedroom units to meet housing demands from all sectors of society;
- Revitalize an underutilized urban area by promoting efficient land use, promoting energy efficiency and promoting alternative modes of transportation and promoting pedestrian activity;
- Introduce high-quality architecture to trigger a transformative effect on neighborhood revitalization;
- Add neighborhood scale retail space and community space to activate the public realm;
- Support the City's goal for a sustainable future through the development of an energy efficient and environmentally friendly building that will strive to achieve a e LEED Silver Certifiable status;
- Provide approximately 124 new units of housing in close proximity to public transit opportunities;
- Contribute towards meeting the City of Boston's goal of adding 30,000 new housing units by 2020;
- Provide new site landscaping treatments with streetscape improvements and the introduction of at least one pocket park open to public use;
- Pedestrian landscape and experience will be enhanced with preservation of the existing Linden street trees and other streetscape amenities;
- Development serves as an example of sustainable and environmentally responsible construction and transit oriented development;
- Project will create construction jobs over the length of the project;
- New resident introduction stimulates the local economy by creating a spillover economic effect for neighboring retail and commercial spaces; and
- Project will increased annual property tax revenues for the City of Boston

2.8 Regulatory Controls and Permits

The Proposed Project is located within the Multifamily Residential Sub-district (MFR) of the Jamaica Plain Neighborhood District (Article 55) as defined by the Boston Zoning Code. The Proposed Project will require variances, dimensional relief and potential conditional use permits from the City of Boston Board of Appeal for certain use, dimensional, parking, and other violations.

2.8.1 Boston Zoning Code – Use Requirements

The Proposed Project includes a number of principal uses including residential townhouses, residential multi-family apartments, a ground floor retail space and a community room. The Project also has accessory parking at the basement level.

Pursuant to the Article 55, Table A of the Boston Zoning Code, townhouse residential use with accessory parking and multi-family apartment dwelling use with accessory parking are "Allowed". Ground floor retail use is "Forbidden", and the Community Space use is "Conditional" within the MFR sub-district. Therefore, the Project requires Conditional Use permits for the retail Space and community space.

2.8.2 Boston Zoning Code – Dimensional Requirements

Tables 1-2A through **1-2C** below summarizes the dimensional requirements in the Jamaica Plain Neighborhood District, as set forth in Table E of Article 55 of the Boston Zoning Code, and compares the requirements to the dimensions for the Proposed Project. A breakdown of the dimensional variances required for each phases is included in **Tables 1-2A** through **1-2C**.

For a project that is subject to Large Project Review, required off-street parking spaces and off-street loading facilities are expected to be determined as a part of the Large Project Review in accordance with the provisions of Article 80 of the Boston Zoning Code. Design elements of the Project will also be reviewed pursuant to Large Project Review.

Table 2-2A. Parcel U Zoning Analysis Dimensional Requirements (Phase A – Condo Townhouses)

Dimensional Element		Multifamily Residential (Rowhouse/Townhouse)	Phase A[1]	Variance(s) Required?
Lot Area Minimum		3,000 sf/ for up to 4 units per building	72,000 sf required 50,528 sf provided	Yes
Additional Lot Area		3,000 sf/ for up 4 units per additional building	72,000 sf required 50,528 sf provided	Yes
Lot Width Min		30'	21'-0" +/-	Yes
Lot Frontage Min		30'	21'-0" +/-	Yes
Floor Area Ratio Max		1.0	0.74 +/-	No
Building Height Maximum		3 story, 35'	3 story, 42'-6" +/- 4 story, 55'-0" +/-	Yes
Minimum Usable Open Space (Square Feet Per D.U.)		200 sf per dwelling unit	Approx. 1100 sf +/- per dwelling unit	No
Minimum Front Yard		15'	18'-3" +/-	No
Minimum Side Yard		10'	9'-8" +/-	Yes
Minimum Rear Yard		20'	29'-2" +/-	No
Maximum Rear Yard by accessory		25%	N/A	N/A
Parking	**Retail**	2 per 1,000 sf	N/A	N/A
	Community	1 per 1,000 sf	N/A	N/A
	Residential	1-3 units: 1.0 per dwelling 4-9 units: 1.25 per dwelling 10+ units: 1.5 per dwelling	1 per dwelling unit (24 dwelling units total)	Yes

1. The dimensions described in this above table may change as the Proposed Project undergoes design review with the BRA.

N/A = Not Available or Not Applicable

Table 2-2B. Parcel U Zoning Analysis Dimensional Requirements (Phase B - Condo Townhouses)

Dimensional Element		Multifamily Residential (Rowhouse/Townhouse)	Phase B[1]	Variance(s) Required?
Lot Area Minimum		3,000 sf/ for up to 4 units per building	72,000 sf required 37,180 sf provided	Yes
Additional Lot Area		3,000 sf/ for up 4 units per additional building	72,000 sf required 37,180 sf provided	Yes
Lot Width Min		30’	21’-0” +/-	Yes
Lot Frontage Min		30’	21’-0” +/-	Yes
Floor Area Ratio Max		1.0	1.00 +/-	No
Building Height Maximum		3 story, 35’	3 story, 42’-6” +/- 4 story, 55’-0” +/-	Yes
Minimum Usable Open Space (Square Feet Per D.U.)		200 sf	Approx. 790 sf+/- per dwelling unit	No
Minimum Front Yard		15’	17’8” +/-	No
Minimum Side Yard		10’	2’-2” +/-	Yes
Minimum Rear Yard		20’	22’-0” +/-	No
Maximum Rear Yard by accessory		25%	N/A	N/A
Parking	**Retail**	2 per 1,000 sf	N/A	N/A
	Community	1 per 1,000 sf	N/A	N/A
	Residential	1-3 units: 1 per dwelling 4-9 units: 1.25 per dwelling 10+ units: 1.5 per dwelling	1 per dwelling (24 units total)	Yes

1. The dimensions described in this above table may change as the Proposed Project undergoes design review with the BRA.

N/A = Not Available or Not Applicable

Table 2-2C. Parcel U Zoning Analysis Dimensional Requirements (Phase C - Rental Apartments)

Dimensional Element		Multifamily Residential (Other Use)	Phase C[1]	Variance(s) Required?
Lot Area Minimum		4,000 sf for first 3 units	77,000 sf required 38,362 sf provided	Yes
Additional Lot Area		1,000 sf for each additional unit	77,000 sf required 38,362 sf provided	Yes
Lot Width Min		40’	234’ +/-	No
Lot Frontage Min		40’	234’ +/-	No
Floor Area Ratio Max		1.0	2.05	Yes
Building Height Maximum		3 story, 35’	5 story over basement, 65’-0” +/-	Yes
Minimum Usable Open Space (Square Feet Per D.U.)		150 sf	Approx. 200 +/- per dwelling unit	No
Minimum Front Yard		15’	9’-2” +/-	Yes
Minimum Side Yard		10’	13’-2” +/- minimum	No
Minimum Rear Yard		20’	20’	No
Maximum Rear Yard by accessory		25%	N/A	N/A
Parking	**Retail**	2 per 1,000 sf	8 curbside for 1,620 sf of retail	No
	Community	1 per 1,000 sf	8 curbside for 1,040 sf of community	No
	Residential	1-3 units: 1.0 per dwelling 4-9 units: 1.25 per dwelling 10+ units: 1.5 per dwelling	0.55 per dwelling (42 parking spaces for 76 dwelling units)	Yes

1 The dimensions described in this above table may change as the Proposed Project undergoes design review with the BRA.

N/A = Not Available or Not Applicable

Table 2-3. Preliminary List of Permits or Other Approvals Which May be Sought

Federal Agencies	
U.S. Environmental Protection Agency	Notice of Intent for EPA Construction Activities General Discharge Permit with associated SWPPP, If Required
State Agencies	
Massachusetts Bay Transportation Authority	Disposition and Sale of Land
MA Department of Environmental Protection, Division of Water Pollution Control	Sewer Connection Self Certification
MA Executive Office of Transportation and Construction	Chapter 40, Section 40A Clearance
MA Department of Environmental Protection, Division of Air Quality Control	Fossil Fuel Permit, If Required
Local Agencies	
Boston Redevelopment Authority	Article 80 Review and Execution of Related Agreements; Recommendation to the Boston Zoning Board of Appeal
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan
Boston Department of Public Works Public Improvements Commission	Street/Sidewalk Repair Plan; Curb-Cut Permit; Street/Sidewalk Occupancy Permit; Earth Retention System Plan
Boston Zoning Board of Appeal	Possible Variances, Conditional Use Permits and other Dimensional Relief
Boston Public Safety Commission Committee on Licenses	Permit for Storage of Fuel in (Emergency Storage) Tanks, If Required
Boston Fire Department	Approval of Fire Safety Equipment
Boston Water and Sewer Commission	Approval for Sewer and Water and Connections; Construction Site Dewatering; and Storm Drainage
Boston Department of Inspectional Services	Building Permits; Certificates of Occupancy; Other Construction-Related Permits

*This is a preliminary list based on project information currently available. It is possible that not all of these permits or actions will be required, or that additional permits may be needed.

2.9 Public Review Process and Agency Coordination

As part of the Article 80 review process, the Proponent is committed to maintaining an open dialogue with all interested parties. The public will have the opportunity to review this EPNF, which has been distributed to interested parties, the Impact Advisory Group and public agencies by the BRA and the Proponent and is available upon request.

The Proponent has met with, or intends to meet with, a broad range of elected officials; government agencies, and neighborhood association groups to solicit feedback and input on the Proposed Project. Preliminary plans for the Proposed Project have been presented at a series of community meetings to help refine the design and approach. The Proponent has been working closely with the Jamaica Plain Neighborhood Council and neighborhood groups on the Proposed Project.

The listing of community outreach meetings that have been held over the last several months follows:

1. **January 20, 2014, 6.30-7.30pm**
   Informational Session with Woodbourne Neighborhood Association, Woodlawn Street Group and Weld Hill Street Watch Group

2. **January 23, 2014, 7.00-9.00pm**
   Informational Session with Asticou/Martinwood/South (AMS) Neighborhood Association

3. **January 29, 2014, 6.30-7.30pm**
   Informational Session with Wenham Neighborhood Association, Yale Terrace Neighborhood Association and West Roxbury Courthouse Neighborhood Association

4. **February 4, 2014, 6.30-8.30pm**
   Informational Session with JP Neighborhood Council - Housing and Development Committee

5. **February 5, 2014, 7.00-9.00pm**
   Informational Session with JP Neighborhood Council- Zoning Committee

6. **March 19, 2014, 7.00-9.00pm**
   Informational Session and Zoning Map Amendment Presentation to JP Neighborhood Council - Zoning Committee

The Proponent has also discussed the Proposed Project with representatives of the BRA prior to filing this Project Notification Form in order to identify issues/concerns as well as design requirements related to the Proposed Project. This has included a pre-filing meeting on June 2, 2014 and a follow-up urban design and transportation review meeting on July 7, 2014.

In accordance with Article 80 requirements, an Impact Advisory Committee ("IAG") has been formed and neighborhood meeting will be scheduled to review the PNF and receive community comments on the Project during the PNF public review period.

The Proponent will continue to meet with public agencies, neighborhood representatives, local business organizations, abutting property owners, and other interested parties, and will follow the requirements of Article 80 pertaining to the public review process.

2.10 Forest Hills Improvement Initiative

In 2008, the BRA undertook the Forest Hills Improvement Initiative (the "Initiative") to engage the stakeholders of Jamaica Plain in a community-based approach to improving the Forest Hills Station area and planning for the sale and development of several MBTA-owned parcels as well as other publicly-owned parcels around the Station. The BRA worked in partnership with the MBTA, the Forest Hills Task Force, and area stakeholders throughout the process.

The Proposed Project's Site is one of the MBTA parcels targeted for redevelopment in the Initiative's community process, known as Parcel U. Use and Design Guidelines released for parcels in this district outlined a list of core principles to guide development, including the following:

- Improved Traffic Patterns,
- Vibrant Mixed Use District,
- Community Orientation,
- Green/Sustainable Development, and
- Green Space Assets

The development at Parcel U closely follows the recommendations of the Forest Hills Improvement Initiative by offering a 21st century energy efficient, transit-oriented development located in proximity of an abundance of transit options and local amenities. The development creates ample housing opportunities with a variety of unit types and ownerships structure.

The development is designed to provide a healthy and energy-efficient environment for residents and to meet the LEED Silver-Certifiable level, promoting the Initiative's sustainability principle. The townhomes are planned to be energy-efficient powered with renewable energy sources

The Proposed Project will have multiple open spaces with varying degrees of privacy for residents and guests and will be within a short walk from regional scale green spaces, including the Southwest Corridor Park, Arnold Arboretum, Franklin Park and the Forest Hills Cemetery.

2.11 Development Impact Payment ("DIP") Status

Based on current schematic design plans, it is <u>not</u> anticipated that Development Impact Payments ("DIP"), in accordance with Article 80B-7 of the Code, will be required as the Proposed Project's eligible DIP uses will be below the 100,000 gsf threshold where DIP is required.

3

URBAN DESIGN

3.0 URBAN DESIGN AND SUSTAINABILITY COMPONENT

3.1 Introduction

Parcel U (the "Project") is a major part of the long term revitalization of the Jamaica Plain's Washington Street and Hyde Park Avenue. The Proposed Project will be among the first large Massachusetts Bay Transportation Authority (MBTA) parcels to be developed along this corridor. The Project Site is located at the Southwest corner of the Forest Hills T Station, directly bounded by the MBTA commuter rail tracks, Hyde Park Avenue, Ukraine Way and the Tollgate Cemetery.

The long and narrow project site is situated between Hyde Park Avenue and the MBTA Commuter Rail and Amtrak lines. The neighborhood can be described as a transitional zone between fine grain, smaller residential scales and larger, more contiguous mixed-use commercial along Washington Street and residential buildings along Hyde Park Avenue. The currently vacant non-productive site will be transformed into a lively, urban residential community with active street-level uses such as three "pocket parks", a retail space, and a community room.

The proposed development will provide 124 residential units, in a variety of unit types ranging from studios, 1-bedroom, 2-bedrooms and 3-bedrooms, in a few urban residential typologies: two townhouse variants and a larger multi-family apartment building.

3.2 Massing

The building massing strategy is informed by the multiple scales and the different edge conditions of the surrounding neighborhood context. Along Hyde Park Avenue across from the Project Site, the existing buildings are primarily residential and possess a varied character. There is an assortment of different house shapes and sizes, different roof lines and colors which are interspersed between small green open spaces. Further down Hyde Park Avenue, in the business district near the Forest Hills Station, the character of the building massing changes. Here, there is a mix of residential and commercial uses such as retail and office and overall the buildings are linked together, and the urban fabric reads as a more continuous "urban wall. The building scale of this nearby area is larger and denser in comparison to the residential neighborhood closer to the project site.

The Proposed Project attempts to bridge the two very different contexts of the residential neighborhood and the nearby business district. To this end, the Proposed Project's building height changes along its length, from three stories to the south, to four stories and finally to a five story block. Similarly, the building massing also changes along the Proposed Project's length. Towards the south, the proposal is made up of small clusters of blocks; towards the middle more of the blocks are linked together and read as only slightly larger; and at the corner, multiple blocks are linked together to form a more continuous building mass.

The spaces between the blocks are designed as different kinds of "green" spaces. Not wanting to create a visual barrier or relentless street wall along the project site, these spaces allow for views through the site and beyond. On three occasions, these green spaces are public "pocket" parks. In other cases, the space is narrower but still allows for access to the rear of the project site for residents via a handicapped accessible ramp and stairs.

3.3 Building Design

The residential massing of the Project will be divided into 3 different housing types:

- Phase A – 3 and 4 stories townhouses with underground parking
- Phase B – 3 and 4 stories townhouses with underground parking
- Phase C – 5-story multifamily apartments with ground floor retail, community space and underground parking

Towards the southeast edge the site, the townhouses respond with building massing that is similar to the residential buildings along Hyde Park Avenue. Phase A and Phase B will each have a mix of 3 and 4 stories townhouses. The height and massing these townhouse units will correspond to the scale of the residential building across the street along Hyde Park Avenue.

For approximately two-thirds of the Site, the Proposed Project will have a distinctly residential character with a fine-grained building blocks made up of both pitched and flat roofs. In order to enrich the pedestrian experience and along the length of this part of the site, the townhouses will have angled bays, undulating walls and balconies. And on the ground floor, there will be low picket fences with entry gateways, and front gardens filled with plantings and small trees. In between, the different clusters of townhouses, there will be open green spaces that allow views through the site and beyond. Similarly, to alleviate the perception of a continuous and high street wall, the top floor of the four-story townhouses will be set back from the building edge to create roof decks.

Though planned as a unified development, the clustering of townhouse units—in pairs, triplets and quad arrangements—reinforces the notion of the accumulation and the build-up of scale and mass that happens in an urban environment over a long period of time. At the same time, the varied rooflines will also further simulate an urban environment that has been developed through time.

As one progresses to the northwest side of Hyde Park Avenue, the last third of the site will be occupied by a larger, five-story apartment building with ground floor retail and community space located at the corner of Hyde Park Avenue and Ukraine Way. At this location, the apartment building's massing negotiates between the small-scale townhouses along Hyde Park Avenue and the larger urban context along Washington Street as well as the future large developments that will happen at the other MBTA redeveloped sites. The corner in particular, provides the opportunity for an "anchor" building- i.e. to make a prominent entry point into the new development. As such, the apartment building will be taller than the townhouses, and rendered in a more commercial material palette such as brick and masonry

and ground-floor storefront glass. The corner specifically, will be marked with a multi-story glass bay window and signage for the ground floor retail space.

3.4 Character and Materials

The Proposed Project strives to be a contextually sensitively, site responsive designed development. The Project's design is intended to feel as if it "belongs" in this place and at this particular time. The site context provides many of the clues for the character and material palette for the proposed structures.. While not literally copying what is there, the Project draws inspiration from the local context by re-interpreting traditional forms, massing, and details and designing them in a contemporary way. Given that the local neighborhood has been built up over time and by different builders and homeowners, the current fabric is rich and varied. Impressed by this heterogeneous character, the Project attempts to recreate some of this texture. To this end, there is a range of different materials, colors and details that are used across the three different building typologies.

The three-story townhouses are wood frame structure with different colored wood and fiber cement siding with a batten trim detail. On the ground floor, a stained wood lattice is applied over paneling and invites ivy to grow on its surfaces. The pitched gable roof is made of standing seam metal. On the south ridge there will be a solar array. The windows are vertically-oriented "punches" of varying widths. The three story townhouses have angled bays and balconies that allow residents to look up and down the street from the insides of their homes. The resultant "bends" in the plan, create visual interest for the pedestrians and commuters along the street.

The four-story townhouses are wood frame structure with different colored clapboard and fiber cement siding. The middle "slot" of the townhouse will be fiber cement paneling with an applied wood trellis over top. The ground floor walls will be stained wood paneling with batten trim detailing. The fourth floor, which will be set back from the front edge, will be white fiber cement paneling. The windows are vertically-oriented "punches" of varying widths

The multi-family apartment building will be expressed as two blocks separated by a glass linkage. In the first block, to the building will be a wood frame structure with a metal panel roof, fiber cement paneling in the middle floors and a larger unit masonry base. The second block, located at the corner, is conceived as the "anchor" to the development. This block will have a metal penthouse floor, masonry on the middle floors, and a glass storefront system at its base.

3.5 Views

The intended Site is unique from the perspective that it is visible from all four sides. Careful attention has been paid to the urban design and planning by providing a level of porosity in the long street block for views, light and air.

Three major buffer zones are allocated to provide visual relief and different spatial experiences:

- The contemplative buffer zone between the development and the Tollgate Cemetery;;
- The intersection of Walk Hill Avenue aims to offer the pedestrians and commuters with a view corridor towards the famed Arnold Arboretum; and
- A community oriented park next to Phase C apartment building

3.6 Landscape Design

The proposed landscape plan for Parcel U addresses different needs of the residents and the surrounding community through multiple layers of public and private landscape elements.

The Hyde Park Avenue streetscape in front of the proposed townhouses maintains the existing public right of way along the street. Adjacent to the sidewalk is a planting band that preserves the existing row of mature street trees. Paths to the entries and yards of the residences, as well as connections to three pocket parks, are located between the trees. Low decorative fencing is set several feet back of the trees, defining the threshold between the public way and the yards of the residences.

In front of the apartment (multi-family) buildings, the proposed on street parking spaces are in the location of the existing sidewalk. In this instance, the sidewalk is required to shift into the private realm, behind the existing row of trees. Pathways from the parking to the sidewalk connect the parking spaces to the pedestrian walkway.

At the corner of Hyde Park Avenue and Ukraine Way, there is a small plaza area with potential for outdoor seating set within the private property that could create a social space for residents and locals. The mature trees along Ukraine Way are also retained, set within a wide planting band in front of the building.

In the private sphere, the landscape offers outdoor yards, planted vertical connections as well as three distinct pocket parks, all held together with planting and landscape elements that stretch across the site. These planted bands enhance perceptual connectivity while allowing for diverse programming.

The three pocket parks feature different landscape communities - each with its own distinct character and suggestive of a different program. The proposed parks are open to the residents and are visually accessible to the public, adding interest and energy to the Parcel U stretch of Hyde Park Avenue. Visually open fencing and gates at the street end of the parks, provides separation from the public way, creating safe and intimate experiences within the parks, while providing interest and visual accessibility from the street.

At the eastern edge of the parcel a proposed woodland pocket park creates an evergreen buffer between the residents and the adjacent cemetery. The planting idea for this park is that of evergreens and flowering trees paired with a lushly planted understory to provide a natural screen. Seating areas give residents a quiet and reflective space that captures the feel of a small forest.

The middle pocket park is based on the concept of a meadow landscape, with a central gathering space and gently undulating fields around it. The meadows are available for lounging and recreation; while ample other seating opportunities create social spaces for residents. Multiple trees and plantings provide shade and soften sound and visuals from the street.

The third pocket park is inspired by a forest clearing and is imagined as a natural playground. Trees, grasses and other plantings create a generous buffer around the park, and possible landforms in the center give the park structure. Rock features could become areas for lounging or playing, and would tie the site back to the area's underlying bedrock foundations, enhancing the natural expression of the park. Other natural elements, such as boulders, logs or puddles could also become play opportunities, defining the park as a recreational respite.

In order to connect the back (rear) lane to Hyde Park Avenue there are sloping vertical connections in each phase of the project. Each phase features both a ramp and a stair with a small seating area at the bottom. These passages as well as the other sloped gardens between the buildings would be planted with a hardy palette that may contain edible plants.

Throughout all of the spaces, the proposed Parcel U landscape seeks to craft multiple options for both community and resident experiences. A variety of interesting and well scaled spaces extend across the site, while the consistent street tree planting and material palette maintains the cohesive identity of the project.

3.7 Response to Accessibility Guidelines

The proponent will coordinate with the Commission for Persons with Disabilities towards reducing barriers affecting persons with disabilities within the development. The development will meet all ADA standards and Massachusetts Architectural Access Board 521 CMR standards. See **Appendix E** for details.

3.8 Sustainable Design/Energy Conservation

3.8.1 Introduction

The Proponent and the Project design team are committed to an integrated design approach using the LEED for Homes 2008 rating system and intends to meet certification as presented in **Figures 3-30 and 3-31** at the end of this section. This rating will meet or exceed Boston's Green Building standard and is currently reaching 71 points (Silver) in the low-rise and 50 points (Certified) with 9 maybe points in the Midrise (maybe points are italicized) in the description below.

3.8.2 Summary of Proposed LEED Credits for Low Rise and Midrise Buildings

Below is a credit by credit summary of the preliminary checklist prerequisites and credits for the low rise and midrise buildings of the Project. These are preliminary LEED Homes credits and may be adjusted as the project goes forward. Currently the Homes size adjustment for the low-rise is neutral and for the midrise reduces the achievement levels by 8.5 points

<u>Low Rise Units Checklist Items</u>

ID 1.1 Preliminary Rating: (**Prerequisite**)

- CSG led the project team through the LEED for Homes process June 2, 2014 and determined which credits were reasonable to be pursued at that point in design.
- Silver was determined to be a reasonable goal.

ID1.2 Integrated project team: **(1 point)**

- This point was determined to be reasonable to achieve as the scale of this project will require the minimum of three experts to be attending meetings regularly. Copies of meeting minutes, agenda, and list of attendees will be collected.

ID 1.3 Professional Credentialed with Respect to LEED for Homes: **(1 point)**

- A central member of the development team is credentialed as a LEED AP Homes Professional.

ID 2.1 Durability planning: (**Prerequisite**)

- The durability evaluation form and durability inspection checklist will be created as design elements are finalized. This is a customized checklist for the project that is required prior to the beginning of construction.

ID 2.2 Durability Management: (**Prerequisite**)

- The builder will use the durability inspection checklist throughout the construction as both an inspection tool and a project meeting item to be reviewed weekly, to ensure those measures are included.

ID 3.1 Innovation 1: **(1 point)**

- LL05-02 Exemplary Performance: proximity to transit. This is awarded to projects that have over 250 rides per day within ½ mile.

LL 3.2 Infill: **(2 points)**
- The project is bordered on two sides by public roads, Ukraine Way and Hyde Park Avenue. To the rear the project is bordered by the Amtrak rail and to the southeast by an auto sales entity. 75% or more of the perimeter borders previously developed land.

LL 4 Existing Infrastructure: **(1 point)**
- The lot is within ½ mile of existing water and sewer service lines.

LL 5.1 – 5.3 Community Resources/Public Transit: **(3 points)**
- Proximity to Orange Line Forest Hill terminal as well as the Forest Hill bus hub provides ample transportation to meet the three points for this item as well as the Exemplary Performance point.

LL 6 Access to Open Space: **(1 point)**
- From the center of the project to Ukraine Way and across Washington St is the Bussey Brook section of the Arnold Arboretum (greater than ¾ acre within ¼ mile).

SS 1.1 Erosion Controls during Construction: (**Prerequisite**)
- Project team will develop erosion control plan prior to start of construction

SS 1.2 Minimize Disturbed Area of Site: **(1 point)**
- Calculations of density allow for D to be met, 48 units in the low-rise section, with 1.94 acres is over 24 units per acre, surpassing the requirement of 7 units per acre.

SS 2.1 No invasive plants: (**Prerequisite**)
- The landscape architect will provide list of plants to be installed and will cross reference a list of invasive plants for the area to ensure no invasive plants are used. (http://www.newfs.org/docs/docs/MIPAG040105.pdf)

SS 2.3 Limit Conventional Turf: **(1 point)**
- The project is going to limit the overall designed softscape area to no more than 60% conventional turf.

SS 2.4 Drought Tolerant Plants: **(1 point)**
- The landscape architect will select drought tolerant plants (45% or more) for the landscaping plan. Lists of plants and their quantities of each plant and the percentage of drought tolerance will be calculated.
- Provided reference list showing what are drought tolerant plants in our region using University of Massachusetts Extension Service.

SS 4.2 Permanent Erosion Controls: **(1 point)**
- The landscaping plan will reflect the goal of replanting disturbed areas following the LEED algorithm of one tree, Four 5 gallon shrubs, or Fifty square feet of native groundcover per five hundred square feet of disturbed area.

SS 4.3 Management of Runoff from Roof: **(2 points)**
- Permanent storm water controls will manage runoff from roof in 1" rain fall events.

SS 5 Pest Control Alternatives: **(2 points)**
- All exterior wood will be kept 12" or more above the soil, external cracks, joints, etc. will be sealed with caulking and permanent pest-proof screens will be installed. No wood-to-concrete connections will exist all planting will be located so a mature plant will be at least 24" from the homes. All foundations will solid concrete. The project will be eligible for using four of the five practices.

SS 6.1 – 6.3 Compact Development: **(4 points)**
- 48 Units on 1.94 acres of lot calculates to 24.7 units per acre. This meets the Very High Density requirement of 20 or greater units per acre.

WE 3.1 and 3.2 Indoor water use: **(5 points)**
- Shower heads with 1.75 or less GPM, lavatory faucets will use 1.5 or less GPM and the toilets selected will be under 1.3 gallons per flush

EA 1.1 Optimize Energy Performance: (**Prerequisite**)
- The Energy Star 2.0 requirements will be met. Stretch Code and Energy Star 2.0 requirements align very closely.

EA 1.2 Exceptional Energy Performance: **(18.5 points)**
- The project intends to achieve a worst case HERS rating of 50 or less, utilizing similar envelope and mechanical construction details to the Urbanica project for E+ building on Highland St. In the checklist a conservative assumption of a HERS of 60 is used.

EA 7.2 Pipe Insulation: **(1 point)**
- All domestic hot water piping shall have R4 pipe insulation installed.

EA 11.1 – Refrigerant Charge Test: (**Prerequisite**)
- All refrigerant lines for air conditioning will be charge tested per manufacturer's standards.

EA 11.2 Appropriate HVAC Refrigerants: **(1 point)**
- R410A refrigerant is anticipated to be used.

MR 1.1 Framing Order Waste Factor: (**Prerequisite**)
- A calculation of the wood necessary to frame the building and orders of the amount of wood purchased will be made. Order must not exceed calculation by more than 10%.

MR 1.5 Off-Site Fabrication: **(4 points)**
- Panelized construction will be used in this project.

MR 2.1 FSC Certified Tropical Woods: (**Prerequisite**)
- Suppliers will be sent a notice of preference for FSC products and a request for the country of manufacture for each wood product
- No tropical wood will be installed

MR 2.2 Environmentally Preferable Products **(0.5 point each 2 points total**)
- The project will install 100% hard flooring
- The project will use cabinets made of FSC wood
- The project will use PEX as water supply piping
- The project will use local aggregate in all concrete

MR 3.1 Construction Waste Management Planning: (**Prerequisite**)
- The project will investigate any recycling opportunities in the area
- Document the waste diverted from the landfill

MR 3.2 Construction Waste Reduction: **(1.5 points)**
- With stringent recycling protocols, the project will limit the total amounts of waste that will go to the land fill and that were diverted to 50% of the construction waste stream

EQ 2.1 Basic Combustion Venting Measures: (**Prerequisite**)
- The requirements are included in the design as requirements for basic code compliance in our area.

EQ 2.2 Enhanced Combustion Venting Measures: **(2 points)**
- There will be no fireplaces in any of the units

EQ 4.1 Basic Outdoor Air Ventilation: (**Prerequisite**)
- Continuous ventilation will be provided to each unit to meet the ASHRAE 62.2 – 2007 ventilation requirement.

EQ 4.2 Enhanced Outdoor Ventilation: **(2 points)**
- The ventilation in each unit will be provided by a heat recovery ventilation (hrv) device.

EQ 4.3 Third Party Performance Testing: **(1 point)**
- The ventilation system in each unit will be tested by a third party to document the performance as meeting the ASHRAEA 62.2 -2007 standard.

EQ 5.1 Basic Local Exhaust: (**Prerequisite**)
- Bath fans will be rated for 80 CFM and kitchen area exhaust fans for greater than 100 CFM to outdoors.

EQ 5.2 Enhanced Local Exhaust: **(1 point)**
- The Panasonic fans will run continuously and boost with occupancy sensors.

EQ 5.3 Third Party Performance Testing **(1 point)**
- The exhaust fans in each unit will be tested by a third party to document the performance as meeting the ASHRAEA 62.2 air flow requirement.

EQ 6.1 Room by Room Load Calculations: (**Prerequisite**)
- Room by room load calculations will be provided by the HVAC engineer or responsible party stating the calculations were performed according to ACCA Manual J and D.

EQ 6.2 Return Air Flow/Room by Room Controls: **(1 point)**
- Each head of the minisplits HVAC system will have individual controls.

EQ 6.3 Third Party Performance Test: **(2 points)**
- Each unit will have at least two separate HVAC zones.

EQ 7.1 – 7.3 Air Filtering: (**Prerequisite**)
- Non ducted mini split heat pumps are exempt from any filter MERV level requirement.

EQ 8.1 Indoor Contaminant Control During Construction: **(1 point)**
- Ductwork (including exhaust) will be sealed throughout construction so that debris doesn't contaminate.

EQ 9.1 Radon–Resistant Construction in High Risk Areas: (Zone 1) (**Prerequisite**)
- The project is located in EPA Zone 3/ low risk and is not required to install a radon resistant construction.

EQ 9.2 Radon Resistant Construction in Moderate Risk Areas: **(1 point)**
- Radon resistant construction techniques are planned.

EQ 10.1 No HVAC in Garage: (**Prerequisite**)
- There will be no HVAC equipment located in the garage.

EQ 10.2 Minimize Pollutants from Garage: **(2 points)**
- All penetrations, cracks at base of walls, as well as joist bays will be sealed.
- At conditioned spaces, all doors shall be weather-stripped.
- CO detectors shall be installed at stairwell leading from garage to living space.

AE 1.1 Education of the Homeowner: (**Prerequisite**)
- A home owner's manual will be created and provided to all occupants.
- A one hour walk through will be conducted with the occupants in group trainings.

AE 1.3 Public Awareness: **(1 point)**
- The developer will create a website about the site, containing features and benefits of LEED homes.
- The developer will work with regional publications to ensure a newspaper article is published about this project.
- The contractor's project sign will include LEED signage at the exterior of the building site.

AE 2 Education of the Building Manager: **(1 point)**
- An operations and training manual will be created and provided to building manager.
- A one hour walk through will be conducted with the building manager.

Midrise Units Checklist Items

ID 1.1 Preliminary Rating: (**Prerequisite**)

- CSG led the project team through the LEED for Homes process June 2, 2014 and determined which credits were reasonable to be pursued at that point in design.

- Silver was determined to be a reasonable goal.

ID1.2 Energy Expertise for Mid-Rise: **(Prerequisite)**

- This point was determined to be reasonable to achieve as the MEP engineer bring the experience of over a dozen highly efficient LEED certified projects and will be completing the ASHRAE model on this building.

ID 1.3 Professional Credentialed with Respect to LEED for Homes: **(1 point)**

- A central member of the development team is credentialed as a LEED AP Homes Professional.

ID 2.1 Durability planning: (**Prerequisite**)

- The durability evaluation form and durability inspection checklist will be created as design elements are finalized. This is a customized checklist for the project that is required prior to the beginning of construction.

ID 2.2 Durability Management: (**Prerequisite**)

- The builder will use the durability inspection checklist throughout the construction as both an inspection tool and a project meeting item to be reviewed weekly, to ensure those measures are included.

ID 3.1 Innovation 1: **(1 point)**

- SS 07-02 Exemplary Performance: proximity to transit. This is awarded to projects that have over 125 rides per day within ½ mile.

LL 3.2 Infill: **(2 points)**

- The project is bordered on two sides by public roads, Ukraine Way and Hyde Park Avenue. To the rear the project is bordered by the Amtrak rail and to the southeast by an auto sales entity. 75% or more of the perimeter borders previously developed land.

LL 4 Existing Infrastructure: **(1 point)**

- The lot is within ½ mile of existing water and sewer service lines.

LL 5.1 – 5.3 Community Resources/Public Transit: **(3 points)**

- Proximity to Orange Line Forest Hill terminal as well as the Forest Hill bus hub provides ample transportation to meet the three points for this item as well as the Exemplary Performance point.

LL 6 Access to Open Space: **(1 point)**

- From the center of the project to Ukraine Way and across Washington St is the Bussey Brook section of the Arnold Arboretum (greater than ¾ acre within ¼ mile).

SS 1.1 Erosion Controls during Construction: (**Prerequisite**)

- Project team will develop erosion control plan prior to start of construction.

SS 1.2 Minimize Disturbed Area of Site: **(1 point)**

- Calculations of density allow for D to be met, 76 units in the midrise section, with .91 acres is 80 units per acre, surpassing the requirement of 40 units per acre.

SS 2.1 No invasive plants: (**Prerequisite**)

- The landscape architect will provide list of plants to be installed and will cross reference a list of invasive plants for the area to ensure no invasive plants are used. (http://www.newfs.org/docs/docs/MIPAG040105.pdf)

SS 2.3 Limit Conventional Turf: **(1 point)**

- The project is going to limit the overall designed softscape area to no more than 79% conventional turf.

SS 2.4 Drought Tolerant Plants: **(1 point)**

- The landscape architect will select drought tolerant plants (90% or more) for the landscaping plan. Lists of plants and their quantities of each plant and the percentage of drought tolerance will be calculated.
- Provided reference list showing what are drought tolerant plants in our region using University of Massachusetts Extension Service.

SS 3.2 Reduce Local Heat Island Effects: **(1 point)**

- The roof will be installed with high albedo material on 75% or more of the roof area.

SS 4.2 Permanent Erosion Controls: **(1 point)**

- The landscaping plan will reflect the goal of replanting disturbed areas following the LEED algorithm of One tree, Four 5 gallon shrubs, or Fifty square feet of native groundcover per five hundred square feet of disturbed area.

SS 4.3 Storm Water Quality Control for Mid-Rise: **(2 points)**

- Storm ware management plan designed in accordance with local program.

SS 5 Pest Control Alternatives: **(2 points)**

- All exterior wood will be kept 12” or more above the soil, external cracks, joints, etc. will be sealed with caulking and permanent pest-proof screens will be installed. No wood-to-concrete connections will exist all planting will be located so a mature plant will be at least 24” from the homes. All foundations will solid concrete. The project will be eligible for using four of the five practices.

SS 6.1 – 6.3 Compact Development: **(4 points)**

- 76 Units on .91 acres of lot calculates to 84 units per acre. This meets the Very High Density requirement of 80 or greater units per acre.

SS7.1 Public Transit Mid-Rise: (2 points)

- The number of transit rises available within ½ mile of the mid-rise is in excess of the credit stipulated 60 rides per day.

SS 7.2 Bicycle Storage for Mid-Rise: (1 point)

- The building will have storage for greater than 15% of the buildings occupants.

WE 3.1 and 3.2 Indoor water use: **(5 points)**

- Shower heads with 1.75 or less GPM, lavatory faucets will use 1.5 or less GPM and the toilets selected will be under 1.3 gallons per flush.

WE 3.3 Water Efficient Appliances for Mid-Rise: ***(2 maybe points)***

- The project will be using highly efficient clothes washers as well as dishwashers in the units.

EA 1.1 Minimum Energy Performance for Mid-Rise: (**Prerequisite**)

- The project will meet the 15% or greater reduction in energy use according to the ASHRAE model with the EPPA simulation guidelines.

EA 1.2 Testing and Verification for Mid-Rise: **(Prerequisite)**

- The project intends to comply with Option 2, performing Commissioning on the buildings fundamental systems.

EA 1.3 Optimize Energy Performance for Mid-Rise: **(7 points)**

- The project intends to reach at least a 20% better than reference in the ASHRAE with EPA simulation modeling.

EA 7.2 Pipe Insulation: **(1 point)**

- All domestic hot water piping shall have R4 pipe insulation installed.

EA 11.1 – Refrigerant Charge Test: (**Prerequisite**)

- All refrigerant lines for air conditioning will be charge tested per manufacturer's standards.

EA 11.2 Appropriate HVAC Refrigerants: **(1 point)**

- R410A refrigerant is anticipated to be used.

MR 1.1 Framing Order Waste Factor: (**Prerequisite**)

- A calculation of the wood necessary to frame the building and orders of the amount of wood purchased will be made. Order must not exceed calculation by more than 10%.

MR 1.5 Off-Site Fabrication: ***(4 maybe points)***

- Panelized construction will be used in this project.

MR 2.1 FSC Certified Tropical Woods: (**Prerequisite**)

- Suppliers will be sent a notice of preference for FSC products and a request for the country of manufacture for each wood product.
- No tropical wood will be installed.

MR 2.2 Environmentally Preferable Products **(.5 point each 1.5 points total**)

- The project will install 100% hard flooring.
- The project will use cabinets made of FSC wood.
- The project will use local aggregate in all concrete.

MR 3.1 Construction Waste Management Planning: (**Prerequisite**)

- The project will investigate any recycling opportunities in the area.
- Document the waste diverted from the landfill.

MR 3.2 Construction Waste Reduction: **(1.5 points)**

- With stringent recycling protocols, the project will limit the total amounts of waste that will go to the land fill and that were diverted to 50% of the construction waste stream

EQ 2.1 Basic Combustion Venting Measures: (**Prerequisite**)

- The requirements are included in the design as requirements for basic code compliance in our area. There will be no fireplaces in any of the units.

EQ 4.1 Basic Outdoor Air Ventilation: (**Prerequisite**)

- Continuous ventilation will be provided to each unit to meet the ASHRAE 62.2 – 2007 ventilation requirement.

EQ 4.2 Enhanced Outdoor Ventilation: ***(2 maybe points)***

- The ventilation in each unit will be provided by a heat recovery ventilation (hrv) device.

EQ 4.3 Third Party Performance Testing: ***(1 maybe point)***

- The ventilation system in each unit will be tested by a third party to document the performance as meeting the ASHRAEA 62.2 -2007 standard.

EQ 5.1 Basic Local Exhaust: (**Prerequisite**)

- Bath fans will be rated for 80 CFM and kitchen area exhaust fans for greater than 100 CFM to outdoors.

EQ 5.2 Enhanced Local Exhaust: **(1 point)**

- The Panasonic fans will run continuously and boost with occupancy sensors.

EQ 5.3 Third Party Performance Testing **(1 point)**

- The exhaust fans in each unit will be tested by a third party to document the performance as meeting the ASHRAEA 62.2 air flow requirement.

EQ 6.1 Room by Room Load Calculations: (**Prerequisite**)

- Room by room load calculations will be provided by the HVAC engineer or responsible party stating the calculations were performed according to ACCA Manual J and D.

EQ 7.1 – 7.3 Air Filtering: (**Prerequisite**)

- Non ducted fan coils are exempt from any filter MERV level requirement.

EQ 8.1 Indoor Contaminant Control During Construction: **(1 point)**

- Ductwork (including exhaust) will be sealed throughout construction so that debris doesn't contaminate.

EQ 9.1 Radon–Resistant Construction in High Risk Areas: (Zone 1) (**Prerequisite**)

- The project is located in EPA Zone 3/ low risk and is not required to install a radon resistant construction.

EQ 9.2 Radon Resistant Construction in Moderate Risk Areas: **(1 point)**

- Radon resistant construction techniques are planned.

EQ 10.1 No HVAC in Garage: (**Prerequisite**)

- There will be no HVAC equipment located in the garage.

EQ 10.2 Minimize Pollutants from Garage: **(2 points)**

- All penetrations, cracks at base of walls, as well as joist bays will be sealed.
- At conditioned spaces, all doors shall be weather-stripped.
- CO detectors shall be installed at stairwell leading from garage to living space.

AE 1.1 Education of the Homeowner: (**Prerequisite**)

- A home owner's manual will be created and provided to all occupants.
- A one hour walk through will be conducted with the occupants in group trainings.

AE 1.3 Public Awareness: **(1 point)**

- The developer will create a website about the site, containing features and benefits of LEED homes.
- The developer will work with regional publications to ensure a newspaper article is published about this project.
- The contractor's project sign will include LEED signage at the exterior of the building site.

AE 2 Education of the Building Manager: **(1 point)**

- An operations and training manual will be created and provided to building manager.
- A one hour walk through will be conducted with the building manager.

3.9 Response to Climate Change Preparedness and Resiliency Checklist for New Construction

The proponent will endeavor to prepare the development for building resiliency and preparedness to meet adverse impacts from future climate change conditions. See **Appendix F** for the Proponent's detailed response.

3.10 Urban Design, Landscape and Sustainability Drawings

Urban design drawings and renderings, and LEED Checklists depicting the Project include:

Figure 3-1: Site Context
Figure 3-2: Site Photos – Existing Conditions
Figure 3-3: Site Photos – Existing Conditions
Figure 3-4: Urban Block Plan
Figure 3-5: Project Site Plan
Figure 3-6: Project Parking Plan
Figure 3-7: Townhouse- 3 Stories Typical Plan
Figure 3-8: Townhouse- 4 Stories Typical Plan
Figure 3-9: Apartment – Basement
Figure 3 -10: Apartment- First Floor
Figure 3 -11: Apartment- Second to Fourth Floor
Figure 3 -12: Apartment- Fifth Floor
Figure 3 -13: Aerial Perspective Front
Figure 3 -14: Aerial perspective Rear
Figure 3 -15: Overall Elevations (Front and Rear)
Figure 3 -16: Hyde Park Elevation
Figure 3 -17: Rear Elevation
Figure 3 -18: Side Elevations
Figure 3 -19: Typical Sections
Figure 3 -20: Project Rendering –Hyde Park Avenue Street Level 1
Figure 3 -21: Project Rendering –Hyde Park Avenue Street Level 2
Figure 3 -22: Project Rendering – Ukraine Way intersection
Figure 3 -23: Landscape Plan
Figure 3 -24: Streetscape
Figure 3 -25: Corner Plaza
Figure 3 -26: Forest Buffer Park
Figure 3 -27: Meadow Park
Figure 3 -28: Natural Playground Park
Figure 3 -29: Pedestrian Access Stations
Figure 3-30: LEED for Homes Checklist for Townhouses
Figure 3-31: LEED for Homes Checklist for Multi-Family Apartments

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Figure 3-1: Site Context

Figure 3-2: Site Photos – Existing Conditions

View of Existing Housing Stock Across Intersection of Hyde Park Avenue and Ukraine Way

View of Existing Houses and Street Trees Along Hyde Park Avenue (Mid Section of Parcel U)

View of Intersection of Hyde Park Avenue and Walk Hill Street

View of Site Across Intersection of Hyde Park Avenue and Ukraine Way

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Figure 3-4: Urban Block Plan

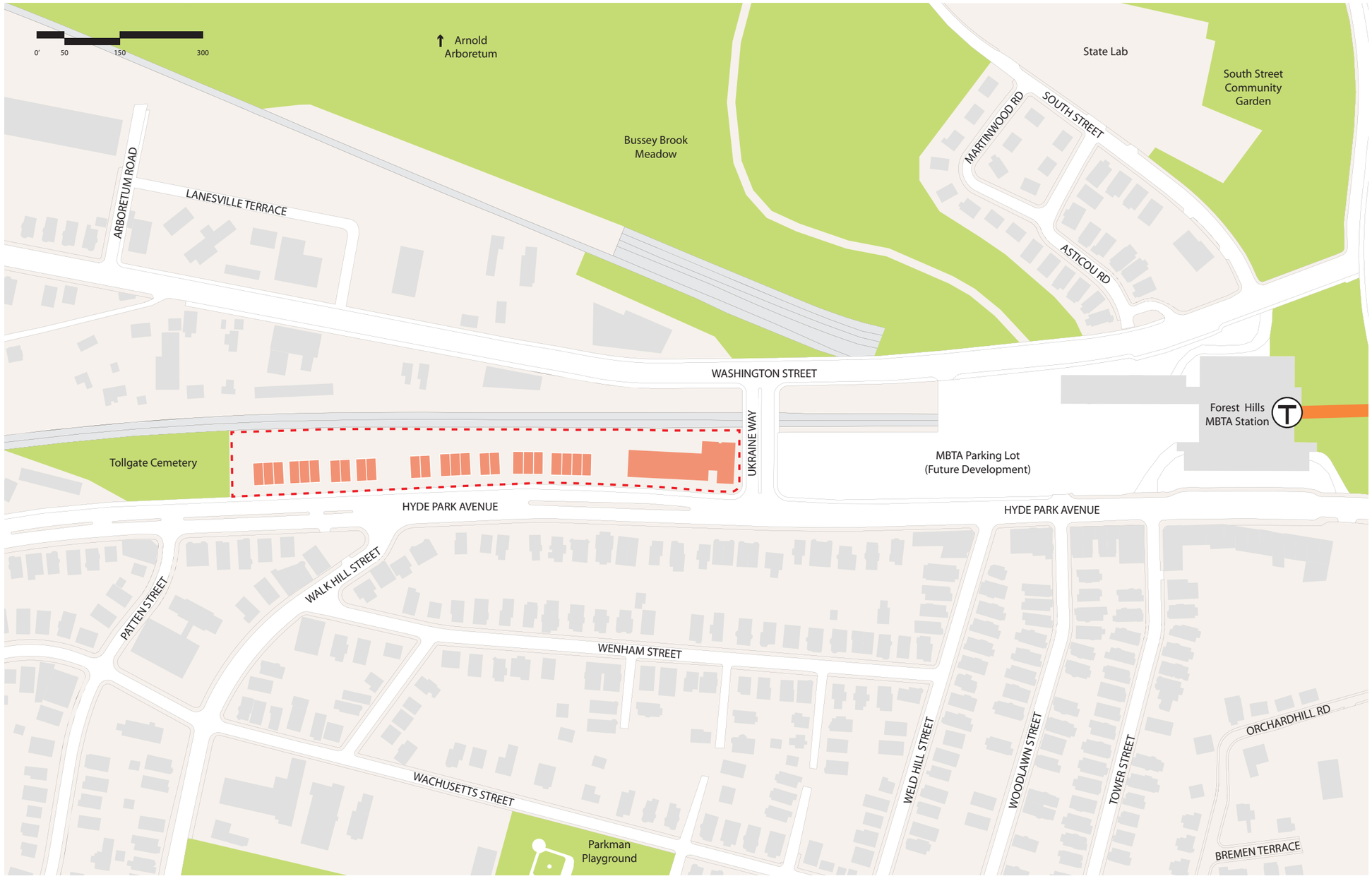

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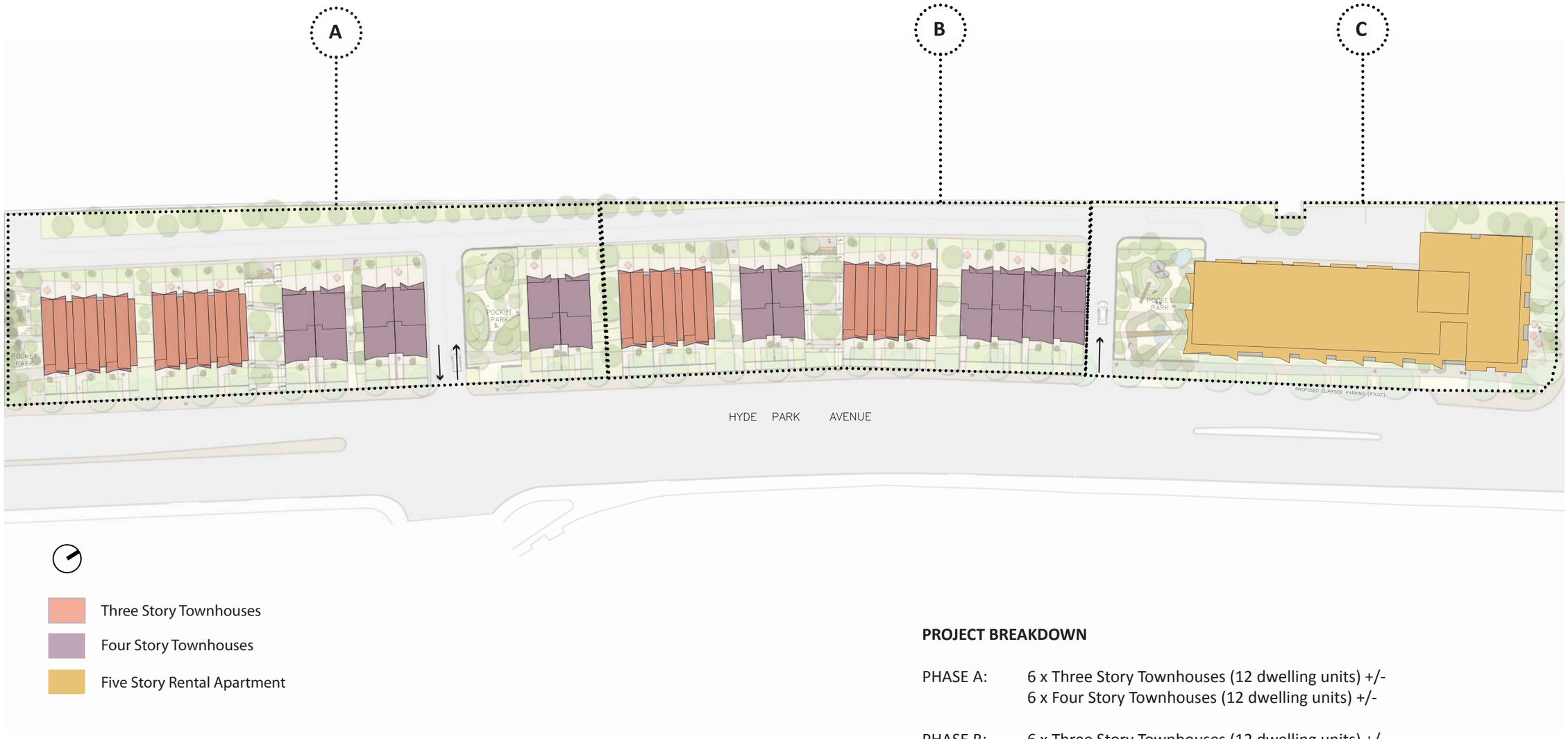
Figure 3-5: Project Site Plan



PROJECT BREAKDOWN

PHASE A: 6 x Three Story Townhouses (12 dwelling units) +/-
6 x Four Story Townhouses (12 dwelling units) +/-

PHASE B: 6 x Three Story Townhouses (12 dwelling units) +/-
6 x Four Story Townhouses (12 dwelling units) +/-

PHASE C: 76 Rental Apartment Units +/-

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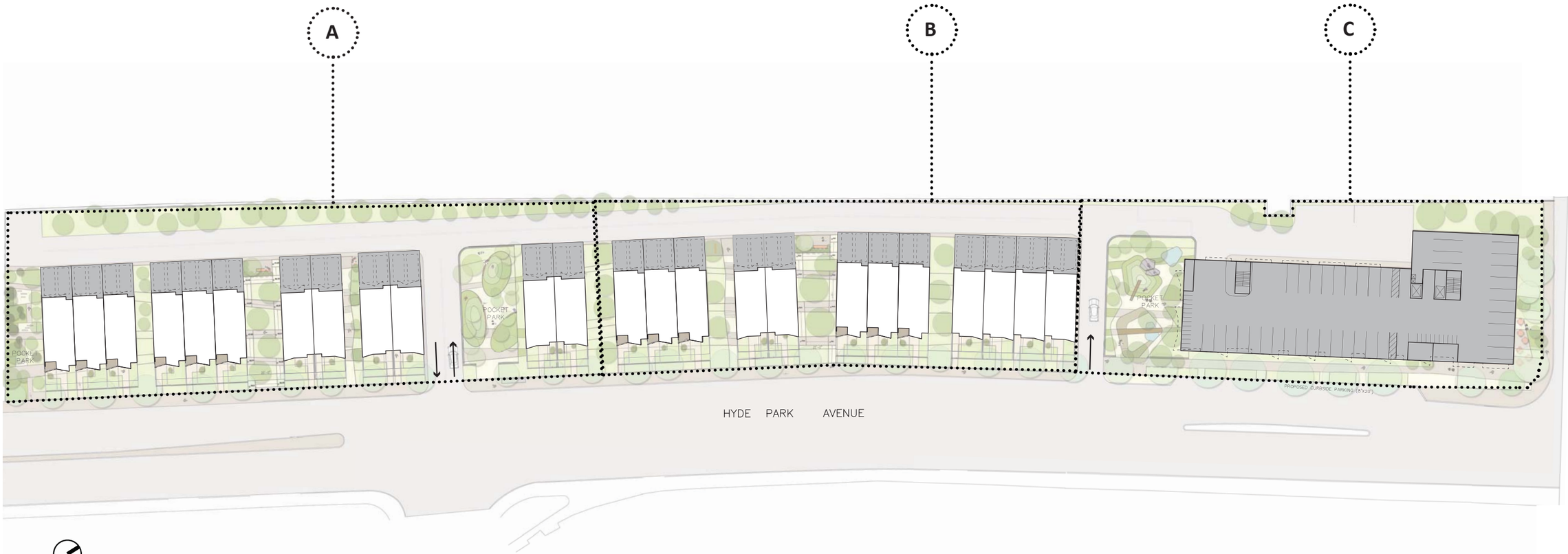
Figure 3-6: Project Parking Plan



PROJECT BREAKDOWN

PHASE A: 24 parking spaces +/-

PHASE B: 24 parking spaces +/-

PHASE C: 42 parking spaces and 8 On-Street Parking +/-

Figure 3-7: Townhouse- 3 Stories Typical Plan

Basement *First Floor* *Second Floor*

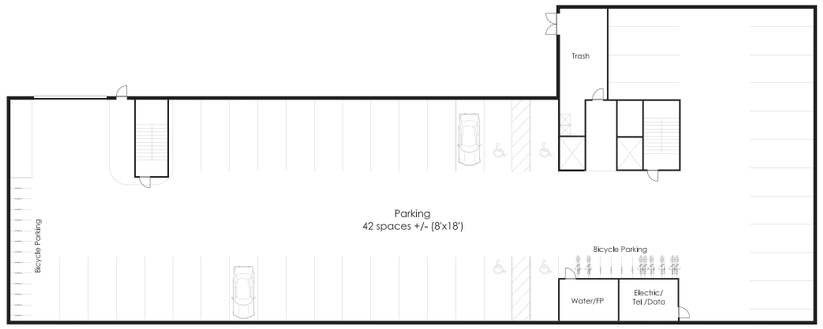
Third Floor *Roof Plan*

Figure 3-8: Townhouse-4 Stories Typical Plan

Basement *First Floor* *Second Floor*

Third Floor *Fourth Floor* *Roof Plan*

Figure 3-9: Apartment – Basement



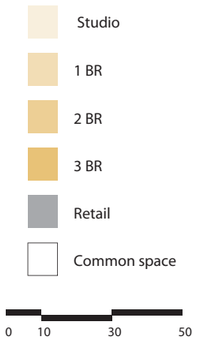


Figure 3-10: Apartment- First Floor

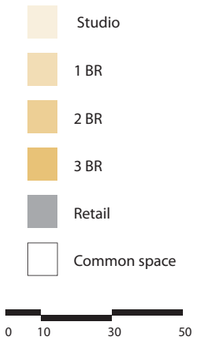


Figure 3-11: Apartment- Second to Fourth Floor

Figure 3-12: Apartment- Fifth Floor

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Figure 3-13: Aerial Perspective Front

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Figure 3-14: Aerial Perspective Rear

Figure 3-15: Overall Elevations (Front and Rear)

Overall Project Front Elevation Along Hyde Park Avenue

Overall Project Rear Elevation Along MBTA Tracks

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Figure 3-16: Hyde Park Elevation

Phase A: Front Elevation Along Hyde Park Avenue

Phase B: Front Elevation Along Hyde Park Avenue

Phase C: Front Elevation Along Hyde Park Avenue

0 10 30 50

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Figure 3-17: Rear Elevation

Phase A: Rear Elevation Along MBTA Tracks

Phase B: Rear Elevation Along MBTA Tracks

Phase C: Rear Elevation Along MBTA Tracks

0 10 30 50

Figure 3-18: Side Elevations

Three Story Townhouse: Typical Side Elevation

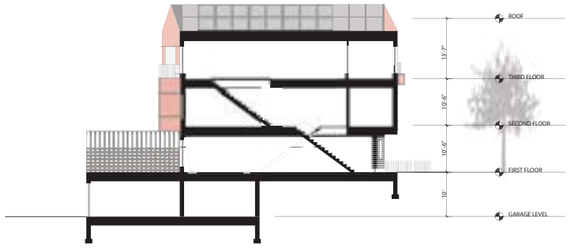
Four Story Townhouse: Typical Side Elevation

Five Story Apartment: Side Elevation (Ukraine Way Side)

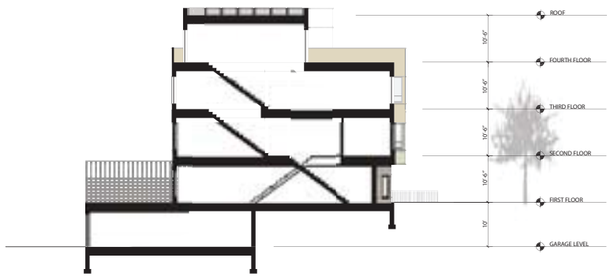
Five Story Apartment: Side Elevation (Pocket Park Side)

0 10 30 50

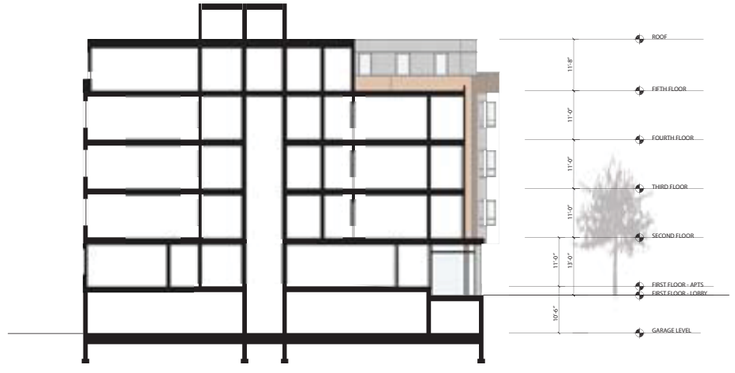
Figure 3-19: Typical Sections



Three Story Townhouse: Short Section

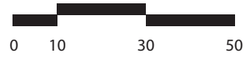


Four Story Townhouse: Short Section



Five Story Apartment: Section Across Circulation Core

Five Story Apartment: Section Across Circulation Core



PARCEL U | FOREST HILLS

Figure 3-20: Project Rendering –Hyde Park Avenue Street Level 1

Southwest View ot the Three Story Townhouses (Looking towards Tollgate Cemetery)

Parcel U- PNF Page 3-48 Urban Design /Sustainability Component

PARCEL U | FOREST HILLS

Figure 3-21: Project Rendering –Hyde Park Avenue Street Level 2

Northeast View ot the Four Story Townhouses (Near Walk Hill and Hyde Park Avenue Intersection)

Parcel U- PNF Page 3-50 Urban Design /Sustainability Component

PARCEL U | FOREST HILLS

Figure 3-22: Project Rendering – Ukraine Way intersection

Southwest View ot the Five Story Apartment Building (Near Ukraine Way and Hyde Park Avenue Intersection)

Parcel U- PNF Page 3-52 Urban Design /Sustainability Component

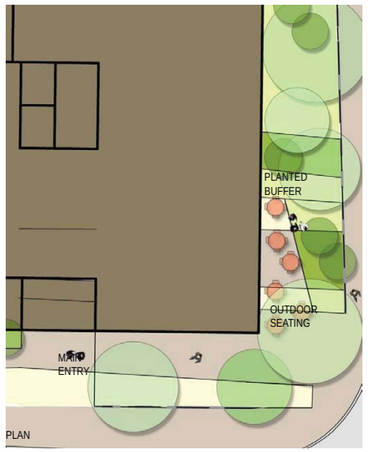
PARCEL U | FOREST HILLS

Figure 3-23: Landscape Plan

Figure 3-24: Streetscape

PLAN

Figure 3-25: Corner Plaza



PLAN

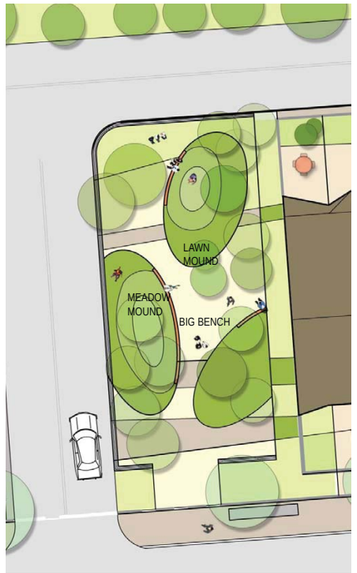
OUTDOOR CAFE

Figure 3-26: Forest Buffer Park

PLAN

WOODLAND UNDERSTORY

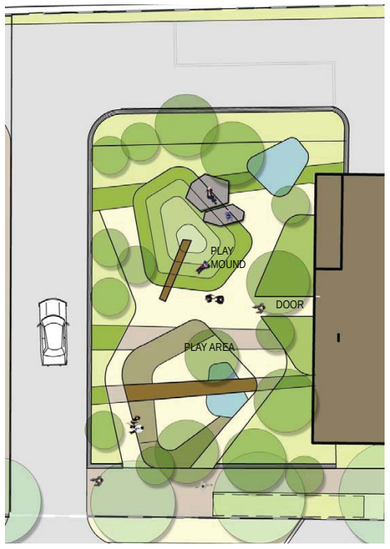
Figure 3-27: Meadow Park



PLAN

MEADOW

Figure 3-28: Natural Playground Park

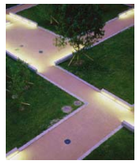


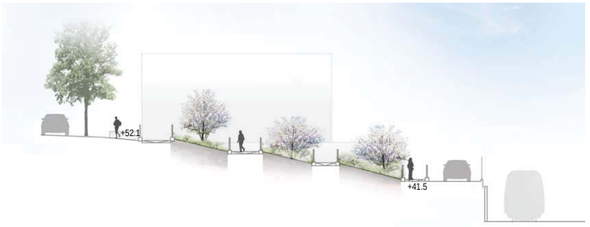
PLAN

NATURAL PLAYGROUND

Figure 3-29: Pedestrian Access Stations

PLAN





RAMP SECTION

STAIR SECTION

Figure 3-30: LEED for Homes Checklist for Townhouses

LEED for Homes Simplified Project Checklist

for Homes

Builder Name:	*Urbanica*
Project Team Leader (if different):	*Shawn Pang, Urbanica*
Home Address (Street/City/State):	*Hyde Park Ave, Jamaica Plain, MA*

Project Description:

Building type: ***Multi-family*** Project type: ***Multi-family De***

# of units: ***48*** Avg. Home Size Adjustment: ***-0.5***

Adjusted Certification Thresholds

Certified: ***44.5*** Gold: ***74.5***

Silver: ***59.5*** Platinum: ***89.5***

Project Point Total

Prelim: *68.5 + 5 maybe pts* Final: *28*

Certification Level

Prelim: *Silver* Final: *Not Certified*

Final Credit Category Total Points

ID: 0 *SS: 4* *EA: 22.5* *EQ: 0*

LL: 0 *WE: 0* *MR: 1.5* *AE: 0*

Minimum Point Thresholds Not Met for Final Rating

date last updated :

last updated by :

				Max Points	Project Points Preliminary Y/Pts	Maybe	No	Final Y/Pts
Innovation and Design Process (ID)			(No Minimum Points Required)	Max				
1. Integrated Project Planning	1.1	Preliminary Rating		Prereq	Y			
	1.2	Integrated Project Team		1	1	0		0
	1.3	Professional Credentialed with Respect to LEED for Homes		1	1	0		0
	1.4	Design Charrette		1	0	0		0
	1.5	Building Orientation for Solar Design		1	0	0		0
2. Durability Management Process	2.1	Durability Planning		Prereq	Y			
	2.2	Durability Management		Prereq	Y			
	2.3	Third-Party Durability Management Verification		3	0	0		0
3.Innovative or Regional Design	3.1	Innovation #1		1	1	0		0
	3.2	Innovation #2		1	0	0		0
	3.3	Innovation #3		1	0	0		0
	3.4	Innovation #4		1	0	0		0
		Sub-Total for ID Category:		***11***	*3*	*0*		***0***
Location and Linkages (LL)			(No Minimum Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. LEED ND	1	LEED for Neighborhood Development		**LL2-6**	10	0	0		0
2. Site Selection	2	Site Selection			2	0	0		0
3. Preferred Locations	3.1	Edge Development		**LL 3.2**	1	0	0		0
	3.2	Infill			2	2	0		0
	3.3	Previously Developed			1	0	0		0
4. Infrastructure	4	Existing Infrastructure			1	1	0		0
5. Community Resources/ Transit	5.1	Basic Community Resources / Transit		**LL 5.2, 5.3**	1	0	0		0
	5.2	Extensive Community Resources / Transit		**LL 5.3**	2	0	0		0
	5.3	Outstanding Community Resources / Transit			3	3	0		0
6. Access to Open Space	6	Access to Open Space			1	1	0		0
		Sub-Total for LL Category:		***10***	*7*	*0*		***0***
Sustainable Sites (SS)			(Minimum of 5 SS Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Site Stewardship	1.1	Erosion Controls During Construction			Prereq	Y			
	1.2	Minimize Disturbed Area of Site			1	1	0		0
2. Landscaping	2.1	No Invasive Plants			Prereq	Y			
	2.2	Basic Landscape Design		**SS 2.5**	2	0	0		0
	2.3	Limit Conventional Turf		**SS 2.5**	3	1	0		0
	2.4	Drought Tolerant Plants		**SS 2.5**	2	1	0		0
	2.5	Reduce Overall Irrigation Demand by at Least 20%			6	0	0		0
3. Local Heat Island Effects	3	Reduce Local Heat Island Effects			1	0	0		0
4. Surface Water Management	4.1	Permeable Lot			4	0	0		0
	4.2	Permanent Erosion Controls			1	1	0		0
	4.3	Management of Run-off from Roof			2	2	0		0
5. Nontoxic Pest Control	5	Pest Control Alternatives			2	2	0		0
6. Compact Development	6.1	Moderate Density		**SS 6.2, 6.3**	2	0	0		0
	6.2	High Density		**SS 6.3**	3	0	0		0
	6.3	Very High Density			4	4	0		4
		Sub-Total for SS Category:		***22***	*12*	*0*		***4***

Figure 3-30: LEED for Homes Checklist for Townhouses

LEED for Homes Simplified Project Checklist (continued)

				Max Points	Project Points Preliminary Y/Pts	Maybe	No	Final Y/Pts
Water Efficiency (WE)			(Minimum of 3 WE Points Required) *OR*	Max				
1. Water Reuse	1.1	Rainwater Harvesting System	**WE 1.3**	4	0	0		0
	1.2	Graywater Reuse System	**WE 1.3**	1	0	0		0
	1.3	Use of Municipal Recycled Water System		3	0	0		0
2. Irrigation System	2.1	High Efficiency Irrigation System	**WE 2.3**	3	0	0		0
	2.2	Third Party Inspection	**WE 2.3**	1	0	0		0
	2.3	Reduce Overall Irrigation Demand by at Least 45%		4	0	0		0
3. Indoor Water Use	3.1	High-Efficiency Fixtures and Fittings		3	1	0		0
	3.2	Very High Efficiency Fixtures and Fittings		6	4	0		0
		Sub-Total for WE Category:		***15***	*5*	*0*		***0***
Energy and Atmosphere (EA)			(Minimum of 0 EA Points Required) *OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Optimize Energy Performance	1.1	Performance of ENERGY STAR for Homes		Prereq				
	1.2	Exceptional Energy Performance		34	22.5	0		22.5
7. Water Heating	7.1	Efficient Hot Water Distribution		2	0	0		0
	7.2	Pipe Insulation		1	1	0		0
11. Residential Refrigerant Management	11.1	Refrigerant Charge Test		Prereq	Y			
	11.2	Appropriate HVAC Refrigerants		1	1	0		0
		Sub-Total for EA Category:		***38***	*24.5*	*0*		***22.5***
Materials and Resources (MR)			(Minimum of 2 MR Points Required) *OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Material-Efficient Framing	1.1	Framing Order Waste Factor Limit		Prereq	Y			
	1.2	Detailed Framing Documents	**MR 1.5**	1	0	0		0
	1.3	Detailed Cut List and Lumber Order	**MR 1.5**	1	0	0		0
	1.4	Framing Efficiencies	**MR 1.5**	3	0	0		0
	1.5	Off-site Fabrication		4	0	4		0
2. Environmentally Preferable Products	2.1	FSC Certified Tropical Wood		Prereq	Y			
	2.2	Environmentally Preferable Products		8	1.5	0		0
3. Waste Management	3.1	Construction Waste Management Planning		Prereq	Y			
	3.2	Construction Waste Reduction		3	1.5	0		1.5
		Sub-Total for MR Category:		***16***	*3*	*4*		***1.5***
Indoor Environmental Quality (EQ)			(Minimum of 6 EQ Points Required) *OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. ENERGY STAR with IAP	1	ENERGY STAR with Indoor Air Package		13	0	0		0
2. Combustion Venting	2.1	Basic Combustion Venting Measures	**EQ 1**	Prereq	Y			
	2.2	Enhanced Combustion Venting Measures	**EQ 1**	2	2	0		0
3. Moisture Control	3	Moisture Load Control	**EQ 1**	1	0	0		0
4. Outdoor Air Ventilation	4.1	Basic Outdoor Air Ventilation	**EQ 1**	Prereq	Y			
	4.2	Enhanced Outdoor Air Ventilation		2	2	0		0
	4.3	Third-Party Performance Testing	**EQ 1**	1	0	1		0
5. Local Exhaust	5.1	Basic Local Exhaust	**EQ 1**	Prereq	Y			
	5.2	Enhanced Local Exhaust		1	1	0		0
	5.3	Third-Party Performance Testing		1	1	0		0
6. Distribution of Space Heating and Cooling	6.1	Room-by-Room Load Calculations	**EQ 1**	Prereq	Y			
	6.2	Return Air Flow / Room by Room Controls	**EQ 1**	1	1	0		0
	6.3	Third-Party Performance Test / Multiple Zones	**EQ 1**	2	2	0		0
7. Air Filtering	7.1	Good Filters	**EQ 1**	Prereq	Y			
	7.2	Better Filters	**EQ 7.3**	1	0	0		0
	7.3	Best Filters		2	0	0		0
8. Contaminant Control	8.1	Indoor Contaminant Control during Construction	**EQ 1**	1	1	0		0
	8.2	Indoor Contaminant Control		2	0	0		0
	8.3	Preoccupancy Flush	**EQ 1**	1	0	0		0
9. Radon Protection	9.1	Radon-Resistant Construction in High-Risk Areas	**EQ 1**	Prereq	N/A			
	9.2	Radon-Resistant Construction in Moderate-Risk Areas	**EQ 1**	1	0	0		0
10. Garage Pollutant Protection	10.1	No HVAC in Garage	**EQ 1**	Prereq	Y			
	10.2	Minimize Pollutants from Garage	**EQ 1, 10.4**	2	2	0		0
	10.3	Exhaust Fan in Garage	**EQ 1, 10.4**	1	0	0		0
	10.4	Detached Garage or No Garage	**EQ 1**	3	0	0		0
		Sub-Total for EQ Category:		***21***	*12*	*1*		***0***
Awareness and Education (AE)			(Minimum of 0 AE Points Required)	Max	Y/Pts	Maybe	No	Y/Pts
1. Education of the Homeowner or Tenant	1.1	Basic Operations Training		Prereq	Y			
	1.2	Enhanced Training		1	0	0		0
	1.3	Public Awareness		1	1	0		0
2. Education of Building Manager	2	Education of Building Manager		1	1	0		0
		Sub-Total for AE Category:		***3***	*2*	*0*		***0***

Figure 3-30: LEED for Homes Checklist for Townhouses

LEED for Homes Simplified Project Checklist

Addendum: Prescriptive Approach for Energy and Atmosphere (EA) Credits

Points cannot be earned in both the Prescriptive (below) and the Performance Approach (pg 2) of the EA section.

Energy and Atmosphere (EA) (No Minimum Points Required)			OR	Max Points	Project Points Preliminary Y/Pts	Maybe	No	Final Y/Pts
2. Insulation	2.1	Basic Insulation		Prereq				
	2.2	Enhanced Insulation		2	0	0		0
3. Air Infiltration	3.1	Reduced Envelope Leakage		Prereq				
	3.2	Greatly Reduced Envelope Leakage		2	0	0		0
	3.3	Minimal Envelope Leakage	EA 3.2	3	0	0		0
4. Windows	4.1	Good Windows		Prereq				
	4.2	Enhanced Windows		2	0	0		0
	4.3	Exceptional Windows	EA 4.2	3	0	0		0
5. Heating and Cooling Distribution System	5.1	Reduced Distribution Losses		Prereq				
	5.2	Greatly Reduced Distribution Losses		2	0	0		0
	5.3	Minimal Distribution Losses	EA 5.2	3	0	0		0
6. Space Heating and Cooling Equipment	6.1	Good HVAC Design and Installation		Prereq				
	6.2	High-Efficiency HVAC		2	0	0		0
	6.3	Very High Efficiency HVAC	EA 6.2	4	0	0		0
7. Water Heating	7.1	Efficient Hot Water Distribution		2	0	0		0
	7.2	Pipe Insulation		1	0	0		0
	7.3	Efficient Domestic Hot Water Equipment		3	0	0		0
8. Lighting	8.1	ENERGY STAR Lights		Prereq				
	8.2	Improved Lighting		2	0	0		0
	8.3	Advanced Lighting Package	EA 8.2	3	0	0		0
9. Appliances	9.1	High-Efficiency Appliances		2	0	0		0
	9.2	Water-Efficient Clothes Washer		1	0	0		0
10. Renewable Energy	10	Renewable Energy System		10	0	0		0
11. Residential Refrigerant Management	11.1	Refrigerant Charge Test		Prereq				
	11.2	Appropriate HVAC Refrigerants		1	0	0		0
		Sub-Total for EA Category:		**38**	24.5	0		**22.5**

Figure 3-31: LEED for Homes Checklist for Multi-Family Apartments

LEED for Homes Mid-rise Simplified Project Checklist

for Homes

Builder Name:	***Urbanica***
Project Team Leader (if different):	***Shawn Pang, Urbanica***
Home Address (Street/City/State):	***Hyde Park Ave, Jamaica Plain, MA***

Project Description:

Building type: ***Mid-rise multi-family*** # of stories: ***5***

# of units: ***76*** Avg. Home Size Adjustment: ***-8.5***

Adjusted Certification Thresholds

Certified: ***36.5*** Gold: ***66.5***

Silver: ***51.5*** Platinum: ***81.5***

Project Point Total

Prelim: ***50 + 9 maybe pts*** Final: ***12.5***

Certification Level

Prelim: ***Certified*** Final: ***Not Certified***

Final Credit Category Total Points

ID: 0 SS: 4 EA: 7 EQ: 0

LL: 0 WE: 0 MR: 1.5 AE: 0

Minimum Point Thresholds Not Met for Final Rating

date last updated :

last updated by :

Innovation and Design Process (ID) (No Minimum Points Required)			Max Pts	Project Points Preliminary Y/Pts	Maybe	No	Final Y/Pts
1. Integrated Project Planning	1.1	Preliminary Rating	Prereq	Y			
	1.2	Energy Expertise for MID-RISE	Prereq	Y			
	1.3	Professional Credentialed with Respect to LEED for Homes	1	1	0		0
	1.4	Design Charrette	1	0	0		0
	1.5	Building Orientation for Solar Design	1	0	0		0
	1.6	Trades Training for MID-RISE	1	0	0		0
2. Durability Management Process	2.1	Durability Planning	Prereq	Y			
	2.2	Durability Management	Prereq	Y			
	2.3	Third-Party Durability Management Verification	3	0	0		0
3.Innovative or Regional Design	3.1	Innovation #1 _____	1	1	0		0
	3.2	Innovation #2 _____	1	0	0		0
	3.3	Innovation #3 _____	1	0	0		0
	3.4	Innovation #4	1	0	0		0
		Sub-Total for ID Category:	**11**	2	0		**0**

Location and Linkages (LL) (No Minimum Points Required)			OR	Max	Y/Pts	Maybe	No	Y/Pts
1. LEED ND	1	LEED for Neighborhood Development	LL2-6	10	0	0		0
2. Site Selection	2	Site Selection		2	0	0		0
3. Preferred Locations	3.1	Edge Development		1	0	0		0
	3.2	Infill	LL 3.1	2	2	0		0
	3.3	Brownfield Redevelopment for MID-RISE		1	0	0		0
4. Infrastructure	4	Existing Infrastructure		1	1	0		0
5. Community Resources/ Transit	5.1	Basic Community Resources for MID-RISE		1	0	0		0
	5.2	Extensive Community Resources for MID-RISE	LL 5.1, 5.3	2	0	0		0
	5.3	Outstanding Community Resources for MID-RISE	LL 5.1, 5.2	3	3	0		0
6. Access to Open Space	6	Access to Open Space		1	1	0		0
		Sub-Total for LL Category:		**10**	7	0		**0**

Sustainable Sites (SS) (Minimum of 5 SS Points Required)			OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Site Stewardship	1.1	Erosion Controls During Construction		Prerequisite				
	1.2	Minimize Disturbed Area of Site for MID-RISE		1	1	0		0
2. Landscaping	2.1	No Invasive Plants		Prerequisite				
	2.2	Basic Landscape Design	SS 2.5	1	0	0		0
	2.3	Limit Conventional Turf for MID-RISE	SS 2.5	2	1	0		0
	2.4	Drought Tolerant Plants for MID-RISE	SS 2.5	1	1	0		0
	2.5	Reduce Overall Irrigation Demand by at Least 20% for MID-RISE		3	0	0		0
3. Local Heat Island Effects	3.1	Reduce Site Heat Island Effects for MID-RISE		1	0	0		0
	3.2	Reduce Roof Heat Island Effects for MID-RISE		1	1	0		0
4. Surface Water Management	4.1	Permeable Lot for MID-RISE		2	0	0		0
	4.2	Permanent Erosion Controls		1	1	0		0
	4.3	Stormwater Quality Control for MID-RISE		2	2	0		0
5. Nontoxic Pest Control	5	Pest Control Alternatives		2	2	0		0
6. Compact Development	6.1	Moderate Density for MID-RISE		2	0	0		0
	6.2	High Density for MID-RISE	SS 6.1, 6.3	3	0	0		0
	6.3	Very High Density for MID-RISE	SS 6.1, 6.2	4	4	0		4
7. Alternative Transportation	7.1	Public Transit for MID-RISE		2	2	0		0
	7.2	Bicycle Storage for MID-RISE		1	1	0		0
	7.3	Parking Capacity/Low-Emitting Vehicles for MID-RISE		1	0	0		0
		Sub-Total for SS Category:		**22**	16	0		**4**

Figure 3-31: LEED for Homes Checklist for Multi-Family Apartments

LEED for Homes Mid-rise Pilot Simplified Project Checklist (continued)

					Max Pts	Project Points Preliminary Y/Pts	Maybe	No	Final Y/Pts
Water Efficiency (WE)			(Minimum of 3 WE Points Required)	*OR*	Max				
1. Water Reuse	⊘	1	Water Reuse for MID-RISE		5	0	0		0
2. Irrigation System	⊘	2.1	High Efficiency Irrigation System for MID-RISE	**WE 2.2**	2	0	0		0
	⊘	2.2	Reduce Overall Irrigation Demand by at Least 45% for MID-RISE		2	0	0		0
3. Indoor Water Use		3.1	High-Efficiency Fixtures and Fittings		3	1	0		0
		3.2	Very High Efficiency Fixtures and Fittings		6	4	0		0
		3.3	Water Efficient Appliances for MID-RISE		2	0	2		0
			Sub-Total for WE Category:		**15**	5	2		**0**
Energy and Atmosphere (EA)			(Minimum of 0 EA Points Required)	*OR*	Max				
1. Optimize Energy Performance		1.1	Minimum Energy Performance for MID-RISE		Prereq	Y			
		1.2	Testing and Verification for MID-RISE		Prereq	Y			
		1.3	Optimize Energy Performance for MID-RISE		34	7	0		7
7. Water Heating	⊘	7.1	Efficient Hot Water Distribution		2	0	0		0
		7.2	Pipe Insulation		1	1	0		0
11. Residential Refrigerant Management		11.1	Refrigerant Charge Test		Prereq	Y			
		11.2	Appropriate HVAC Refrigerants		1	1	0		0
			Sub-Total for EA Category:		**38**	9	0		7
Materials and Resources (MR)			(Minimum of 2 MR Points Required)	*OR*	Max				
1. Material-Efficient Framing		1.1	Framing Order Waste Factor Limit		Prereq				
		1.2	Detailed Framing Documents	**MR 1.5**	1	0	0		0
		1.3	Detailed Cut List and Lumber Order	**MR 1.5**	1	0	0		0
		1.4	Framing Efficiencies	**MR 1.5**	3	0	0		0
		1.5	Off-site Fabrication		4	0	4		0
2. Environmentally Preferable Products	⊘	2.1	FSC Certified Tropical Wood		Prereq				
	⊘	2.2	Environmentally Preferable Products		8	1.5	0		0
3. Waste Management		3.1	Construction Waste Management Planning		Prereq				
		3.2	Construction Waste Reduction		3	1.5	0		1.5
			Sub-Total for MR Category:		**16**	3	4		1.5
Indoor Environmental Quality (EQ)			(Minimum of 6 EQ Points Required)	*OR*	Max				
2. Combustion Venting		2	Basic Combustion Venting Measures		Prereq	Y			
3. Moisture Control		3	Moisture Load Control		1	0	0		0
4. Outdoor Air Ventilation	⊘	4.1	Basic Outdoor Air Ventilation for MID-RISE		Prereq	Y			
		4.2	Enhanced Outdoor Air Ventilation for MID-RISE		2	0	2		0
		4.3	Third-Party Performance Testing for MID-RISE		1	0	1		0
5. Local Exhaust	⊘	5.1	Basic Local Exhaust		Prerequisite	Y			
		5.2	Enhanced Local Exhaust		1	1	0		0
		5.3	Third-Party Performance Testing		1	1	0		0
6. Distribution of Space Heating and Cooling	⊘	6.1	Room-by-Room Load Calculations		Prereq	Y			
		6.2	Return Air Flow / Room by Room Controls		1	0	0		0
		6.3	Third-Party Performance Test / Multiple Zones		2	0	0		0
7. Air Filtering		7.1	Good Filters		Prereq	Y			
		7.2	Better Filters	**EQ 7.3**	1	0	0		0
		7.3	Best Filters		2	0	0		0
8. Contaminant Control	⊘	8.1	Indoor Contaminant Control during Construction		1	1	0		0
		8.2	Indoor Contaminant Control for MID-RISE		2	0	0		0
	⊘	8.3	Preoccupancy Flush		1	0	0		0
9. Radon Protection	⊘	9.1	Radon-Resistant Construction in High-Risk Areas		Prereq	N/A			
	⊘	9.2	Radon-Resistant Construction in Moderate-Risk Areas		1	0	0		0
10. Garage Pollutant Protection		10.1	No HVAC in Garage for MID-RISE		Prereq	Y			
		10.2	Minimize Pollutants from Garage for MID-RISE	**EQ 10.3**	2	2	0		0
		10.3	Detached Garage or No Garage for MID-RISE		3	0	0		0
11. ETS Control		11	Environnmental Tobacco Smoke Reduction for MID-RISE		1	1	0		0
12. Compartmentalization of Units		12.1	Compartmentalization of Units		Prereq	Y			
		12.2	Enhanced Compartmentalization of Units		1	0	0		0
			Sub-Total for EQ Category:		**21**	6	3		0
Awareness and Education (AE)			(Minimum of 0 AE Points Required)		Max				
1. Education of the Homeowner or Tenant	⊘	1.1	Basic Operations Training		Prereq	Y			
	⊘	1.2	Enhanced Training		1	0	0		0
		1.3	Public Awareness		1	1	0		0
2. Education of Building Manager	⊘	2	Education of Building Manager		1	1	0		0
			Sub-Total for AE Category:		**3**	2	0		0

4

ENVIRONMENTAL PROTECTION

4.0 ENVIRONMENTAL PROTECTION COMPONENT

4.1 Shadow Impacts Analysis

4.1.1 Introduction

The following shadow study describes and graphically depicts anticipated new shadow impacts from the Project compared to shadows from existing buildings. The study presents the existing and built conditions for the proposed Project for the hours 9:00 AM, 12:00 Noon, 3:00 PM, and 6:00 PM for the vernal equinox, summer solstice, autumnal equinox, and winter solstice.

4.1.2 Vernal Equinox (March 21)

At 9:00 AM, shadows are cast in a westerly direction onto the railway behind the Project. There are no new shadows cast on existing buildings.

At 12:00 Noon, new shadow is cast in a northerly direction, which mostly stays within the Project Site. A minimal amount of shadow is anticipated on the edge of Ukraine Way.

At 3:00 PM, new shadow is cast in a northeasterly direction on a portion of Ukraine Way.

At 6:00 PM, shadows are cast in an easterly direction onto Hyde Park Ave. and abutting lawns.

4.1.3 Summer Solstice (June 21)

At 9:00 AM, shadows are cast in a westerly direction onto a portion of the railway behind the Project. There are no new shadows cast on existing buildings.

At 12:00 Noon, a minimal amount of shadow is cast in a northerly direction, which stays within the Site.

At 3:00 PM, a minimal amount of shadow from the Project is cast in a northeasterly direction near the corner of Ukraine Way and Hyde Park Ave.

At 6:00 PM, new shadow from the Project is cast in an easterly direction onto Hyde Park Ave., and a minimal amount cast onto the edge of a few abutting lawns.

4.1.4 Autumnal Equinox (September 21)

At 9:00 AM, shadows are cast in a westerly direction onto the railway behind the Project. There are no new shadows cast on existing buildings.

At 12:00 Noon, new shadow is cast in a northerly direction, which mostly stays within the Site. A minimal amount of shadow is anticipated on the edge of Ukraine Way.

At 3:00 PM, new shadow is cast in a northeasterly direction on a portion of Ukraine Way.

At 6:00 PM, shadows are cast in an easterly direction onto Hyde Park Ave. and abutting lawns.

4.1.5 Winter Solstice (December 21)

At 9:00 AM, shadows are cast in a northwesterly direction onto the railway behind the Project, as well as on portions of Washington St. and Ukraine Way near their intersection.

At 12:00 Noon, shadow is cast in a northerly direction onto the edge of the railway, parts of Ukraine Way, and the edge of the Forest Hills Station parking lot.

At 3:00 PM, new shadow from the Project is cast in a northeasterly direction along Hyde Park Ave., a portion of Ukraine Way, and a corner of the Forest Hills Station parking lot.

4.2.5 Summary

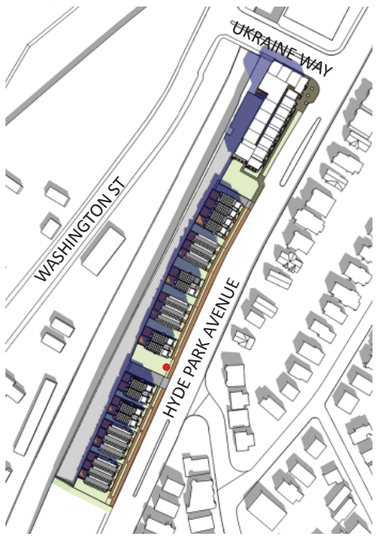
The Proposed Project's shadow impacts are minimal and do not overcast existing buildings during the daytime hours. New shadow is generally limited to the streets surrounding the Site, with afternoon shadows reaching Ukraine Way, and late-afternoon/early-evening shadows on Hyde Park Ave. The Proposed Project's comparable height with its context and the downward slope of the Site help to keep shadows from extending much beyond Hyde Park Ave. and front yards of homes until evening hours. Overall, the Proposed Project's shadow impacts will generally be consistent with current patterns and will not adversely impact the Project Site and surroundings.

Figure 4.2-1. Vernal Equinox- Shadow Study: March 21

9:00 am Altitude 23.42 Azimuth 112.6

3:00 pm Altitude 39.18 Azimuth -136.7

12:00 pm Altitude 46.52 Azimuth 161.1



6:00 pm Altitude 9.9 Azimuth -98.4

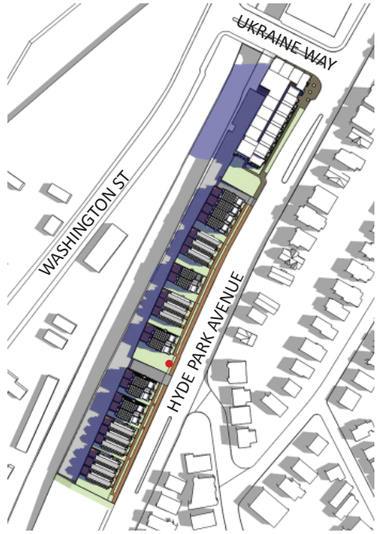
LEGEND
- Bus Stop
- New shadow
- Existing shadow

Shadow Study: March 21, Vernal Equinox

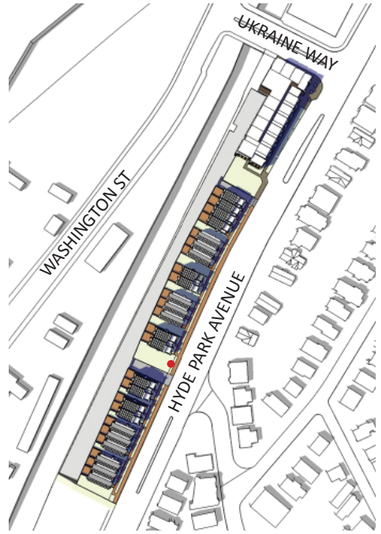
N

Figure 4.2-2. Summer Solstice - Shadow Study: June 21

9:00 am Altitude 39.9 Azimuth 93.5



3:00 pm Altitude 56.5 Azimuth -113.7



12:00 pm Altitude 68.8 Azimuth 149.4

6:00 pm Altitude 23.9 Azimuth -79.3

LEGEND
- Bus Stop
- New shadow
- Existing shadow

Shadow Study: June 21, Summer Solstice

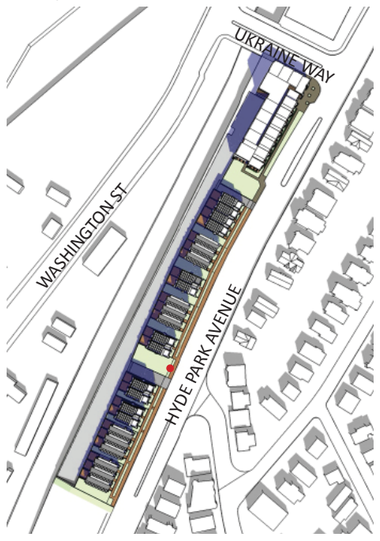
N

Figure 4.2-3. Autumnal Equinox –Shadow Study: September 21

9:00 am Altitude 25.9 Azimuth 115.3

3:00 pm Altitude 37.4 Azimuth -132.9

12:00 pm Altitude 47.4 Azimuth 166.0



6:00 pm Altitude 7.3 Azimuth -96.0

LEGEND
- Bus Stop
- New shadow
- Existing shadow

Shadow Study: Sept. 21, Autumnal Equinox

N

Figure 4.2-4. Winter Solstice - Shadow Study: December 21

9:00 am Altitude 14.2 Azimuth 141.9

3:00 pm Altitude 10 Azimuth -135.1

12:00 pm Altitude 24.1 Azimuth -175.6

6:00 pm Altitude n/a Azimuth n/a

LEGEND
- Bus Stop
- New shadow
- Existing shadow

Shadow Study: Dec. 21, Winter Solstice

N

4.2 Air Quality

Tech Environmental, Inc. performed air quality analyses for the proposed mixed-use residential/retail development at Parcel U in Jamaica Plain, MA. These analyses consisted of: 1) an evaluation of existing air quality; 2) an evaluation of potential carbon monoxide (CO) impacts from the operation of the Project's parking garage, and 3) a microscale CO analysis for intersections in the Project area that meet the BRA criteria for requiring such an analysis.

4.2.1 Existing Air Quality

The City of Boston is currently classified as being in attainment of the Massachusetts and National Ambient Air Quality Standards ("NAAQS") for all of the criteria air pollutants except ozone (see **Table 4.2-1**). These air quality standards have been established to protect the public health and welfare in ambient air, with a margin for safety.

The Massachusetts Department of Environmental Protection ("DEP") currently operates air monitors in various locations throughout the city. The closest, most representative, DEP monitors for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), fine particulate matter ($PM_{2.5}$), coarse particulate matter (PM_{10}), and lead are located at Dudley Square (Harrison Avenue). Harrison Avenue, Boston, MA. The closest, most representative, DEP monitor for ozone is located at Dudley Square (Harrison Avenue).

Table 4.2-2 summarizes the DEP air monitoring data, for the most recent available, complete, three-year period (2010-2012), that are considered to be representative of the project area. **Table 4.2-2** shows that the existing air quality in the Project area is generally much better than the NAAQS. The highest impacts relative to a NAAQS are for ozone and $PM_{2.5}$. Ozone is a regional air pollutant on which the small amount of additional traffic generated by this Project will have an insignificant impact. The Project's operations will not have a significant impact on local $PM_{2.5}$ concentrations.

Table 4.2-1. Massachusetts and National Ambient Air Quality Standards (NAAQS)

Pollutant	Averaging Time	NAAQS (µg/m^3)
SO_2	1-hour^P 24-hour^P Annual^P (Arithmetic Mean)	196[a] 365[b] 80
CO	1-hour^P 8-hour^P	40,000[b] 10,000[b]
NO_2	1-hour^P Annual$^{P/S}$ (Arithmetic Mean)	188[c] 100
PM_{10}	24-hour$^{P/S}$	150
$PM_{2.5}$	24-hour$^{P/S}$ Annual$^{P/S}$ (Arithmetic Mean)	35[d] 12[e,f]
O_3	8-hour$^{P/S}$	147[g]
Pb	Rolling 3-Month Avg.$^{P/S}$ Calendar Quarter$^{P/S}$ (Arithmetic Mean)	0.15 1.5

P = primary standard; S = secondary standard.

[a] 99th percentile 1-hour concentrations in a year (average over three years).
[b] One exceedance per year is allowed.
[c] 98th percentile 1-hour concentrations in a year (average over three years).
[d] 98th percentile 24-hour concentrations in a year (average over three years).
[e] Three-year average of annual arithmetic means.
[f] As of March 18, 2013, the U.S. EPA lowered the $PM_{2.5}$ annual standard from 15 ug/m^3 to 12 ug/m^3.
[g] Three-year average of the annual 4th-highest daily maximum 8-hour ozone concentration must not exceed 0.075 ppm (147 ug/m^3) (effective May 27, 2008) and the annual PM_{10} standard was revoked in 2006.

Table 4.2-2. Representative Existing Air Quality in the Project Area

Pollutant, Averaging Period	Monitor Location	Value (ug/m^3)	NAAQS (ug/m^3)	Percent of NAAQS
CO, 1-hour	Harrison Avenue, Boston	2,863	40,000	7%
CO, 8-hour	Harrison Avenue, Boston	2,061	10,000	21%
NO_2, 1-hour	Harrison Avenue, Boston	93.4	188	50%
NO_2, Annual	Harrison Avenue, Boston	34.8	100	35%
Ozone, 8-hour	Harrison Avenue, Boston	131	147	89%
PM_{10}, 24-hour	Harrison Avenue, Boston	41	150	27%
$PM_{2.5}$, 24-hour	Harrison Avenue, Boston	21.3	35	59%
$PM_{2.5}$, Annual	Harrison Avenue, Boston	8.4	12	69%
Lead, Quarterly	Harrison Avenue, Boston	0.017	1.5	1.1%
SO_2, 1-hour	Harrison Avenue, Boston	47.4	196	24%

Source: MassDEP, http://www.mass.gov/dep/air/priorities/aqreports.htm., downloaded July 22, 2013.

Notes:

(1) Annual averages are highest measured during the most recent three-year period for which data are available (2010 - 2012). Values for periods of 24-hours or less are highest, second-highest over the three-year period unless otherwise noted.

(2) The eight-hour ozone value is the 3-year average of the annual fourth-highest values, the 24-hour $PM_{2.5}$ value is the 3-year average of the 98th percentile values, the annual $PM_{2.5}$ value is the 3-year average of the annual values – these are the values used to determine compliance with the NAAQS for these air pollutants.

(3) The one-hour NO_2 value is the 3-year average of the 98th percentile values and the one-hour SO_2 value is the -year average of the 99th percentile values

(4) The one-hour ozone standard was revoked by the US EPA in 2005; the annual PM_{10} standard was revoked in 2006 and the 3-hour SO_2 standard was revoked by the US EPA in 2010.

4.2.2 Impacts from Parking Garage Ventilation

The Parcel U project includes a parking garage, located at ground level, designed to provide parking spaces for 42 vehicles. An analysis of the worst-case air quality impacts from the proposed parking garage was performed (see **Appendix B**). The procedures used for this analysis are consistent with U.S. EPA's Volume 9 guidance.[1] The objective of this analysis was to determine the maximum CO concentrations inside the garage and at the closest sensitive receptors surrounding the Project. These closest sensitive receptors include: air intakes located on the proposed building and nearby existing buildings and pedestrians at ground level

[1] US EPA, "Guidelines for Air Quality Maintenance Planning and Analysis Volume 9 (Revised): Evaluating Indirect Sources," EPA-450/4-78-001, September 1978.

anywhere near the Project. CO emissions from motor vehicles operating inside the garage were calculated and the CO concentrations inside the garage and surrounding the Project were based on morning and afternoon peak traffic periods. The garage exhaust CO emissions were modeled using an U.S. EPA-approved air model.

Garage Ventilation System

The proposed parking garage will require mechanical ventilation. The garage ventilation system will be designed to provide adequate dilution of the motor vehicle emissions before they are vented outside. The design of the garage ventilation system will meet all building code requirements. Full ventilation of the garage will require a maximum flow of approximately 19,930 cubic feet per minute (cfm) of fresh air. This quantity of air is designed to meet the building code and will be more than adequate to dilute the emissions inside the parking garage to safe levels before they are vented outside. The garage ventilation exhausts will likely be located at two side vents.

Peak Garage Traffic Volumes

Parking for the apartment component of the Project will be provided in a ground-level garage. The peak morning and afternoon one-hour entering and exiting traffic volumes for the garage are shown in **Table 4.2-3**.

Table 4.2-3. Peak-Hour Garage Traffic Volumes

Period	Entering (vehicles/hour)	Exiting (vehicles/hour)	Total (vehicles/hour)
Morning Peak Hour	8	26	34
Afternoon Peak Hour	25	20	45

Source: Howard-Stein Hudson, Inc.

Motor Vehicle Emission Rates

The U.S. Environmental Protection Agency (EPA) MOBILE6.2 emission factor model was used to calculate single vehicle CO emissions rates, for a vehicle speed of 5 mph. The inputs to the MOBILE6.2 model followed the latest guidance from the Massachusetts Department of Environmental Protection (DEP) and were performed for the baseline traffic year of 2014. This represents the worst case, since the MOBILE6.2 model predicts decreasing CO emissions rates in future years due to more stringent emission control requirements for new motor vehicles. The

CO emission rate calculated by MOBILE6.2, for a speed of 5 mph, was 14.82 grams per mile (gpm) for each entering and exiting vehicle. These emission rates apply to wintertime conditions when motor vehicle CO emissions are greatest due to cold temperatures. MOBILE6.2 model output is provided in the **Appendix B.**

To determine the maximum one-hour CO emissions inside the garage it was necessary to estimate the amount of time each motor vehicle will be in the parking garage with its engine running. To be conservative, it was assumed that every car entering the garage will travel to the farthest parking spot, and that the vehicles leaving the garage will have to travel the same distance from inside the garage to the exit. The calculations in **Appendix B** show how long each vehicle was calculated to travel in the garage for both the morning and afternoon peak periods.

Peak Garage CO Emission Rate and CO Concentration Inside the Garage

The peak one-hour CO emission rate for the parking garage was calculated to be 0.97 grams per minute for the morning peak hour and 1.29 grams per minute for the afternoon peak hour. Applying the maximum volumetric garage ventilation flow rate for the parking garage, the peak one-hour CO concentration inside the garage was calculated to be 1.51 parts of CO per million parts of air (ppm) for the morning peak hour and 2.00 ppm for the afternoon peak hour. Therefore, the peak one-hour CO concentration inside the garage will be 2.00 ppm with a peak one-hour emission rate of 1.29 grams/minute (0.0215 grams/second), corresponding to the afternoon peak period. These predictions represent conservative estimates of the peak garage CO emissions and concentrations.

Peak Ambient CO Concentration

Worst-case concentrations of CO from the parking garage were predicted for locations around the building with using AERMOD model (Version 14134) in screening-mode. The results of the air quality analysis for locations outside and around the building are summarized in **Table 4.2-4**. The results in **Table 4.2-4** represent all outside locations on and near the Project Site, including nearby building air intakes and nearby residences. **Appendix B** contains the AERMOD model output.

The AERMOD model in screening-mode was used to predict the maximum concentration of CO by modeling the garage emissions as a volume source with aerodynamic building downwash using worst-case meteorological conditions for an urban area. The screening-mode option simulates modeling results predicted by AERSCREEN. AERMOD was used to predict the total maximum concentration of CO by modeling the garage emissions as one volume source with the total peak morning CO emissions (0.006 grams/sec). The predicted concentrations presented here represent the worst-case air quality impacts from the garage at all locations on and around the Project. AERMOD predicted one-hour average concentrations of air pollutants.

AERMOD predicted that the maximum one-hour CO concentration from the garage exhausts will be 0.008 ppm (8.55 $\mu g/m^3$). This concentration represents the maximum CO concentration at any location surrounding the Project.

The maximum predicted eight-hour CO concentration at any ambient (outside) location will be significantly smaller than the one-hour prediction. This is because: 1) the average number of vehicles entering and exiting the garage over the peak eight-hour period will be significantly less than the peak one-hour values used to predict the peak one-hour CO impact, and 2) the worst-case meteorological conditions used to predict the peak one-hour impact will not persist for eight consecutive hours. AERSCREEN guidance allows the maximum eight-hour CO impact to be conservatively estimated by multiplying the maximum one-hour impact by a factor of 0.9 (i.e. the eight-hour impact is 90% of the one-hour impact). The maximum predicted eight-hour CO concentration was determined to be approximately 0.007 ppm (0.008 ppm x 0.9).

The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare in ambient air, with a margin for safety. The NAAQS for CO are 35 ppm for a one-hour average and 9 ppm for an eight-hour average. The Commonwealth of Massachusetts has established the same standards for CO. Conservative, urban CO background values of 1.8 ppm for a one-hour period and 1.5 ppm for an eight-hour period were added to the maximum predicted garage ambient impacts to represent the CO contribution from other, more distant, sources. With the conservative background concentration added, the peak, total, one-hour and eight-hour CO impacts from the garage, at any location around the building, will be no larger than 1.50 ppm and 1.80 ppm, respectively. These maximum predicted total CO concentrations (garage exhaust impacts plus background) are safely in compliance with the NAAQS. This analysis demonstrates that the operation of the parking garage will not have an adverse impact on air quality.

Table 4.2-4. Peak Predicted Parking Garages Air Quality Impacts

Location	Peak Predicted One-Hour Impact (ppm)	One-Hour NAAQS (ppm)	Peak Predicted Eight-Hour Impact (ppm)	Eight-Hour NAAQS (ppm)
Outside – Surrounding the Building* (Parking Garages)	1.80**	35 (NAAQS)	1.50**	9 (NAAQS)

NAAQS = Massachusetts and National Ambient Air Quality Standards for CO (ppm = parts per million)
* Representative of maximum CO impact at all nearby residences, buildings, and sidewalks.
** Includes background concentrations of 1.8 ppm for the one-hour period and 1.5 ppm for the eight-hour period.

Conclusions

A conservative air quality analysis demonstrates that there will be no adverse air quality impacts from the operation of the Project's proposed parking garage.

4.2.3 Microscale CO Analysis for Selected Intersections

The Boston Redevelopment Authority (BRA) and the Massachusetts DEP typically require a microscale air quality analysis for any intersection in the Project study area where the level of service (LOS) is expected to deteriorate to D and the proposed project causes a 10% increase in traffic or where the level of service is E or F and the project contributes to a reduction in LOS. For such intersections, a microscale air quality analysis is required to examine the carbon monoxide (CO) concentrations at sensitive receptors near the intersection.

A microscale air quality analysis was not performed for this Project due to its extremely small motor vehicle trip generation. The Project generates only 37 motor vehicle trips during the morning peak traffic hour and only 51 motor vehicle trips during the afternoon traffic hour. The Project will add no more than 40 motor vehicle trips to any of the intersections included in the transportation impact analysis during either the morning or afternoon peak traffic period. **Table 4.2-5** shows that the Project will not deteriorate the LOS at any of the analyzed intersections and will increase the traffic at either intersection by no more than 1.5%. The small motor vehicle trip generation from the Project will not have a significant impact on motor vehicle delays and air pollutant emissions at the analyzed intersections. Therefore, the motor vehicle traffic generated by the Project will not have a significant impact on air quality at any intersection in the Project area and a microscale air quality analysis is not necessary for this Project.

Table 4.2-5. Summary of Build Case Level of Service

Intersection	Build LOS (AM/PM)	Requires Analysis?
Ukraine Way/Washington Street – signalized	D/E	NO*
Ukraine Way/Hyde Park Avenue – signalized	C/E	NO*
Site Drive South/Hyde Park Avenue – signalized	C/C	NO
Site Drive North/Hyde Park Avenue – unsignalized	A/A	NO
Parking Lot/Washington Street – unsignalized	A/A	NO
Weld Hill Street/Hyde Park Avenue– unsignalized	A/A	NO
Patten Street/Hyde Park Avenue – unsignalized	A/A	NO

The LOS shown represents the overall delay at each signalized intersection and the worst approach at the unsignalized intersection. Percentages shown for LOS D are percent increase in traffic from the Project.
*Project does not contribute to reduction in level of service. Source: Howard/Stein-Hudson Associates, Inc.

Conclusions

The traffic generated by the proposed project will have an insignificant impact on the peak-hour traffic volumes at local intersections. Therefore, the proposed Project will have an insignificant impact on the local air quality. The air quality in the Project area will remain safely in compliance with the NAAQS for CO after the Project is built.

4.3 Noise Impacts

Tech Environmental, Inc., performed a noise study to determine whether the operation of the proposed Project will comply with the City of Boston Noise Regulations and the Massachusetts Department of Environmental Protection ("DEP") Noise Policy.

4.3.1 Common Measures of Community Noise

The unit of sound pressure is the decibel (dB). The decibel scale is logarithmic to accommodate the wide range of sound intensities to which the human ear is subjected. A property of the decibel scale is that the sound pressure levels of two separate sounds are not directly additive. For example, if a sound of 70 dB is added to another sound of 70 dB, the total is only a 3-decibel increase (or 73 dB), not a doubling to 140 dB. Thus, every 3 dB increase represents a doubling of sound energy. For broadband sounds, a 3 dB change is the minimum change perceptible to the

human ear. **Table 4.3-1** gives the perceived change in loudness of different changes in sound pressure levels.2

Table 4.3-1. Subjective Effects of Changes in Sound Pressure Levels

Change in Sound Level	Apparent Change in Loudness
3 dB	Just perceptible
5 dB	Noticeable
10 dB	Twice (or half) as loud

Non-steady noise exposure in a community is commonly expressed in terms of the A-weighted sound level (dBA); A-weighting approximates the frequency response of the human ear. Levels of many sounds change from moment to moment. Some are sharp impulses lasting 1 second or less, while others rise and fall over much longer periods of time. There are various measures of sound pressure designed for different purposes. To establish the background ambient sound level in an area, the L_{90} metric, which is the sound level exceeded 90 percent of the time, is typically used. The L_{90} can also be thought of as the level representing the quietest 10 percent of any time period. Similarly, the L_{10} can also be thought of as the level representing the quietest 90 percent of any time period. The L_{10} and L_{90} are broadband sound pressure measures, i.e., they include sounds at all frequencies.

Sound level measurements typically include an analysis of the sound spectrum into its various frequency components to determine tonal characteristics. The unit of frequency is Hertz (Hz), measuring the cycles per second of the sound pressure waves, and typically the frequency analysis examines nine octave bands from 32 Hz to 8,000 Hz. A source is said to create a pure tone if acoustic energy is concentrated in a narrow frequency range and one octave band has a sound level 3 dB greater than both adjacent octave bands.

The acoustic environment in an urban area such as the Project area results from numerous sources. Observations show that major contributors to the background sound level in the Project area include motor vehicle traffic on local and distant streets, aircraft over-flights, mechanical equipment on nearby buildings, and general city noises such as street sweepers and police/fire sirens. Typical sound levels associated with various activities and environments are presented in **Table 4.3-2**.

[2] American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1989 ASHRAE Handbook--Fundamentals (I-P) Edition, Atlanta, GA, 1989.

4.3.2 Noise Regulations

Commonwealth Noise Policy

The DEP regulates noise through 310 CMR 7.00, “Air Pollution Control.” In these regulations “air contaminant” is defined to include sound and a condition of “air pollution” includes the presence of an air contaminant in such concentration and duration as to “cause a nuisance” or “unreasonably interfere with the comfortable enjoyment of life and property.”

Regulation 7.10 prohibits “unnecessary emissions” of noise. The DEP DAQC Policy Statement 90-001 (February 1, 1990) interprets a violation of this noise regulation to have occurred if the noise source causes either:

1. An increase in the broadband sound pressure level of more than 10 dBA above the ambient level; or
2. A “pure tone” condition.

The ambient background level is defined as the L_{90} level as measured during equipment operating hours. A “pure tone” condition occurs when any octave band sound pressure level exceeds both of the two adjacent octave band sound pressure levels by 3 dB or more.

The DEP does not regulate noise from motor vehicles accessing a site or the equipment backup notification alarms. Therefore, the provisions described above only apply to a portion of the sources that may generate sound following construction of the Project.

Local Regulations

The City of Boston Environment Department regulates noise through the Regulations for the Control of Noise as administered by the Air Pollution Control Commission. The Project is located in an area consisting of commercial and residential uses. The Project will have low-rise residential uses to the north, east, and south. The Project must comply with Regulation 2.2 for noise levels in Residential Zoning Districts at these residential locations**. Table 4.3-3** lists the maximum allowable octave band and broadband sound pressure levels for residential and business districts. Daytime is defined by the City of Boston Noise Regulations as occurring between the hours of 7:00 a.m. and 6:00 p.m. daily except Sunday. Compliance with the most restrictive nighttime residential limits will ensure compliance for other land uses with equal or higher noise limits.

4.3.3 Pre-Construction Sound Level Measurements

Existing baseline sound levels in the Project area were measured during the quietest overnight period when human activity and street traffic were at a minimum, and when the Project’s mechanical equipment (the principal sound sources) could be operating. Since the Project’s mechanical equipment may operate at any time during a 24-hour day, a weekday between

11:00 p.m. and 4:00 a.m. was selected as the worst-case time period, i.e., the time period when Project-related sounds may be most noticeable due to the quieter background sound levels. Establishing an existing background (L_{90}) during the quietest hours of the facility operation is a conservative approach for noise impact assessment and is required by the DEP Noise Policy.

Table 4.3-2. Common Indoor and Outdoor Sound Levels

Outdoor Sound Levels	Sound Pressure (μPa)	Sound Level (dBA)	Indoor Sound Levels
	6,324,555	110	Rock Band at 5 m
Jet Over-Flight at 300 m		105	
	2,000,000	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		95	
	632,456	90	Food Blender at 1 m
Diesel Truck at 15 m		85	
Noisy Urban Area—Daytime	200,000	80	Garbage Disposal at 1 m
		75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		65	Normal Speech at 1 m
	20,000	60	
Quiet Urban Area—Daytime		55	Quiet Conversation at 1m
	6,325	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		45	
	2,000	40	Empty Theater or Library
Quiet Suburb—Nighttime		35	
	632	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		25	Empty Concert Hall
Rustling Leaves	200	20	Average Whisper
		15	Broadcast and Recording Studios
	63	10	
		5	Human Breathing
Reference Pressure Level	20	0	Threshold of Hearing

Notes: μPa, or micro-Pascals, describes sound pressure levels (force/area). DBA, or A-weighted decibels, describes sound pressure on a logarithmic scale with respect to 20 μPa (reference pressure level).

Table 4.3-3. Maximum Allowable Sound Pressure Levels (dB) City of Boston

Octave Band (Hz)	Zoning District		
	Residential (Daytime)	Residential (All Other Times)	Business (anytime)
32 Hz	76	68	79
63 Hz	75	67	78
125 Hz	69	61	73
250 Hz	62	52	68
500 Hz	56	46	62
1000 Hz	50	40	56
2000 Hz	45	33	51
4000 Hz	40	28	47
8000 Hz	38	26	44
Broadband (dBA)	**60**	**50**	**65**

The nighttime noise measurement locations are as follows (see the Figure 1 in the **Appendix C**):

Monitoring Location #1: Hyde Park Avenue & Walk Hill Street

Monitoring Location #2: Hyde Park Avenue & Ukraine Way

Broadband (dBA) and octave band sound level measurements were made with a Bruel and Kjaer Model 2250 environmental sound level analyzer, at each monitoring location, for a duration of approximately thirty minutes. The full octave band frequency analysis was performed on the frequencies spanning 16 to 16,000 Hertz. A time-integrated statistical analysis of the data used to quantify the sound variation was also performed, including the calculation of the L_{90}, which is used to set the ambient background sound level.

The B&K model 2250 is equipped with a ½" precision condenser microphone and has an operating range of 5 dB to 140 dB and an overall frequency range of 3.5 Hz to 20,000 Hz. This meter meets or exceeds all requirements set forth in the ANSI S1.4-1983 Standards for Type 1 quality and accuracy and the State and City requirements for sound level instrumentation. Prior to any measurements, this sound analyzer was calibrated with an ANSI Type 1 calibrator that has an accuracy traceable to the National Institute of Standards and Technology (NIST). During all measurements, the B&K 2250 was tripod mounted at approximately five feet above the ground in open areas away from vertical reflecting surfaces.

The nighttime sound level monitoring was conducted on Wednesday and Thursday, May 14 and 15, 2014. Weather conditions during the sound survey were conducive to accurate sound level monitoring: the temperature was 58° F, the skies were overcast, and the winds were 0 to 5 mph.

The microphone of the sound level analyzer was fitted with a 7-inch windscreen to negate any effects of wind-generated noise.

The nighttime sound level measurements taken in the vicinity of the Project Site reveal sound levels that are typical for an urban area. The significant sources of existing sound at both locations are motor vehicle traffic on local streets, pedestrian traffic and the adjacent MBTA Needham commuter rail line.

The results of the nighttime baseline sound level measurements are presented in **Table 4.3-4**. The nighttime background L_{90} level was 46.8 dBA at Location #2 and 49.4 dBA at Location #1. The octave band data in **Table 4.3-4** show that no pure tones were detected in the nighttime noise measurements.

Table 4.3-4. Nighttime Baseline Sound Level Measurements, May 14, 2014

Sound Level Measurement	(Location #1) Hyde Park Avenue & Walk Hill Street 11:01 – 11:31 p.m.	(Location #2) Hyde Park Avenue & Urkaine Way 11:45 p.m. - 12:15 a.m.
Broadband (dBA) Background (L_{90})	46.8	49.4
Octave Band L_{90} (dB)		
16 Hz	51.4	50.8
32 Hz	55.1	57.5
63 Hz	55.1	57.1
125 Hz	50.2	53.1
250 Hz	41.7	47.1
500 Hz	40.7	43.6
1000 Hz	43.1	45.3
2000 Hz	39.3	41.6
4000 Hz	28.4	32.4
8000 Hz	17.6	22.2
16000 Hz	12.5	13.8
Pure Tone?	No	No

Noise monitoring at the Project Site during the morning peak traffic period was used to evaluate the existing ambient sound levels and to evaluate conformance with the Site Acceptability Standards established by HUD for residential development. The purpose of the HUD guidelines is to provide standards for determining the acceptability of residential project locations with regards to existing sound levels. The HUD criteria regarding the day-night average sound level (L_{dn}) are listed below. These standards apply to L_{dn} measurements taken several feet from the building in the direction of the predominant source of noise.

- Normally Acceptable – L_{dn} not exceeding 65 dBA
- Normally Unacceptable – L_{dn} above 65 dBA but not exceeding 75 dBA
- Unacceptable – L_{dn} above 75 dBA.

These HUD standards do not apply to this Project, but are used as guidance regarding the suitability of the Project area with regard to background sound levels.

Daytime sound level measurements were taken to help estimate the L_{dn} for the Project Site. A 30-minute sound level measurement was taken during the morning, on Friday, May 16, 2014 between 8:36 a.m. and 9:06 a.m. at Hyde Park Avenue and Ukraine Way (Location #2) representing the closest location to the Project Site. The weather conditions during the sound survey were conducive to accurate sound level monitoring: the skies were overcast, and the winds were 5-10 mph. The microphone of the sound level analyzer was fitted with a 7-inch windscreen to negate any effects of wind-generated noise.

The daytime sound level measurements taken in the vicinity of the Project Site reveal sound levels that are typical for an urban area. The main sources of noise during the peak morning traffic period sound level measurement were motor vehicle traffic on nearby local streets, construction vehicles in the distance, adjacent MBTA Needham commuter rail line activity, and aircraft over-flights. The L_{eq} measured during the morning period was 70 dBA. The L_{eq} sound level measured during the nighttime at the same location was 63 dBA. Using both the daytime and nighttime L_{eq} sound levels, the calculated L_{dn} for the site is 71 dBA, which is above the HUD guideline noise limit of 65 dBA.

It is assumed that standard building construction practices will result in at least a 20 dBA reduction of sound from outdoor sound levels. The Proponent will incorporate sound mitigation, as necessary, to assure that motor vehicle sound sources and the MBTA rail yard do not result in noise impacts greater than 45 dBA inside the residential units closest to the neighboring streets.

4.3.4 Reference Data and Candidate Mitigation Measures

The mechanical systems for the Proposed Project are in the early design stage. Typical sound power data for the equipment of the expected size and type for the Project have been used in the acoustic model to represent the Project's mechanical equipment. The sound levels from all potential significant Project noise sources are discussed in this section.

The design for the Proposed Project is expected to include the following significant mechanical equipment:

- Ductless Mini Splits Units with rooftop condensers on the 24 townhomes.
- VRV/VRF units or Multi zoned Minisplits with rooftop condensers on the apartment building.

The equipment listed above was included in the noise impact analysis. The Project's traffic was not included in the noise analysis because motor vehicles are exempt under both the City of Boston and Massachusetts DEP noise regulations.

The sound generation profiles for the mechanical equipment noise sources operating concurrently under full-load conditions were used to determine the maximum possible resultant sound levels from the Project Site as a whole, to define a worst-case scenario. To be in compliance with City and DEP regulations, the resultant sound level must not exceed the allowable octave band limits in the City of Boston noise regulation and must be below the allowable incremental noise increase, relative to existing noise levels, as required in the DEP Noise Policy.

This sound level impact analysis was performed using sound generation data for representative equipment to demonstrate compliance with noise regulations. As the building design evolves, the sound generation for the actual equipment selected may differ from the values that were utilized for the analysis.

4.3.5 Calculated Future Sound Levels

Methodology

Future maximum sound levels at the upper floors of all existing residences bordering the Project, and at the nearest residential property line, were calculated with acoustic modeling software assuming simultaneous operation of all mechanical equipment at their maximum loads.

The Cadna-A computer program, a comprehensive 3-dimensional acoustical modeling software package was used to calculate Project generated sound propagation and attenuation.[3] The model is based on ISO 9613, an internationally recognized standard specifically developed to ensure the highly accurate calculation of environmental noise in an outdoor environment. ISO 9613 standard incorporates the propagation and attenuation of sound energy due to divergence with distance, surface and building reflections, air and ground absorption, and sound wave diffraction and shielding effects caused by barriers, buildings, and ground topography.

Receptors

The closest/worst-case sensitive (residential) location is to the east of the project on Hyde Park Ave (R1). This location was selected based on the proximity of the equipment (smaller distances correspond to larger noise impacts) and the amount of shielding by other buildings (taller nearby residential locations will experience less shielding from the Project's rooftop mechanical equipment, which may result in larger potential noise impacts from the Project). This location is

[3] Cadna-A Computer Aided Noise Abatement Program, Version 4.4

expected to receive the largest sound level impacts from the Project's rooftop mechanical equipment. It can be classified as a residential zone.

The sound level impacts from the building's mechanical equipment were predicted at the closest residential location, as well as at four other residential locations to the east and south of the project area. Figure 1 in **Appendix C** shows the locations of the modeled noise receptors. Noise impacts at other nearby noise-sensitive locations (residences, parks, etc.) farther from the Project Site will be less than those predicted for these receptors.

4.3.6 Compliance with State and Local Noise Standards

The City of Boston and DEP noise standards apply to the operation of the mechanical equipment at the proposed Project. The details of the noise predictions are presented in **Tables 4.3-5** through **4.3-9**. The sound impact analysis includes the simultaneous operation of the Project's rooftop HVAC equipment. The predicted sound levels are worst-case predictions that represent all hours of the day, as the analysis assumes full operation of the mechanical equipment 24-hours a day. The typical sound level impacts from the mechanical equipment will likely be lower than what is presented here, since most of the mechanical equipment will operate at full-load only during certain times of the day and during the warmer months of the year, it is not likely that all of the mechanical equipment will operate at the same time. Sound level impacts at locations farther from the Project (e.g. other residences, etc.) will be lower than those presented in this report.

City of Boston Noise Standards

The noise impact analysis results, presented in **Tables 4.3-6** through **4.3-9**, reveal that the sound level impact at the worst-case property line and the closest residence will be 42.5 dBA. The smallest sound level impact of 39.5 dBA is predicted to occur at the R5 on Walk Hill Street. Noise impacts predicted at all locations are in compliance with the City of Boston's nighttime noise limit (50 dBA) for a residential area. Note that sound levels from the Project will be below the residential nighttime limits at all times. The results also demonstrate compliance with the City of Boston, residential, non-daytime, octave band noise limits at all locations.

The City of Boston noise limits for business areas are significantly higher than the nighttime noise limits for residential areas (see **Table 4.3-3**). The Project will also easily comply with the City of Boston business area noise limits at all surrounding commercial properties.

Massachusetts DEP Noise Regulations

The predicted sound level impacts at the worst-case property line and the worst-case residential locations were added to the measured L_{90} value of the quietest daily hour to test compliance with DEP's noise criteria. Assuming the Project's mechanical noise is constant throughout the day, the Project will cause the largest increase in sound levels during the period when the

lowest background noise occurs. Minimum background sound levels (diurnal) typically occur between 12:00 a.m. and 5:00 a.m.

The predicted sound level impacts at the worst-case property line and the closest residences were added to the L_{90} values measured during the period with the least amount of background noise to test compliance with DEP's noise criteria. The predicted noise impacts at the property line and the closest residences were added to the most-representative measured L_{90} values to determine the largest possible increase in the sound level at each location during the quietest hour at the Project Site.

As shown in **Tables 4.3-6** through **4.3-9**, the Project is predicted to produce a less than 1 dBA change in the background sound levels at all modeled locations. Therefore, the Project's worst-case sound level impacts during the quietest nighttime periods will be in compliance with the Massachusetts DEP allowed noise increase of 10 dBA. The noise predictions for each octave band indicate that the mechanical equipment will not create a pure tone condition at any location.

MBTA Commuter Rail Line

One of the benefits of the project is that the townhouse buildings and apartment building will act as a sound barrier between the MBTA Needham commuter rail line and residences along Hyde Park Avenue and Walk Hill Street. The Cadna-A acoustic model was used to calculate the potential sound reduction of the buildings. The sound level reductions ranged from 3 to 13 dBA, which are considered a barely perceptible to a significant sound reduction.

Table 4.3-5. Estimated Future Sound Level Impacts – Anytime Hyde Park Avenue (Closest PL & Residence) – Location R1

Octave Bands	Residential Nighttime Noise Standards	Maximum Predicted Sound Levels*
32 Hz	68	51
63 Hz	67	49
125 Hz	61	48
250 Hz	52	43
500 Hz	46	42
1000 Hz	40	37
2000 Hz	33	30
4000 Hz	28	21
8000 Hz	26	7
Broadband (dBA)	**50**	**42.5**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Location # 2)	49.4
Parcel U Project*	42.5
Calculated Combined Future Sound Level	50.2
Calculated Incremental Increase	+0.8
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.
Note: DEP Policy allows a sound level increase of up to 10 dBA

Table 4.3-6. Estimated Future Sound Level Impacts – Anytime Hyde Park Avenue – Location R2

Octave Bands	Residential Nighttime Noise Standards	Maximum Predicted Sound Levels*
32 Hz	68	49
63 Hz	67	46
125 Hz	61	44
250 Hz	52	41
500 Hz	46	41
1000 Hz	40	37
2000 Hz	33	32
4000 Hz	28	23
8000 Hz	26	8
Broadband (dBA)	**50**	**42.0**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Location # 2)	49.4
Parcel U Project*	42.0
Calculated Combined Future Sound Level	50.1
Calculated Incremental Increase	+0.7
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.
Note: DEP Policy allows a sound level increase of up to 10 dBA

Table 4.3-7. Estimated Future Sound Level Impacts – Anytime Hyde Park Avenue – Location R3

Octave Bands	Residential Nighttime Noise Standards	Maximum Predicted Sound Levels*
32 Hz	68	49
63 Hz	67	45
125 Hz	61	42
250 Hz	52	41
500 Hz	46	40
1000 Hz	40	37
2000 Hz	33	31
4000 Hz	28	23
8000 Hz	26	8
Broadband (dBA)	**50**	**41.3**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Location # 2)	49.4
Parcel U Project*	41.3
Calculated Combined Future Sound Level	50.0
Calculated Incremental Increase	+0.6
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.
Note: DEP Policy allows a sound level increase of up to 10 dBA

Table 4.3-8. Estimated Future Sound Level Impacts – Anytime Hyde Park Avenue – Location R4

Octave Bands	Residential Nighttime Noise Standards	Maximum Predicted Sound Levels*
32 Hz	68	47
63 Hz	67	43
125 Hz	61	40
250 Hz	52	39
500 Hz	46	38
1000 Hz	40	36
2000 Hz	33	31
4000 Hz	28	23
8000 Hz	26	10
Broadband (dBA)	**50**	**40.1**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Location # 1)	46.9
Parcel U Project*	40.1
Calculated Combined Future Sound Level	47.7
Calculated Incremental Increase	+0.8
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.
Note: DEP Policy allows a sound level increase of up to 10 dBA

Table 4.3-9. Estimated Future Sound Level Impacts – Walk Hill Street – Location R5

Octave Bands	Residential Nighttime Noise Standards	Maximum Predicted Sound Levels*
32 Hz	68	46
63 Hz	67	42
125 Hz	61	39
250 Hz	52	38
500 Hz	46	38
1000 Hz	40	35
2000 Hz	33	30
4000 Hz	28	21
8000 Hz	26	6
Broadband (dBA)	**50**	**39.5**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Location # 1)	46.9
Parcel U Project*	39.5
Calculated Combined Future Sound Level	47.6
Calculated Incremental Increase	+0.7
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.
Note: DEP Policy allows a sound level increase of up to 10 dBA

4.3.7 Conclusions

Sound levels at all nearby sensitive locations and at all property lines will fully comply with the most stringent City of Boston and DEP daytime and nighttime sound level limits. The project will also help to reduce sound levels from the existing MBTA Needham commuter rail line at nearby residences.

This acoustic analysis demonstrates that the Project's design will meet the applicable acoustic criteria.

4.4 Stormwater Management and Water Quality

The existing storm drain utility infrastructure surrounding the proposed Parcel U site appears to be of adequate capacity to service the needs of the project. Best management practices and sustainable design will be incorporated into the Project wherever practical and applicable. Stormwater management systems will be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

Utility connections will be designed to minimize impacts to the surrounding area and all appropriate permits and approvals will be acquired prior to construction.

The proposed stormwater management systems will include water quality units and groundwater recharge systems. The Project will increase the amount of impervious area at the site compared to the existing condition. It is anticipated that the stormwater recharge systems will work to passively infiltrate runoff into the ground with a gravity recharge system. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate of stormwater discharge from the Project site in the developed condition compared to the existing condition. In addition, water quality units will be installed to reduce pollutants prior to discharging to the groundwater recharge systems.

All improvements and connections to BWSC infrastructure will be reviewed as part of the Commission's site plan review process. The process includes a comprehensive design review of the proposed service connections, assessment of project demands and system capacity.

4.5 Solid and Hazardous Waste Materials

4.5.1 Solid Waste

During the preparation of the Site, debris, including asphalt, trash, and demolition debris, as necessary, will be removed from the Project Site. The Proponent will ensure that waste removal and disposal during construction and operation will be in conformance with the City and DEP's Regulations for Solid Waste.

Upon completion of construction, the Proposed Project will generate approximately 24 tons of solid waste per year, based on the assumption that each residential unit generates 8 lbs of solid waste per day, office (community space) use generates .01 lb/sf / day, and retail uses generate .02 lb / sf / day -translating to approximately 23 tons / year for the residential units, approximately 0.5 tons / year for the office (community space) use, and approximately 0.5 ton / year for the retail. Residential waste for the homeownership units in Phases A and B will be handled by trash containers in the ground floor garages which will be picked up by private contractors. The Phase C, apartment rental trash, will be handled through a trash chute extending to all floors, and then compacted before being brought to the ground level garage for disposal by private contractors. Waste from the office and retail components will be brought directly to the loading area by their respective staffs.

The project will also include ambitious goals for construction waste management in order to meet the requirements for the LEED™ rating system. This strategy will divert demolition and construction waste by reusing and recycling materials.

In order to meet the requirements for the Boston Environmental Department and the LEED™ rating system, the overall Proposed Project will include space dedicated to the storage and collection of recyclables, including dedicated dumpsters at the loading area. The recycling program will meet or exceed the City's guidelines, and provide–areas for waste paper and newspaper, metal, glass, and plastics (21 through 27, co-mingled).

4.5.2 Hazardous Waste and Materials

The 2.89 acre Parcel U site is currently vacant, grass covered, undeveloped, and owned by the MBTA. The Site has been utilized as a green space over the last several years, according to IES, Parcel U's hazardous waste consultants; although the property was utilized for rail car storage by various rail companies prior to that since the 1920's.

Based on a historical review and research of state and local files completed by IES Inc. in its Phase I Environmental Site Assessment for Parcel U (May 14, 2014), the project site is not listed on any EPA or DEP data bases, and that there were no recognized environmental conditions (REC's), identified hazardous substances or petroleum products, on the site. Nearby listings of concern identified in the IES study include railroad lines located on the Site's western boundary; a former gasoline filling station with associated UST at 8 Walk Hill Street, which adjoins the Site to the southeast; a used automobile dealer at 388R Washington Street, 100 feet to the south of the Site; and the nearby DEP spill at 25 Walk Hill Street (Release Tracking Number. N81-5012), approximately 250 feet to the southeast of the Site.

None of these spills/releases were considered posing significant environmental problems to the Site at this time according to the IES report. Nevertheless, due to the potential on-site and off-site threats of contamination, IES classifies the Site as a "Moderate/High Cleanup Risk due to

potential for groundwater contamination from adjoining properties and to historical use of the Site for storage and maintenance of railways cars.

The project proponent has continued to retain IEP to provide Licensed Site Professional support services during property redevelopment activities to both maintain compliance with the MCP and to assist with planning and attaining site closure under the MCP.

Additional detailed information from the IEP Phase I Environmental Site Assessment is available upon request to the Proponent.

4.6 Geotechnical / Groundwater Impacts Analysis

Site grades on the 2.9 acres site slope downward from the east (Hyde Park Avenue) to the west (MBTA tracks), and vary from elevations 55 to 37 feet including gradual to steep contours. The adjacent MBTA lines are depressed approximately 7 to 8 feet, and separated by a concrete retaining wall. Below grade parking is proposed for the Phase A and B home ownership developments.

Based on a "Preliminary Groundwater Summary" completed by KMM Geotechnical Consultants, LLC on August 16, 2013, it is anticipated that there will be little or no impact to the groundwater table due to the Proposed Project. The foundations are expected to use a conventional spread footing foundation with very little subsurface work required with the below level garages, and no work below the water table. The subgrade conditions are generally considered suitable by the geotechnical consultant to support the proposed spread footing foundations. Based on eight test borings, many advanced to depths of 14 to 16 feet, indicated that fill was encountered in all test bores to depths of 9 to 12 feet. Soil character generally consisted of brown to dark brown, sand and gravel with little trace of silt. There was also trace amounts of rubble and urban fill, and boulders and stone from prior construction (which may have been residential) with some shallow concrete at one of the test borings. Groundwater was not encountered at the 10-16 feet exploration.

The proposed construction is not anticipated to have adverse effects on long-term groundwater levels because the lowest floor level in the fill areas is above the groundwater level. Roof drains and runoff from impermeable outdoor surfaces will be led to infiltration devices where there is sufficient capacity for percolation. In ledge areas, the drains will lead to detention cisterns of the required size and released gradually into storm drains. Construction mitigation measures will be incorporated into the Proposed Project to avoid any potential for ground movement and settlement.

Additional geotechnical exploration and engineering is expected to be completed as the project design is more fully developed during the various phases.

4.7 Construction Impact

The following section describes impacts likely to result from the construction of the Parcel U Project and the steps that will be taken to avoid or minimize environmental and transportation-related impacts. Construction methodologies and scheduling will aim to minimize impacts on the surrounding

environment. The Proponent will insure that the general contractors will be responsible for developing construction phasing and staging plans and for coordinating construction activities with all appropriate regulatory agencies. The Project's geotechnical consultant will also provide consulting services associated with foundation design recommendations, prepare geotechnical specifications, and review the construction contractor's proposed procedures.

4.7.1 Construction Management Plan

The Proponent will comply with applicable state and local regulations governing construction of the Project. The Proponent will insure that general contractors comply with the Construction Management Plan, ("CMP") developed in consultation with and approved by the Boston Transportation Department ("BTD"), prior to the commencement of construction. The CMPs will establish the guidelines for the duration of the Project phases and will include specific mitigation measures and staging plans to minimize impacts on abutters.

Construction methodologies that will ensure safety will be employed, signage will include General Contractor contact information with emergency contact numbers.

4.7.2 Proposed Construction Program

Construction Activity Schedule

The construction period for the Proposed Project is expected to last approximately 9-12 months for each of Phases A and B, and 15-18 months for Phase C, beginning in the 2nd Quarter 2015 and reaching completion in the 3rd Quarter 2018 for the Phase C (apartment rental) construction. The City of Boston Noise and Work Ordinances will dictate the normal work hours, which will be from 7:00 AM to 6:00 PM, Monday through Friday. Saturday work will be only in the event of schedule delay or unusual tasks such as street openings, etc.

Perimeter Protection/Public Safety

The CMP will describe any necessary sidewalk closures, pedestrian re-routings, and barrier placements and/or fencing deemed necessary to ensure safety around the Site perimeter. When possible, the sidewalk will remain open to pedestrian traffic during the construction period. Barricades and secure fencing will be used to isolate construction areas from pedestrian traffic. In addition, sidewalk areas and walkways near construction activities will be well marked to ensure pedestrian safety.

Proper signage will be placed at every corner of the Proposed Project as well as those areas that may be confusing to pedestrians and automobile traffic.

The Proponent will continue to coordinate with all pertinent regulatory agencies and representatives of the surrounding neighborhoods to ensure they are informed of any changes in construction activities.

4.7.3 Construction Traffic Impacts

Construction Vehicle Routes

Specific truck routes will be established with BTD through the CMPs. These established truck routes will prohibit truck travel on residential side streets. Construction contracts will include clauses restricting truck travel to BTD requirements. Maps showing approved truck routes will be provided to all suppliers, contractors, and subcontractors. It is anticipated that all deliveries will be via Hyde Park Avenue directly to the site, not passing through residential areas in the Forest Hills, Jamaica Plain or Hyde Park neighborhoods.

Construction Worker Parking

The number of workers required for construction of the Proposed Project will vary during the construction period and during each of the phases. However, it is anticipated that all construction workers will arrive and depart prior to peak traffic periods.

Limited parking in designated areas of the Project Site and lay-down area(s) will be allowed. Parking will be discouraged in the immediate neighborhood. Further, given the Proposed Project's close proximity to transit service (e.g., MBTA Orange Line as well as bus service) public transit use will be encouraged with the Proponent and general contractor working to ensure the construction workers are informed of the many public transportation options immediately adjacent to this area. Terms and conditions related to worker parking will be written into each subcontractor's contract. The general contractors will provide a weekly orientation with all new personnel to ensure enforcement of this policy.

Pedestrian Traffic

The Site abuts sidewalks on Hyde Park Avenue and Ukraine Way. Pedestrian traffic may be temporarily impacted in these areas. The general contractors will minimize the impact the construction of the proposed building will have on the adjacent sidewalks. The general contractors will implement plans that will clearly denote all traffic patterns. Safety measures such as jersey barriers, fencing, and signage will be used to direct pedestrian traffic around the construction site and to secure the work area.

4.7.4 Construction Environmental Impacts and Mitigation

Construction Air Quality

Construction activities may generate fugitive dust, which will result in a localized increase of airborne particle levels. Fugitive dust emission from construction activities will depend on such factors as the properties of the emitting surface (e.g. moisture content), meteorological variables, and construction practices employed.

To reduce the emission of fugitive dust and minimize impacts on the local environment the construction contractor will adhere to a number of strictly enforceable mitigation measures. These measures may include:

- Using wetting agents to control and suppress dust from construction debris;
- Ensuring that all trucks traveling to and from the Project Site will be fully covered;
- Removing construction debris regularly;
- Monitoring construction practices closely to ensure any emissions of dust are negligible;
- Cleaning streets and sidewalks to minimize dust and dirt accumulation;
- Monitoring construction activities by the job site superintendent; and
- Wheel-washing trucks before they leave the Project Site during the excavation phase.

Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and Boston Water and Sewer ("BWSC") storm drain systems. During construction, existing catch basins will be protected from sediments with filter fabric, silt sacks or hay bale filters.

Construction Noise Impacts

To reduce the noise impacts of construction on the surrounding neighborhood, a number of noise mitigation measures will be included in the CMP. Some of the measures that may be taken to ensure a low level of noise emissions include:

- Initiating a proactive program for compliance to the City of Boston's noise limitation requirements;
- Scheduling of work during regular working hours as much as possible;
- Using mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously operating equipment, such as air compressors and power and welding generators;
- Scheduling construction activities so as to avoid the simultaneous operation of the noisiest construction activities;
- Turning off all idling equipment;
- Reminding truck drivers that trucks cannot idle more than five (5) minutes unless the engine is required for operational activity;
- Locating noisy equipment at locations that protect sensitive receptors and neighborhood homes through shielding or distance;

- Installing a site barricade as required;
- Identifying and maintaining truck routes to minimize traffic and noise throughout the project; and
- Maintaining all equipment to have proper sound attenuation devices.

4.7.5 Rodent Control

The City of Boston enforces the requirements established under Massachusetts State Sanitary Code, Chapter 11, 105 CMR 410.550. This policy establishes that the elimination of rodents is required for issuance of any building permits. During construction, rodent control service visits will be made by a certified rodent control firm to monitor the situation.

4.7.6 Utility Protection During Construction

During construction, the City or Commonwealth's infrastructure will be protected using sheeting and shoring, temporary relocations, and construction staging as required. The contractor will be required to coordinate all protection measures, temporary supports, and temporary shutdowns of all utilities with the appropriate utility owners and/or agencies. The contractor will also be required to provide adequate notification to the utility owner/operator prior to any work commencing on their utility. Also, in the event a utility cannot be maintained in service during a switch-over to a temporary or permanent system, the contractor will be required to coordinate the shutdown with the utility owners/operators and Project abutters to minimize impacts and inconveniences accordingly.

5

HISTORIC RESOURCES

5.0 HISTORIC RESOURCES COMPONENT

This section provides a discussion of the history of the Project Site and the historic resources/ districts in the Project vicinity.

5.1 Historic Resources on the Project Site and Property History

The 2.89 acre Parcel U site is currently vacant, grass covered, undeveloped, and owned by the MBTA. The Site has been utilized as a green space over the last several years, according to IES, Parcel U's hazardous waste consultants; although the property was utilized for rail car storage by various rail companies since the 1920's. A review of Sanborn Atlases over the last 100 years completed by IES indicated that in 1898 the Site appeared to be occupied by several residential flat structures. The 1928 Atlas revealed that the northerly portion of site was occupied by the "Boston Elevated Railway Car House" (built 1922) and the southerly portion of the Site was utilized as a "Boston Elevated Railway Storage Yard for Cars". The 1950 and 1964 Atlases showed the same railway uses.

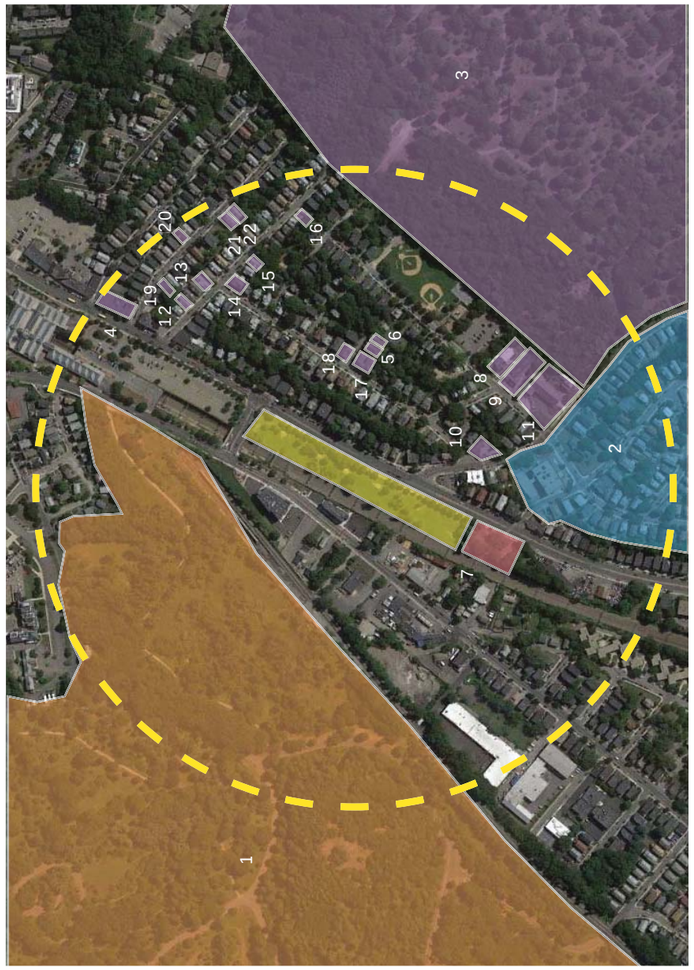
According to files at the Massachusetts Historical Commission, the on-site structures are not listed in the National or State Register of Historic Places, or the Inventory of Historical and Archaeological Assets of the Commonwealth. It is not expected that the Project will cause adverse impacts on any historic or architectural elements of nearby historic resources outside the Project Site (see **Figure 5-1** for identifications of historic resources in the Project vicinity).

5.2 Historic Districts and Resources

The Project Site is not within, nor does it directly abut, any listed historic districts or resources. However, the Woodbourne Historic District is within one-quarter-mile radius of the Proposed Project. The area surrounding the Project Site is a busy commercial district. Residential, retail and commercial uses characterize much of the area along Hyde Park Avenue and Washington Street. The nearby Arnold Arboretum is a United State National Landmark and 19 individual properties within one-quarter-mile radius of the Proposed Project are included in the National Register of Historic Properties (excluding properties within the Woodbourne Historic District).

The historic resources within one-quarter-mile radius of the Proposed Project are summarized in **Table 5-1** that follows.

Figure 5-1. Historic Resources



Parcel U - Historic Resources Component

Figure 5-1
Historic Resources

= National Register Historic District
= U.S. National Historic Landmark
= Property on Inventory of Historic Places
= National Register Individual Property
= 1/4 mile buffer
= Project Site

1 Arnold Arboretum
2 Woodbourne Historic District
3 Forest Hills Cemetery
4 Thomas F. Minton Building
5 Charles Emmell Two-Family House
6 Charles Emmell Two-Family House
7 Toll Gate Cemetery
8 Saint Andrew the Apostle Roman Catholic Convent
9 Saint Andrew the Apostle Roman Catholic School
10 Chemical Engine #13 Fire House
11 Saint Andrew the Apostle Roman Catholic Rectory & Church
12 Weld and Browne Two-Family House
13 Weld and Browne Two-Family House
14 Weld and Browne Two-Family House
15 Weld and Browne Two-Family House
16 Weld and Browne Two-Family House
17 Charles Emmell Two-Family House
18 Charles Emmell Two-Family House
19 Lanin Realty Company Three Decker
20 Lanin Realty Company Three Decker
21 Lanin Realty Company Three Decker
22 Lanin Realty Company Three Decker

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Table 5.1. Historic Resources in the Vicinity of the Project Site

Key to Historic Resources Figure (Figure 5-1)	Historic Resource	Address/Description
National Register Individual Properties		
3	Forest Hills Cemetery	95 Forest Hills Avenue
4	Thomas F. Minton Building	2 Hyde Park Avenue
5	Charles Emmell Two-Family House	5 Craft Place
6	Charles Emmell Two-Family House	7 Craft Place
8	Saint Andrew the Apostle Roman Catholic Convent	84 Wachusett Street
9	Saint Andrew the Apostle Roman Catholic School	86 Wachusett Street
10	Chemical Engine #13 Fire House	16-18 Walk Hill Street
11	Saint Andrew the Apostle Roman Catholic Rectory & Church	38 + 40 Walk Hill Street
12	Weld and Browne Two-Family House	16 Weld Hill Street
13	Weld and Browne Two-Family House	24 Weld Hill Street
14	Weld and Browne Two-Family House	31 Weld Hill Street
15	Weld and Browne Two-Family House	37 Weld Hill Street
16	Weld and Browne Two-Family House	57 Weld Hill Street
17	Charles Emmell Two-Family House	45 Wenham Street
18	Charles Emmell Two-Family House	47 Wenham Street
19	Lanin Realty Company Three Decker	15-17 Woodlawn St
20	Lanin Realty Company Three Decker	32 Woodlawn St
21	Lanin Realty Company Three Decker	47 Woodlawn St
22	Lanin Realty Company Three Decker	49 Woodlawn St
U.S. National Historic Landmarks		
1	Arnold Arboretum	125 Arborway
National Register Historic District		
2	Woodbourne Historic District	District bounded by Walk Hill, Goodway and Wachusett Streets
Inventory of Historic Places		
7	Toll Gate Cemetery	Hyde Park Avenue

The Proposed Project is not expected to have effects on any of the listed historically significant resources in **Table 5-1.**

5.3 Archaeological Resources

No known archaeological resources were located within the Project site during the review of Massachusetts Historic Commission files and MACRIS, therefore no impacts to archaeological resources are anticipated.

6

INFRASTRUCTURE SYSTEMS

6.0 INFRASTRUCTURE SYSTEMS COMPONENT

6.1 Introduction

This section of the PNF outlines the existing utilities surrounding the Proposed Project site, the proposed connections required to provide service to the Proposed Project, and any impacts on the existing utility systems that may result from the construction of the Proposed Project. The following utility systems are discussed herein:

- Sewer
- Domestic water
- Fire protection
- Drainage
- Electricity
- Telecommunications
- Natural gas

The Proposed Project includes the development of an approximately 2.9± acre site identified as Parcel "U" that was formerly owned by the Massachusetts Bay Transportation Authority (MBTA) into a 124 dwelling unit site development. The Proposed Project is located on Hyde Park Avenue in Boston's Jamaica Plain neighborhood.

6.2 Wastewater

6.2.1 Sewer Infrastructure

There is an existing Boston Water and Sewer Commission (BWSC) sanitary sewer main located in Hyde Park Avenue adjacent to the Project site. There is a 12-inch sanitary sewer beneath Hyde Park Avenue flowing in an easterly direction.

There is also an existing BWSC 36-inch sanitary sewer main located within the project site which will maintained as part of the Proposed Project. The 36-inch sanitary sewer main into the project site from Washington Street in a southeasterly direction then flows northeasterly direction where both 12-inch and 36-inch sewer mains connect to an existing 32"x48" sewer main located at the intersection of Hyde Park Avenue and Tower Street. Ultimately this sanitary sewer line drains to the MWRA Deer Island Waste Water Treatment Plant for disposal.

The existing sewer system is illustrated in **Figures 6-1.0** and **6-1.1.**

Figure 6-1.0 Existing Sewer System

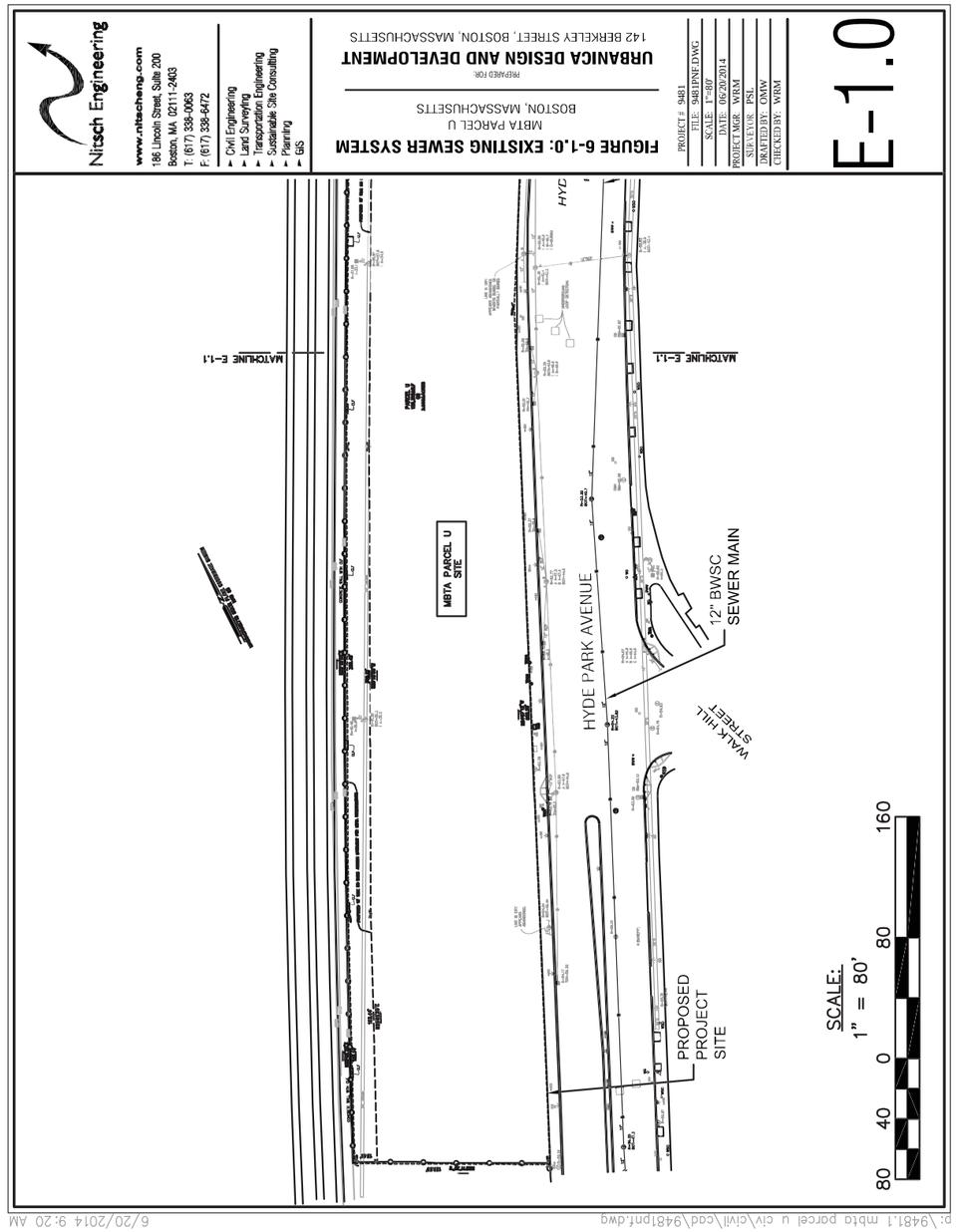
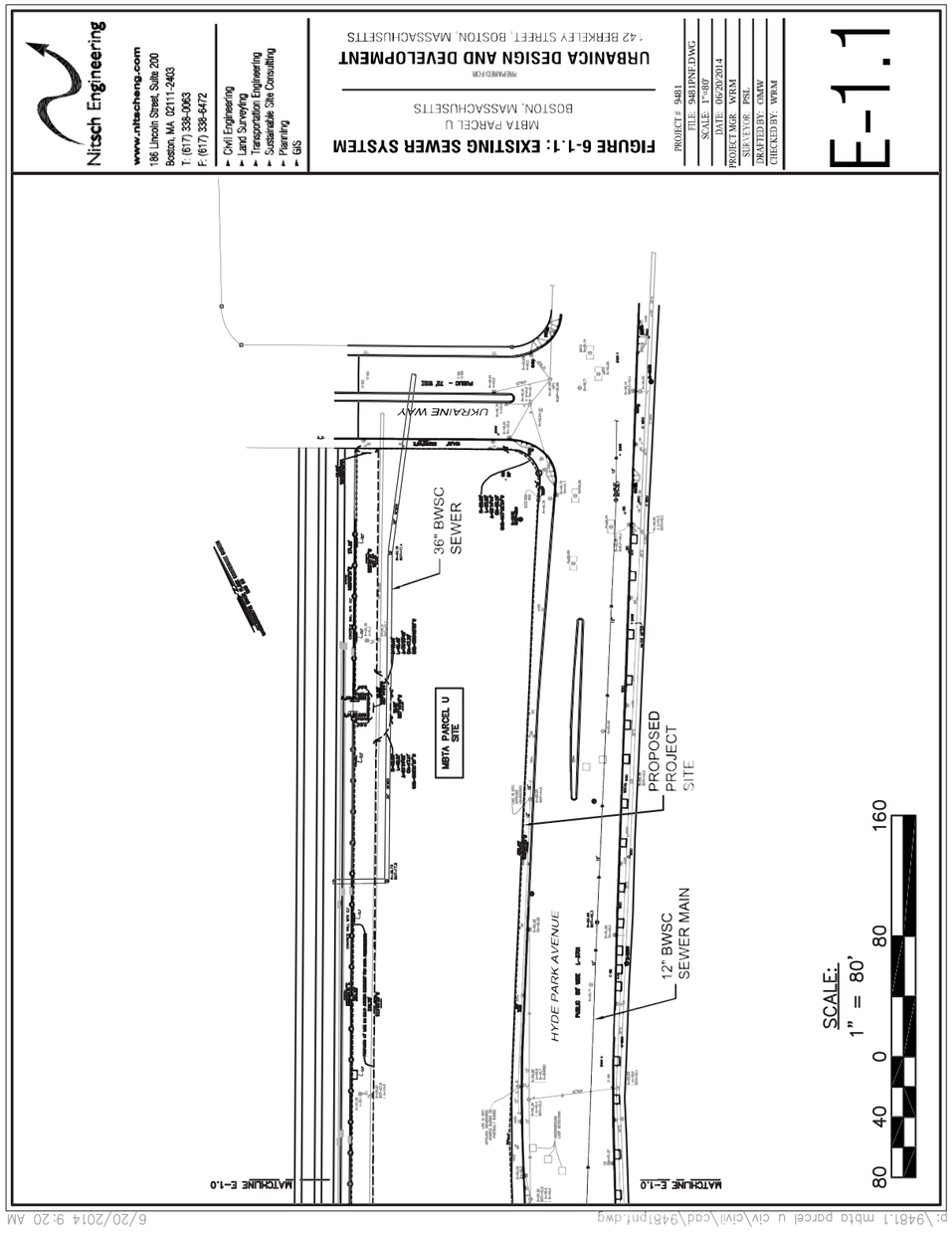


Figure 6-1.1 Existing Sewer System



6.2.2 Wastewater Generation

The Proposed Project's sewage generation rates were estimated using the Massachusetts Division of Water Pollution Control Sewer System Extension and Connection Permit Program at 314 CMR 07.00 and the proposed building program. 314 CMR 7.00 lists typical sewage generation values for the proposed sources, as shown in **Table 6-1.** Typical generation values are conservative values for estimating the sewage flows from new construction. 314 CMR 7.00 sewage generation values are used to evaluate new sewage flows or an increase in flows to existing connections. **Table 6-1** describes the increased sewage generation in gallons per day (gpd) due to the Proposed Project.

Table 6-1. Proposed Project Wastewater Generation

Program	Unit	314 CMR Value (gpd/unit)	Total Flow (gpd)
Phase A – 24 DU's	54 Bedrooms	110 gpd/bedroom	5,940
Phase B – 24 DU's	54 Bedrooms	110 gpd/bedroom	5,940
Phase C – 76 DU's	117 Bedrooms	110 gpd/bedroom	12,870
Proposed Sewer Flows (gpd)			24,750

6.2.3 Sewage Capacity & Impacts

The Proposed Project's impact to the existing BWSC systems in Hyde Park Avenue was analyzed. The existing sewer system capacity calculations are presented in **Table 6-2.**

Table 6-2. Sewer Hydraulic Capacity Analysis

Manhole (BWSC Number)	Distance (feet)	Invert Elevation (up)	Invert Elevation (down)	Slope (%)	Diameter (inches)	Manning's Number	Flow Capacity (cfs)	Flow Capacity (MGD)
Hyde Park Avenue								
143 to 142	280	47.3	43.82	1.2%	12	0.013	3.98	2.57
142 to 141	149	43.82	40	2.1%	12	0.013	5.16	3.33
141 to 146	278	40.7	40.3	0.14%	12	0.013	1.36	0.88
146 to 147	296	40.3	39.7	0.20%	12	0.013	1.61	1.04
Minimum Flow Analyzed:							1.36	0.88

Notes:
1. Manhole numbers taken from BWSC Sewer System Map No. 12G
2. Flow Calculations based on Manning Equation.

6.2.4 *Proposed Conditions*

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the sewer system. The Proposed Project is expected to generate an increase in wastewater flows of approximately 24,750 gallons per day. Because the sanitary flow is less than 50,000 gpd, a Massachusetts Department of Environmental Protection (MassDEP) Sewer Compliance Certification will be required. MassDEP is currently in the process of eliminating its sewer connection permit program. Depending on the timing, the Project may not be required to submit to MassDEP. In that case, approval for the increase in sanitary flow will come from BWSC.

The sewer services for the Proposed Project will connect to the existing sewer main located in Hyde Park Avenue.

All improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's site plan review process for the Proposed Project. This process includes a comprehensive design review of the proposed service connections, an assessment of project demands and system capacity, and the establishment of service accounts.

6.2.5 *Proposed Impacts*

The adjacent roadway sewer system in Hyde Park Avenue and potential building service connections to the sewer system were analyzed.

Results shown in **Table 6-2** indicate the hydraulic capacity of the 12-inch sanitary sewer within Hyde Park Avenue near the Proposed Project. The minimum hydraulic capacity is 0.88 million gallons per day (MGD) or 1.36 cubic feet per second (cfs) for the 12-inch system in Shawmut Avenue. Based on an average daily flow estimate for the Proposed Project of 24,750 GPD or 0.02 MGD; and with a factor of safety of 10 (total estimate = 0.02 MGD x 10 = 0.25 MGD), no capacity problems are expected within the Hyde Park Avenue system.

6.2.6 *Water Infrastructure*

Water for the Proposed Project site will be provided by the BWSC. There are five water systems within the City, and these provide service to portions of the City based on ground surface elevation. The five systems are southern low (commonly known as low service), southern high (commonly known as high service), southern extra high, northern low, and northern high. There is a 12-inch Southern High main beneath Hyde Park Avenue which increases to a 16-inch Southern High main beneath Hyde Park Avenue near Ukraine Street. There is also a 12-inch Southern High Main beneath Ukraine Street. There is a 48-inch water main beneath Hyde Park Avenue that is owned by the Massachusetts Water Resources Authority (MWRA). No connection to the 48" MWRA water main is expected with this project. The existing water system is illustrated in **Figures 6-2.0** and **6-2.1.**

Hydrant(s) may be installed onsite to meet fire protection requirements.

6.3 Water Supply

6.3.1 *Water Consumption*

The Proposed Project's water demand estimate for domestic services is based on the Proposed Project's estimated sewage generation, described above. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater flows calculated with 314 CMR 07.00 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Proposed Project's estimated domestic water demand is 27,225 gpd. The water for the Proposed Project will be supplied by the BWSC systems in Hyde Park Avenue.

All efforts to reduce water consumption will be made. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed.

All new water services will be installed in accordance with the latest local, state, and federal codes and standards. Backflow preventers will be installed at both domestic and fire protection service connections. New meters will be installed with Meter Transmitter Units (MTU's) as part of the Boston Water and Sewer Commission's Automatic Meter Reading (AMR) system.

6.3.2 Existing Water Capacity & Impacts

BWSC record flow test data containing actual flow and pressure for hydrants within the vicinity of the Proposed Project site was requested by the Proponent. BWSC did not have record data near the Project site. The Proponent will request BWSC to perform hydrant flow testing adjacent to the Proposed Project, as hydrant flow data should be less than a year old to be used as a design tool. As the design progresses, the Proponent will request hydrant flows be conducted by BWSC adjacent to the Proposed Project.

6.3.3 Proposed Project

The domestic and fire protection water services for the Proposed Project will connect to the existing BWSC water main in Hyde Park Avenue.

The domestic and fire protection water service connections required by the Proposed Project will meet the applicable City and State codes and standards, including cross-connection backflow prevention. Compliance with the standards for the domestic water system service connection will be reviewed as part of BWSC's Site Plan Review Process. This review includes, but is not limited to, sizing of domestic water and fire protection services, calculation of meter sizing, backflow prevention design, and location of hydrants and siamese connections that conform to BWSC and Boston Fire Department requirements.

Figure 6-2.0. Existing Water System

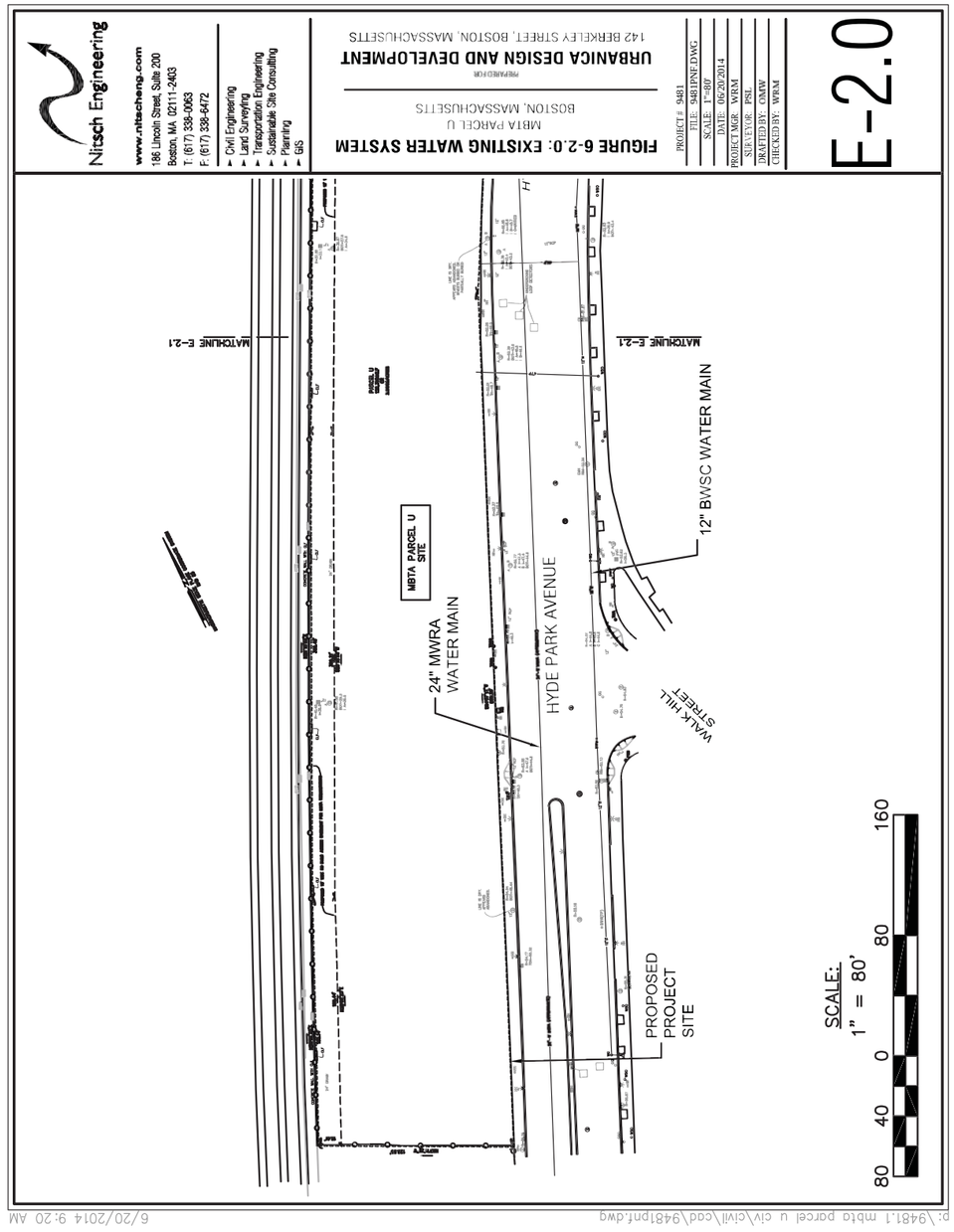
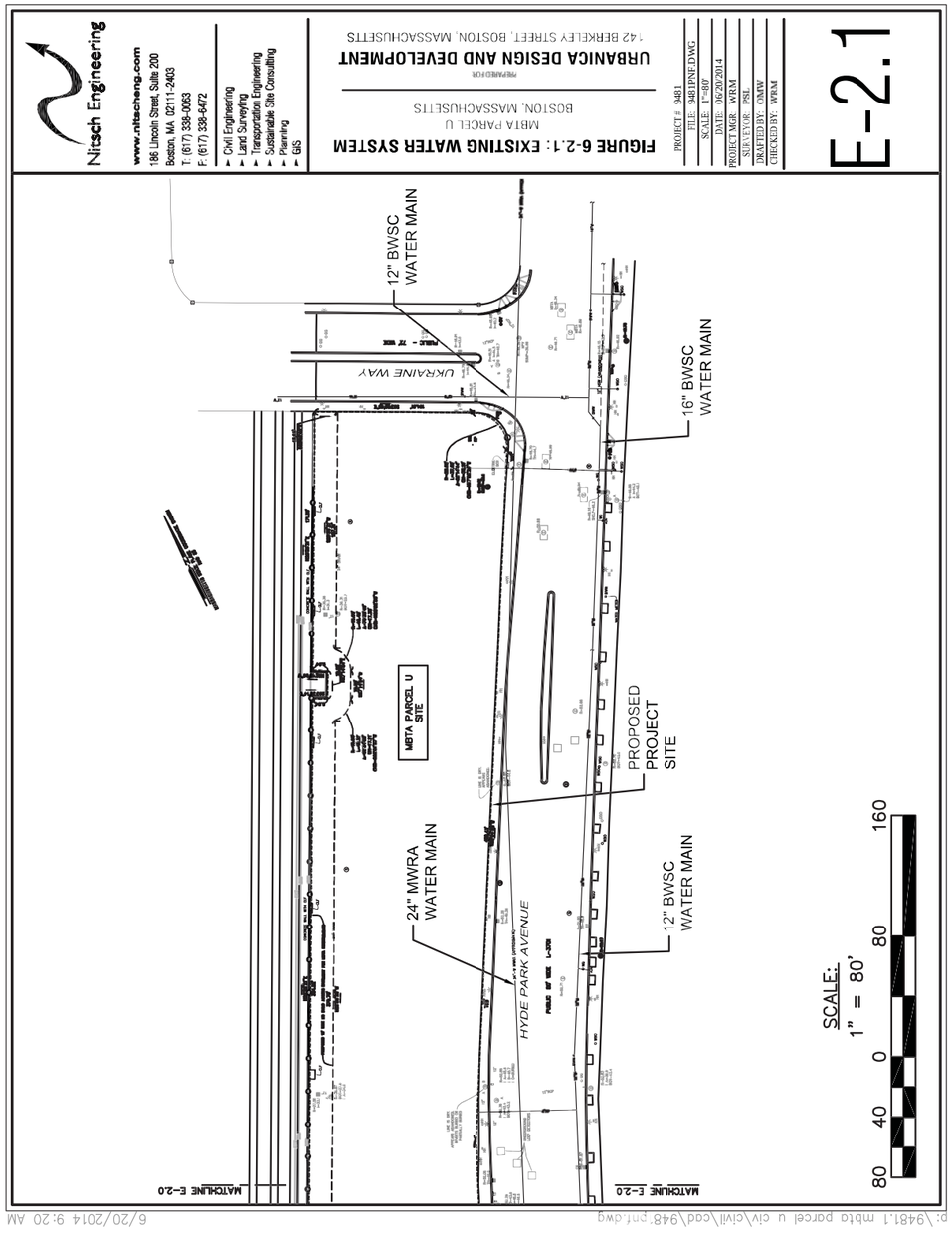


Figure 6-2.1. Existing Water System



6.2.1 Proposed Impacts

Water capacity problems are not anticipated within this system as a result of the Proposed Project's construction.

6.4 Stormwater

There are existing BWSC storm drains in Hyde Park Avenue and Ukraine Street. There is a 30-inch storm drain main within Hyde Park Avenue that flows in an easterly direction where it connects into a 204"x165" storm drain main. There is also a 12-inch storm drain main in Ukraine Street that flows easterly to the 204"x165" storm drain main.

There is an existing closed drainage system on the project site. There are three catch basins connecting to a 24-inch drain line that flows to a 204"x165" storm drain main located on the northerly side of Ukraine Street.

6.4.1 Proposed Project

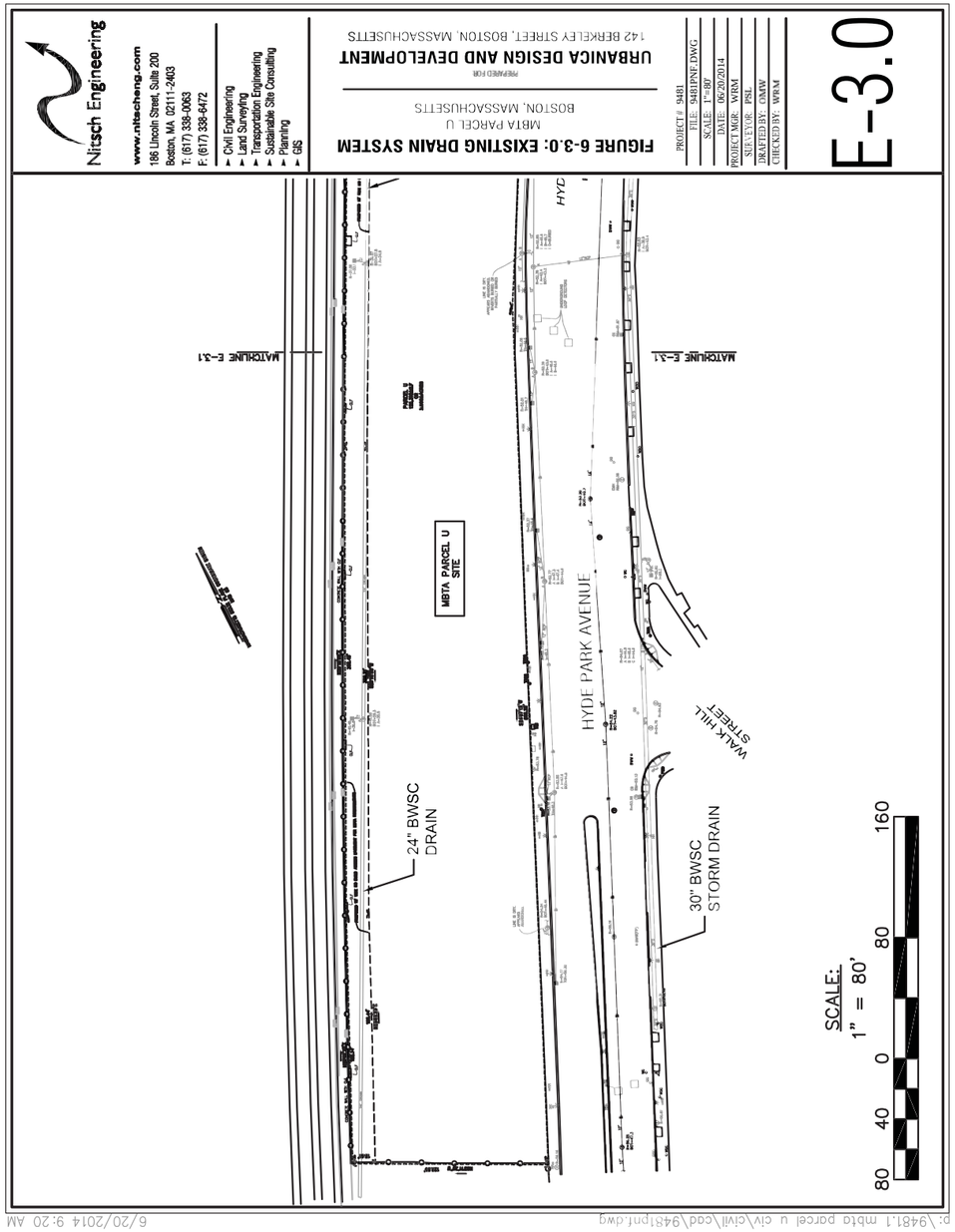
Stormwater runoff collected from the roof of the Proposed Project will be directed to subsurface recharge system(s) on site which will overflow to an adjacent BWSC storm drain. Site runoff will be collected by a closed drainage system, treated and recharged into the ground before overflowing to the BWSC storm drainage system. The existing BWSC storm drain system is illustrated in **Figures 6-3.0** and **6-3.1.**

The Proposed Project will increase the amount of impervious area at the site compared to the existing condition. The project is expected to maintain the existing peak rates and volumes of stormwater runoff from the site.

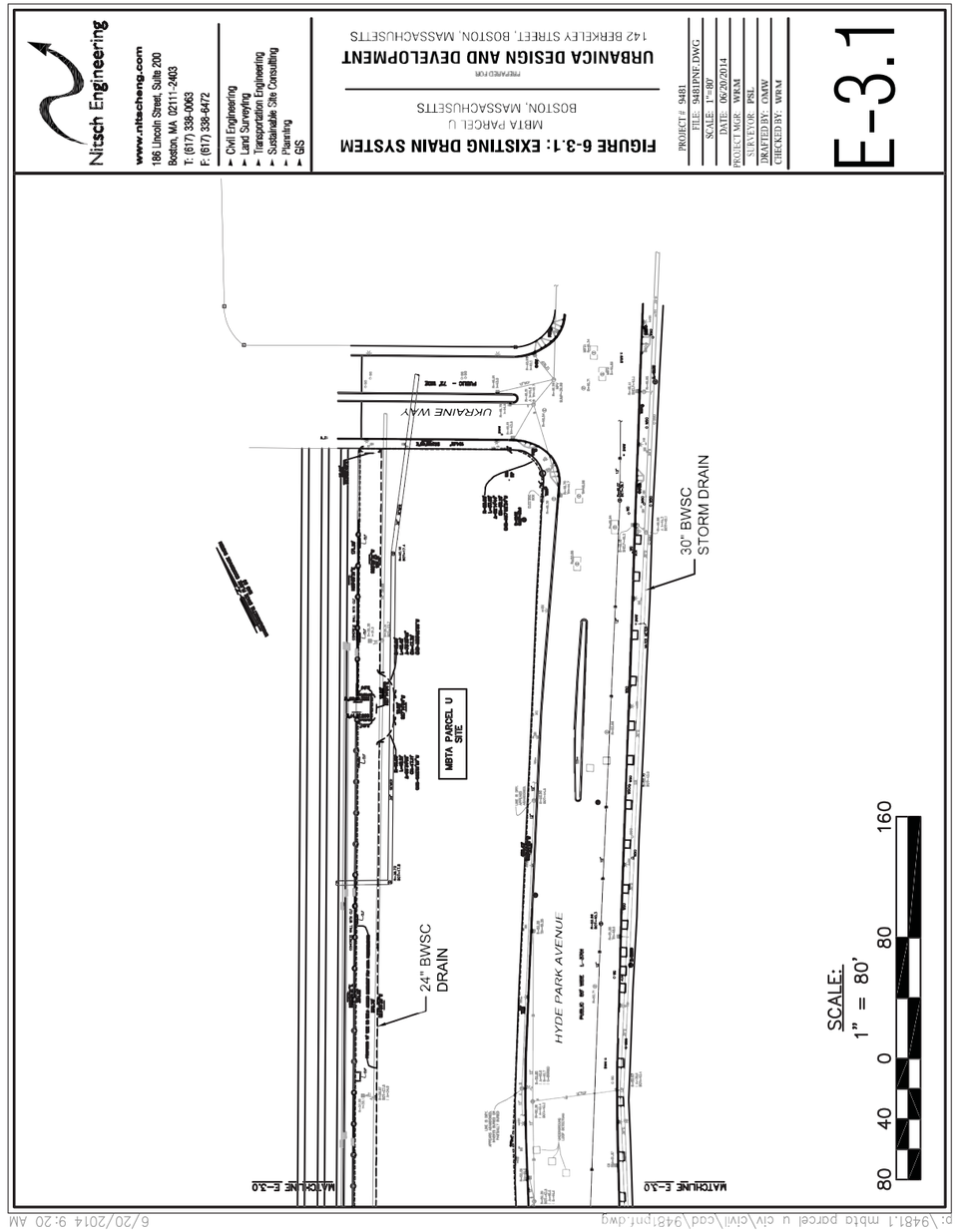
The proposed stormwater management system will include a groundwater recharge system. The Project will increase the amount of impervious area at the site compared to the existing condition. It is anticipated that the stormwater recharge system will work to passively infiltrate runoff into the ground with a gravity recharge system. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate of stormwater discharge from the Project site in the developed condition compared to the existing condition.

All improvements and connections to BWSC infrastructure will be reviewed as part of the Commission's site plan review process. The process includes a comprehensive design review of the proposed service connections, assessment of project demands and system capacity.

Figures 6-3.0. Existing Drain System



Figures 6-3.1. Existing Drain System



6.2.2 Water Quality Impact

The Proposed Project will not affect the water quality of nearby water bodies. Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and BWSC storm drain systems. During construction, existing catch basins will be protected with filter fabric, straw bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until all areas of disturbance have been stabilized through the placement of pavement, structure, or vegetative cover.

All necessary dewatering will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once construction is complete, the Proposed Project will each be in compliance with all local and state stormwater management policies. See below for additional information.

6.4.3 DEP Stormwater Management Policy Standards

In March 1997, MassDEP adopted a new Stormwater Management Policy to address non-point source pollution. In 1997, MassDEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy, which was revised in February 2008. The Policy prescribes specific stormwater management standards for development projects, including urban pollutant removal criteria for projects that may impact environmental resource areas. Compliance is achieved through the implementation of Best Management Practices (BMPs) in the stormwater management design. The Policy is administered locally pursuant to MGL Ch. 131, s. 40.

A brief explanation of each Policy Standard and the system compliance is provided below:

Standard #1: No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Compliance: The proposed design will comply with this Standard. The project site is not located near any wetlands or water bodies. Therefore, no new untreated stormwater will be directly discharged to, nor will erosion be caused to wetlands or waters of the Commonwealth as a result of stormwater discharges related to the Proposed Project.

Standard #2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-*development peak discharge rates.*

Compliance: The proposed design will comply with this Standard. The existing discharge rate will be met or decreased as a result of the improvements associated with the Proposed Project.

Standard #3: Loss of annual recharge to groundwater should be minimized through the use of infiltration measures *including environmental sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual*

recharge from pre-development conditions based on soil types. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Compliance: The Proposed Project will comply with this standard to the maximum extent practicable.

Standard #4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Compliance: The proposed design will comply with this standard. Within the Proposed Project's limit of work, there will be mostly roof, landscaping, parking and pedestrian areas. Any paved areas that would contribute unwanted sediments or pollutants to the existing storm drain system will be collected by deep sump, hooded catch basins and conveyed through water quality units before discharging into the BWSC system.

Standard #5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Compliance: The proposed design will comply with this standard. The Proposed Project is not associated with Higher Potential Pollutant Loads (per the Policy, Volume I, Page 1-6). The project complies with this standard.

Standard #6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural

stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

Compliance: The proposed design will comply with this Standard. The Proposed Project will not discharge untreated stormwater to a sensitive area or any other area.

Standard #7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Compliance: The proposed design will comply with this Standard. The Proposed Project complies with the Stormwater Management Standards as applicable to the *redevelopment*.

Standard #8: Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.

Compliance: The Proposed Project will comply with this standard. Sedimentation and erosion controls will be incorporated as part of the design of these projects and employed during construction.

Standard *9: A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

Compliance: The Proposed Project will comply with this standard. An O&M Plan including long-term BMP operation requirements will be prepared for the Proposed Project and will assure proper maintenance and functioning of the stormwater management system.

Standard 10*: All illicit discharges to the stormwater management system are prohibited.*

Compliance: The Proposed Project will comply with this standard. There will be no illicit connections associated with the Proposed Project.

6.5 Protection Proposed During Construction

Existing public and private infrastructure located within nearby public rights-of-way will be protected during construction of each component of the Proposed Project. The installation of proposed utility connections within public ways will be undertaken in accordance with BWSC, Boston Public Works Department, the Dig-Safe Program, and applicable utility company requirements. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer, and drain facilities will be reviewed by the BWSC as part of its Site Plan Review process. All necessary permits will be obtained before the commencement of work.

The Proponent will continue to work and coordinate with the BWSC and the utility companies to ensure safe and coordinated utility operations in connection with the Proposed Project.

6.6 Conservation of Resources

The State Building Code requires the use of water-conserving fixtures. Water conservation measures such as low-flow toilets and restricted flow faucets will help reduce the domestic water demand on the existing distribution system. The installation of sensor-operated sinks with water conserving aerators and sensor-operated toilets in all restrooms will be incorporated into the design plans for the Proposed Project.

6.7 Electrical Service

NSTAR owns the electrical system in the vicinity of the Project site. It is expected that adequate service is available in the existing electrical systems near the Project. The Proponent will work with NSTAR to confirm adequate system capacity as design is finalized.

6.8 Telecommunications Systems

The Proponent will select private telecommunications companies to provide telephone, cable, and data services. There are several potential candidates with substantial Boston networks capable of providing service. Upon selection of a provider or providers, the Proponent will coordinate service connection locations and obtain appropriate approvals.

6.9 Gas Systems

National Grid has gas service adjacent to the site. There is adequate capacity in the gas supply system to meet the Project's demand.

7

TRANSPORTATION

7.0 TRANSPORTATION COMPONENT

7.1 Introduction

7.1.1 Purpose of the Transportation Component

Howard/Stein-Hudson Associates, Inc. (HSH) has conducted an evaluation of the transportation impacts of a proposed residential development consisting of 48 townhouse units, 76 apartment units, and 1,750 square feet (sf) of ancillary retail space located along Hyde Park Avenue, south of Ukraine Way near the Forest Hills Station (the "Project"). The parcel (Parcel U) is currently owned by the Massachusetts Bay Transportation Authority (MBTA) and is included in the Forest Hills Improvement Initiative planning study developed by the Boston Redevelopment Authority (BRA). This transportation study adheres to the Boston Transportation Department (BTD) *Transportation Access Plan Guidelines* and Article 80 development review process. This study includes an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity.

7.1.2 Project Description

The Project site is located off of Hyde Park Avenue, immediately south of Ukraine Way in the Forest Hills neighborhood of Boston as shown in **Figure 7-1**. The site is conveniently located in proximity to the Forest Hills Station and several MBTA bus lines, providing convenient access to transit opportunities. The site is bounded by the MBTA Commuter Rail to the west, Hyde Park Avenue to the east, Ukraine Way to the north, and a vacant parcel to the south. The site is currently vacant.

Vehicular access to the site will be provided by two driveways. A full access driveway will be located opposite Walk Hill Street and will form the fourth leg of the signalized intersection. An entrance-only, one-way entering driveway will be provided in the northerly part of the site. Primary pedestrian connectivity will be provided along Hyde Park Avenue. Loading, deliveries, move-in/move-out, and trash pick-up will take place on the Project site.

A total of 90 parking spaces will also be provided on the Project site. A total of 48 spaces will be provided for the townhouse units and a total of 42 spaces will be provided for the apartment units. An additional 8 parallel parking spaces will be provided along Hyde Park Avenue southbound that will serve the retail uses in the northerly part of the site. Secure and covered storage for bicycles will also be provided on the site.

Figure 7-1.
Study Area Intersections

7.1.3 Study Area

The transportation study area is generally bounded by the MBTA Commuter Rail to the west, a vacant parcel to the south, Ukraine Way to the north, and Hyde Park Avenue to the east. It includes the following three intersections, also shown on **Figure 7-1**:

- Washington Street at Ukraine Way;
- Hyde Park Avenue at Ukraine Way; and
- Hyde Park Avenue at Walk Hill Street.

7.1.4 Study Methodology

This transportation study and supporting analyses were conducted in accordance with BTD guidelines and is described below.

The existing conditions analysis includes an inventory of the existing (2014) transportation conditions such as roadway capacities, traffic characteristics, parking and curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. Existing counts were conducted for vehicles, bicycles, and pedestrians at the intersection of Hyde Park Avenue at Walk Hill Street in May 2014. Existing counts at the other two study area intersections were conducted in February 2012 and obtained from the proposed Casey Arborway project documents. The traffic counts form the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. Long-term impacts are evaluated for the year 2019, based on a five-year horizon from the year of the filing of this traffic study (2014). Expected roadway, parking, transit, pedestrian, bicycle accommodation, and loading capacities and deficiencies are identified. This section includes the following scenarios:

- The 2019 No-Build conditions scenario includes both general background traffic growth and traffic growth associated with specific developments and transportation improvements that are planned in the vicinity of the Project site.

- The 2019 Build conditions scenario includes Project-generated traffic volume estimates added to the traffic volumes developed as part of the 2019 No-Build conditions scenario.

The final part of the transportation study identifies measures to mitigate Project-related impacts and to address any traffic, pedestrian, bicycle, transit, safety, or construction related issues that are necessary to accommodate the Project.

An evaluation of short-term traffic impacts associated with construction activities is also provided.

7.2 Existing Transportation Conditions

This section includes descriptions of existing study area roadway geometries, intersection traffic control, peak-hour vehicular and pedestrian volumes, average daily traffic volumes, transit availability, parking and curb usage, and loading conditions.

7.2.1 Existing Roadway Conditions

The major study area roadways are described below. The descriptions reflect functional classifications by the Massachusetts Department of Transportation (MassDOT) Highway Division's Office of Transportation Planning.

Washington Street is located west of the Project site, is classified as an urban principal arterial under BTD jurisdiction, and generally runs in a north to south direction between South Street to the north and Hill Street in Norwood to the south. Washington Street generally consists of one lane in each direction with additional turning lanes provided at major intersections. On-street parking is not provided in the vicinity of the Project site. Sidewalks are provided along both sides of Washington Street.

Ukraine Way is located adjacent to the north side of the Project site, is classified as a local roadway under BTD jurisdiction, and runs in an east to west direction between Washington Street to the west and Hyde Park Avenue to the east. Ukraine Way consists of two travel lanes in each direction with a 6 foot median separating the directions of travel. There is no parking provided along Ukraine Way. Sidewalks are provided along both sides of the roadway.

Hyde Park Avenue is located adjacent to the east side of the Project site, is classified as an urban principal arterial under BTD jurisdiction, and runs in a north to south direction beginning at Forest Hills Station to the north and terminating in Readville south of Wolcott Square. Hyde Park Avenue is a two-way roadway with two travel lanes in each direction in the vicinity of the Project site. On-street parking is provided in the northbound direction in the vicinity of the Project site. Sidewalks are provided along both sides of Hyde Park Avenue.

Walk Hill Street is southeast of the Project site, is classified as an urban minor arterial under BTD jurisdiction, and runs in a northwest to southeast direction between Hyde Park Avenue to the northwest and Blue Hill Avenue to the southeast. Walk Hill Street is a two-way roadway with a single travel lane in each direction. A combination of two hour parking and residential parking is provided along Walk Hill Street in the vicinity of the Project site. Sidewalks are provided along both sides of Walk Hill Street.

7.2.2 Existing Intersection Conditions

Washington Street at Ukraine Way is a signalized intersection with three approaches. The Ukraine Way westbound approach consists of a left turn lane and a right turn lane. The directions of travel along Ukraine Way are separated by a 6 foot median. The Washington Street northbound approach consists of a through lane and a through/right-turn lane. The Washington Street southbound approach consists of a left-turn lane a through lane. The directions of travel along Washington Street are separated by a double-yellow centerline. Parking is prohibited along all legs of the intersection. Crosswalks are provided across the westbound and southbound approaches. Sidewalks are provided along both sides of all approaches.

Hyde Park Avenue at Ukraine Way is a signalized intersection with three approaches. The Ukraine Way eastbound approach consists of a left turn lane and a right turn lane. The directions of travel along Ukraine Way are separated by a 6 foot median. The Hyde Park Avenue northbound approach consists of a left-turn/through lane and a through lane. The Hyde Park Avenue southbound approach consists of a right-turn lane and a through lane. The directions of travel along Hyde Park Avenue are separated by a double-yellow centerline north of the intersection, and separated by a median south of the intersection. Parking is allowed along the northbound approach. Crosswalks are provided across all approaches. Sidewalks are provided along both sides of all approaches.

Hyde Park Avenue at Walk Hill Street is a signalized intersection with three approaches. The Walk Hill Street westbound approach consists of a single travel lane that accommodates left-turn and right-turn movements. The Hyde Park Avenue northbound approach consists of a through lane and a shared through/right-turn lane. The Hyde Park Avenue southbound approach consists of two through lanes and an exclusive left-turn lane. The directions of travel along Hyde Park Avenue are separated by a median along the northbound approach. MBTA bus stops are provided along both sides of Hyde Park Avenue, north of Walk Hill Street for Bus Route 32. Parking is allowed along Walk Hill Street and is prohibited along Hyde Park Avenue at the intersection. Sidewalks are provided along both sides of all approaches. Crosswalks are provided across the westbound and northbound approaches to the intersection.

7.2.3 Existing Traffic Conditions

Traffic movement data was collected at the intersections of Washington Street/Ukraine Way and Hyde Park Avenue/Ukraine Way in February 2012 for the Casey Arborway project. Additional traffic movement data was collected at the intersection of Hyde Park Avenue/Walk Hill Street in May 2014. Manual turning movement counts (TMCs) and vehicle classification counts were conducted during the weekday morning and weekday evening peak periods (7:00-9:00 a.m. and 4:00-6:00 p.m., respectively). The vehicle classification counts included car, truck, pedestrian, and bicycle movements. Based on the TMCs, the peak hours of vehicular traffic throughout the study area are 7:00-8:00 a.m. and 4:15-5:15 p.m. The detailed traffic counts are provided in the Appendix. The 2012 counts were adjusted upward to reflect 2014 conditions.

The 2014 Existing weekday a.m. and p.m. peak hour traffic volumes are shown in **Figures 7-2** and **7-3**, respectively.

7.2.4 Existing Traffic Operations

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay experienced by vehicles at intersections and along intersection approaches. Trafficware's Synchro (version 6) software package was used to calculate average delay and associated LOS at the study area intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's 2000 Highway Capacity Manual (HCM). Field observations were performed by HSH to collect intersection geometry such as number of turning lanes, lane length, and lane width that were then incorporated into the operations analysis.

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. **Table 7-1** displays the intersection LOS criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst (unacceptable) condition, with significant traffic delay. LOS D or better is typically considered acceptable in an urban area. However, LOS E or F is often typical for a stop controlled minor street that intersects a major roadway.

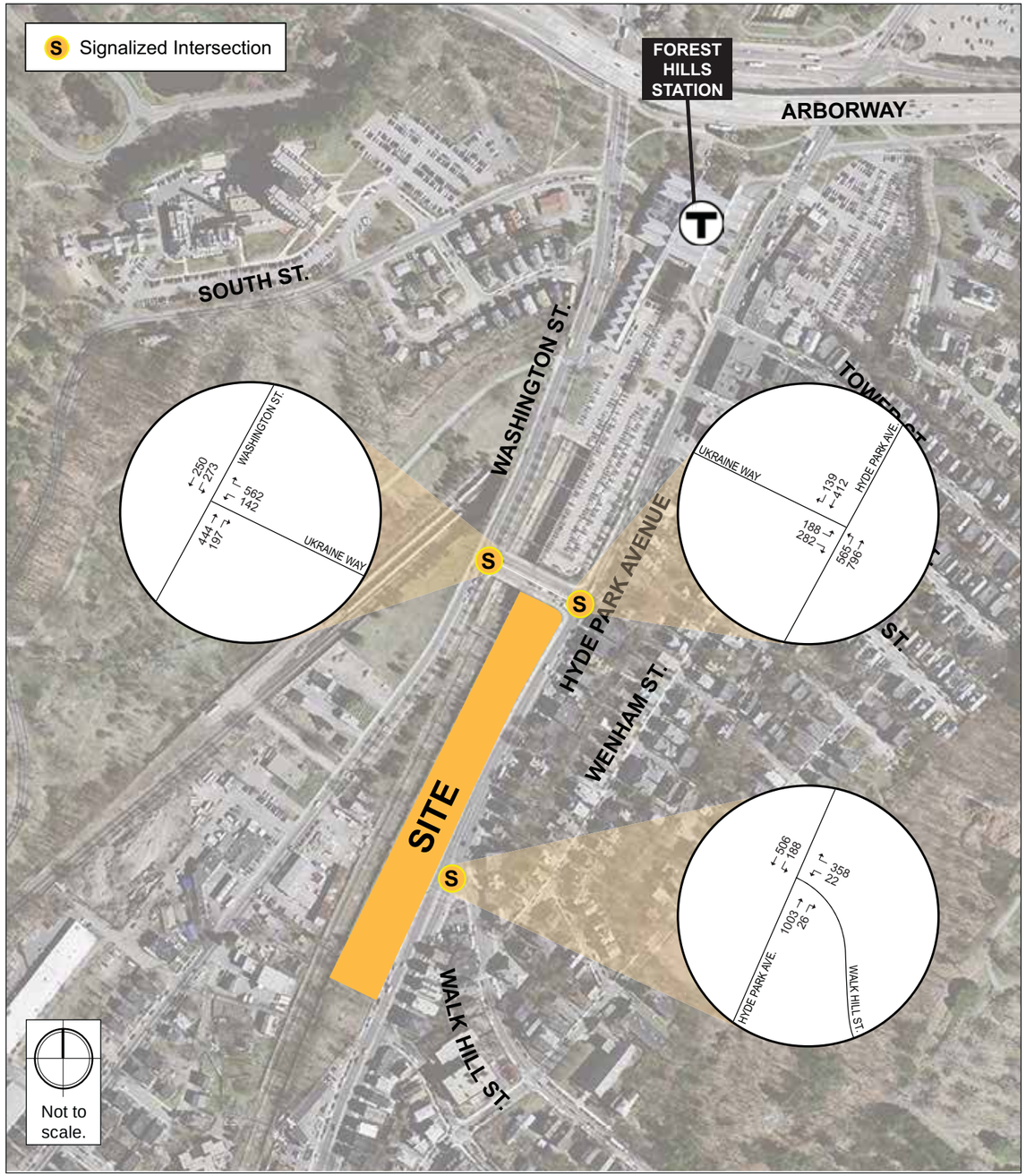


Figure 7-2.
Existing Conditions (2014) Turning Movement Volumes, a.m. Peak Hour (7:00 - 8:00 a.m.)

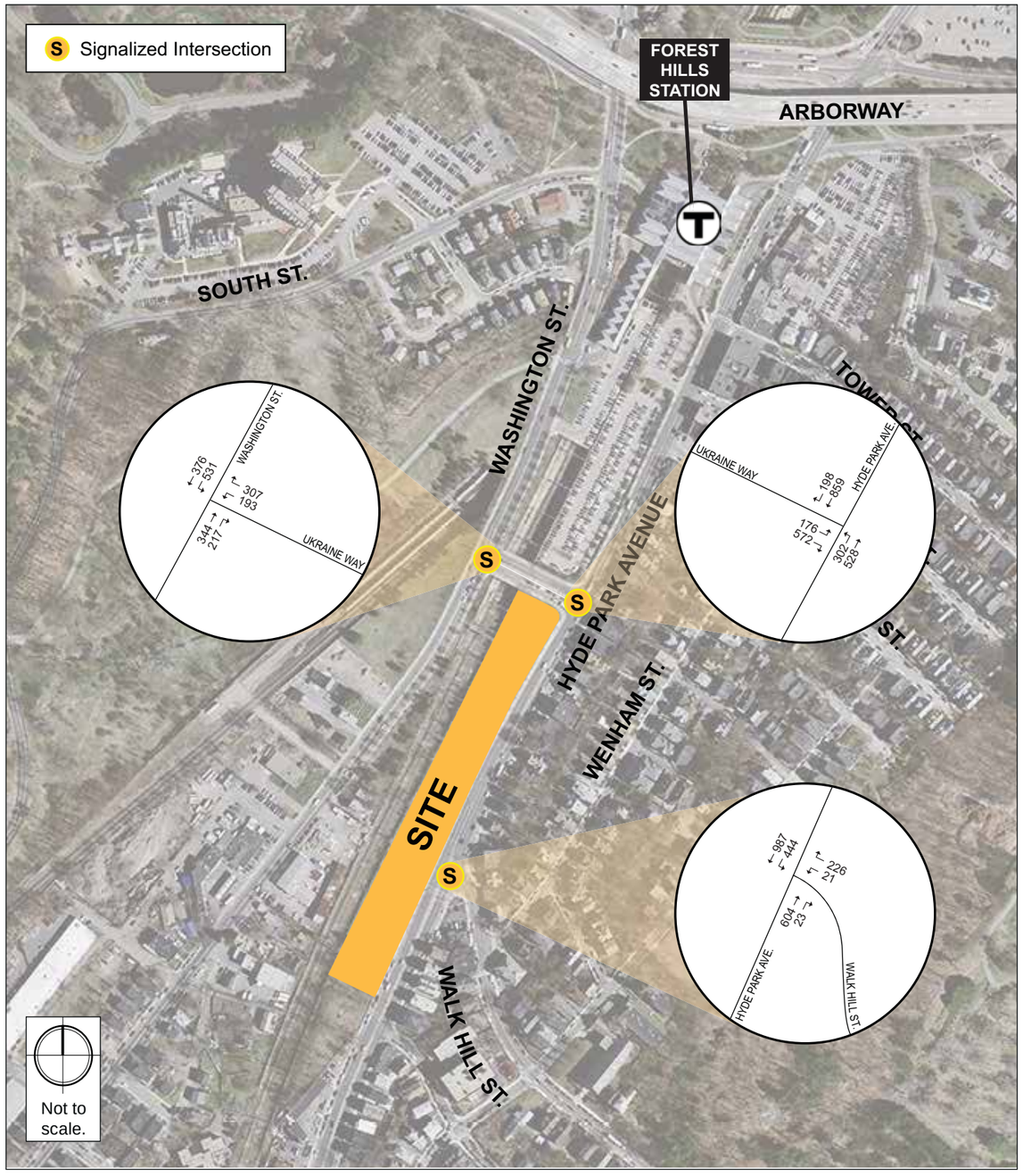


Figure 7-3.
Existing Conditions (2014) Turning Movement Volumes, p.m. Peak Hour (4:15 - 5:15 p.m.)

Table 7-1. Intersection Level of Service Criteria

Level of Service	Average Stopped Delay (sec/veh)	
	Signalized Intersection	Unsignalized Intersection
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

In addition to delay and LOS, the operational capacity and vehicular queues are calculated and used to further quantify traffic operations at intersections. The following describes these other calculated measures.

The volume-to-capacity (v/c) ratio is a measure of congestion at an intersection approach. A v/c ratio below one indicates that the intersection approach has adequate capacity to process the arriving traffic volumes over the course of an hour. A v/c ratio of one or greater indicates that the traffic volume on the intersection approach exceeds capacity.

The 50th percentile queue length, measured in feet, represents the maximum queue length during a cycle of the traffic signal with typical (or median) entering traffic volumes.

The 95th percentile queue length, measured in feet, represents the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line during five percent of all signal cycles. The 95th percentile queue will not be seen during each cycle. The queue would be this long only five percent of the time and would typically not occur during off-peak hours. Since volumes fluctuate throughout the hour, the 95th percentile queue represents what can be considered a "worst case" scenario. Queues at the intersection are generally below the 95th percentile queue throughout the course of the peak hour. It is also unlikely that the 95th percentile queues for each approach to the intersection will occur simultaneously.

Table 7-2 and **Table 7-3** present the 2014 Existing conditions operational analysis for the study area intersections for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in **Appendix D.**

Table 7-2. Existing Conditions (2014) Level of Service Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized					
Washington Street / Ukraine Way	**C**	**34.4**	-	-	-
Ukraine Way WB left	E	64.9	0.68	130	m116
Ukraine Way WB right	B	15.7	0.66	86	m131
Washington Street NB thru | thru/right	D	42.3	0.76	251	#454
Washington Street SB left	D	51.3	0.82	190	#319
Washington Street SB thru	B	19.1	0.38	129	184
Hyde Park Avenue / Ukraine Way	**C**	**31.2**	-	-	-
Ukraine Way EB left	E	67.8	0.85	167	m#213
Ukraine Way EB right	B	14.7	0.35	66	m182
Hyde Park Avenue NB left/thru | thru	C	21.0	0.92	580	#703
Hyde Park Avenue SB thru | thru/right	D	52.3	0.85	205	#489
Hyde Park Avenue / Walk Hill Street	**C**	**32.4**	-	-	-
Walk Hill Street WB left	D	50.8	0.22	21	41
Walk Hill Street WB right	A	9.4	0.84	27	87
Hyde Park Avenue NB thru | thru/right	D	37.7	0.84	448	#698
Hyde Park Avenue SB left	F	>80.0	>1.00	~202	233
Hyde Park Avenue SB thru | thru	A	6.2	0.28	52	m201

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.
m = 95th percentile queue is metered by upstream traffic signal.
Grey shading indicates LOS E or LOS F.

Table 7-3. Existing Conditions (2014) Level of Service Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized					
Washington Street / Ukraine Way	**D**	**53.4**	-	-	-
Ukraine Way WB left	E	59.7	0.78	191	m220
Ukraine Way WB right	C	22.3	0.39	123	m165
Washington Street NB thru | thru/right	D	49.2	0.82	~298	#414
Washington Street SB left	F	>80.0	>1.00	~484	#687
Washington Street SB thru	B	19.3	0.46	213	284
Hyde Park Avenue / Ukraine Way	**D**	**54.0**	-	-	-
Ukraine Way EB left	E	72.8	0.73	147	m149
Ukraine Way EB right	F	>80.0	0.84	188	m88
Hyde Park Avenue NB left/thru | thru	D	37.8	>1.00dl	~394	#567
Hyde Park Avenue SB thru | thru/right	D	37.8	0.85	~534	#699
Hyde Park Avenue / Walk Hill Street	**C**	**29.3**	-	-	-
Walk Hill Street WB left	E	66.4	0.49	42	33
Walk Hill Street WB right	A	3.5	0.35	0	41
Hyde Park Avenue NB thru | thru/right	D	42.5	0.75	293	#416
Hyde Park Avenue SB left	E	63.4	>1.00	~363	m#561
Hyde Park Avenue SB thru | thru	B	10.0	0.53	251	464

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.
m = 95th percentile queue is metered by upstream traffic signal.
dl = Defacto left turn lane; through/left-turn lane operates as an exclusive left-turn lane.
Grey shading indicates LOS E or LOS F.

As shown in **Tables 7-2** and **7-3**, the intersection of Washington Street/Ukraine Way currently operates at LOS C during the weekday a.m. peak hour and LOS D during the weekday p.m. peak hour. The Ukraine Way westbound left-turn movements currently operate at LOS E during both the weekday a.m. and p.m. peak hours, with the Washington Street southbound left-turn movements operating at LOS F during the p.m. peak hour. The longest queues at the intersection occur along Washington Street southbound during the a.m. peak hour and along Washington Street northbound during the p.m. peak hour.

The intersection of Hyde Park Avenue/Ukraine Way currently operates at LOS C during the weekday a.m. peak hour and LOS D during the weekday p.m. peak hour. The Ukraine Way eastbound left-turn movements currently operate at LOS E during both the weekday a.m. and p.m. peak hours, with the Ukraine Way eastbound right-turn movements operating at LOS F during the p.m. peak hour. The longest queues at the intersection occur along the Hyde Park Avenue northbound and southbound approaches.

The intersection of Hyde Park Avenue at Walk Hill Street currently operates at LOS C during both the a.m. and p.m. peak hours. The Hyde Park Avenue southbound left-turn movements currently operate at LOS F during the weekday a.m. peak hour and LOS E during the p.m. peak hour. The Walk Hill Street westbound left-turn movements currently operate at LOS E during the p.m. peak hour. The longest queues at the intersection occur along the Hyde Park Avenue northbound approaches during the peak hours.

7.2.5 Existing Parking and Curb Use

Figure 7-4 illustrates the on-street parking regulations in the vicinity of the study area. As shown in **Figure 7-4**, on-street parking is not allowed along Ukraine Way or Washington Street in the vicinity of the Project site. On-street parking is generally allowed along the northbound side of Hyde Park Avenue in the vicinity of the Project site, with two hour time restriction and resident permit parking. There are 206 off-street parking spaces provided at Forest Hills Station for $6.00 per day. Bus stops are located along Washington Street and Hyde Park Avenue in the vicinity of the Project site.

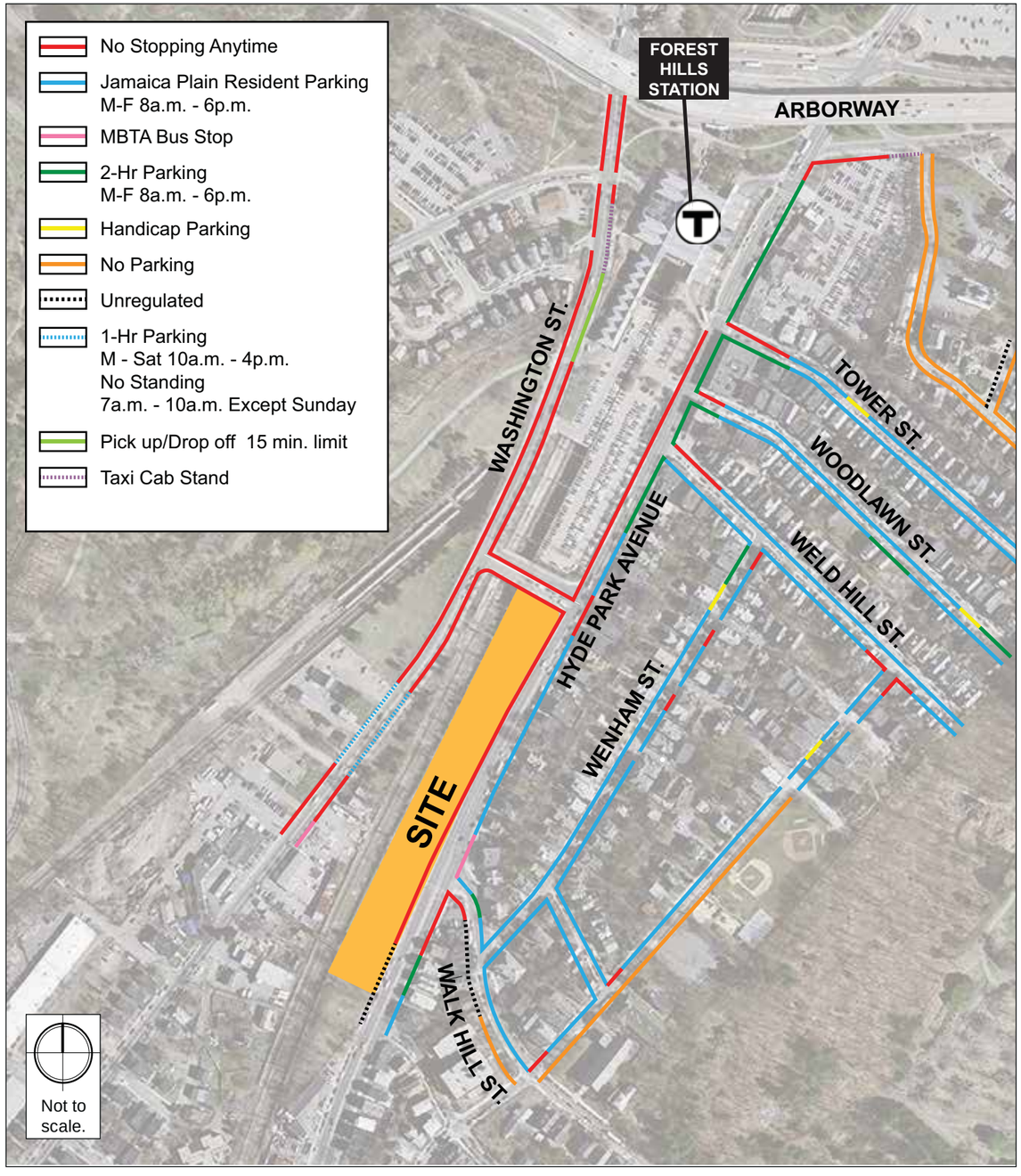


Figure 7-4.
On-Street Parking Regulations

7.2.6 Existing Public Transportation

The Project site is located conveniently within a quarter mile of the Forest Hills Station, which provides service to sixteen bus routes, one subway route, and one commuter rail route. These routes are summarized in **Table 7-4** and shown graphically in **Figure 7-5.**

Table 7-4. Public Transportation

Route	Description	Rush Hour Headway[1] (minutes)
Bus Routes		
16	Forest Hills Station – Andrew Station	15-17
21	Ashmont Station – Forest Hills Station via Morton St.	9-12
30	Mattapan Station – Forest Hills Station via Cummins Highway & Roslindale Square	7-20
31	Mattapan Station – Forest Hills Station via Morton St.	5
32	Wolcott Square – Forest Hills Station via Hyde Park Ave.	7-8
34	Walpole Center – Forest Hills Station via Washington St.	9-15
34E	Walpole Center – Forest Hills Station via Washington St.	20
35	Stimson St. – Forest Hills Station via Belgrade Ave. & Centre St.	20-26
36	Charles River Loop – Forest Hills Station via Belgrade Ave. & Centre St.	3-17
37	Bake & Vermont Sts. – Forest Hills Station via Belgrade Ave. & Centre St.	18-31
38	Wren St. – Forest Hills Station via Centre & South Streets	22
39	Forest Hills Station – Back Bay Station via Huntington Ave.	1-6
40	Georgetown – Forest Hills Station via Washington St & West Boundary Road	30
42	Forest Hills Station – Dudley or Ruggles Station via Washington Street	12
50	Cleary Square – Forest Hills Station via Roslindale Square	25
51	Cleveland Circle – Forest Hills Station via Hancock Village	10-25
Subway Routes		
Orange Line	Oak Grove – Forest Hills	6
Commuter Rail Routes		
Providence /Stoughton	Wickford Junction – South Station	10-60

The MBTA Orange Line subway provides service from Forest Hills Station in Jamaica Plain through downtown Boston to Oak Grove Station in Malden, Massachusetts. The Orange Line provides inbound and outbound service approximately every five minutes Monday through Friday and every ten minutes on Saturday and Sunday. The most recent published passenger count data indicates that the Orange Line serves approximately 141,000 passengers per day[4].

[4] Ridership and Service Statistics (13th Edition); Central Transportation Planning Staff; Boston, MA; 2010.

The primary MBTA bus route serving the Project site is the #32 bus, which provides service between Wolcott Square in Readville and Forest Hills Station via Hyde Park Avenue. The buses operate on 7-8 minute headways in the a.m. and p.m. peak periods.

The Needham MBTA commuter rail line stops at Forest Hills Station. This train provides access between Needham Heights and South Station in downtown Boston. On a weekday, the Needham Line has 16 inbound trains that run between 6:37 a.m. and 10:35 p.m. and 14 outbound trains that run between 7:16 a.m. and 10:43 p.m. that stop at Forest Hills Station. There is no weekend commuter rail service at Forest Hills Station.

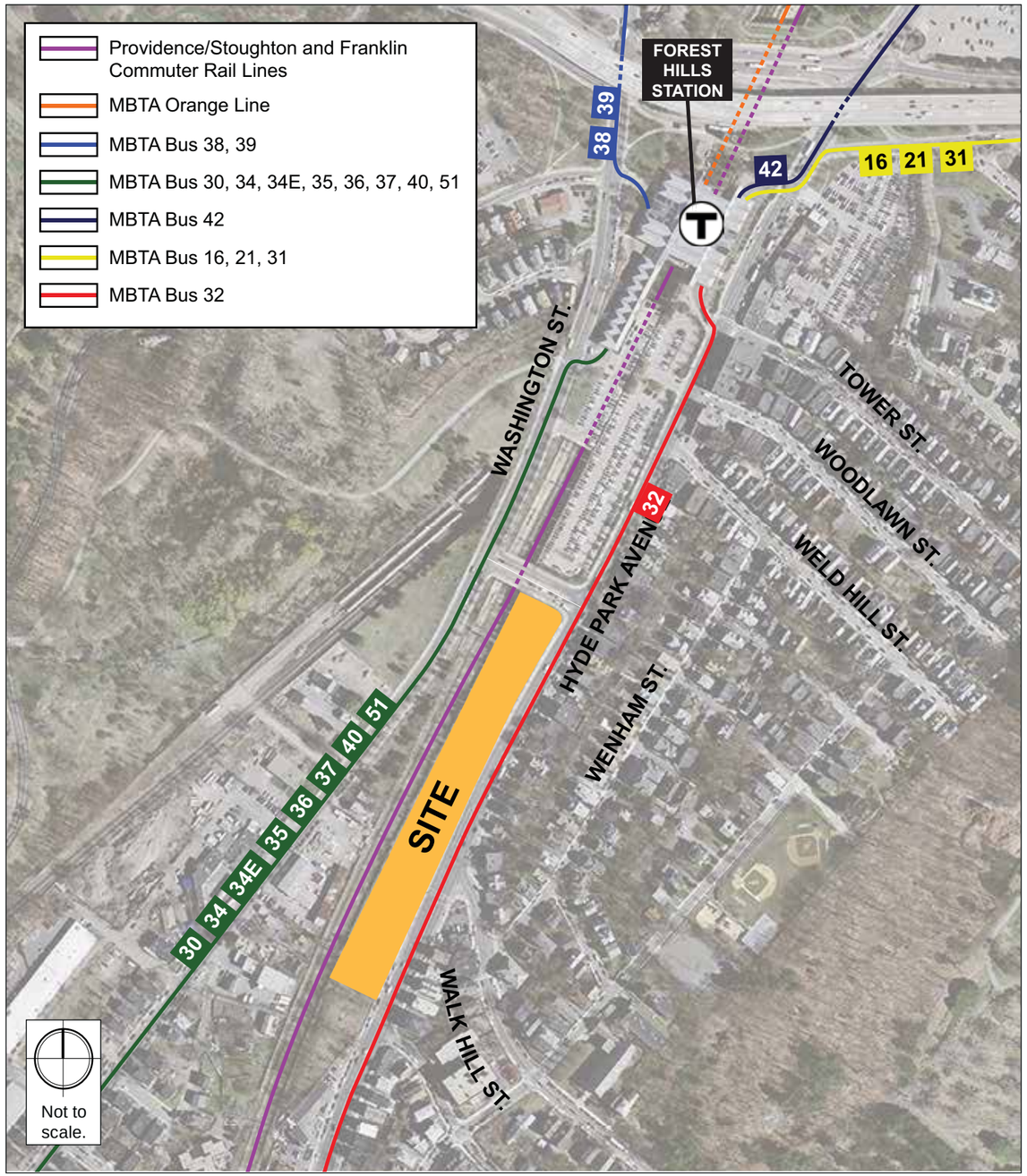


Figure 7-5.
Public Transportation Facilities

7.2.7 Car Sharing Services

Car sharing, predominantly served by Zipcar in the Boston area, provides easy access to short term vehicular transportation. Vehicles are rented on an hourly or daily basis, and all vehicle costs (gas, maintenance, insurance, and parking) are included in the rental fee. Vehicles are checked out for a specific time period and returned to their designated location.

The nearby Zipcar service provides an important transportation option and reduces the need for private vehicle ownership. As shown on **Figure 7-6**, Zipcar has two locations in the vicinity of the Project.

7.2.8 Existing Pedestrian and Bicycle Conditions

The Project site is located immediately adjacent to Hyde Park Avenue, which provides primary pedestrian access to the Forest Hills Station to the north. Sidewalks are generally provided along all streets within the study area and are generally in fair to good condition. Adjacent to the Project site, the sidewalks are approximately 10 feet in width along Hyde Park Avenue. Crosswalks and pedestrian signal equipment are provided at the three study area intersection locations.

To estimate the amount of pedestrian activity within the study area, pedestrian counts were conducted concurrent with the TMCs at the study area intersections and are presented in **Figure 7-7**. The pedestrian activity within the study area is heaviest along the north-south movements across Ukraine Way at Washington Street and Hyde Park Avenue. These crossings provide access to the Forest Hills Station from the south.

Figure 7-6.
Car Sharing Services

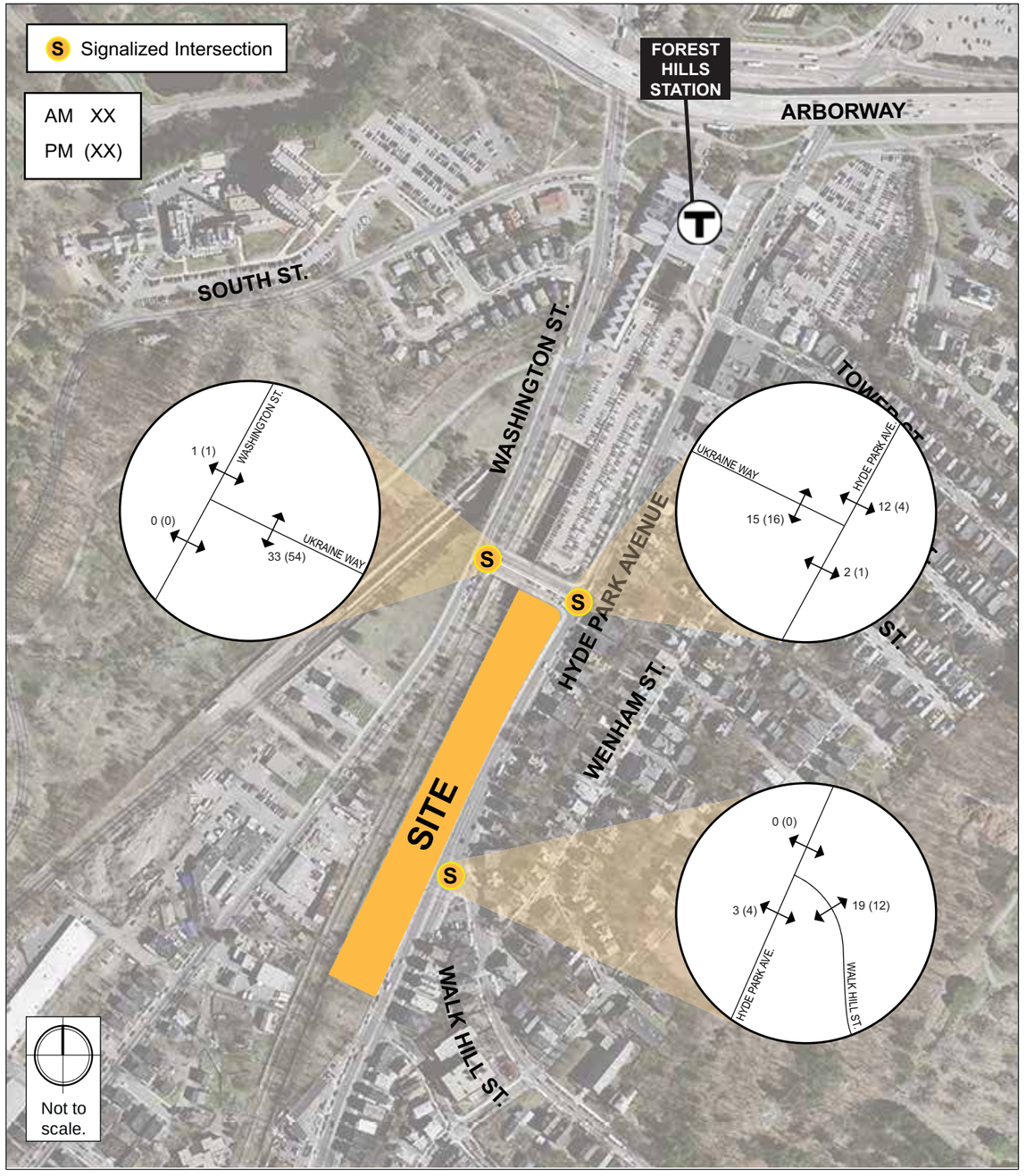


Figure 7-7.
Existing Pedestrian (2014) Volumes, a.m. and p.m. Peak Hour

7.2.9 Existing Bicycle Facilities

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project site is conveniently located south of the terminus of the Southwest Corridor Park, which provides approximately 4.7 miles of biking, walking, and jogging paths between Forest Hills and Back Bay.

Washington Street currently has exclusive bicycle lanes in both the northbound and southbound directions in the vicinity of the Project site. The remaining roadways in the study area currently have no designated bicycle lanes or markings. In the vicinity of the study area, both Washington Street and Hyde Park Avenue are designated as advanced-level bike routes suitable for experienced and traffic confident cyclists on the 2010-2011 Boston Bikes Map.

The 2014 existing a.m. and p.m. peak-hour bicycle turning movement counts appear in **Figure 7-8**. Detailed bicycle counts are provided in **Appendix D.**

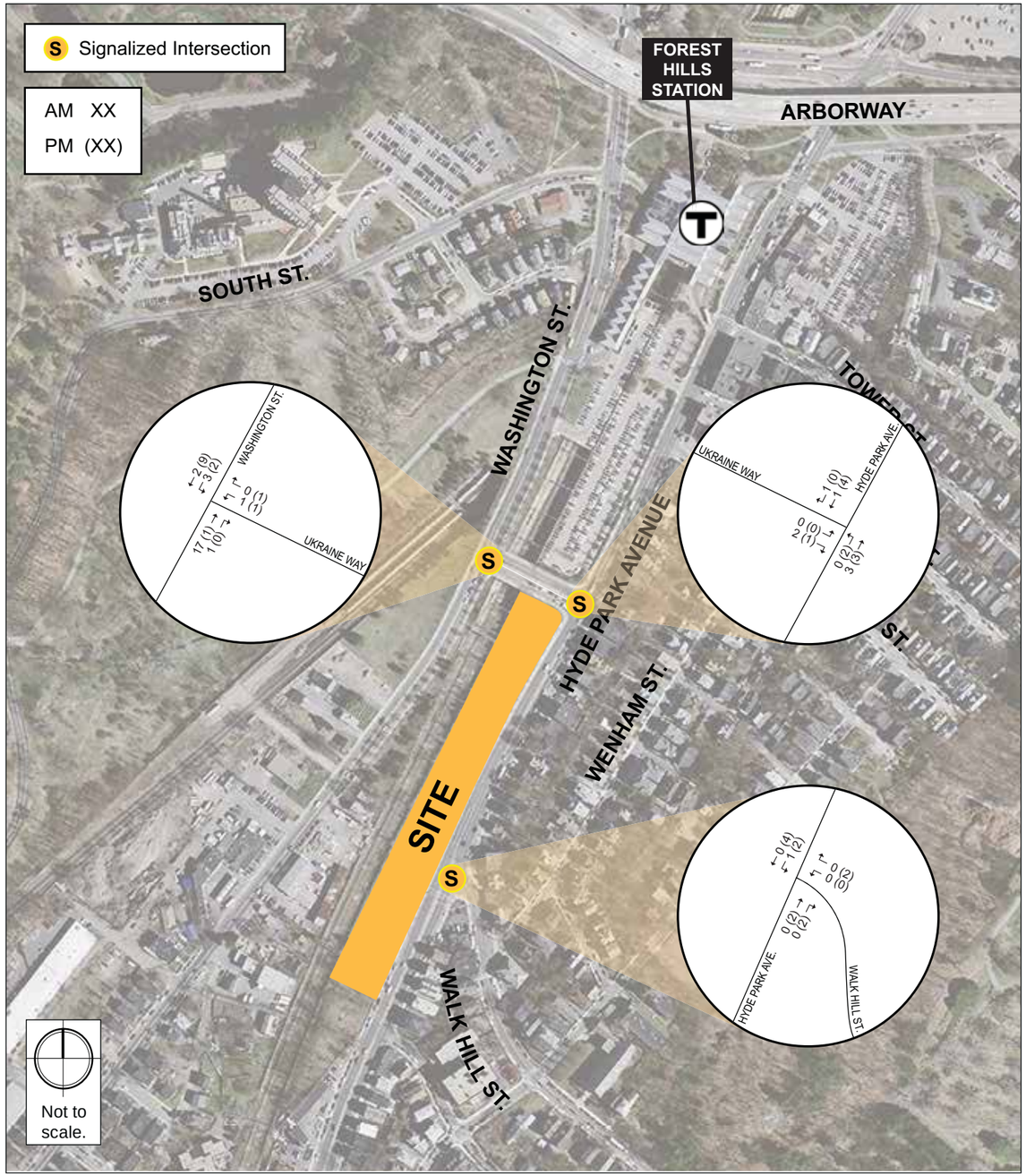


Figure 7-8.
Existing Bicycle (2014) Volumes, a.m. and p.m. Peak Hour

7.3 Future Conditions

For transportation impact analyses, it is standard practice to evaluate two future conditions: No-Build conditions (without the proposed project) and Build conditions (with the proposed project). In accordance with BTD guidelines, these conditions are projected to a future date five years from the Existing conditions year. For this evaluation of this Project, 2019 was selected as the horizon year for the future conditions analyses.

This section presents a description of the 2019 future conditions scenarios and includes an evaluation of the transportation facilities under the No-Build and Build conditions.

7.3.1 No-Build Conditions

The No-Build conditions reflect a future scenario that incorporates any anticipated traffic growth independent of the Project and any planned infrastructure improvements that will affect travel patterns throughout the study area.

No-Build Background Growth

Two methodologies are used to account for future traffic growth, independent of the Project. The first methodology accounts for general background traffic growth that may be affected by changes in demographics, automobile usage, and automobile ownership. Based on a review of recent traffic studies conducted for projects within the vicinity of the study area, a 0.5% annual traffic growth rate was used to develop the future conditions traffic volumes.

The second methodology identifies any specific planned developments that are expected to affect traffic patterns throughout the study area within the future analysis time horizon. The following projects are located in the vicinity of the study area and, where appropriate, traffic volumes associated with these projects were also incorporated into the future conditions traffic volumes.

The Commons at Forest Hills Station – This proposed project consists of the redevelopment of the former Hughes Oil site in Jamaica Plain to include 289 residential units including 37 affordable units, parking and ground floor retail space. This project has been approved by the BRA.

3521-3529 Washington Street – This proposed project consists of the construction of a 4-story self-storage facility, 2-story retail building fronting Washington Street and multifamily housing fronting Burnett Street. This project is currently under review by the BRA.

The 0.5% per year annual growth rate was applied to the 2014 Existing conditions traffic volumes, then the traffic volumes associated with the background development projects listed above were added to develop the 2019 No-Build conditions traffic volumes. The 2019 No-Build

weekday a.m. and p.m. peak hour traffic volumes are shown on **Figure 7-9** and **Figure 7-10**, respectively.

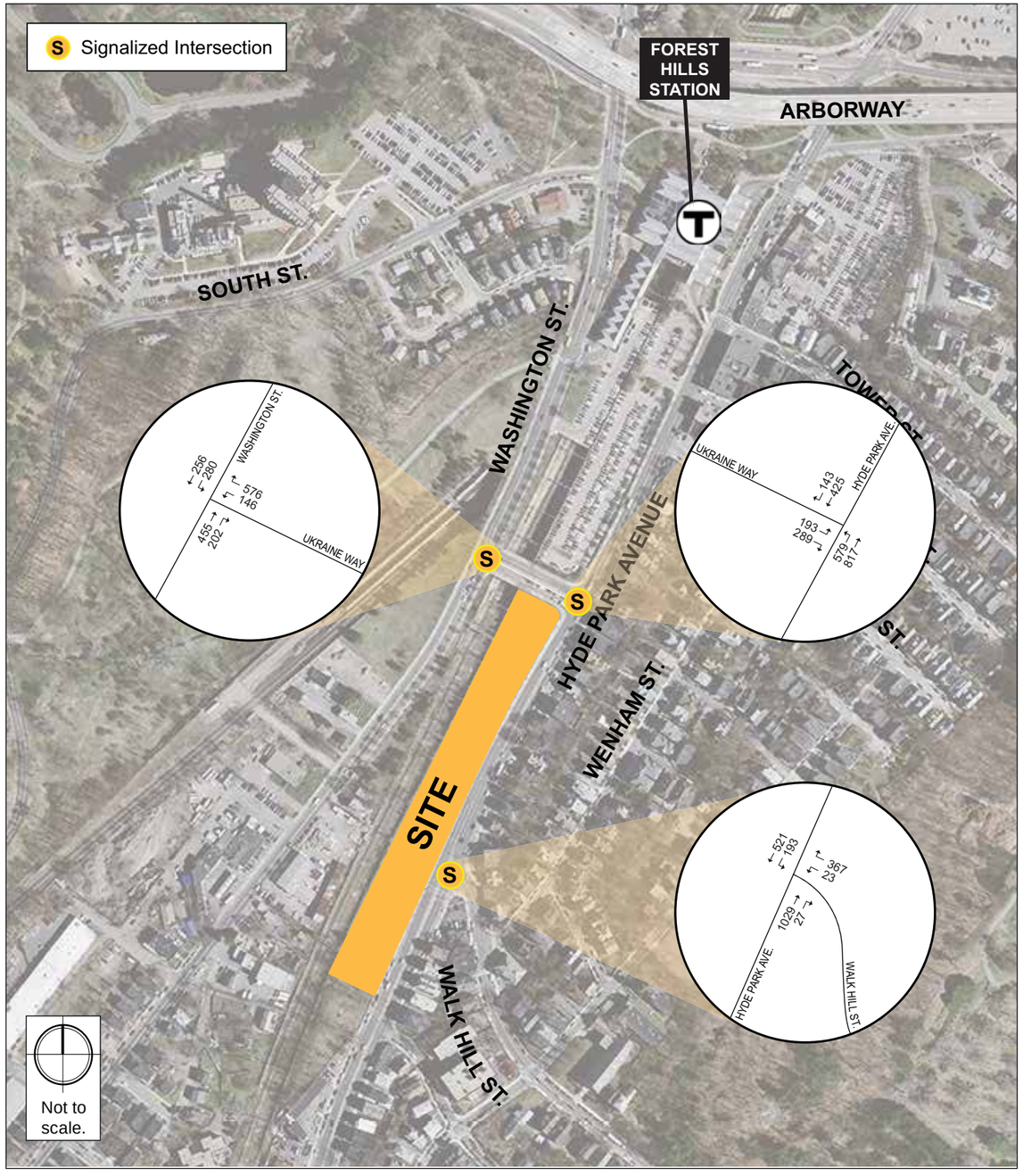


Figure 7-9.
No-Build Conditions (2019) Turning Movement Volumes, a.m. Peak Hour

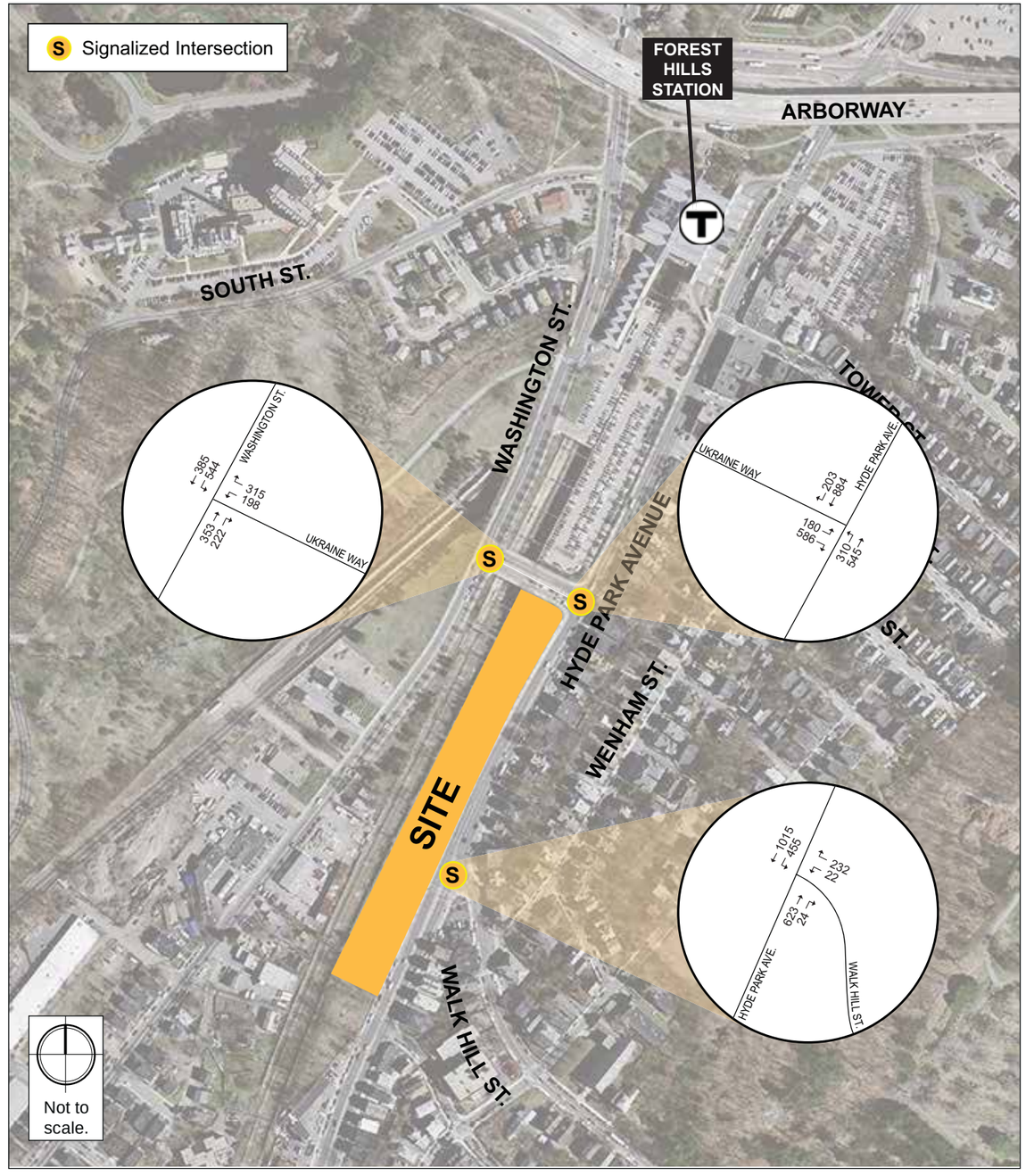


Figure 7-10.
No-Build Conditions (2019) Turning Movement Volumes, p.m. Peak Hour

Proposed Infrastructure Improvements

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any nearby projects in the vicinity of the study area. Based on this review, the following project was identified within the study area.

Casey Arborway Project. This Project will replace the existing structurally deficient Casey Overpass with a new at-grade boulevard. The intersections of Washington Street at Arborway and South Street at Arborway will be reconstructed as at-grade, signalized intersections. Left-turns from the Arborway to Washington Street and South Street will be accommodated by two new u-turns that will be located east of Washington Street (for Arborway eastbound left-turns) and west of South Street (for Arborway westbound left-turns). A separate bus lane will be provided for the MBTA buses for the Arborway westbound left-turn movement to Washington Street southbound. The Casey Arborway Project will also improve the multi-use path connections between the Southwest Corridor Park and the adjacent transportation facilities (i.e. Washington Street, South Street, and the Forest Hills MBTA Station). This project is expected to commence between summer 2014 and fall 2016.

No-Build Traffic Operations

The 2019 No-Build conditions scenario analysis uses the same methodology as the 2014 Existing conditions scenario analysis. **Table 7-5** and **Table 7-6** present the 2019 No-Build conditions operations analysis for the weekday morning and evening peak hours, respectively. The shaded cells in the tables indicate a worsening in LOS between the 2014 Existing conditions and the 2019 No-Build conditions. The detailed analysis sheets are provided in **Appendix D.**

Table 7-5. No-Build Conditions (2019) Level of Service Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized					
Washington Street / Ukraine Way	**D**	**36.1**	-	-	-
Ukraine Way WB left	E	64.3	0.69	133	m116
Ukraine Way WB right	B	18.1	0.69	102	m131
Washington Street NB thru | thru/right	D	44.1	0.79	261	#471
Washington Street SB left	D	53.4	0.84	196	#335
Washington Street SB thru	B	19.5	0.39	134	189
Hyde Park Avenue / Ukraine Way	**C**	**33.1**	-	-	-
Ukraine Way EB left	E	67.9	0.86	170	m208
Ukraine Way EB right	B	14.8	0.35	68	m182
Hyde Park Avenue NB left/thru | thru	C	23.3	0.95	594	#735
Hyde Park Avenue SB thru | thru/right	D	54.8	0.88	213	#503
Hyde Park Avenue / Walk Hill Street	**C**	**34.5**	-	-	-
Walk Hill Street WB left	D	50.2	0.22	21	43
Walk Hill Street WB right	A	10.1	0.66	34	98
Hyde Park Avenue NB thru | thru/right	D	40.0	0.87	476	#725
Hyde Park Avenue SB left	F	>80.0	>1.00	~247	#244
Hyde Park Avenue SB thru | thru	A	6.5	0.29	53	m201

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.
m = 95th percentile queue is metered by upstream traffic signal.
Grey shading indicates a decrease to LOS E or LOS F when compared to existing conditions.

Table 7-6. No-Build Conditions (2018) Level of Service Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized					
Washington Street / Ukraine Way	**E**	**57.8**	-	-	-
Ukraine Way WB left	E	60.4	0.79	196	m220
Ukraine Way WB right	C	23.1	0.39	126	m162
Washington Street NB thru | thru/right	D	53.7	0.85	~318	#429
Washington Street SB left	F	>80.0	>1.00	~505	#710
Washington Street SB thru	B	19.7	0.48	219	290
Hyde Park Avenue / Ukraine Way	**E**	**57.9**	-	-	-
Ukraine Way EB left	E	70.6	0.74	151	m148
Ukraine Way EB right	F	>80.0	0.85	84	m87
Hyde Park Avenue NB left/thru | thru	D	40.3	>1.00dl	~413	#587
Hyde Park Avenue SB thru | thru/right	D	40.5	0.88	~563	#726
Hyde Park Avenue / Walk Hill Street	**C**	**31.0**	-	-	-
Walk Hill Street WB left	E	67.1	0.50	44	35
Walk Hill Street WB right	A	3.4	0.38	0	41
Hyde Park Avenue NB thru | thru/right	D	43.4	0.77	303	#436
Hyde Park Avenue SB left	E	70.0	>1.00	~428	m#564
Hyde Park Avenue SB thru | thru	B	10.5	0.55	279	506

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.
m = 95th percentile queue is metered by upstream traffic signal.
dl = Defacto left turn lane; through/left-turn lane operates as an exclusive left-turn lane.
Grey shading indicates a decrease to LOS E or LOS F when compared to existing conditions.

As shown in Table 7-5 and Table 7-6, operations at the intersection of Washington Street/Ukraine Way will decrease to LOS D from LOS C during the a.m. peak hour and to LOS E from LOS D during the p.m. peak hour under the No-Build conditions. The longest queues at the intersection will continue to occur along both Washington Street approaches.

Operations at the intersection of Hyde Park Avenue/Ukraine Way will remain at LOS C during the a.m. peak hour and will decrease to LOS E during the p.m. peak hour under the No-Build conditions. The longest queues at the intersection will continue to occur along Hyde Park Avenue.

Operations at the intersection of Hyde Park Avenue/Walk Hill Street will remain at LOS C during both the a.m. and p.m. peak hours under the No-Build conditions.

7.3.2 Build Conditions

As previously summarized, the Project consists of the construction of a 48 residential townhomes, 76 apartment units, and approximately 1,600 sf of ancillary retail space to be located off Hyde Park Avenue, south of Ukraine Way in the Forest Hills neighborhood of Boston. The 2019 Build conditions reflect a future scenario that adds anticipated Project-generated trips to the 2019 No-Build conditions traffic volumes. A total of 90 parking spaces will be provided for the residential uses on the site, with an additional 8 parallel parking spaces proposed along Hyde Park Avenue to serve the retail spaces on site. Secure storage for approximately 124 bicycles will also be provided on the site.

Site Access and Circulation

As shown in the Project site plan in **Figure 7-11**, primary access and egress will be provided by way of a proposed driveway opposite Walk Hill Street along Hyde Park Avenue. This driveway will form the fourth leg of the signalized intersection. Secondary access will be provided by way of a right-in entrance-only driveway in the northerly part of the site. Left-turns into the site at the northern driveway would be physically precluded via a proposed extension of the existing median along Hyde park Avenue. Circulation throughout the site will be provided by way of an access driveway in the rear of the site that runs parallel to Hyde Park Avenue. Loading and service, including trash, recycling, and deliveries will occur on-site. In addition, adequate space has been provided on-site to accommodate residential move-in/move-out without impacting the public sidewalk, parking, or roadway. Primary pedestrian connectivity will be provided along Hyde Park Avenue.

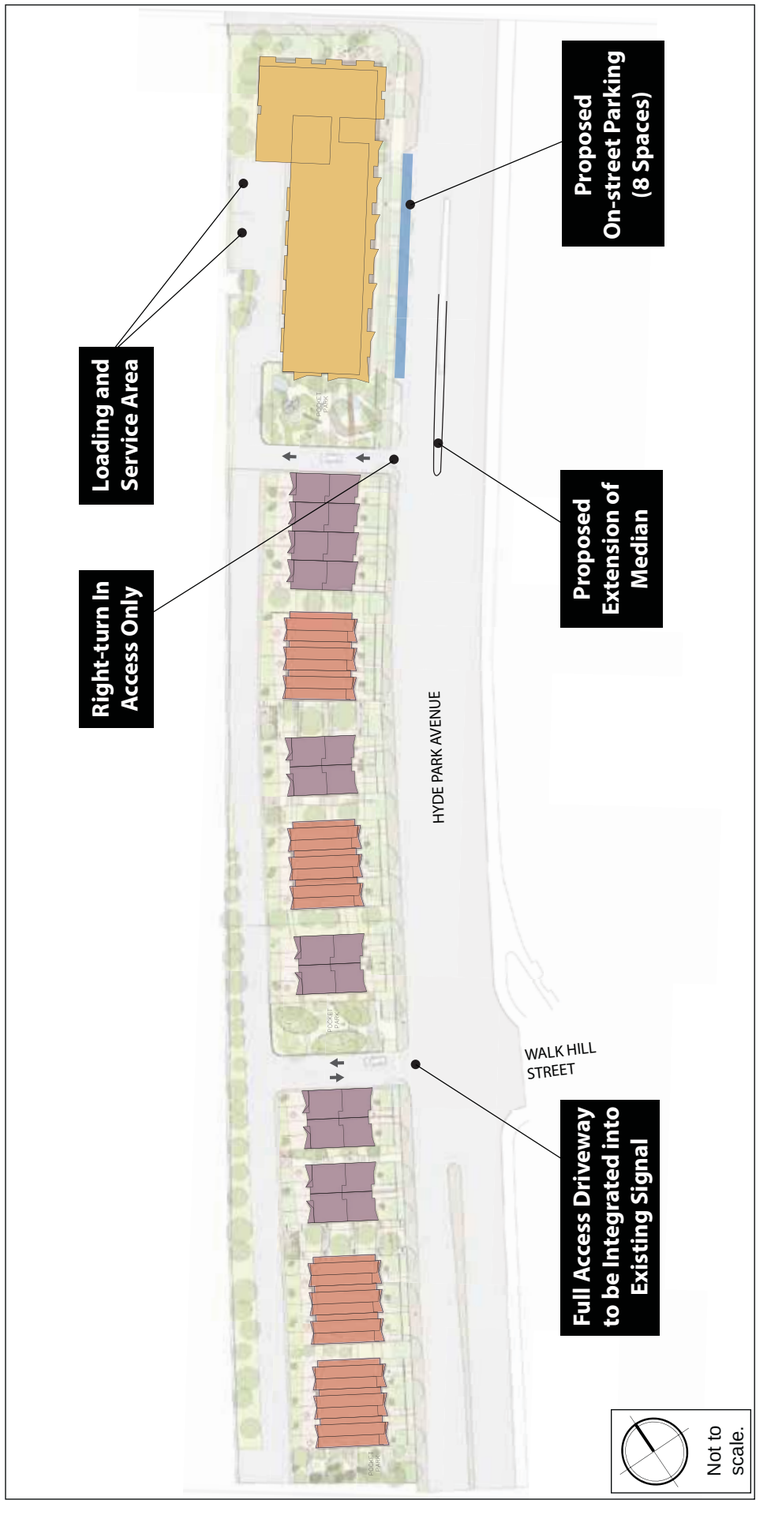


Figure 7-11.
Proposed Site Access Plan

Parcel U - Expanded PNF

Howard/Stein-Hudson Associates, Inc.
CREATIVE SOLUTIONS • EFFECTIVE PARTNERING

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Trip Generation

Trip generation is a complex, multi-step process that produces an estimate of vehicle trips, transit trips, walk trips, and bicycle trips associated with a proposed project and a specific land use program. A project's location and proximity to different modes determines how people will travel to and from that project site.

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[5] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit.

To estimate the unadjusted number of vehicular trips for the Project, the following ITE land use codes (LUCs) were used:

LUC 220 – Apartment. Apartments are rental dwelling units that are located within the same building with at least three other dwelling units—for example, quadraplexes and all types of apartment buildings. This LUC was used for the apartment component of the Project.

LUC 230 – Residential Condominium/Townhouse. Residential condominiums/townhouses are defined as *ownership* units that have at least one other owned unit within the same building structure. Both condominiums and townhouses are included in this land use. This LUC was used for the townhouse component of the Project.

LUC 820 – Shopping Center. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store. A shopping center also provides on-site parking facilities sufficient to serve its own parking demands.

Mode Share

The BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located in the northerly portion of designated Area 6. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[6]. The person trips were then distributed to different modes according to the mode shares shown in **Table 7-7**.

[5] *Trip Generation Manual*, 9th Edition; Institute of Transportation Engineers; Washington, D.C.; 2012.

[6] *Summary of Travel Trends: 2009 National Household Travel Survey*; FHWA; Washington, D.C.; June 2011.

Table 7-7. Travel Mode Shares

Time Period		Vehicle Occupancy Rate [a]	Walk Share [b]	Transit Share [b]	Auto Share [b]
Daily					
Apartment	In	1.13	13%	25%	62%
	Out	1.13	13%	25%	62%
Condominium	In	1.13	13%	25%	62%
	Out	1.13	13%	25%	62%
Retail	In	1.78	16%	23%	61%
	Out	1.78	16%	23%	61%
a.m. Peak Hour					
Apartment	In	1.13	18%	26%	56%
	Out	1.13	12%	44%	44%
Condominium	In	1.13	18%	26%	56%
	Out	1.13	12%	44%	44%
Retail	In	1.78	20%	26%	54%
	Out	1.78	13%	42%	45%
p.m. Peak Hour					
Apartment	In	1.13	12%	44%	44%
	Out	1.13	18%	26%	56%
Condominium	In	1.13	12%	44%	44%
	Out	1.13	18%	26%	56%
Retail	In	1.78	13%	42%	45%
	Out	1.78	20%	26%	54%

a Based on Table 16 from "Summary of Travel Trends: 2009 National Household Travel Survey" (FHWA,2011).
b Based on rates published by the Boston Transportation Department.

Trip Generation Summary

The mode share percentages shown in **Table 7-7** were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates. The trip generation for the Project by mode is shown in **Table 7-8**. The detailed trip generation is provided in **Appendix D.**

Table 7-8. Project Trip Generation

Land Use		Walk/ Bicycle Trips	Transit Trips	Vehicle Trips
Daily				
Apartments[1] *76 units*	In	43	82	181
	Out	43	82	181
Townhomes[2] *48 units*	In	25	48	106
	Out	25	48	106
Retail[3] *1,600 sf*	In	10	14	21
	Out	10	14	21
a.m. Peak Hour				
Apartments[1] *76 units*	In	2	2	4
	Out	4	16	15
Townhomes[2] *48 units*	In	1	1	3
	Out	3	12	11
Retail[3] *1,600 sf*	In	0	0	1
	Out	0	1	0
p.m. Peak Hour				
Apartments[1] *76 units*	In	4	15	14
	Out	4	6	12
Townhomes[2] *48 units*	In	3	11	10
	Out	2	3	6
Retail[3] *1,600 sf*	In	1	2	1
	Out	1	2	2

1 Based on ITE LUC 220 – Apartments for 76 units.
2 Based on ITE LUC 230 – Condominium/Townhouse for 48 units.
3 Based on ITE LUC 820 – Shopping Center for 1,600 sf.

Vehicle Trip Generation

To develop the overall trip generation characteristics, the adjusted vehicular trips associated with the Project were estimated. The Project-generated new vehicle trips are summarized in **Table 7-9**, with the detailed trip generation information provided in **Appendix D.**

Table 7-9. Project Vehicle Trip Generation

Time Period	Direction	Apartments[1]	Townhomes[2]	Retail[3]	Total
Daily	In	181	106	21	308
	Out	181	106	21	308
	Total	**362**	**212**	**42**	**616**
a.m. Peak Hour	In	4	3	1	8
	Out	15	11	0	26
	Total	**19**	**14**	**1**	**34**
p.m. Peak Hour	In	14	10	1	25
	Out	12	6	2	20
	Total	**26**	**16**	**3**	**45**

1 Based on ITE LUC 220 – Apartments for 76 units.
2 Based on ITE LUC 230 – Condominium/Townhouse for 48 units.
3 Based on ITE LUC 820 – Shopping Center for 1,600 sf.

As shown in **Table 7-9**, the Project is expected to generate approximately 616 new daily vehicle trips (308 entering and 308 exiting), with 34 new vehicle trips (8 entering and 26 exiting) during the a.m. peak hour and 45 new vehicle trips (25 entering and 20 exiting) during the p.m. peak hour.

Trip Distribution

The trip distribution identifies the various travel paths for vehicles arriving and leaving the Project site. Trip distribution patterns for the Project were based on BTD's origin-destination data for Area 6 and trip distribution patterns presented in traffic studies for nearby projects. The trip distribution patterns for the Project are illustrated on **Figure 7-12**.

The Project-generated trips were assigned to the study area roadway network based on the trip distribution patterns shown in **Figure 7-12** and are shown in **Figure 7-13** and **Figure 7-14** for the weekday a.m. and weekday p.m. peak hours, respectively. The Project-generated trips were added to the 2019 No-Build conditions traffic volumes to develop the 2019 Build conditions peak hour traffic volume networks and are shown in **Figure 7-15** and **Figure 7-16** for the weekday a.m. and weekday p.m. peak hours, respectively.

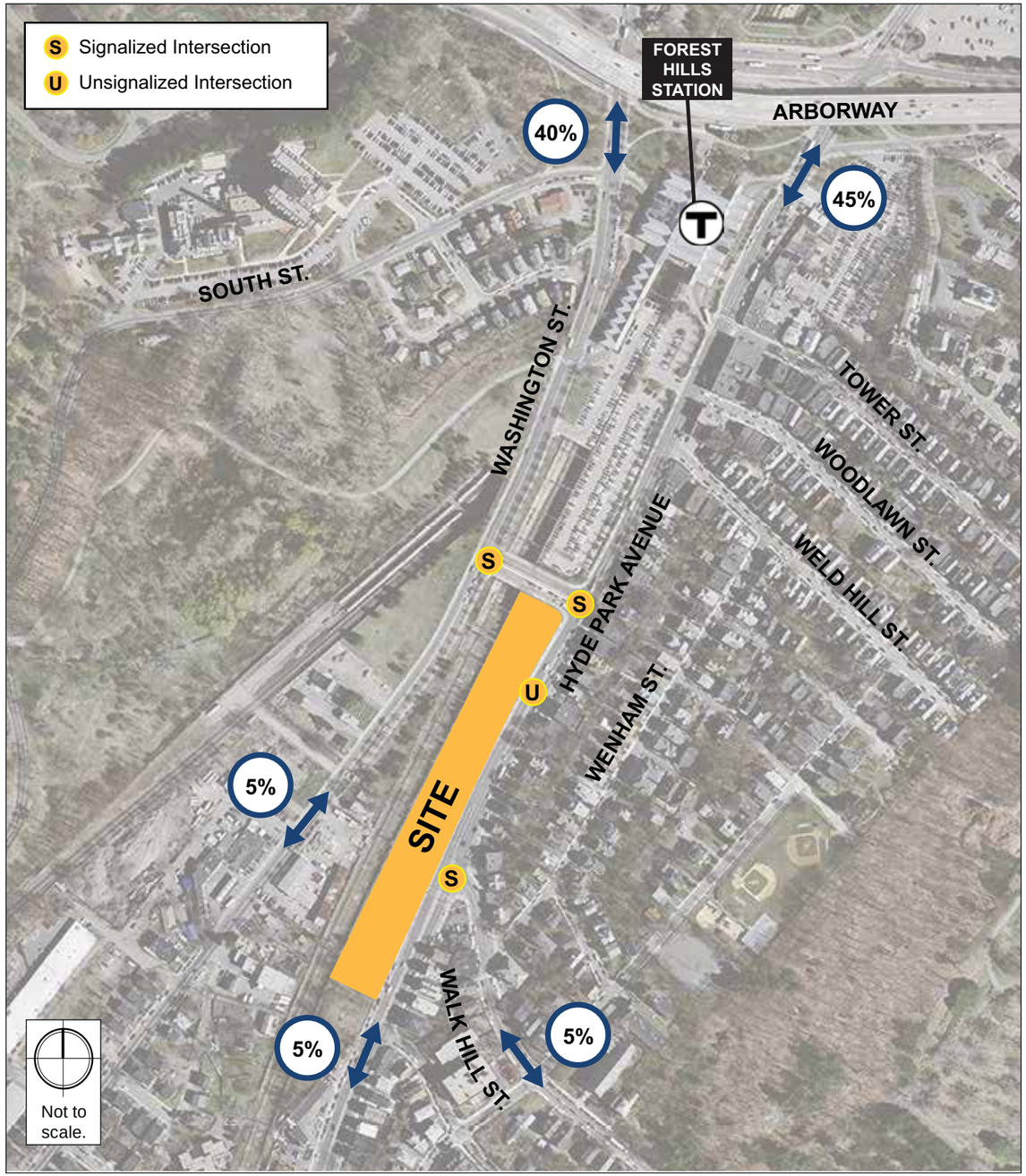

Figure 7-12.
Vehicle Trip Distribution

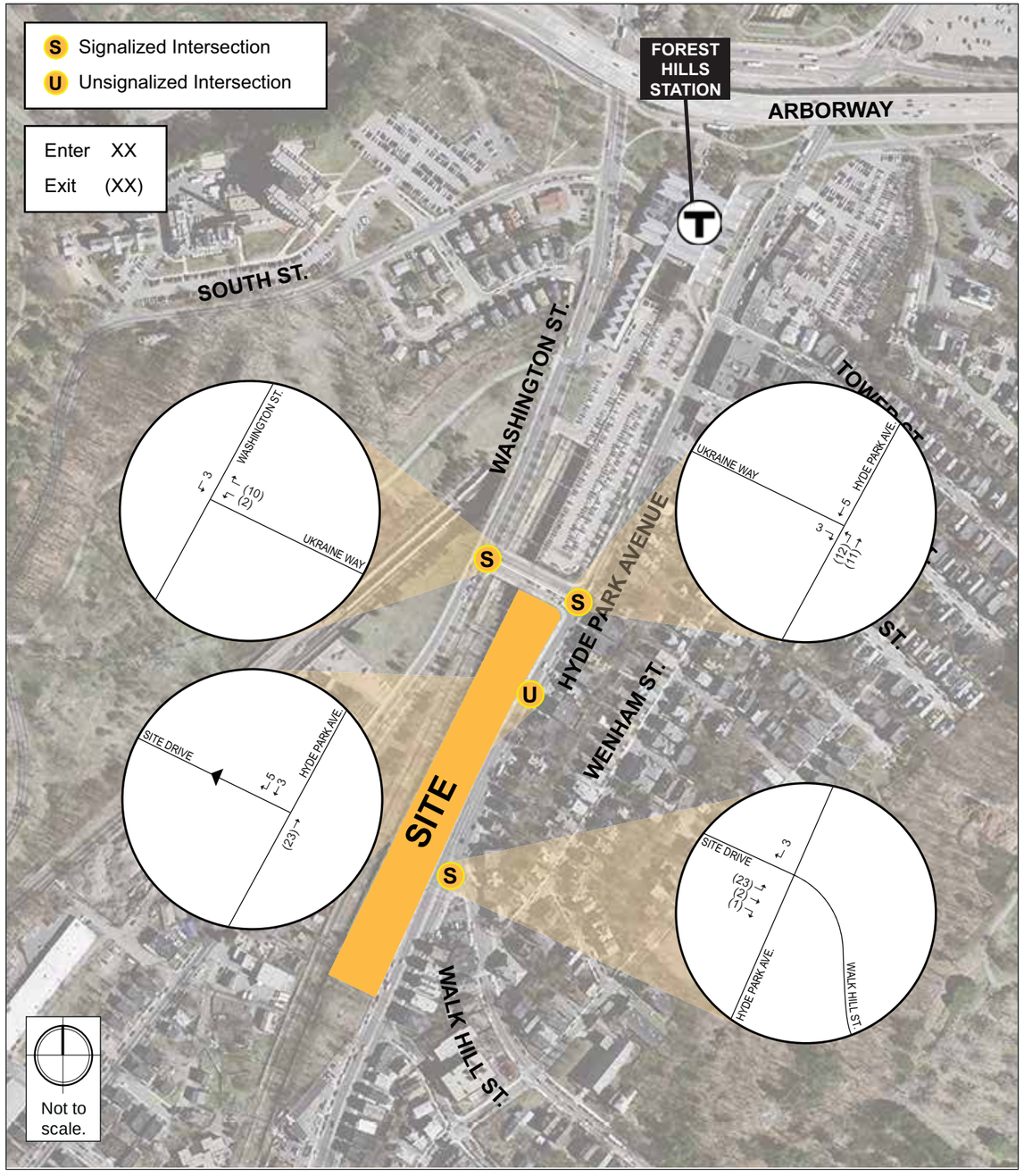

Figure 7-13.
Project Generated Trips, a.m. Peak Hour

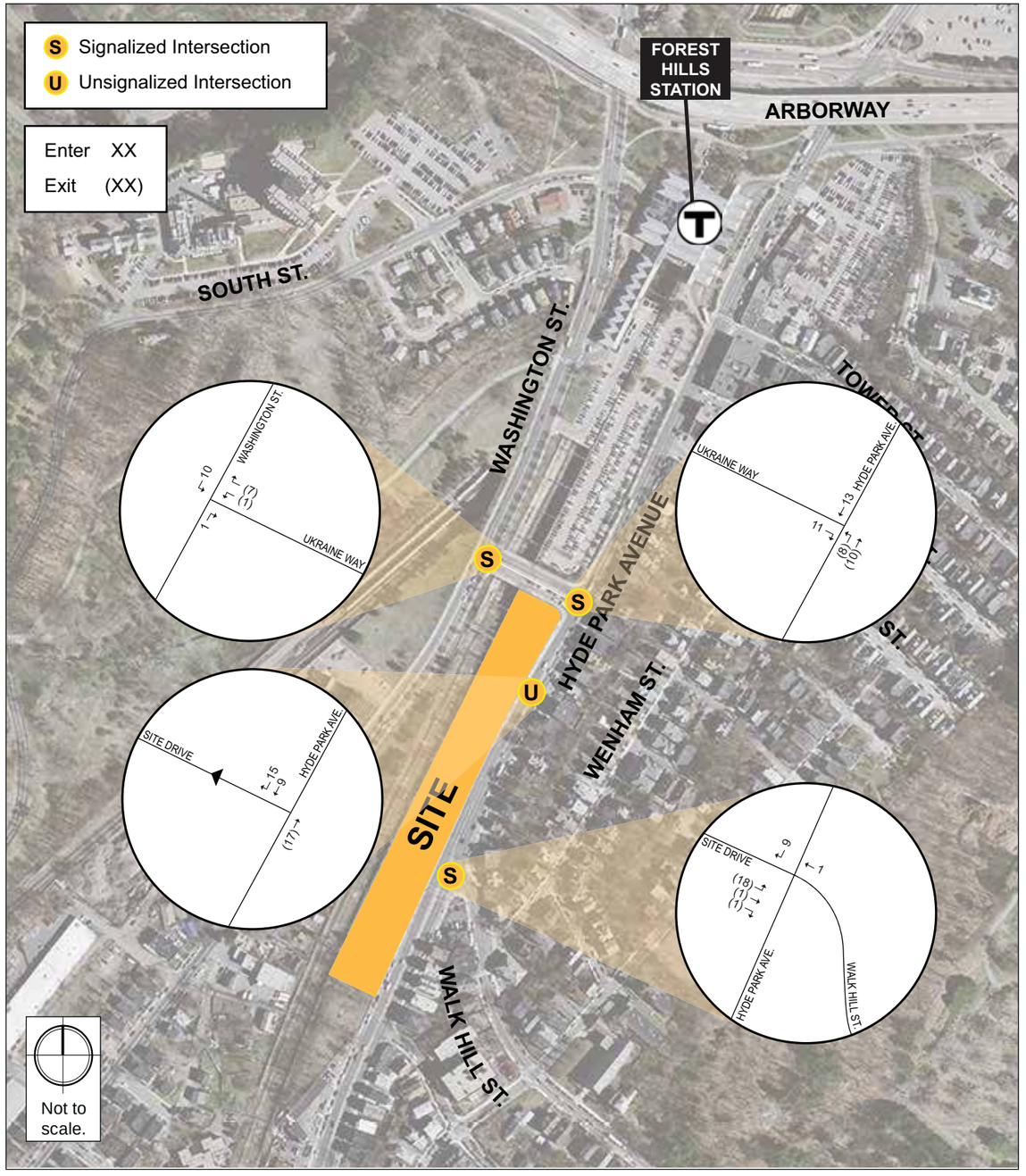

Figure 7-14.
Project Generated Trips, p.m. Peak Hour

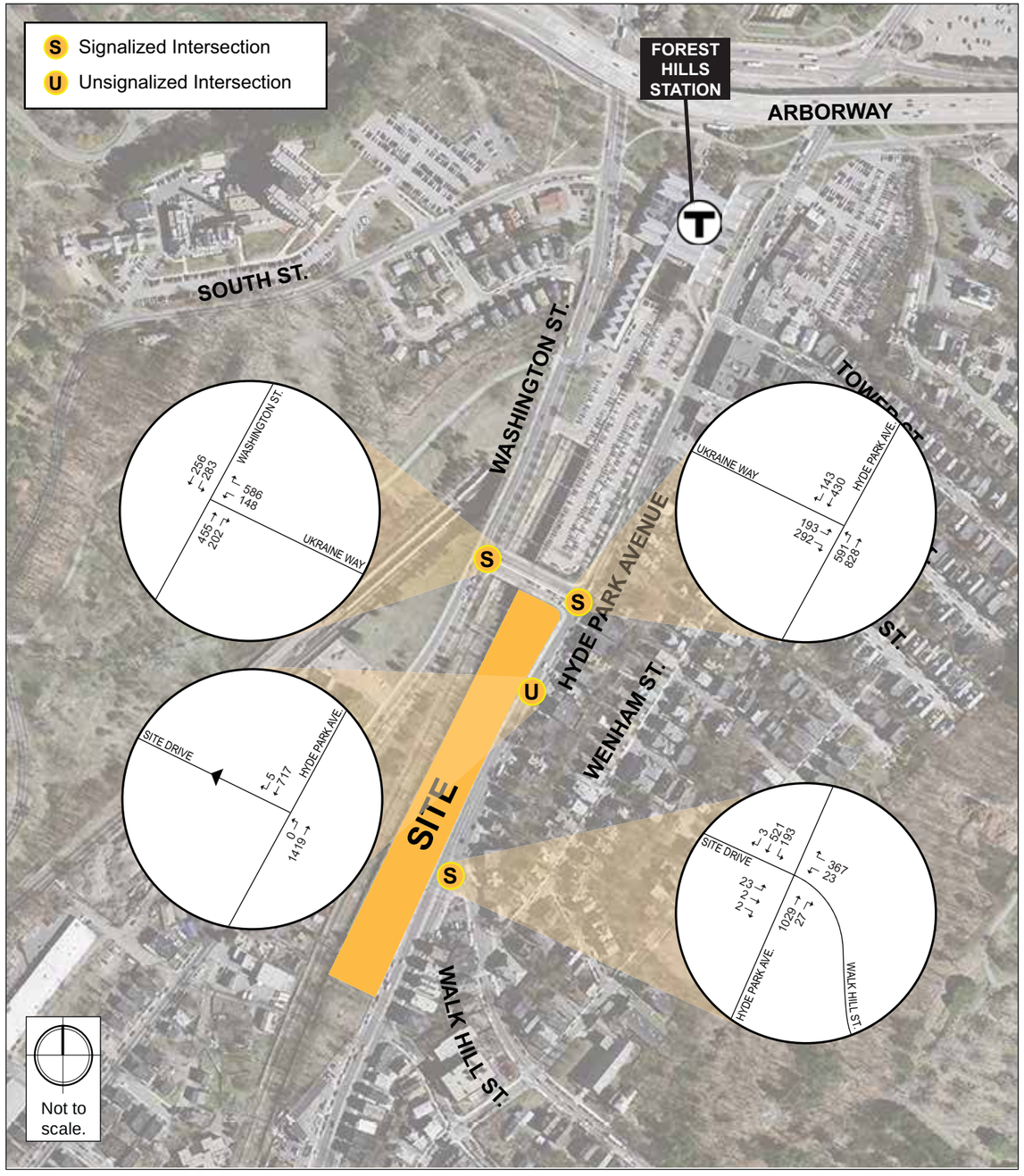

Figure 7-15.
Build Conditions (2019) Turning Movement Volumes, a.m. Peak Hour

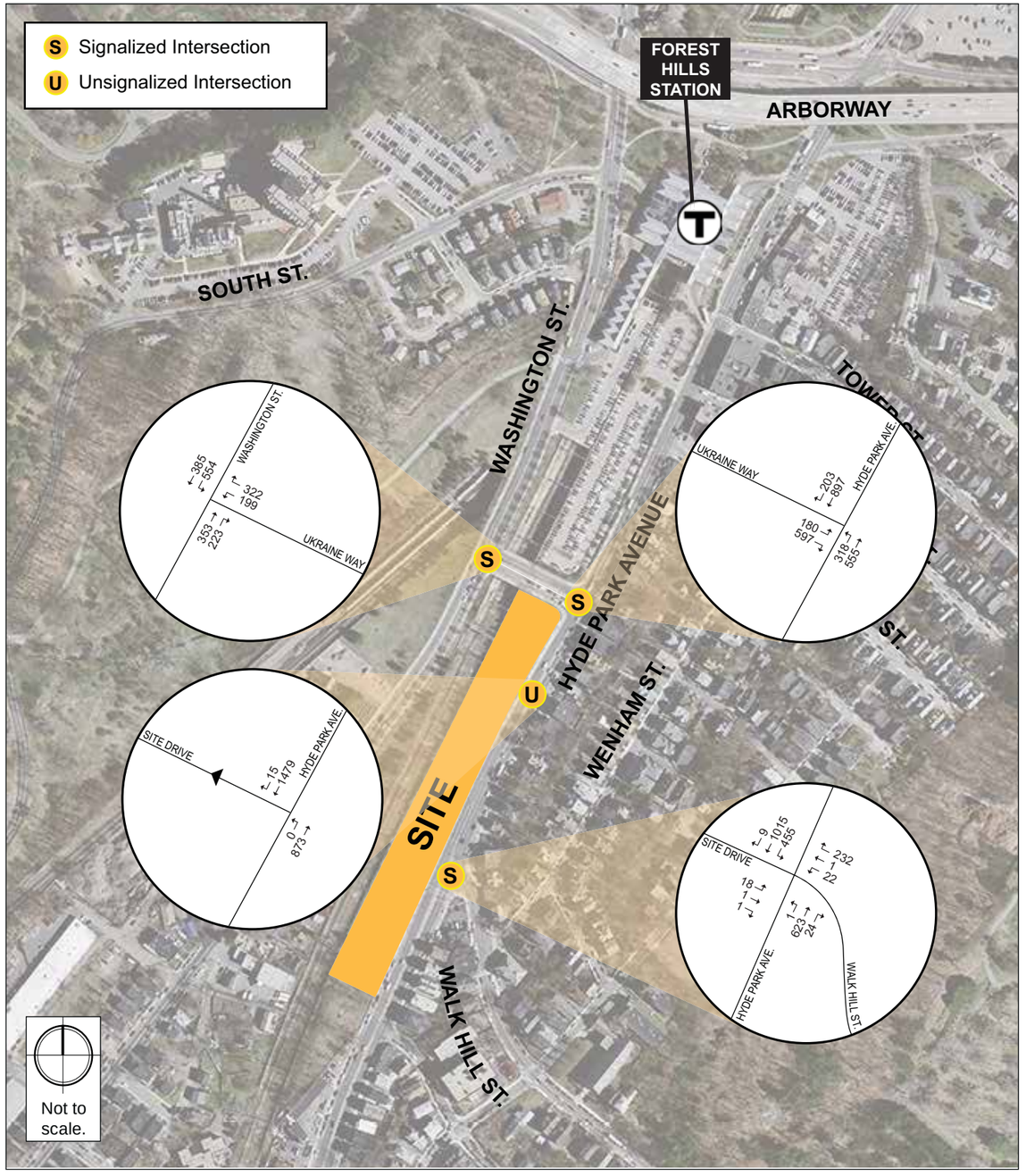

Figure 7-16.
Build Conditions (2019) Turning Movement Volumes, p.m. Peak Hour

Build Conditions Traffic Operations

The 2019 Build conditions scenario analysess use the same methodology as the 2014 Existing and 2019 No-Build conditions scenario analyses. **Table 7-10** and **Table 7-11** present the 2019 Build conditions operations analyses for the weekday a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in **Appendix D.**

Table 7-10. Build Conditions (2019) Level of Service Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized					
Washington Street / Ukraine Way	**D**	**36.3**	-	-	-
Ukraine Way WB left	E	64.4	0.71	135	m115
Ukraine Way WB right	C	21.4	0.69	104	m130
Washington Street NB thru | thru/right	D	44.1	0.78	262	#471
Washington Street SB left	D	48.0	0.84	171	#366
Washington Street SB thru	C	20.2	0.38	134	231
Hyde Park Avenue / Ukraine Way	**C**	**32.1**	-	-	-
Ukraine Way EB left	E	67.7	0.86	170	m#209
Ukraine Way EB right	B	15.1	0.36	71	m184
Hyde Park Avenue NB left/thru | thru	C	20.9	0.97	134	#763
Hyde Park Avenue SB thru | thru/right	E	56.2	0.89	217	#512
Hyde Park Avenue / Walk Hill Street / Site Drive South	**C**	**32.5**	-	-	-
Site Drive South EB left/thru/right	E	57.1	0.29	20	52
Walk Hill Street WB left/thru	E	59.5	0.29	22	54
Walk Hill Street WB right	C	24.6	0.88	0	#119
Hyde Park Avenue NB left/thru | thru/right	D	35.7	0.84	474	#629
Hyde Park Avenue SB left	E	75.1	0.98	234	237
Hyde Park Avenue SB thru | thru/right	A	6.9	0.28	111	m194
Unsignalized					
Hyde Park Avenue / Site Drive North	-	-	-	-	-
Hyde Park Avenue NB left/thru | thru	A	0.0	0.60	-	0
Hyde Park Avenue SB thru/right | thru	A	0.0	0.31	-	0

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.
m = 95th percentile queue is metered by upstream traffic signal.
Grey shading indicates a decrease to LOS E or LOS F when compared to No-Build conditions.

Table 7-11. Build Conditions (2019) Level of Service Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized					
Washington Street / Ukraine Way	**E**	**58.1**	-	-	-
Ukraine Way WB left	E	58.3	0.80	197	m212
Ukraine Way WB right	C	26.8	0.40	140	m154
Washington Street NB thru | thru/right	D	52.6	0.85	~318	#428
Washington Street SB left	F	>80.0	>1.00	~513	#766
Washington Street SB thru	C	20.5	0.48	226	361
Hyde Park Avenue / Ukraine Way	**E**	**61.7**	-	-	-
Ukraine Way EB left	E	68.8	0.68	135	m146
Ukraine Way EB right	F	>80.0	0.85	169	m88
Hyde Park Avenue NB left/thru | thru	D	44.7	>1.00dl	~463	m#567
Hyde Park Avenue SB thru | thru/right	D	47.7	0.92	~629	#741
Hyde Park Avenue / Walk Hill Street / Site Drive South	**C**	**28.8**	-	-	-
Site Drive South EB left/thru/right	E	56.7	0.22	14	40
Walk Hill Street WB left/thru	F	>80.0	0.71	46	#118
Walk Hill Street WB right	A	3.8	0.39	0	42
Hyde Park Avenue NB left/thru | thru/right	E	56.9	0.92	~398	#482
Hyde Park Avenue SB left	D	40.3	0.94	285	m#497
Hyde Park Avenue SB thru | thru/right	A	7.9	0.52	235	348
Unsignalized					
Hyde Park Avenue / Site Drive North	-	-	-	-	-
Hyde Park Avenue NB left/thru | thru	A	0.0	0.37	-	0
Hyde Park Avenue SB thru/right | thru	A	0.0	0.63	-	0

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.
m = 95th percentile queue is metered by upstream traffic signal.
dl = Defacto left turn lane; through/left-turn lane operates as an exclusive left-turn lane.
Grey shading indicates a decrease to LOS E or LOS F when compared to No-Build conditions.

As shown in **Table 7-10** and **Table 7-11,** the intersection of Washington Street/Ukraine Street will continue to operate at an overall LOS D during the a.m. peak hour and LOS E during the p.m. peak hour under the 2019 Build conditions. The Project was shown to have minimal impact upon operations at this intersection.

Overall operations at the intersection of Hyde Park Avenue/Ukraine Way are expected to remain at LOS C during the a.m. peak hour and LOS E during the p.m. peak hour under the 2019 Build conditions. The Hyde Park Avenue southbound movements will decrease from LOS D to LOS E during the a.m. peak hour due to the minimal amount of Project-generated trips traveling through the intersection. The decrease in LOS is caused by an increase of 1.4 seconds of delay for the movement.

The Project will add a fourth leg to the signalized intersection of Hyde Park Avenue/Walk Hill Street. This newly modified intersection will operate at an overall LOS C during both the a.m. and p.m. peak hours under the 2019 Build conditions, which is consistent with the 2019 No-Build operations. The intersection will also be provided an optimal traffic signal timing and phasing plan.

The proposed intersection of Hyde Park Avenue at the northerly site drive will accommodate one-way traffic entering the site and will operate at LOS A during both the a.m. and p.m. peak hours.

Based on the traffic operations analysis presented in **Table 7-10** and **Table 7-11,** the Project is not expected to have a significant impact upon traffic operations at the study area intersections. The existing roadway infrastructure will accommodate the minor increases in traffic volumes at the study area intersections expected to be generated by the Project. No additional capacity or operational improvements are necessary at the study area intersections to accommodate the Project-generated traffic volumes.

Parking

This section presents the Project's parking supply and an evaluation of the Project's parking demand. The Project will provide a total of 90 parking spaces on the site. A total of 48 parking spaces will be allocated for the 48 townhomes and a total of 42 parking spaces will be allocated for the 76 apartment units. No additional parking will be provided on-site for the retail uses. To accommodate the parking demand for the retail uses, a total of ten parallel parking spaces will be provided along Hyde Park Avenue southbound in front of the retail uses. The total parking ratio for the residential units is 0.73 parking spaces per units (1.0 parking spaces per townhome and 0.55 parking spaces per apartment unit). This parking ratio is consistent with the district-based parking goals developed by BTD for the Forest Hills area (a maximum of 0.75 - 1.25 spaces per residential unit) and is also consistent with parking ratios proposed for nearby residential projects in the vicinity of the Forest Hills Station.

Public Transportation

Based on the transit mode shares presented in **Table 7-7,** the future transit trips associated with the Project were estimated and are summarized in **Table 7-11.**

Table 7-12. Project Transit Trips

Time Period	Direction	Apartments[1]	Townhomes[2]	Retail[3]	Total
Daily	In	82	48	14	144
	Out	82	48	14	144
	Total	**164**	**96**	**28**	**288**
a.m. Peak Hour	In	2	1	0	3
	Out	16	12	1	28
	Total	**18**	**13**	**1**	**31**
p.m. Peak Hour	In	15	11	2	28
	Out	6	3	2	11
	Total	**21**	**14**	**4**	**39**

1 Based on ITE LUC 220 – Apartments for 76 units.
2 Based on ITE LUC 230 – Condominium/Townhouse for 48 units.
3 Based on ITE LUC 820 – Shopping Center for 1,600 sf.

As shown in **Table 7-11,** approximately 288 new transit trips will occur over the course of an average weekday, with 31 new transit trips (3 alighting/28 boarding) during the weekday morning peak hour and 39 new transit trips (28 alighting/11 boarding) during the weekday evening peak hour. The transit trips will mostly be dispersed on the MBTA 32 bus route and the Orange Line at Forest Hills Station.

Pedestrians

Based on the bicycle/walk mode shares presented in **Table 7-7**, the future bicycle/walk trips were estimated and are summarized in **Table 7-12.**

Table 7-13. Project Pedestrian/Bicycle Trips

Time Period	Direction	Apartments[1]	Townhomes[2]	Retail[3]	Total
Daily	In	43	25	10	78
	Out	43	25	10	78
	Total	**86**	**50**	**20**	**156**
a.m. Peak Hour	In	2	1	0	3
	Out	4	3	0	7
	Total	**6**	**4**	**0**	**10**
p.m. Peak Hour	In	4	3	1	8
	Out	4	2	1	7
	Total	**8**	**5**	**2**	**15**

1 Based on ITE LUC 220 – Apartments for 76 units.
2 Based on ITE LUC 230 – Condominium/Townhouse for 48 units.

3 Based on ITE LUC 820 – Shopping Center for 1,600 sf.

Over the course of the day, the Project will generate 156 new pedestrian trips and an additional 288 transit trips that will require a walk to or from the site. This results in an additional 444 new pedestrian trips per day. Approximately 10 new pedestrian trips will occur during the a.m. peak hour and 15 new pedestrian trips will occur during the p.m. peak hour in addition to the transit trips that will also require a walk from the site. The pedestrian facilities surrounding the site have adequate capacity to accommodate the pedestrian trips generated by the Project.

Bicycle Accommodations

BTD has established guidelines requiring projects subject to Article 80 Large Project Review to provide secure covered bicycle parking for residents and employees and short-term bicycle racks for visitors. The Project will provide a total of 124 covered and secure bicycle storage spaces on-site. Additional storage will be provided by outdoor bicycle racks accessible to visitors to the site in accordance with BTD guidelines.

All bicycle racks, signs, and parking areas will conform to BTD guidelines and will be located in safe, secure locations. The Proponent will work with BTD to identify the most appropriate quantity and location for bicycle racks on the Project site as part of the Transportation Access Plan Agreement (TAPA) process.

Loading and Service Accommodations

Loading and service operations will occur on-site along the rear access road that runs parallel to Hyde Park Avenue. All trash truck activity and residential move-in/move-out activity will also take place on-site along the rear access road.

Residential units primarily generate delivery trips related to small packages and prepared food. Delivery trip estimates were based on data provided in the Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area report[7]. Deliveries to the Project site will be limited to SU-36 trucks (single-unit moving and box trucks) and smaller delivery vehicles. Based on the CTPS report, residential uses generate approximately 0.01 light truck trips per 1,000 sf of gross floor area. The Project is expected to generate approximately one to two delivery trips per day. These numbers do not include trash truck trips. The low number of anticipated deliveries will have minimal impact on the vehicular operations along Hyde Park Avenue. All move-in/move-out activity can occur on-site without impacting the public sidewalk, parking, or roadway.

7 *Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area*; Central Transportation Planning Staff; September 1993.

7.4 Transportation Mitigation Measures

While the traffic impacts associated with the new trips are minimal, the Proponent will continue to work with the City of Boston to create a Project that efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use. The Project is proposing the following mitigation measures, some with the assistance of additional public finding which the Proponent is discussing with the BRA and city agencies:

- The Project proposes to upgrade all traffic signal equipment at the intersection of Hyde Park Avenue/Walk Hill Street in order to accommodate the proposed site driveway and will provide an optimal traffic signal timing and phasing plan.
- The Project will create eight (8) on-street parking spaces along Hyde Park Avenue to help support the proposed ground-floor retail use. This parking will also serve as a buffer between the roadway and the sidewalk.
- The Project proposes to extend the existing median on Hyde Park Avenue to physically preclude left-turns into the northern driveway.

The Proponent is responsible for preparation of the Transportation Access Plan Agreement (TAPA), a formal legal agreement between the Proponent and the BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, travel demand management measures, and any other responsibilities that are agreed to by both the Proponent and the BTD. Because the TAPA must incorporate the results of the technical analysis, it must be executed after these other processes have been completed. The proposed measures listed above and any additional transportation improvements to be undertaken as part of this Project will be defined and documented in the TAPA.

The Proponent will also produce a Construction Management Plan (CMP) for review and approval by BTD. The CMP will detail the schedule, staging, parking, delivery, and other associated impacts of the construction of the Project. See **Section 7.6** for additional information related to the CMP.

7.5 Transportation Demand Management

The Proponent is committed to implementing Transportation Demand Management (TDM) measures to minimize automobile usage and Project related traffic impacts. TDM will be facilitated by the nature of the Project (which does not generate significant peak hour trips) and its proximity to numerous public transit alternatives.

On-site management will keep a supply of transit information (schedules, maps, and fare information) to be made available to the residents of the site. The Proponent will work with the City to develop a TDM program appropriate to the Project and consistent with its level of impact.

The Proponent is prepared to take advantage of good transit access in marketing the site to future residents by working with them to implement the following TDM measures to encourage the use of non-vehicular modes of travel.

The TDM measures for the Project may include but are not limited to the following:

- **Orientation Packets**: The Proponent will provide orientation packets to new residents and tenants containing information on available transportation choices, including transit routes/schedules and nearby vehicle sharing and bicycle sharing locations. On-site management will work with residents and tenants as they move in to help facilitate transportation for new arrivals.
- **Bicycle Accommodation**: The Proponent will provide bicycle storage in secure, sheltered areas for residents consistent with the City of Boston *Bicycle Parking Guidelines*. Subject to necessary approvals, public use bicycle racks for visitors will be placed near building entrances.
- **Transportation Coordinator**: The Proponent will designate a transportation coordinator to oversee transportation issues, including parking, service and loading, and deliveries, and will work with residents as they move in to raise awareness of public transportation, bicycling, and walking opportunities.
- **Project Web Site**: The web site will include transportation-related information for residents, workers, and visitors.
- **Electric Charging Stations**: The Proponent will explore the feasibility of providing electric charging stations on the site.
- **Vehicle Sharing Program**: Zipcar car sharing spaces currently exist in nearby locations including at Forest Hills Station and at Washington Street/Arborway, which are expected to be sufficient to meet the car sharing needs of the Proposed Project. The Project will promote the availability of this service to new residents and tenants.

7.6 Evaluation of Short-Term Construction Impacts

Most construction activities will be accommodated within the current site boundaries. Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a Construction Management Plan to be filed with BTD in accordance with the City's transportation maintenance plan requirements.

To minimize transportation impacts during the construction period, the following measures will be considered for the Construction Management Plan:

- Limited construction worker parking on-site;
- Encouragement of worker carpooling;
- Consideration of a subsidy for MBTA passes for full-time employees; and
- Providing secure spaces on-site for workers' supplies and tools so they do not have to be brought to the site each day.

The Construction Management Plan to be executed with the City prior to commencement of construction will document all committed measures.

8

COORDINATION WITH GOVERNMENT AGENCIES

8.0 COORDINATION WITH GOVERNMENTAL AGENCIES

8.1 Architectural Access Board Requirements

This Project will comply with the requirements of the Architectural Access Board. The Project will also be designed to comply with the Standards of the Americans with Disabilities Act.

8.2 Massachusetts Environmental Policy Act

Based on information currently available, development of the Proposed Project is not expected to result in state permit/state agency action meeting thresholds requiring review by the MEPA Office of the Executive Office of Energy and Environmental Affairs.

8.3 Boston Civic Design Commission

The Proposed Project exceeds the 100,000 gross square feet size threshold requirement for review of the schematic plan(s) by the Boston Civic Design Commission.

9

PROJECT CERTIFICATION

9.0 PROJECT CERTIFICATION

This form has been circulated to the Boston Redevelopment Authority as required by Article 80B of the Boston Zoning Code.

Urbanica, Inc., Manager of JP Parcel U, LLC

Signature of Proponent
Kamran Zahedi

8/1/2014
Date

Mitchell L. Fischman Consulting LLC

Signature of Preparer
Mitchell L. Fischman

8/1/2014
Date

APPENDIX A
LETTER OF INTENT

URBANICA
DESIGN + DEVELOPMENT

May 1, 2014

BY HAND

Mr. Brian Golden,
Acting Director & Executive Director/Secretary
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Subject: Letter of Intent to File Project Notification Form (PNF)
Parcel U, Hyde Park Avenue at Ukraine Way, Jamaica Plain

Dear Mr. Golden:

In accordance with Article 80B Large Project review requirements of the Boston Zoning Code (the "Code"), please consider this letter as a notification to the Boston Redevelopment Authority that JP Parcel U, LLC, managed by Urbanica, Inc, ("Project Proponent") intends to develop a new project with landscaping and open space that offers a mix of homeownership townhouses and rental apartment building which includes 24 Townhouses (48 condominium units +/-) and one block of 65-70 unit of Multifamily Mixed-income rental apartments totaling approximately 190,000 square feet of gross floor area (inclusive of parking and utility areas), which in total will contain approximately 118 dwelling units +/-, a ground floor retail space and a community room ('Proposed Project") on Parcel "U", with approximately 122,799 s.f. +/- of land in the Jamaica Plain neighborhood, and bounded by Hyde Park Avenue, Ukraine Way, Toll Gate Cemetery, and the MBTA Commuter Rail tracks on a surplus parcel currently owned by the MBTA and on part of the remaining land after completion of the Southwest Corridor project ("Project Site"). See attached **Figure 1. Site Locus.**

The Project Proponent also expresses an interest to file an Expanded PNF, as this approach is intended to identify and resolve critical project impact issues early on in the process, and would include detailed analyses of possible impacts in the Expanded PNF that are normally presented in the later Draft Project impact Report. It is also expected that the appropriate content and scope of the Expanded PNF will be developed in consultation with the BRA and City Department staffs.

The Proponent was selected by the Massachusetts Bay Transportation Authority [MBTA] through its real estate representative, Transit Realty Associates [TRA] from a two phase "Invitation to Bid" process that closed on November 15, 2012. Phase I was an eligibility prequalification round that included categories such as Experience and Qualification, Financial Capability, Diversity and M/WBE and Project Program Compatibility. Phase II was a review of financial bids whereby the highest offer was awarded the bid. JP Parcel U, LLC was highest qualified bidder and was designated by the MBTA as the designated developer of the Site.

The Proposed Project will also far exceed the requirements of the City's Inclusionary Development Policy by offering approximately 31 affordable units (approximately 35% of market rate units). The Proposed Project's program mix will include a mix of bedroom sizes from studios to three bedroom dwelling units.

As a Transit Oriented Development (T.O.D.) located only a five-minute walk from the Forest Hills MBTA Intermodal Transit Hub, and its close proximity to the Southwest Corridor – which contains a bike path running all the way to Back Bay – the Proposed Project will offer adequate bike storage and a lower automotive parking ratio in order to promote the use of alternative means of transportation. The townhouse component of the Proposed Project will offer a 1:1 dwelling unit to parking space ratio. The rental apartment component will offer a ratio of 1: 0.65 dwelling unit to parking space. There are also plans to provide a modest number of exterior curbside parking

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spaces along Hyde Park Avenue to support the ground floor uses of retail and community space. The overall project-wide parking ratio will be at 1: 0.79 dwelling unit to parking spaces.

The Project Site was formerly located within the "Open Space-Parkland" Zoning Sub-district of Article 55: Jamaica Plain Neighborhood District. The Zoning Sub-district was amended on April 9, 2014 by the Boston Zoning Commission to "Multifamily Residential" following a petition by JP Parcel U, LLC. The Proposed Project still anticipates the need for zoning relief for the proposed use of retail and community space located at the ground floor of the rental apartment, as well as for a number of dimensional variances and parking variances. The Proposed Project will comply with the provisions of Boston Zoning Code Article 37: Green Buildings and with the City's Inclusionary Development Policy.

By closely adopting the comprehensive planning study of the 2008 Forest Hills Improvement Initiative, the Proposed Project aims to supply much needed additional housing for Jamaica Plain in close proximity to the Forest Hills MBTA Station while respecting the residential scale and unique feel of the Forest Hills area. The Proposed Project will also contribute towards meeting the City of Boston's goal of adding 30,000 new housing units by 2020.

Urbanica, Inc, in collaboration with The Community Builders, will lead a team of professional designers, planners, engineers and consultants with extensive experience in the development of mixed-use projects. The team has already conducted a number of pre-review planning meetings with the BRA staff members, and has undertaken significant outreach with abutters and relevant neighborhood groups. The team also has worked closely with the neighborhood groups and BRA staff members leading to the unanimous approval of the zoning map amendment by the Boston Zoning Commission on April 9, 2014.

Urbanica, Inc., looks forward to continuing working with you, your staff, elected officials, community leaders, and neighborhood groups to make a 21st century Transit Oriented Development (T.O.D.) project that will greatly benefit Jamaica Plain and the City of Boston. Thank you in advance for your consideration.

Sincerely,

Kamran Zahedi
Principal of Urbanica, Inc
Manager of JP Parcel U, LLC

Attachment: Figure 1: Site Locus

cc Kairos Shen, Boston Redevelopment Authority, Director of Planning
Heather Campisano, Boston Redevelopment Authority, Chief of Staff
Erico Lopez, Boston Redevelopment Authority, Director of Development Review & Policy
Tyler Norod, Boston Redevelopment Authority, Senior Project Manager
Eliza Datta and James Madden, The Community Builders, Inc
Mitchell Fischman, Mitchell L. Fischman Consulting LLC

FIGURE 1- Site Locus

PARCEL U | Jamaica Plain | Boston, MA

APPENDIX B

AIR QUALITY APPENDIX

APPENDIX B
AIR QUALITY APPENDIX

PARCEL U
PROJECT NOTIFICATION FORM


```
*************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                            *
* Input file: 3764_14W.INP (file 1, run 1).                             *
*************************************************************************
* *** Winter 2014

* Reading Registration Distributions from the following external
* data file: 2005_REG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)

* Reading I/M program description records from the following external
* data file: 09NEWIM.D
* 15 Year Exemption Age
* New Annual OBD Exhaust I/M program for Light Duty MY 1996 through 2007 vehicles <=8,500 lb GVWR
* New Annual OBD Exhaust I/M program for Light Duty and Medium duty MY 2008 and later <=14,000 lb GVWR
* New Annual OBD Evap I/M program for Light Duty MY 1996 through 2007 vehicles <=8,500 lb GVWR
* New Annual OBD Evap I/M program for for Light Duty and Medium duty MY 2008 and later <=14,000 lb GVWR
  M601 Comment:
              User has enabled STAGE II REFUELING.


* Reading 94+ LEV IMPLEMENTATION SCHEDULE from the following external
* data file: MA_LEV2.D

  Reading User Supplied Tier2 Exhaust bin phase-in fractions

     Data read from file: LEV2EXH.D


  Reading User Supplied Tier2 EVAP phase-in fractions
```

```
   Data read from file: LEV2EVAP.D


  Reading User Supplied Tier2 50K certification standards

   Data read from file: LEV2CERT.D

  M616 Comment:
              User has supplied post-1999 sulfur levels.
  M614 Comment:
              User supplied diesel sale fractions.

* # # # # # # # # # # # # # # # # # # # # # # # #
* 2014 - Winter at 5.0 mph
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
           The user supplied arterial average speed of  5.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M112 Warning:
              Wintertime Reformulated Gasoline Rules Apply
  M 48 Warning:
             there are no sales for vehicle class HDGV8b

 LEV phase-in data read from file MA_LEV2.D
                    Calendar Year:  2014
                            Month:  Jan.
                         Altitude:  Low
                Minimum Temperature:  22.8 (F)
                Maximum Temperature:  38.3 (F)
                  Absolute Humidity:   75. grains/lb
                Fuel Sulfur Content:   30. ppm

                Exhaust I/M Program:  Yes
                   Evap I/M Program:  Yes
                        ATP Program:  No
                   Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
                   GVWR:              <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:    0.2947    0.4151    0.1630              0.0364    0.0002    0.0015    0.0853    0.0037    1.0000
  ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite CO  :     16.33     14.62     14.90     14.70     27.82     2.818     1.135     3.064     62.64    14.819
  ---------------------------------------------------------------------------------------------------------------------
```



```
INDOOR GARAGE ANALYSIS PROGRAM

  PROJECT:  PARCEL U PARKING GARAGE PEAK AM HOUR - YEAR: 2014

  DISTANCE IN:               93.4 METERS
  DISTANCE OUT:              93.4 METERS

  NUMBER OF EXIT LANES:         1 LANE(S)
  TOTAL EXIT VOLUME:           34 VEH/HOUR

                 CO RATE:     14.82 GRAMS CO/MILE

  SPEED IN GARAGE:             5.0 M.P.H.

  VENT CFM:                   19,930 CFM


  TOTAL CO EMISSIONS =   0.972 GRAMS/MIN  =  0.0162 GRAMS/SEC
  TOTAL VENTILATION  =     564 CU. M/MIN


      PEAK 1-HOUR CO CONCENTRATION FROM VEHICLES:   1.51 PPM

********************************************************************************

PROJECT:  PARCEL U PARKING GARAGE PEAK PM HOUR - YEAR: 2014

DISTANCE IN:               93.4 METERS
DISTANCE OUT:              93.4 METERS

NUMBER OF EXIT LANES:         1 LANE(S)
TOTAL EXIT VOLUME:           45 VEH/HOUR

               CO RATE:     14.82 GRAMS CO/MILE

SPEED IN GARAGE:             5.0 M.P.H.

VENT CFM:                   19,930 CFM


TOTAL CO EMISSIONS =   1.290 GRAMS/MIN  =  0.0215 GRAMS/SEC
TOTAL VENTILATION  =     564 CU. M/MIN


    PEAK 1-HOUR CO CONCENTRATION FROM VEHICLES:  2.00 PPM
```

```
*** AERMOD - VERSION  14134 ***   *** Parcel U Project                                              ***
06/20/14
 *** AERMET - VERSION 14134  ***   *** Screening 1-hour CO Concentrations                            ***
16:16:00
                                                                                                         PAGE
1
 **MODELOPTs:   NonDFAULT CONC      FLAT      NOCHKD    SCREEN

                                       ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses URBAN Dispersion Algorithm for the SBL for     1 Source(s),
   for Total of    1 Urban Area(s):
   Urban Population =      4398.0 ;  Urban Roughness Length =  1.000 m

 **Model Allows User-Specified Options:
        1. Stack-tip Downwash.
        2. Model Assumes Receptors on FLAT Terrain.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Urban Roughness Length of 1.0 Meter Used.

 **Other Options Specified:
        NOCHKD   - Suppresses checking of date sequence in meteorology files
        SCREEN   - Use screening option
 which forces calculation of centerline values

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  OTHER

 **Model Calculates  1 Short Term Average(s) of:   1-HR

 **This Run Includes:      1 Source(s);       1 Source Group(s); and     478 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date: 14134

 **Output Options Selected:
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =     5.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =
0.0
                  Emission Units = GRAMS/SEC                               ;  Emission Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.6 MB of RAM.

 **Input Runstream File:          CO_5yrs_OTHER.DTA
 **Output Print File:             CO_5yrs_OTHER.LST

 **File for Summary of Results:   W:\Apps\aermod\3779\CO_5yrs_OTHER.SUM
 *** AERMOD - VERSION  14134 ***   *** Parcel U Project                                              ***
06/20/14
 *** AERMET - VERSION 14134  ***   *** Screening 1-hour CO Concentrations                            ***
16:16:00
                                                                                                         PAGE
2
 **MODELOPTs:   NonDFAULT CONC      FLAT      NOCHKD    SCREEN

                                       *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                          (1=YES; 0=NO)

          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
```



```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1

              NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.


                              *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                         (METERS/SEC)

                                               1.54,   3.09,   5.14,   8.23,  10.80,
 *** AERMOD - VERSION  14134 ***   *** Parcel U Project                                              ***
06/20/14
 *** AERMET - VERSION 14134  ***   *** Screening 1-hour CO Concentrations                            ***
16:16:00
                                                                                                         PAGE
3
 **MODELOPTs:   NonDFAULT CONC      FLAT      NOCHKD    SCREEN

                                 *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

   Surface file:   Urban.sfc                                                                  Met Version: 14134
   Profile file:   Urban.PFL
   Surface format: FREE
   Profile format: FREE
   Surface station no.:    11111                 Upper air station no.:    22222
                Name: UNKNOWN                                        Name: UNKNOWN
                Year:   2010                                         Year:   2010

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 10 01 01   1 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50   10.   10.0  255.2    2.0
 10 01 02   2 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50   20.   10.0  255.2    2.0
 10 01 03   3 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50   30.   10.0  255.2    2.0
 10 01 04   4 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50   40.   10.0  255.2    2.0
 10 01 05   5 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50   50.   10.0  255.2    2.0
 10 01 06   6 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50   60.   10.0  255.2    2.0
 10 01 07   7 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50   70.   10.0  255.2    2.0
 10 01 08   8 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50   80.   10.0  255.2    2.0
 10 01 09   9 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50   90.   10.0  255.2    2.0
 10 01 10  10 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  100.   10.0  255.2    2.0
 10 01 11  11 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  110.   10.0  255.2    2.0
 10 01 12  12 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  120.   10.0  255.2    2.0
 10 01 13  13 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  130.   10.0  255.2    2.0
 10 01 14  14 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  140.   10.0  255.2    2.0
 10 01 15  15 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  150.   10.0  255.2    2.0
 10 01 16  16 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  160.   10.0  255.2    2.0
 10 01 17  17 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  170.   10.0  255.2    2.0
 10 01 18  18 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  180.   10.0  255.2    2.0
 10 01 19  19 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  190.   10.0  255.2    2.0
 10 01 20  20 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  200.   10.0  255.2    2.0
 10 01 21  21 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  210.   10.0  255.2    2.0
 10 01 22  22 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  220.   10.0  255.2    2.0
 10 01 23  23 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  230.   10.0  255.2    2.0
 10 01 24  24 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21    0.50  240.   10.0  255.2    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 10 01 01 01   10.0 1   10.    0.50   255.3   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
 *** AERMOD - VERSION  14134 ***   *** Parcel U Project                                              ***
06/20/14
 *** AERMET - VERSION 14134  ***   *** Screening 1-hour CO Concentrations                            ***
16:16:00
                                                                                                         PAGE
4
 **MODELOPTs:   NonDFAULT CONC      FLAT      NOCHKD    SCREEN

                                             *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                                 ** CONC OF OTHER    IN MICROGRAMS/M**3                          **

                                                         DATE
NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF
TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - -

ALL      HIGH   1ST HIGH VALUE IS       8.54731  ON 10112101: AT (     200.20,      166.60,     5.00,     5.00,    0.00)
DC
         HIGH   2ND HIGH VALUE IS       8.54731  ON 10112201: AT (     200.20,      166.60,     5.00,     5.00,    0.00)
DC
```

```
 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
 *** AERMOD - VERSION  14134 ***   *** Parcel U Project                                                    ***
06/20/14
 *** AERMET - VERSION 14134  ***   *** Screening 1-hour CO Concentrations                                  ***
16:16:00
                                                                                                                PAGE
5
 **MODELOPTs:   NonDFAULT CONC      FLAT      NOCHKD    SCREEN

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            2 Warning Message(s)
 A Total of            0 Informational Message(s)

 A Total of        18504 Hours Were Processed

 A Total of            0 Calm Hours Identified

 A Total of            0 Missing Hours Identified (  0.00 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***
```


APPENDIX C

NOISE APPENDIX

APPENDIX C
NOISE APPENDIX

PARCEL U
PROJECT NOTIFICATION FORM

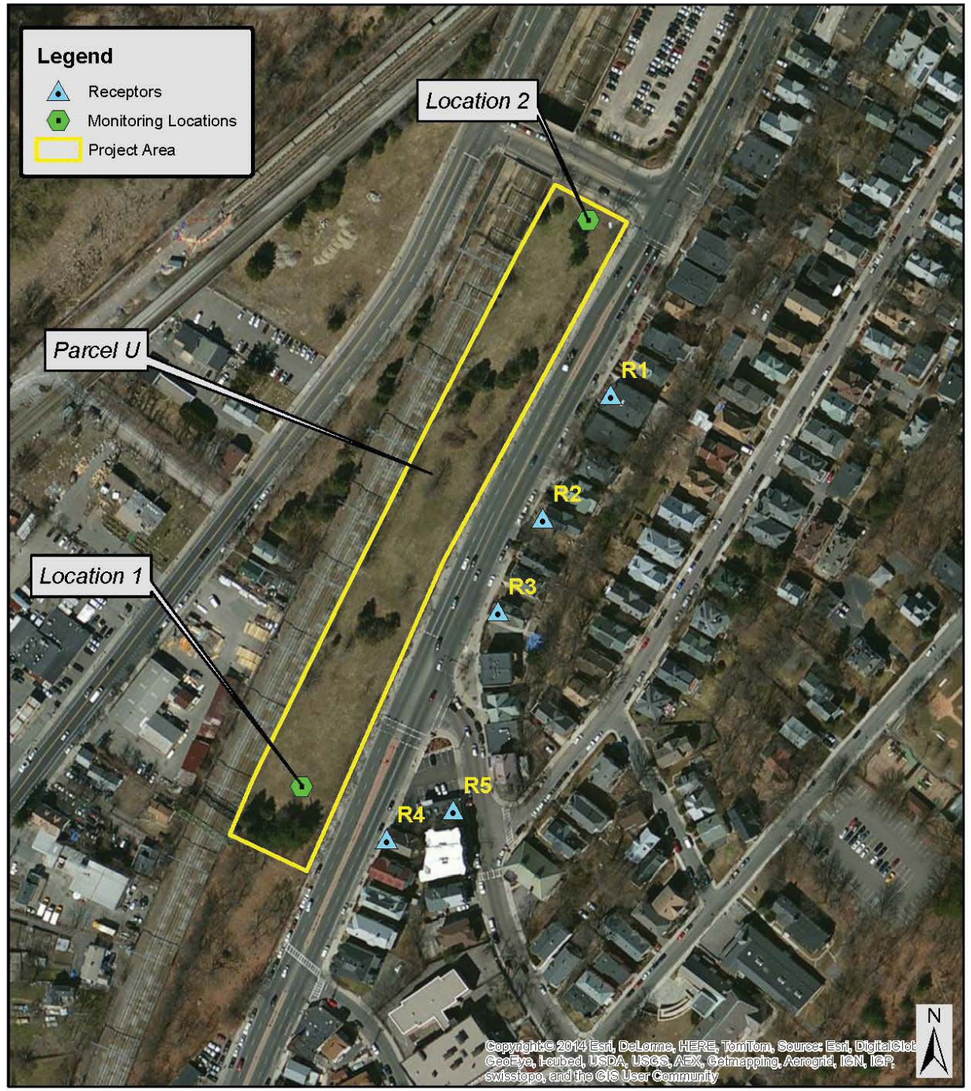

Figure 1
Sound Monitoring and Receptor Locations
For Parcel U
Boston, MA

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

APPENDIX D

TRANSPORTATION APPENDIX

Cadna Noise Modeling Results

Name	ID	Sound	Octave Band Levels									Height		Coordinates		
		Level	*31*	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*			X	Y	Z
		(dBA)	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	(m)		(m)	(m)	(m)
Hyde Park Ave 1	Third	38.6	47	45	44	39	38	33	26	16	0	11	r	231785.4	894229.5	27.4
Hyde Park Ave 2	Third	39.5	48	47	45	40	39	33	26	17	1	11	r	231771.7	894218.5	26.7
Hyde Park Ave 3	Third	40.9	50	48	47	42	40	34	28	19	4	11	r	231764.3	894204.3	28.0
Hyde Park Ave 4	Third	41.7	50	49	47	43	41	35	29	20	6	11	r	231760.9	894192.4	29.0
Hyde Park Ave 5	Third	41.6	51	49	48	43	41	35	28	20	6	11	r	231752.0	894178.5	28.1
Hyde Park Ave 6	Third	42.1	51	50	48	43	42	36	29	20	7	11	r	231745.0	894166.9	28.6
Hyde Park Ave 7	Third	42.5	51	49	48	43	42	37	30	21	7	11	r	231734.9	894151.8	29.2
Hyde Park Ave 8	Third	41.7	51	49	47	42	41	36	29	20	5	11	r	231726.0	894139.7	27.8
Hyde Park Ave 9	Third	41.6	50	48	46	42	41	36	30	21	5	11	r	231722.8	894123.0	28.5
Hyde Park Ave 10	Third	41.9	50	47	45	42	41	37	31	22	7	11	r	231713.8	894111.2	28.8
Hyde Park Ave 11	Third	42	49	46	44	41	41	37	32	23	8	11	r	231706.1	894099.2	29.2
Hyde Park Ave 12	Third	41.7	49	46	43	41	40	37	31	23	8	11	r	231696.3	894081.7	28.1
Hyde Park Ave 13	Third	41.4	49	45	43	41	40	37	31	23	8	11	r	231691.9	894072.9	27.9
Hyde Park Ave 14	Third	41.3	49	45	42	41	40	37	31	23	8	11	r	231684.2	894058.3	27.7
Hyde Park Ave 15	Third	40.4	48	44	42	40	39	36	30	21	5	11	r	231678.0	894035.1	27.2
Hyde Park Ave 16	Third	40.1	47	43	40	39	38	36	31	23	10	11	r	231637.1	893958.7	28.3
Hyde Park Ave 17	Third	39.5	47	42	39	38	37	35	30	22	9	11	r	231631.3	893945.8	28.3
Hyde Park Ave 18	Third	38.6	46	41	38	38	37	35	29	21	7	11	r	231625.5	893934.0	28.4
Hyde Park Ave 19	Third	37.5	45	40	37	37	36	33	28	19	4	11	r	231621.2	893921.0	28.5
Walk Hill Street 1	Third	39.8	47	43	41	39	38	35	30	21	3	11	r	231680.7	894014.8	28.3
Walk Hill Street 2	Third	39.4	46	42	40	38	38	35	29	20	2	11	r	231678.7	894001.0	28.7
Walk Hill Street 3	Third	38.7	45	42	39	38	37	35	29	20	3	11	r	231683.7	893987.3	30.1
Walk Hill Street 4	Third	39.5	46	42	39	38	38	35	30	21	6	11	r	231658.0	893973.4	28.9

Name	ID	Sound	Octave Band Levels									Height		Coordinates		
		Level	*31*	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*			X	Y	Z
		(dBA)	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	*(dB)*	(m)		(m)	(m)	(m)
Hyde Park Ave 1	Third	42.5	51	49	48	43	42	37	30	21	7	11	r	231734.9	894151.8	29.2
Hyde Park Ave 2	Third	42	49	46	44	41	41	37	32	23	8	11	r	231706.1	894099.2	29.2
Hyde Park Ave 3	Third	41.3	49	45	42	41	40	37	31	23	8	11	r	231684.2	894058.3	27.7
Hyde Park Ave 4	Third	40.1	47	43	40	39	38	36	31	23	10	11	r	231637.1	893958.7	28.3
Walk Hill Street 1	Third	39.5	46	42	39	38	38	35	30	21	6	11	r	231658.0	893973.4	28.9

TRANSPORTATION TECHNICAL APPENDIX

- TRAFFIC COUNTS
- TRIP GENERATION CALCULATIONS
- INTERSECTION CAPACITY ANALYSIS WORKSHEETS

TRAFFIC COUNTS

N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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

File Name : 143861 A
Site Code : 13038
Start Date : 5/1/2014
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Hyde Park Avenue From North			Walk Hill Street From East			Hyde Park Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	125	21	0	101	6	0	4	248	0	505
07:15 AM	98	44	0	73	4	1	9	270	0	499
07:30 AM	127	67	0	91	7	0	7	250	1	550
07:45 AM	104	36	0	78	5	1	6	194	0	424
Total	454	168	0	343	22	2	26	962	1	1978
08:00 AM	100	61	1	58	5	0	7	152	0	384
08:15 AM	81	53	0	59	6	0	10	122	0	331
08:30 AM	86	77	0	57	5	0	10	229	0	464
08:45 AM	74	55	0	60	5	0	5	189	0	388
Total	341	246	1	234	21	0	32	692	0	1567
Grand Total	795	414	1	577	43	2	58	1654	1	3545
Apprch %	65.7	34.2	0.1	92.8	6.9	0.3	3.4	96.6	0.1	
Total %	22.4	11.7	0	16.3	1.2	0.1	1.6	46.7	0	
Cars	728	394	1	565	40	2	50	1566	1	3347
% Cars	91.6	95.2	100	97.9	93	100	86.2	94.7	100	94.4
Heavy Vehicles	67	20	0	12	3	0	8	88	0	198
% Heavy Vehicles	8.4	4.8	0	2.1	7	0	13.8	5.3	0	5.6

	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	125	21	0	146	101	6	0	107	4	248	0	252	505
07:15 AM	98	44	0	142	73	4	1	78	9	270	0	279	499
07:30 AM	127	67	0	194	91	7	0	98	7	250	1	258	550
07:45 AM	104	36	0	140	78	5	1	84	6	194	0	200	424
Total Volume	454	168	0	622	343	22	2	367	26	962	1	989	1978
% App. Total	73	27	0		93.5	6	0.5		2.6	97.3	0.1		
PHF	.894	.627	.000	.802	.849	.786	.500	.857	.722	.891	.250	.886	.899
Cars	417	166	0	583	335	20	2	357	25	929	1	955	1895
% Cars	91.9	98.8	0	93.7	97.7	90.9	100	97.3	96.2	96.6	100	96.6	95.8
Heavy Vehicles	37	2	0	39	8	2	0	10	1	33	0	34	83
% Heavy Vehicles	8.1	1.2	0	6.3	2.3	9.1	0	2.7	3.8	3.4	0	3.4	4.2

N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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

File Name : 143861 A
Site Code : 13038
Start Date : 5/1/2014
Page No : 1

Groups Printed- Cars

	Hyde Park Avenue From North			Walk Hill Street From East			Hyde Park Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	110	21	0	97	5	0	3	236	0	472
07:15 AM	92	44	0	71	3	1	9	264	0	484
07:30 AM	121	65	0	89	7	0	7	240	1	530
07:45 AM	94	36	0	78	5	1	6	189	0	409
Total	417	166	0	335	20	2	25	929	1	1895
08:00 AM	95	58	1	58	5	0	5	134	0	356
08:15 AM	69	47	0	57	6	0	7	113	0	299
08:30 AM	76	70	0	56	5	0	10	219	0	436
08:45 AM	71	53	0	59	4	0	3	171	0	361
Total	311	228	1	230	20	0	25	637	0	1452
Grand Total	728	394	1	565	40	2	50	1566	1	3347
Apprch %	64.8	35.1	0.1	93.1	6.6	0.3	3.1	96.8	0.1	
Total %	21.8	11.8	0	16.9	1.2	0.1	1.5	46.8	0	

	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	110	21	0	131	97	5	0	102	3	236	0	239	472
07:15 AM	92	44	0	136	71	3	1	75	9	264	0	273	484
07:30 AM	121	65	0	186	89	7	0	96	7	240	1	248	530
07:45 AM	94	36	0	130	78	5	1	84	6	189	0	195	409
Total Volume	417	166	0	583	335	20	2	357	25	929	1	955	1895
% App. Total	71.5	28.5	0		93.8	5.6	0.6		2.6	97.3	0.1		
PHF	.862	.638	.000	.784	.863	.714	.500	.875	.694	.880	.250	.875	.894

N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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File Name : 143861 A
Site Code : 13038
Start Date : 5/1/2014
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Groups Printed- Heavy Vehicles

	Hyde Park Avenue From North			Walk Hill Street From East			Hyde Park Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	15	0	0	4	1	0	1	12	0	33
07:15 AM	6	0	0	2	1	0	0	6	0	15
07:30 AM	6	2	0	2	0	0	0	10	0	20
07:45 AM	10	0	0	0	0	0	0	5	0	15
Total	37	2	0	8	2	0	1	33	0	83
08:00 AM	5	3	0	0	0	0	2	18	0	28
08:15 AM	12	6	0	2	0	0	3	9	0	32
08:30 AM	10	7	0	1	0	0	0	10	0	28
08:45 AM	3	2	0	1	1	0	2	18	0	27
Total	30	18	0	4	1	0	7	55	0	115
Grand Total	67	20	0	12	3	0	8	88	0	198
Apprch %	77	23	0	80	20	0	8.3	91.7	0	
Total %	33.8	10.1	0	6.1	1.5	0	4	44.4	0	

	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
08:00 AM	5	3	0	8	0	0	0	0	2	18	0	20	28
08:15 AM	12	6	0	18	2	0	0	2	3	9	0	12	32
08:30 AM	10	7	0	17	1	0	0	1	0	10	0	10	28
08:45 AM	3	2	0	5	1	1	0	2	2	18	0	20	27
Total Volume	30	18	0	48	4	1	0	5	7	55	0	62	115
% App. Total	62.5	37.5	0		80	20	0		11.3	88.7	0		
PHF	.625	.643	.000	.667	.500	.250	.000	.625	.583	.764	.000	.775	.898
Peak Hour for Entire Intersection Begins at 08:00 AM													

N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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File Name : 143861 A
Site Code : 13038
Start Date : 5/1/2014
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Groups Printed- Peds and Bicycles

	Hyde Park Avenue From North			Walk Hill Street From East			Hyde Park Avenue From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	0	0	0	0	0	3	0	0	0	3
07:15 AM	0	0	0	0	0	3	0	0	1	4
07:30 AM	0	1	0	0	0	3	0	0	1	5
07:45 AM	0	0	0	0	0	10	0	0	1	11
Total	0	1	0	0	0	19	0	0	3	23
08:00 AM	0	1	0	0	0	6	0	0	1	8
08:15 AM	0	0	1	0	0	15	0	1	0	17
08:30 AM	0	0	0	0	0	12	0	0	0	12
08:45 AM	0	0	0	0	0	3	0	0	1	4
Total	0	1	1	0	0	36	0	1	2	41
Grand Total	0	2	1	0	0	55	0	1	5	64
Apprch %	0	66.7	33.3	0	0	100	0	16.7	83.3	
Total %	0	3.1	1.6	0	0	85.9	0	1.6	7.8	

	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
07:45 AM	0	0	0	0	0	0	10	10	0	0	1	1	11
08:00 AM	0	1	0	1	0	0	6	6	0	0	1	1	8
08:15 AM	0	0	1	1	0	0	15	15	0	1	0	1	17
08:30 AM	0	0	0	0	0	0	12	12	0	0	0	0	12
Total Volume	0	1	1	2	0	0	43	43	0	1	2	3	48
% App. Total	0	50	50		0	0	100		0	33.3	66.7		
PHF	.000	.250	.250	.500	.000	.000	.717	.717	.000	.250	.500	.750	.706
Peak Hour for Entire Intersection Begins at 07:45 AM													

N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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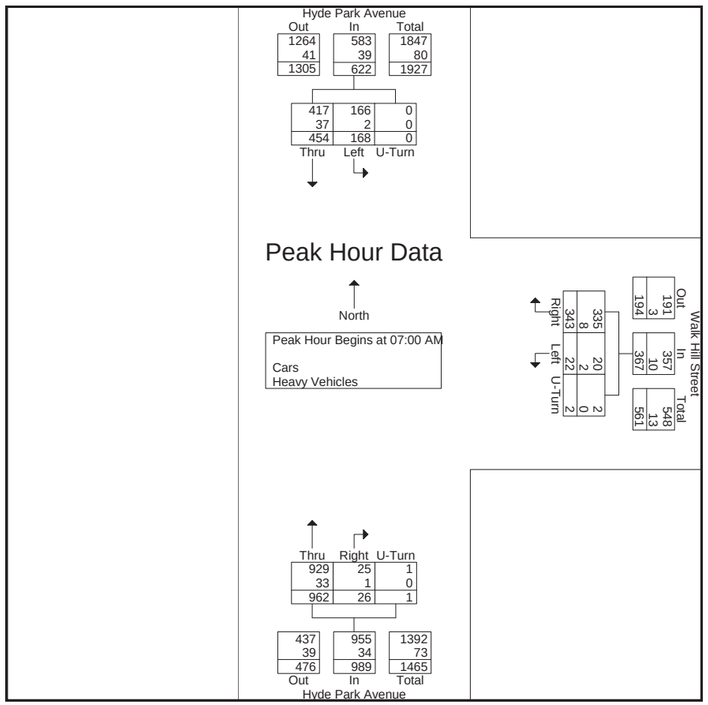
	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	125	21	0	146	101	6	0	107	4	248	0	252	505
07:15 AM	98	44	0	142	73	4	1	78	9	270	0	279	499
07:30 AM	127	67	0	194	91	7	0	98	7	250	1	258	550
07:45 AM	104	36	0	140	78	5	1	84	6	194	0	200	424
Total Volume	454	168	0	622	343	22	2	367	26	962	1	989	1978
% App. Total	73	27	0		93.5	6	0.5		2.6	97.3	0.1		
PHF	.894	.627	.000	.802	.849	.786	.500	.857	.722	.891	.250	.886	.899
Cars	417	166	0	583	335	20	2	357	25	929	1	955	1895
% Cars	91.9	98.8	0	93.7	97.7	90.9	100	97.3	96.2	96.6	100	96.6	95.8
Heavy Vehicles	37	2	0	39	8	2	0	10	1	33	0	34	83
% Heavy Vehicles	8.1	1.2	0	6.3	2.3	9.1	0	2.7	3.8	3.4	0	3.4	4.2



N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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File Name : 143861 AA
Site Code : 13038
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Groups Printed- Cars - Heavy Vehicles

	Hyde Park Avenue From North			Walk Hill Street From East			Hyde Park Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	206	91	0	55	14	0	6	124	0	496
04:15 PM	266	116	0	59	7	0	7	138	1	594
04:30 PM	182	87	0	41	3	1	5	116	0	435
04:45 PM	253	93	0	55	6	0	8	165	0	580
Total	907	387	0	210	30	1	26	543	1	2105
05:00 PM	196	107	0	55	5	0	3	142	0	508
05:15 PM	181	84	0	36	3	0	1	151	0	456
05:30 PM	207	110	0	38	2	0	3	141	0	501
05:45 PM	229	106	0	41	14	0	9	150	0	549
Total	813	407	0	170	24	0	16	584	0	2014
Grand Total	1720	794	0	380	54	1	42	1127	1	4119
Apprch %	68.4	31.6	0	87.4	12.4	0.2	3.6	96.3	0.1	
Total %	41.8	19.3	0	9.2	1.3	0	1	27.4	0	
Cars	1658	781	0	362	51	1	39	1068	0	3960
% Cars	96.4	98.4	0	95.3	94.4	100	92.9	94.8	0	96.1
Heavy Vehicles	62	13	0	18	3	0	3	59	1	159
% Heavy Vehicles	3.6	1.6	0	4.7	5.6	0	7.1	5.2	100	3.9

	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	266	116	0	382	59	7	0	66	7	138	1	146	594
04:30 PM	182	87	0	269	41	3	1	45	5	116	0	121	435
04:45 PM	253	93	0	346	55	6	0	61	8	165	0	173	580
05:00 PM	196	107	0	303	55	5	0	60	3	142	0	145	508
Total Volume	897	403	0	1300	210	21	1	232	23	561	1	585	2117
% App. Total	69	31	0		90.5	9.1	0.4		3.9	95.9	0.2		
PHF	.843	.869	.000	.851	.890	.750	.250	.879	.719	.850	.250	.845	.891
Cars	873	398	0	1271	197	19	1	217	22	530	0	552	2040
% Cars	97.3	98.8	0	97.8	93.8	90.5	100	93.5	95.7	94.5	0	94.4	96.4
Heavy Vehicles	24	5	0	29	13	2	0	15	1	31	1	33	77
% Heavy Vehicles	2.7	1.2	0	2.2	6.2	9.5	0	6.5	4.3	5.5	100	5.6	3.6

N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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Site Code : 13038
Start Date : 5/1/2014
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Groups Printed- Cars

	Hyde Park Avenue From North			Walk Hill Street From East			Hyde Park Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	188	87	0	54	14	0	5	113	0	461
04:15 PM	259	112	0	50	6	0	7	128	0	562
04:30 PM	178	87	0	38	3	1	5	107	0	419
04:45 PM	245	93	0	54	6	0	7	157	0	562
Total	870	379	0	196	29	1	24	505	0	2004
05:00 PM	191	106	0	55	4	0	3	138	0	497
05:15 PM	173	81	0	35	3	0	0	147	0	439
05:30 PM	202	110	0	35	2	0	3	137	0	489
05:45 PM	222	105	0	41	13	0	9	141	0	531
Total	788	402	0	166	22	0	15	563	0	1956
Grand Total	1658	781	0	362	51	1	39	1068	0	3960
Apprch %	68	32	0	87.4	12.3	0.2	3.5	96.5	0	
Total %	41.9	19.7	0	9.1	1.3	0	1	27	0	

	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
04:15 PM	259	112	0	371	50	6	0	56	7	128	0	135	562
04:30 PM	178	87	0	265	38	3	1	42	5	107	0	112	419
04:45 PM	245	93	0	338	54	6	0	60	7	157	0	164	562
05:00 PM	191	106	0	297	55	4	0	59	3	138	0	141	497
Total Volume	873	398	0	1271	197	19	1	217	22	530	0	552	2040
% App. Total	68.7	31.3	0		90.8	8.8	0.5		4	96	0		
PHF	.843	.888	.000	.856	.895	.792	.250	.904	.786	.844	.000	.841	.907
Peak Hour for Entire Intersection Begins at 04:15 PM													

N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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File Name : 143861 AA
Site Code : 13038
Start Date : 5/1/2014
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Groups Printed- Heavy Vehicles

	Hyde Park Avenue From North			Walk Hill Street From East			Hyde Park Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	18	4	0	1	0	0	1	11	0	35
04:15 PM	7	4	0	9	1	0	0	10	1	32
04:30 PM	4	0	0	3	0	0	0	9	0	16
04:45 PM	8	0	0	1	0	0	1	8	0	18
Total	37	8	0	14	1	0	2	38	1	101
05:00 PM	5	1	0	0	1	0	0	4	0	11
05:15 PM	8	3	0	1	0	0	1	4	0	17
05:30 PM	5	0	0	3	0	0	0	4	0	12
05:45 PM	7	1	0	0	1	0	0	9	0	18
Total	25	5	0	4	2	0	1	21	0	58
Grand Total	62	13	0	18	3	0	3	59	1	159
Apprch %	82.7	17.3	0	85.7	14.3	0	4.8	93.7	1.6	
Total %	39	8.2	0	11.3	1.9	0	1.9	37.1	0.6	

	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
04:00 PM	18	4	0	22	1	0	0	1	1	11	0	12	35
04:15 PM	7	4	0	11	9	1	0	10	0	10	1	11	32
04:30 PM	4	0	0	4	3	0	0	3	0	9	0	9	16
04:45 PM	8	0	0	8	1	0	0	1	1	8	0	9	18
Total Volume	37	8	0	45	14	1	0	15	2	38	1	41	101
% App. Total	82.2	17.8	0		93.3	6.7	0		4.9	92.7	2.4		
PHF	.514	.500	.000	.511	.389	.250	.000	.375	.500	.864	.250	.854	.721
Peak Hour for Entire Intersection Begins at 04:00 PM													

N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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File Name : 143861 AA
Site Code : 13038
Start Date : 5/1/2014
Page No : 1

Groups Printed- Peds and Bicycles

	Hyde Park Avenue From North			Walk Hill Street From East			Hyde Park Avenue From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	0	0	0	0	0	2	0	1	0	3
04:15 PM	2	1	0	0	0	2	0	1	1	7
04:30 PM	0	0	0	1	0	2	0	0	1	4
04:45 PM	2	0	0	1	0	7	1	0	1	12
Total	4	1	0	2	0	13	1	2	3	26
05:00 PM	0	1	0	0	0	1	1	1	1	5
05:15 PM	0	0	0	0	0	4	0	1	0	5
05:30 PM	1	0	0	0	0	3	0	3	3	10
05:45 PM	1	0	0	0	0	5	0	0	0	6
Total	2	1	0	0	0	13	1	5	4	26
Grand Total	6	2	0	2	0	26	2	7	7	52
Apprch %	75	25	0	7.1	0	92.9	12.5	43.8	43.8	
Total %	11.5	3.8	0	3.8	0	50	3.8	13.5	13.5	

	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	2	0	0	2	1	0	7	8	1	0	1	2	12
05:00 PM	0	1	0	1	0	0	1	1	1	1	1	3	5
05:15 PM	0	0	0	0	0	0	4	4	0	1	0	1	5
05:30 PM	1	0	0	1	0	0	3	3	0	3	3	6	10
Total Volume	3	1	0	4	1	0	15	16	2	5	5	12	32
% App. Total	75	25	0		6.2	0	93.8		16.7	41.7	41.7		
PHF	.375	.250	.000	.500	.250	.000	.536	.500	.500	.417	.417	.500	.667

N/S: Hyde Park Avenue
E: Walk Hill Street
City, State: Jamaica Plain, MA
Client: HSH/ A. Fabiszewski

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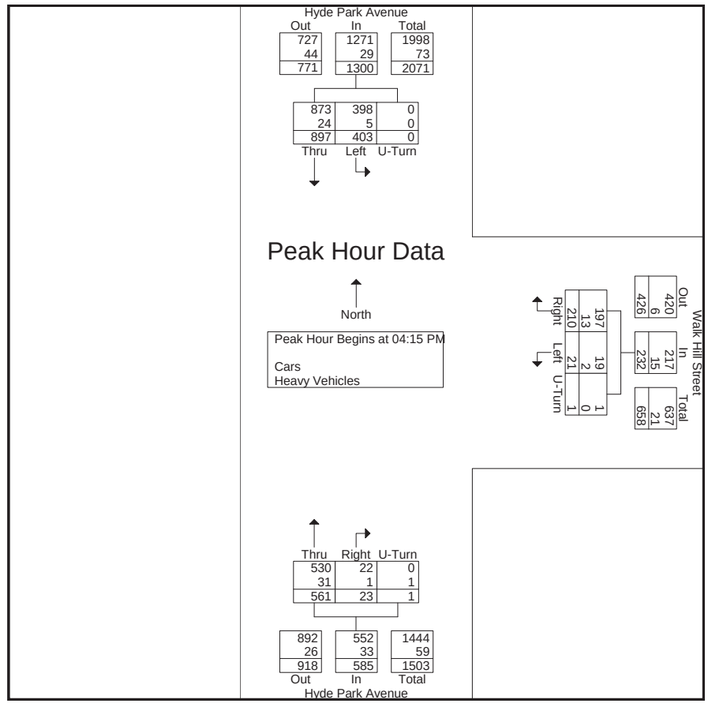
	Hyde Park Avenue From North				Walk Hill Street From East				Hyde Park Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	266	116	0	382	59	7	0	66	7	138	1	146	594
04:30 PM	182	87	0	269	41	3	1	45	5	116	0	121	435
04:45 PM	253	93	0	346	55	6	0	61	8	165	0	173	580
05:00 PM	196	107	0	303	55	5	0	60	3	142	0	145	508
Total Volume	897	403	0	1300	210	21	1	232	23	561	1	585	2117
% App. Total	69	31	0		90.5	9.1	0.4		3.9	95.9	0.2		
PHF	.843	.869	.000	.851	.890	.750	.250	.879	.719	.850	.250	.845	.891
Cars	873	398	0	1271	197	19	1	217	22	530	0	552	2040
% Cars	97.3	98.8	0	97.8	93.8	90.5	100	93.5	95.7	94.5	0	94.4	96.4
Heavy Vehicles	24	5	0	29	13	2	0	15	1	31	1	33	77
% Heavy Vehicles	2.7	1.2	0	2.2	6.2	9.5	0	6.5	4.3	5.5	100	5.6	3.6



N/S: Washington Street
E: Ukraine Way
City, State: Jamaica Plain, MA
Client: Tetra Tech Rizzo/ N. Brackett

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Email:datarequests@pdillc.com

File Name : 122784 E
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Cars - Heavy Vehicles

	Washington Street From North			Ukraine Way From East			Washington Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	58	74	0	128	36	0	48	112	0	456
07:15 AM	58	57	0	156	33	0	44	107	0	455
07:30 AM	61	63	0	137	45	0	47	121	0	474
07:45 AM	73	72	0	141	28	0	54	104	0	472
Total	250	266	0	562	142	0	193	444	0	1857
08:00 AM	48	80	0	135	32	0	50	136	0	481
08:15 AM	62	62	0	145	44	0	53	107	0	473
08:30 AM	52	52	0	148	33	0	43	109	0	437
08:45 AM	57	74	0	122	32	0	43	96	0	424
Total	219	268	0	550	141	0	189	448	0	1815
09:00 AM	52	66	0	94	29	0	47	87	0	375
09:15 AM	64	54	0	113	36	0	52	90	0	409
09:30 AM	71	67	0	89	24	0	43	92	0	386
09:45 AM	58	46	0	63	45	0	35	74	0	321
Total	245	233	0	359	134	0	177	343	0	1491
10:00 AM	59	49	0	66	40	0	42	65	0	321
10:15 AM	66	61	0	77	22	0	42	68	0	336
10:30 AM	62	70	0	66	33	0	54	79	0	364
10:45 AM	60	65	1	49	41	0	50	62	0	328
Total	247	245	1	258	136	0	188	274	0	1349
11:00 AM	61	63	0	52	52	0	42	81	0	351
11:15 AM	71	67	0	49	21	0	46	69	0	323
11:30 AM	72	56	0	50	31	0	33	74	0	316
11:45 AM	73	64	0	56	28	2	48	72	0	343
Total	277	250	0	207	132	2	169	296	0	1333
12:00 PM	52	63	0	49	36	0	40	68	0	308
12:15 PM	69	56	0	62	25	0	52	62	0	326
12:30 PM	78	59	0	69	19	1	58	55	0	339
12:45 PM	89	76	0	69	42	0	56	89	0	421
Total	288	254	0	249	122	1	206	274	0	1394
01:00 PM	58	69	0	56	33	0	54	73	0	343
01:15 PM	63	71	0	74	37	0	44	61	0	350
01:30 PM	58	60	0	87	28	0	42	71	0	346
01:45 PM	70	69	0	76	37	0	55	75	0	382
Total	249	269	0	293	135	0	195	280	0	1421
02:00 PM	68	63	0	72	44	0	48	80	0	375
02:15 PM	59	79	0	88	47	0	54	69	0	396
02:30 PM	74	83	0	82	32	0	45	91	0	407
02:45 PM	74	92	0	76	50	0	49	63	0	404
Total	275	317	0	318	173	0	196	303	0	1582
03:00 PM	87	118	0	65	33	0	71	71	0	445
03:15 PM	88	121	0	64	46	0	38	75	0	432
03:30 PM	90	122	0	74	42	0	66	81	0	475
03:45 PM	84	129	0	63	47	0	58	81	0	462
Total	349	490	0	266	168	0	233	308	0	1814
04:00 PM	77	103	0	59	42	1	72	79	0	433
04:15 PM	99	125	0	83	53	0	61	75	0	496
04:30 PM	105	128	0	69	46	0	54	103	0	505
04:45 PM	78	143	0	82	57	0	45	73	0	478
Total	359	499	0	293	198	1	232	330	0	1912

N/S: Washington Street
E: Ukraine Way
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Client: Tetra Tech Rizzo/ N. Brackett

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File Name : 122784 E
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Cars - Heavy Vehicles

	Washington Street From North			Ukraine Way From East			Washington Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
05:00 PM	94	132	0	70	35	0	56	93	0	480
05:15 PM	98	124	0	69	50	0	51	68	0	460
05:30 PM	106	132	0	72	43	0	43	92	0	488
05:45 PM	90	118	0	79	55	0	56	95	0	493
Total	388	506	0	290	183	0	206	348	0	1921
06:00 PM	111	95	0	59	44	0	51	91	0	451
06:15 PM	83	104	0	67	50	0	46	79	0	429
06:30 PM	90	74	0	46	30	0	45	88	0	373
06:45 PM	88	90	0	61	51	0	52	75	0	417
Total	372	363	0	233	175	0	194	333	0	1670
Grand Total	3518	3960	1	3878	1839	4	2378	3981	0	19559
Apprch %	47	52.9	0	67.8	32.1	0.1	37.4	62.6	0	
Total %	18	20.2	0	19.8	9.4	0	12.2	20.4	0	
Cars	3060	3797	1	3693	1721	4	2221	3478	0	17975
% Cars	87	95.9	100	95.2	93.6	100	93.4	87.4	0	91.9
Heavy Vehicles	458	163	0	185	118	0	157	503	0	1584
% Heavy Vehicles	13	4.1	0	4.8	6.4	0	6.6	12.6	0	8.1

	Washington Street From North				Ukraine Way From East				Washington Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	61	63	0	124	137	**45**	0	182	47	121	0	168	474
07:45 AM	**73**	72	0	**145**	141	28	0	169	**54**	104	0	158	472
08:00 AM	48	**80**	0	128	135	32	0	167	50	**136**	0	**186**	**481**
08:15 AM	62	62	0	124	**145**	44	0	**189**	53	107	0	160	473
Total Volume	244	277	0	521	558	149	0	707	204	468	0	672	1900
% App. Total	46.8	53.2	0		78.9	21.1	0		30.4	69.6	0		
PHF	.836	.866	.000	.898	.962	.828	.000	.935	.944	.860	.000	.903	.988
Cars	198	264	0	462	535	128	0	663	183	402	0	585	1710
% Cars	81.1	95.3	0	88.7	95.9	85.9	0	93.8	89.7	85.9	0	87.1	90.0
Heavy Vehicles	46	13	0	59	23	21	0	44	21	66	0	87	190
% Heavy Vehicles	18.9	4.7	0	11.3	4.1	14.1	0	6.2	10.3	14.1	0	12.9	10.0
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 12:45 PM													
12:45 PM	**89**	**76**	0	**165**	69	**42**	0	111	**56**	**89**	0	**145**	**421**
01:00 PM	58	69	0	127	56	33	0	89	54	73	0	127	343
01:15 PM	63	71	0	134	74	37	0	111	44	61	0	105	350
01:30 PM	58	60	0	118	**87**	28	0	**115**	42	71	0	113	346
Total Volume	268	276	0	544	286	140	0	426	196	294	0	490	1460
% App. Total	49.3	50.7	0		67.1	32.9	0		40	60	0		
PHF	.753	.908	.000	.824	.822	.833	.000	.926	.875	.826	.000	.845	.867
Cars	240	263	0	503	270	131	0	401	185	268	0	453	1357
% Cars	89.6	95.3	0	92.5	94.4	93.6	0	94.1	94.4	91.2	0	92.4	92.9
Heavy Vehicles	28	13	0	41	16	9	0	25	11	26	0	37	103
% Heavy Vehicles	10.4	4.7	0	7.5	5.6	6.4	0	5.9	5.6	8.8	0	7.6	7.1

N/S: Washington Street
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File Name : 122784 E
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Start Date : 2/28/2012
Page No : 3

	Washington Street From North				Ukraine Way From East				Washington Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	99	125	0	224	**83**	53	0	136	**61**	75	0	136	496
04:30 PM	**105**	128	0	**233**	69	46	0	115	54	**103**	0	**157**	**505**
04:45 PM	78	**143**	0	221	82	**57**	0	**139**	45	73	0	118	478
05:00 PM	94	132	0	226	70	35	0	105	56	93	0	149	480
Total Volume	376	528	0	904	304	191	0	495	216	344	0	560	1959
% App. Total	41.6	58.4	0		61.4	38.6	0		38.6	61.4	0		
PHF	.895	.923	.000	.970	.916	.838	.000	.890	.885	.835	.000	.892	.970
Cars	333	514	0	847	280	182	0	462	203	294	0	497	1806
% Cars	88.6	97.3	0	93.7	92.1	95.3	0	93.3	94.0	85.5	0	88.8	92.2
Heavy Vehicles	43	14	0	57	24	9	0	33	13	50	0	63	153
% Heavy Vehicles	11.4	2.7	0	6.3	7.9	4.7	0	6.7	6.0	14.5	0	11.3	7.8

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File Name : 122784 E
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Start Date : 2/28/2012
Page No : 1

Groups Printed- Cars

	Washington Street From North			Ukraine Way From East			Washington Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	44	69	0	123	34	0	46	102	0	418
07:15 AM	47	51	0	151	30	0	41	92	0	412
07:30 AM	47	60	0	134	39	0	44	108	0	432
07:45 AM	59	71	0	130	25	0	50	86	0	421
Total	197	251	0	538	128	0	181	388	0	1683
08:00 AM	39	73	0	132	28	0	44	121	0	437
08:15 AM	53	60	0	139	36	0	45	87	0	420
08:30 AM	40	46	0	147	29	0	36	93	0	391
08:45 AM	43	62	0	119	30	0	36	80	0	370
Total	175	241	0	537	123	0	161	381	0	1618
09:00 AM	40	62	0	89	27	0	45	72	0	335
09:15 AM	53	52	0	105	33	0	44	81	0	368
09:30 AM	64	62	0	86	21	0	38	79	0	350
09:45 AM	51	45	0	59	42	0	35	61	0	293
Total	208	221	0	339	123	0	162	293	0	1346
10:00 AM	52	43	0	62	39	0	41	59	0	296
10:15 AM	56	56	0	73	22	0	37	61	0	305
10:30 AM	55	65	0	63	31	0	49	72	0	335
10:45 AM	54	63	1	47	40	0	47	53	0	305
Total	217	227	1	245	132	0	174	245	0	1241
11:00 AM	56	61	0	47	48	0	38	72	0	322
11:15 AM	66	65	0	45	18	0	43	61	0	298
11:30 AM	64	54	0	49	29	0	29	67	0	292
11:45 AM	64	63	0	51	27	2	46	65	0	318
Total	250	243	0	192	122	2	156	265	0	1230
12:00 PM	44	60	0	49	36	0	39	62	0	290
12:15 PM	65	54	0	62	25	0	50	56	0	312
12:30 PM	70	55	0	66	18	1	57	51	0	318
12:45 PM	83	73	0	67	41	0	51	83	0	398
Total	262	242	0	244	120	1	197	252	0	1318
01:00 PM	51	67	0	54	29	0	53	69	0	323
01:15 PM	56	68	0	67	35	0	42	54	0	322
01:30 PM	50	55	0	82	26	0	39	62	0	314
01:45 PM	64	66	0	68	36	0	52	71	0	357
Total	221	256	0	271	126	0	186	256	0	1316
02:00 PM	56	57	0	67	38	0	45	72	0	335
02:15 PM	48	76	0	82	44	0	53	61	0	364
02:30 PM	60	80	0	76	31	0	42	85	0	374
02:45 PM	59	89	0	73	44	0	47	50	0	362
Total	223	302	0	298	157	0	187	268	0	1435
03:00 PM	76	113	0	64	30	0	66	64	0	413
03:15 PM	78	116	0	61	43	0	38	60	0	396
03:30 PM	80	118	0	73	42	0	59	67	0	439
03:45 PM	72	127	0	58	42	0	51	63	0	413
Total	306	474	0	256	157	0	214	254	0	1661
04:00 PM	64	98	0	53	39	1	66	68	0	389
04:15 PM	90	123	0	75	53	0	57	67	0	465
04:30 PM	91	124	0	64	43	0	50	87	0	459
04:45 PM	66	140	0	75	53	0	42	58	0	434
Total	311	485	0	267	188	1	215	280	0	1747

N/S: Washington Street
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File Name : 122784 E
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Cars

	Washington Street From North			Ukraine Way From East			Washington Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
05:00 PM	86	127	0	66	33	0	54	82	0	448
05:15 PM	84	122	0	65	47	0	50	55	0	423
05:30 PM	96	128	0	70	41	0	42	78	0	455
05:45 PM	81	118	0	77	51	0	55	86	0	468
Total	347	495	0	278	172	0	201	301	0	1794
06:00 PM	102	94	0	59	44	0	50	81	0	430
06:15 PM	79	103	0	66	50	0	44	70	0	412
06:30 PM	83	74	0	44	29	0	44	78	0	352
06:45 PM	79	89	0	59	50	0	49	66	0	392
Total	343	360	0	228	173	0	187	295	0	1586
Grand Total	3060	3797	1	3693	1721	4	2221	3478	0	17975
Apprch %	44.6	55.4	0	68.2	31.8	0.1	39	61	0	
Total %	17	21.1	0	20.5	9.6	0	12.4	19.3	0	

	Washington Street From North				Ukraine Way From East				Washington Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	47	60	0	107	134	**39**	0	173	44	108	0	152	432
07:45 AM	**59**	71	0	**130**	130	25	0	155	**50**	86	0	136	421
08:00 AM	39	**73**	0	112	132	28	0	160	44	**121**	0	**165**	**437**
08:15 AM	53	60	0	113	**139**	36	0	**175**	45	87	0	132	420
Total Volume	198	264	0	462	535	128	0	663	183	402	0	585	1710
% App. Total	42.9	57.1	0		80.7	19.3	0		31.3	68.7	0		
PHF	.839	.904	.000	.888	.962	.821	.000	.947	.915	.831	.000	.886	.978
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 12:30 PM													
12:30 PM	70	55	0	125	66	18	**1**	85	**57**	51	0	108	318
12:45 PM	**83**	**73**	0	**156**	**67**	**41**	0	**108**	51	**83**	0	**134**	**398**
01:00 PM	51	67	0	118	54	29	0	83	53	69	0	122	323
01:15 PM	56	68	0	124	67	35	0	102	42	54	0	96	322
Total Volume	260	263	0	523	254	123	1	378	203	257	0	460	1361
% App. Total	49.7	50.3	0		67.2	32.5	0.3		44.1	55.9	0		
PHF	.783	.901	.000	.838	.948	.750	.250	.875	.890	.774	.000	.858	.855
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	90	123	0	213	**75**	**53**	0	**128**	**57**	67	0	124	**465**
04:30 PM	**91**	124	0	**215**	64	43	0	107	50	**87**	0	**137**	459
04:45 PM	66	**140**	0	206	75	53	0	128	42	58	0	100	434
05:00 PM	86	127	0	213	66	33	0	99	54	82	0	136	448
Total Volume	333	514	0	847	280	182	0	462	203	294	0	497	1806
% App. Total	39.3	60.7	0		60.6	39.4	0		40.8	59.2	0		
PHF	.915	.918	.000	.985	.933	.858	.000	.902	.890	.845	.000	.907	.971

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File Name : 122784 E
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Heavy Vehicles

	Washington Street From North			Ukraine Way From East			Washington Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	14	5	0	5	2	0	2	10	0	38
07:15 AM	11	6	0	5	3	0	3	15	0	43
07:30 AM	14	3	0	3	6	0	3	13	0	42
07:45 AM	14	1	0	11	3	0	4	18	0	51
Total	53	15	0	24	14	0	12	56	0	174
08:00 AM	9	7	0	3	4	0	6	15	0	44
08:15 AM	9	2	0	6	8	0	8	20	0	53
08:30 AM	12	6	0	1	4	0	7	16	0	46
08:45 AM	14	12	0	3	2	0	7	16	0	54
Total	44	27	0	13	18	0	28	67	0	197
09:00 AM	12	4	0	5	2	0	2	15	0	40
09:15 AM	11	2	0	8	3	0	8	9	0	41
09:30 AM	7	5	0	3	3	0	5	13	0	36
09:45 AM	7	1	0	4	3	0	0	13	0	28
Total	37	12	0	20	11	0	15	50	0	145
10:00 AM	7	6	0	4	1	0	1	6	0	25
10:15 AM	10	5	0	4	0	0	5	7	0	31
10:30 AM	7	5	0	3	2	0	5	7	0	29
10:45 AM	6	2	0	2	1	0	3	9	0	23
Total	30	18	0	13	4	0	14	29	0	108
11:00 AM	5	2	0	5	4	0	4	9	0	29
11:15 AM	5	2	0	4	3	0	3	8	0	25
11:30 AM	8	2	0	1	2	0	4	7	0	24
11:45 AM	9	1	0	5	1	0	2	7	0	25
Total	27	7	0	15	10	0	13	31	0	103
12:00 PM	8	3	0	0	0	0	1	6	0	18
12:15 PM	4	2	0	0	0	0	2	6	0	14
12:30 PM	8	4	0	3	1	0	1	4	0	21
12:45 PM	6	3	0	2	1	0	5	6	0	23
Total	26	12	0	5	2	0	9	22	0	76
01:00 PM	7	2	0	2	4	0	1	4	0	20
01:15 PM	7	3	0	7	2	0	2	7	0	28
01:30 PM	8	5	0	5	2	0	3	9	0	32
01:45 PM	6	3	0	8	1	0	3	4	0	25
Total	28	13	0	22	9	0	9	24	0	105
02:00 PM	12	6	0	5	6	0	3	8	0	40
02:15 PM	11	3	0	6	3	0	1	8	0	32
02:30 PM	14	3	0	6	1	0	3	6	0	33
02:45 PM	15	3	0	3	6	0	2	13	0	42
Total	52	15	0	20	16	0	9	35	0	147
03:00 PM	11	5	0	1	3	0	5	7	0	32
03:15 PM	10	5	0	3	3	0	0	15	0	36
03:30 PM	10	4	0	1	0	0	7	14	0	36
03:45 PM	12	2	0	5	5	0	7	18	0	49
Total	43	16	0	10	11	0	19	54	0	153
04:00 PM	13	5	0	6	3	0	6	11	0	44
04:15 PM	9	2	0	8	0	0	4	8	0	31
04:30 PM	14	4	0	5	3	0	4	16	0	46
04:45 PM	12	3	0	7	4	0	3	15	0	44
Total	48	14	0	26	10	0	17	50	0	165

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Groups Printed- Heavy Vehicles

	Washington Street From North			Ukraine Way From East			Washington Street From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
05:00 PM	8	5	0	4	2	0	2	11	0	32
05:15 PM	14	2	0	4	3	0	1	13	0	37
05:30 PM	10	4	0	2	2	0	1	14	0	33
05:45 PM	9	0	0	2	4	0	1	9	0	25
Total	41	11	0	12	11	0	5	47	0	127
06:00 PM	9	1	0	0	0	0	1	10	0	21
06:15 PM	4	1	0	1	0	0	2	9	0	17
06:30 PM	7	0	0	2	1	0	1	10	0	21
06:45 PM	9	1	0	2	1	0	3	9	0	25
Total	29	3	0	5	2	0	7	38	0	84
Grand Total	458	163	0	185	118	0	157	503	0	1584
Apprch %	73.8	26.2	0	61.1	38.9	0	23.8	76.2	0	
Total %	28.9	10.3	0	11.7	7.4	0	9.9	31.8	0	

	Washington Street From North				Ukraine Way From East				Washington Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	9	7	0	16	3	4	0	7	6	15	0	21	44
08:15 AM	9	2	0	11	**6**	**8**	0	**14**	**8**	**20**	0	**28**	53
08:30 AM	12	6	0	18	1	4	0	5	7	16	0	23	46
08:45 AM	**14**	**12**	0	**26**	3	2	0	5	7	16	0	23	**54**
Total Volume	44	27	0	71	13	18	0	31	28	67	0	95	197
% App. Total	62	38	0		41.9	58.1	0		29.5	70.5	0		
PHF	.786	.563	.000	.683	.542	.563	.000	.554	.875	.838	.000	.848	.912
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 10:15 AM													
10:15 AM	**10**	**5**	0	**15**	4	0	0	4	**5**	7	0	12	**31**
10:30 AM	7	5	0	12	3	2	0	5	5	7	0	12	29
10:45 AM	6	2	0	8	2	1	0	3	3	**9**	0	12	23
11:00 AM	5	2	0	7	**5**	**4**	0	**9**	4	9	0	**13**	29
Total Volume	28	14	0	42	14	7	0	21	17	32	0	49	112
% App. Total	66.7	33.3	0		66.7	33.3	0		34.7	65.3	0		
PHF	.700	.700	.000	.700	.700	.438	.000	.583	.850	.889	.000	.942	.903
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:45 PM													
03:45 PM	12	2	0	14	5	**5**	0	**10**	**7**	**18**	0	**25**	**49**
04:00 PM	13	**5**	0	**18**	6	3	0	9	6	11	0	17	44
04:15 PM	9	2	0	11	**8**	0	0	8	4	8	0	12	31
04:30 PM	**14**	4	0	18	5	3	0	8	4	16	0	20	46
Total Volume	48	13	0	61	24	11	0	35	21	53	0	74	170
% App. Total	78.7	21.3	0		68.6	31.4	0		28.4	71.6	0		
PHF	.857	.650	.000	.847	.750	.550	.000	.875	.750	.736	.000	.740	.867

N/S: Washington Street
E: Ukraine Way
City, State: Jamaica Plain, MA
Client: Tetra Tech Rizzo/ N. Brackett

PRECISION DATA INDUSTRIES, LLC
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File Name : 122784 E
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Peds and Bicycles

	Washington Street From North			Ukraine Way From East			Washington Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	1	1	1	0	0	5	0	3	0	11
07:15 AM	0	0	0	0	0	13	0	4	0	17
07:30 AM	1	1	0	0	1	5	1	5	0	14
07:45 AM	0	1	0	0	0	10	0	5	0	16
Total	2	3	1	0	1	33	1	17	0	58
08:00 AM	0	0	0	1	0	7	0	6	0	14
08:15 AM	1	0	0	1	0	8	0	3	0	13
08:30 AM	1	0	0	0	0	6	0	4	0	11
08:45 AM	0	0	0	2	0	4	0	4	0	10
Total	2	0	0	4	0	25	0	17	0	48
09:00 AM	1	1	0	1	0	6	0	2	1	12
09:15 AM	0	0	0	1	1	10	0	3	0	15
09:30 AM	0	1	0	0	0	9	0	3	0	13
09:45 AM	0	0	0	0	1	4	0	2	0	7
Total	1	2	0	2	2	29	0	10	1	47
10:00 AM	0	0	0	0	0	3	0	1	0	4
10:15 AM	0	0	0	2	0	5	0	1	0	8
10:30 AM	0	0	0	0	0	4	0	4	1	9
10:45 AM	1	0	1	0	0	5	0	3	0	10
Total	1	0	1	2	0	17	0	9	1	31
11:00 AM	0	0	0	0	0	5	0	0	0	5
11:15 AM	0	0	0	0	0	6	0	3	0	9
11:30 AM	0	0	0	1	0	2	0	1	0	4
11:45 AM	0	0	0	0	0	3	0	0	0	3
Total	0	0	0	1	0	16	0	4	0	21
12:00 PM	1	0	0	0	0	8	0	0	0	9
12:15 PM	1	0	0	0	0	7	0	0	0	8
12:30 PM	0	0	0	0	0	5	0	1	0	6
12:45 PM	0	0	0	0	0	8	0	0	0	8
Total	2	0	0	0	0	28	0	1	0	31
01:00 PM	0	0	1	0	0	10	0	1	0	12
01:15 PM	1	1	0	0	0	3	0	0	0	5
01:30 PM	0	2	0	0	0	3	0	0	0	5
01:45 PM	0	0	0	0	0	8	0	1	0	9
Total	1	3	1	0	0	24	0	2	0	31
02:00 PM	2	0	1	0	0	7	0	0	0	10
02:15 PM	0	1	0	0	0	10	0	1	0	12
02:30 PM	1	1	1	0	1	9	0	0	0	13
02:45 PM	1	0	0	0	0	11	0	2	0	14
Total	4	2	2	0	1	37	0	3	0	49
03:00 PM	2	0	0	0	0	11	0	2	0	15
03:15 PM	2	1	0	1	0	6	0	0	0	10
03:30 PM	0	0	0	0	0	15	0	0	0	15
03:45 PM	1	0	0	0	2	10	1	1	0	15
Total	5	1	0	1	2	42	1	3	0	55
04:00 PM	0	0	1	0	0	10	0	0	2	13
04:15 PM	3	1	0	0	0	18	0	1	0	23
04:30 PM	2	0	0	0	0	19	0	0	0	21
04:45 PM	4	1	0	0	0	8	0	0	0	13
Total	9	2	1	0	0	55	0	1	2	70

N/S: Washington Street
E: Ukraine Way
City, State: Jamaica Plain, MA
Client: Tetra Tech Rizzo/ N. Brackett

PRECISION DATA INDUSTRIES, LLC
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File Name : 122784 E
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Peds and Bicycles

	Washington Street From North			Ukraine Way From East			Washington Street From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
05:00 PM	0	0	1	1	1	9	0	0	0	12
05:15 PM	2	3	0	0	0	8	1	3	1	18
05:30 PM	6	0	0	0	0	6	0	0	0	12
05:45 PM	3	1	0	0	0	13	0	2	0	19
Total	11	4	1	1	1	36	1	5	1	61
06:00 PM	4	0	0	0	0	8	0	0	0	12
06:15 PM	1	0	0	0	0	10	0	1	0	12
06:30 PM	6	1	0	0	0	4	0	0	0	11
06:45 PM	2	1	0	0	0	8	0	0	0	11
Total	13	2	0	0	0	30	0	1	0	46
Grand Total	51	19	7	11	7	372	3	73	5	548
Apprch %	66.2	24.7	9.1	2.8	1.8	95.4	3.7	90.1	6.2	
Total %	9.3	3.5	1.3	2	1.3	67.9	0.5	13.3	0.9	

	Washington Street From North				Ukraine Way From East				Washington Street From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	0	0	0	0	0	0	**13**	**13**	0	4	0	4	**17**
07:30 AM	**1**	**1**	0	**2**	0	**1**	5	6	**1**	5	0	**6**	14
07:45 AM	0	1	0	1	0	0	10	10	0	5	0	5	16
08:00 AM	0	0	0	0	**1**	0	7	8	0	**6**	0	6	14
Total Volume	1	2	0	3	1	1	35	37	1	20	0	21	61
% App. Total	33.3	66.7	0		2.7	2.7	94.6		4.8	95.2	0		
PHF	.250	.500	.000	.375	.250	.250	.673	.712	.250	.833	.000	.875	.897
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 12:15 PM													
12:15 PM	**1**	0	0	**1**	0	0	7	7	0	0	0	0	8
12:30 PM	0	0	0	0	0	0	5	5	0	**1**	0	**1**	6
12:45 PM	0	0	0	0	0	0	8	8	0	0	0	0	8
01:00 PM	0	0	**1**	1	0	0	**10**	**10**	0	1	0	1	**12**
Total Volume	1	0	1	2	0	0	30	30	0	2	0	2	34
% App. Total	50	0	50		0	0	100		0	100	0		
PHF	.250	.000	.250	.500	.000	.000	.750	.750	.000	.500	.000	.500	.708
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:45 PM													
03:45 PM	1	0	0	1	0	**2**	10	12	**1**	**1**	0	**2**	15
04:00 PM	0	0	**1**	1	0	0	10	10	0	0	**2**	2	13
04:15 PM	**3**	**1**	0	**4**	0	0	18	18	0	1	0	1	**23**
04:30 PM	2	0	0	2	0	0	**19**	**19**	0	0	0	0	21
Total Volume	6	1	1	8	0	2	57	59	1	2	2	5	72
% App. Total	75	12.5	12.5		0	3.4	96.6		20	40	40		
PHF	.500	.250	.250	.500	.000	.250	.750	.776	.250	.500	.250	.625	.783

N/S: Washington Street
E: Ukraine Way
City, State: Jamaica Plain, MA
Client: Tetra Tech Rizzo/ N. Brackett

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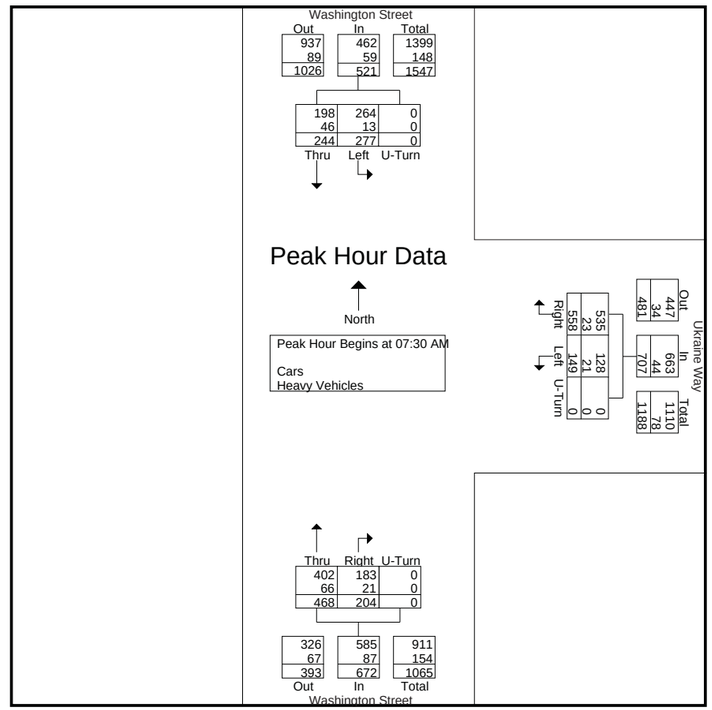
File Name : 122784 E
Site Code : 127-3946
Start Date : 2/28/2012

	Washington Street From North				Ukraine Way From East				Washington Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	61	63	0	124	137	**45**	0	182	47	121	0	168	474
07:45 AM	**73**	72	0	**145**	141	28	0	169	**54**	104	0	158	472
08:00 AM	48	**80**	0	128	135	32	0	167	50	**136**	0	**186**	**481**
08:15 AM	62	62	0	124	**145**	44	0	**189**	53	107	0	160	473
Total Volume	244	277	0	521	558	149	0	707	204	468	0	672	1900
% App. Total	46.8	53.2	0		78.9	21.1	0		30.4	69.6	0		
PHF	.836	.866	.000	.898	.962	.828	.000	.935	.944	.860	.000	.903	.988
Cars	198	264	0	462	535	128	0	663	183	402	0	585	1710
% Cars	81.1	95.3	0	88.7	95.9	85.9	0	93.8	89.7	85.9	0	87.1	90.0
Heavy Vehicles	46	13	0	59	23	21	0	44	21	66	0	87	190
% Heavy Vehicles	18.9	4.7	0	11.3	4.1	14.1	0	6.2	10.3	14.1	0	12.9	10.0



N/S: Washington Street
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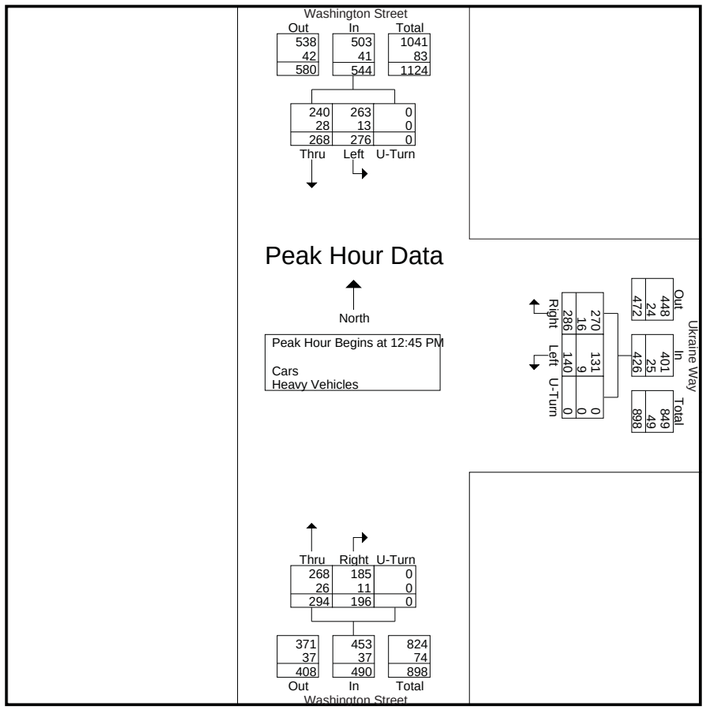
File Name : 122784 E
Site Code : 127-3946
Start Date : 2/28/2012
Page No : 2

	Washington Street From North				Ukraine Way From East				Washington Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 12:45 PM													
12:45 PM	**89**	**76**	0	**165**	69	**42**	0	111	**56**	**89**	0	**145**	**421**
01:00 PM	58	69	0	127	56	33	0	89	54	73	0	127	343
01:15 PM	63	71	0	134	74	37	0	111	44	61	0	105	350
01:30 PM	58	60	0	118	**87**	28	0	**115**	42	71	0	113	346
Total Volume	268	276	0	544	286	140	0	426	196	294	0	490	1460
% App. Total	49.3	50.7	0		67.1	32.9	0		40	60	0		
PHF	.753	.908	.000	.824	.822	.833	.000	.926	.875	.826	.000	.845	.867
Cars	240	263	0	503	270	131	0	401	185	268	0	453	1357
% Cars	89.6	95.3	0	92.5	94.4	93.6	0	94.1	94.4	91.2	0	92.4	92.9
Heavy Vehicles	28	13	0	41	16	9	0	25	11	26	0	37	103
% Heavy Vehicles	10.4	4.7	0	7.5	5.6	6.4	0	5.9	5.6	8.8	0	7.6	7.1



N/S: Washington Street
E: Ukraine Way
City, State: Jamaica Plain, MA
Client: Tetra Tech Rizzo/ N. Brackett

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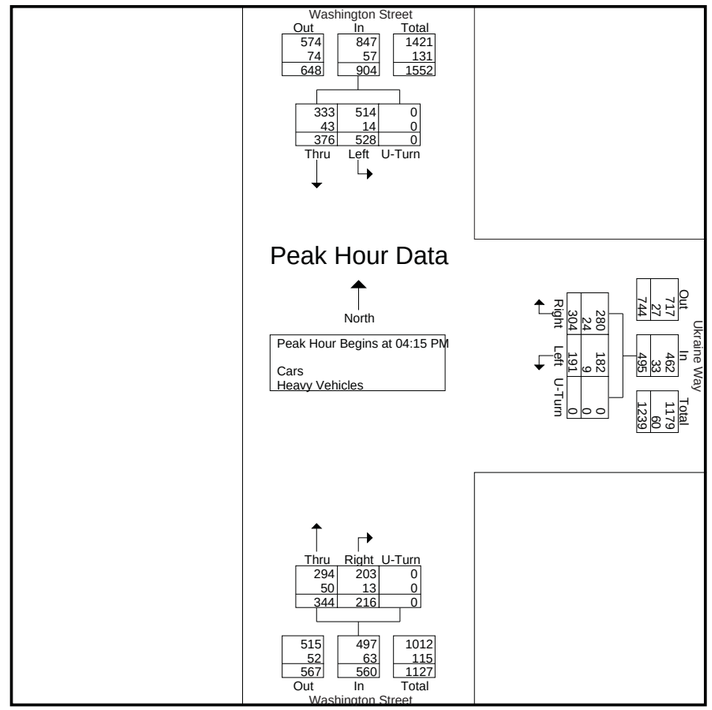
File Name : 122784 E
Site Code : 127-3946
Start Date : 2/28/2012
Page No : 3

	Washington Street From North				Ukraine Way From East				Washington Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	99	125	0	224	**83**	53	0	136	**61**	75	0	136	496
04:30 PM	**105**	128	0	**233**	69	46	0	115	54	**103**	0	**157**	**505**
04:45 PM	78	**143**	0	221	82	**57**	0	**139**	45	73	0	118	478
05:00 PM	94	132	0	226	70	35	0	105	56	93	0	149	480
Total Volume	376	528	0	904	304	191	0	495	216	344	0	560	1959
% App. Total	41.6	58.4	0		61.4	38.6	0		38.6	61.4	0		
PHF	.895	.923	.000	.970	.916	.838	.000	.890	.885	.835	.000	.892	.970
Cars	333	514	0	847	280	182	0	462	203	294	0	497	1806
% Cars	88.6	97.3	0	93.7	92.1	95.3	0	93.3	94.0	85.5	0	88.8	92.2
Heavy Vehicles	43	14	0	57	24	9	0	33	13	50	0	63	153
% Heavy Vehicles	11.4	2.7	0	6.3	7.9	4.7	0	6.7	6.0	14.5	0	11.3	7.8



N/S: Hyde Park Avenue
W: Ukraine Way
City, State: Jamaica Plain, MA
Client: Tetra Tech Rizzo/ N. Brackett

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File Name : 122784 H
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Cars - Heavy Vehicles

	Hyde Park Avenue From North			Hyde Park Avenue From South			Ukraine Way From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
07:00 AM	43	106	0	184	121	0	82	47	0	583
07:15 AM	30	102	0	203	152	0	57	43	0	587
07:30 AM	36	89	0	220	150	0	68	48	0	611
07:45 AM	29	115	0	189	142	0	75	50	0	600
Total	138	412	0	796	565	0	282	188	0	2381
08:00 AM	24	96	0	186	138	0	83	43	0	570
08:15 AM	46	121	0	193	152	0	74	44	0	630
08:30 AM	30	102	0	192	156	0	59	42	0	581
08:45 AM	36	80	0	157	112	0	71	44	0	500
Total	136	399	0	728	558	0	287	173	0	2281
09:00 AM	34	79	0	144	93	0	67	48	0	465
09:15 AM	35	98	0	157	109	0	58	46	0	503
09:30 AM	22	92	0	133	89	0	72	40	0	448
09:45 AM	45	97	0	113	65	0	55	27	0	402
Total	136	366	0	547	356	0	252	161	0	1818
10:00 AM	38	97	0	100	66	0	49	39	0	389
10:15 AM	27	88	0	94	77	0	66	42	0	394
10:30 AM	31	82	0	106	62	0	76	45	1	403
10:45 AM	43	70	0	80	53	0	67	44	0	357
Total	139	337	0	380	258	0	258	170	1	1543
11:00 AM	47	84	0	82	53	0	66	42	0	374
11:15 AM	21	78	0	85	52	0	67	44	0	347
11:30 AM	27	91	0	93	53	0	61	28	0	353
11:45 AM	28	88	0	107	60	0	75	34	0	392
Total	123	341	0	367	218	0	269	148	0	1466
12:00 PM	33	89	0	95	46	0	74	35	0	372
12:15 PM	20	89	0	84	68	0	65	44	0	370
12:30 PM	25	104	0	107	66	0	68	48	0	418
12:45 PM	32	98	0	100	78	0	79	50	0	437
Total	110	380	0	386	258	0	286	177	0	1597
01:00 PM	33	83	0	109	57	0	75	51	0	408
01:15 PM	32	100	0	104	77	0	79	35	1	428
01:30 PM	29	121	0	92	82	0	63	36	1	424
01:45 PM	33	107	0	113	81	0	78	42	0	454
Total	127	411	0	418	297	0	295	164	2	1714
02:00 PM	44	102	0	115	73	0	66	51	0	451
02:15 PM	42	115	0	98	92	0	88	47	0	482
02:30 PM	35	128	0	118	84	0	94	36	0	495
02:45 PM	38	160	0	121	83	0	96	40	0	538
Total	159	505	0	452	332	0	344	174	0	1966
03:00 PM	33	151	0	119	72	0	128	65	1	569
03:15 PM	35	170	0	135	66	1	125	32	0	564
03:30 PM	46	200	0	126	64	0	142	48	0	626
03:45 PM	47	202	0	134	63	0	139	42	0	627
Total	161	723	0	514	265	1	534	187	1	2386
04:00 PM	32	170	0	122	73	0	128	47	1	573
04:15 PM	51	204	0	148	83	0	136	44	0	666
04:30 PM	58	243	0	108	68	0	142	46	0	665
04:45 PM	47	221	0	133	84	0	152	36	0	673
Total	188	838	0	511	308	0	558	173	1	2577

N/S: Hyde Park Avenue
W: Ukraine Way
City, State: Jamaica Plain, MA
Client: Tetra Tech Rizzo/ N. Brackett

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File Name : 122784 H
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Cars - Heavy Vehicles

	Hyde Park Avenue From North			Hyde Park Avenue From South			Ukraine Way From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
05:00 PM	42	191	0	139	67	0	142	50	0	631
05:15 PM	51	262	0	174	67	0	129	36	0	719
05:30 PM	42	260	0	161	72	0	149	40	0	724
05:45 PM	53	242	0	142	82	0	127	37	0	683
Total	188	955	0	616	288	0	547	163	0	2757
06:00 PM	42	218	0	129	64	0	112	43	1	609
06:15 PM	55	206	0	116	58	0	110	36	0	581
06:30 PM	34	148	0	119	45	0	73	50	0	469
06:45 PM	54	170	0	92	54	0	93	44	0	507
Total	185	742	0	456	221	0	388	173	1	2166
Grand Total	1790	6409	0	6171	3924	1	4300	2051	6	24652
Apprch %	21.8	78.2	0	61.1	38.9	0	67.6	32.3	0.1	
Total %	7.3	26	0	25	15.9	0	17.4	8.3	0	
Cars	1629	5975	0	5728	3783	1	4119	1918	6	23159
% Cars	91	93.2	0	92.8	96.4	100	95.8	93.5	100	93.9
Heavy Vehicles	161	434	0	443	141	0	181	133	0	1493
% Heavy Vehicles	9	6.8	0	7.2	3.6	0	4.2	6.5	0	6.1

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:30 AM

	Hyde Park Avenue From North				Hyde Park Avenue From South				Ukraine Way From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
07:30 AM	36	89	0	125	**220**	150	0	**370**	68	48	0	116	611
07:45 AM	29	115	0	144	189	142	0	331	75	**50**	0	125	600
08:00 AM	24	96	0	120	186	138	0	324	**83**	43	0	**126**	570
08:15 AM	**46**	**121**	0	**167**	193	**152**	0	345	74	44	0	118	**630**
Total Volume	135	421	0	556	788	582	0	1370	300	185	0	485	2411
% App. Total	24.3	75.7	0		57.5	42.5	0		61.9	38.1	0		
PHF	.734	.870	.000	.832	.895	.957	.000	.926	.904	.925	.000	.962	.957
Cars	119	385	0	504	732	556	0	1288	283	169	0	452	2244
% Cars	88.1	91.4	0	90.6	92.9	95.5	0	94.0	94.3	91.4	0	93.2	93.1
Heavy Vehicles	16	36	0	52	56	26	0	82	17	16	0	33	167
% Heavy Vehicles	11.9	8.6	0	9.4	7.1	4.5	0	6.0	5.7	8.6	0	6.8	6.9

Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 01:00 PM

	Hyde Park Avenue From North				Hyde Park Avenue From South				Ukraine Way From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
01:00 PM	**33**	83	0	116	109	57	0	166	75	**51**	0	**126**	408
01:15 PM	32	100	0	132	104	77	0	181	**79**	35	**1**	115	428
01:30 PM	29	**121**	0	**150**	92	**82**	0	174	63	36	1	100	424
01:45 PM	33	107	0	140	**113**	81	0	**194**	78	42	0	120	**454**
Total Volume	127	411	0	538	418	297	0	715	295	164	2	461	1714
% App. Total	23.6	76.4	0		58.5	41.5	0		64	35.6	0.4		
PHF	.962	.849	.000	.897	.925	.905	.000	.921	.934	.804	.500	.915	.944
Cars	110	392	0	502	386	282	0	668	281	159	2	442	1612
% Cars	86.6	95.4	0	93.3	92.3	94.9	0	93.4	95.3	97.0	100	95.9	94.0
Heavy Vehicles	17	19	0	36	32	15	0	47	14	5	0	19	102
% Heavy Vehicles	13.4	4.6	0	6.7	7.7	5.1	0	6.6	4.7	3.0	0	4.1	6.0

N/S: Hyde Park Avenue
W: Ukraine Way
City, State: Jamaica Plain, MA
Client: Tetra Tech Rizzo/ N. Brackett

PRECISION DATA INDUSTRIES, LLC
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File Name : 122784 H
Site Code : 127-3946
Start Date : 2/28/2012

	Hyde Park Avenue From North				Hyde Park Avenue From South				Ukraine Way From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	42	191	0	233	139	67	0	206	142	**50**	0	**192**	631
05:15 PM	51	**262**	0	**313**	**174**	67	0	**241**	129	36	0	165	719
05:30 PM	42	260	0	302	161	72	0	233	**149**	40	0	189	**724**
05:45 PM	**53**	242	0	295	142	**82**	0	224	127	37	0	164	683
Total Volume	188	955	0	1143	616	288	0	904	547	163	0	710	2757
% App. Total	16.4	83.6	0		68.1	31.9	0		77	23	0		
PHF	.887	.911	.000	.913	.885	.878	.000	.938	.918	.815	.000	.924	.952
Cars	173	925	0	1098	595	282	0	877	537	156	0	693	2668
% Cars	92.0	96.9	0	96.1	96.6	97.9	0	97.0	98.2	95.7	0	97.6	96.8
Heavy Vehicles	15	30	0	45	21	6	0	27	10	7	0	17	89
% Heavy Vehicles	8.0	3.1	0	3.9	3.4	2.1	0	3.0	1.8	4.3	0	2.4	3.2

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File Name : 122784 H
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Groups Printed- Cars

	Hyde Park Avenue From North			Hyde Park Avenue From South			Ukraine Way From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
07:00 AM	37	85	0	171	120	0	76	45	0	534
07:15 AM	27	88	0	190	148	0	52	40	0	545
07:30 AM	31	83	0	211	146	0	65	44	0	580
07:45 AM	27	110	0	173	132	0	73	47	0	562
Total	122	366	0	745	546	0	266	176	0	2221
08:00 AM	22	84	0	165	133	0	75	39	0	518
08:15 AM	39	108	0	183	145	0	70	39	0	584
08:30 AM	30	91	0	179	153	0	50	39	0	542
08:45 AM	34	72	0	147	108	0	63	37	0	461
Total	125	355	0	674	539	0	258	154	0	2105
09:00 AM	30	67	0	127	88	0	63	44	0	419
09:15 AM	33	86	0	146	101	0	54	40	0	460
09:30 AM	17	78	0	122	87	0	66	34	0	404
09:45 AM	42	85	0	106	62	0	54	27	0	376
Total	122	316	0	501	338	0	237	145	0	1659
10:00 AM	32	85	0	86	65	0	43	37	0	348
10:15 AM	25	75	0	88	73	0	60	37	0	358
10:30 AM	29	79	0	102	60	0	71	42	1	384
10:45 AM	41	66	0	70	52	0	65	38	0	332
Total	127	305	0	346	250	0	239	154	1	1422
11:00 AM	42	75	0	75	48	0	63	40	0	343
11:15 AM	18	73	0	81	49	0	67	40	0	328
11:30 AM	23	85	0	84	52	0	57	26	0	327
11:45 AM	27	81	0	101	56	0	73	33	0	371
Total	110	314	0	341	205	0	260	139	0	1369
12:00 PM	33	84	0	91	46	0	71	35	0	360
12:15 PM	20	84	0	78	67	0	62	43	0	354
12:30 PM	22	99	0	96	65	0	64	47	0	393
12:45 PM	31	90	0	90	76	0	74	47	0	408
Total	106	357	0	355	254	0	271	172	0	1515
01:00 PM	29	77	0	100	55	0	73	51	0	385
01:15 PM	26	93	0	98	74	0	76	33	1	401
01:30 PM	25	118	0	84	78	0	57	35	1	398
01:45 PM	30	104	0	104	75	0	75	40	0	428
Total	110	392	0	386	282	0	281	159	2	1612
02:00 PM	35	93	0	107	71	0	60	47	0	413
02:15 PM	39	104	0	93	87	0	86	46	0	455
02:30 PM	30	121	0	104	81	0	91	34	0	461
02:45 PM	33	147	0	110	79	0	93	38	0	500
Total	137	465	0	414	318	0	330	165	0	1829
03:00 PM	31	140	0	108	70	0	123	60	1	533
03:15 PM	34	160	0	125	62	1	120	32	0	534
03:30 PM	46	193	0	115	64	0	138	42	0	598
03:45 PM	41	192	0	119	60	0	135	37	0	584
Total	152	685	0	467	256	1	516	171	1	2249
04:00 PM	26	153	0	114	69	0	122	41	1	526
04:15 PM	46	191	0	139	80	0	131	43	0	630
04:30 PM	51	234	0	97	67	0	137	44	0	630
04:45 PM	40	208	0	123	80	0	149	33	0	633
Total	163	786	0	473	296	0	539	161	1	2419

N/S: Hyde Park Avenue
W: Ukraine Way
City, State: Jamaica Plain, MA
Client: Tetra Tech Rizzo/ N. Brackett

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File Name : 122784 H
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Cars

	Hyde Park Avenue From North			Hyde Park Avenue From South			Ukraine Way From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
05:00 PM	37	180	0	134	65	0	138	46	0	600
05:15 PM	46	255	0	170	66	0	128	35	0	700
05:30 PM	39	254	0	154	71	0	144	39	0	701
05:45 PM	51	236	0	137	80	0	127	36	0	667
Total	173	925	0	595	282	0	537	156	0	2668
06:00 PM	42	208	0	121	64	0	111	42	1	589
06:15 PM	54	199	0	110	58	0	110	33	0	564
06:30 PM	33	141	0	114	43	0	73	49	0	453
06:45 PM	53	161	0	86	52	0	91	42	0	485
Total	182	709	0	431	217	0	385	166	1	2091
Grand Total	1629	5975	0	5728	3783	1	4119	1918	6	23159
Apprch %	21.4	78.6	0	60.2	39.8	0	68.2	31.7	0.1	
Total %	7	25.8	0	24.7	16.3	0	17.8	8.3	0	

	Hyde Park Avenue From North				Hyde Park Avenue From South				Ukraine Way From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	31	83	0	114	**211**	**146**	0	**357**	65	44	0	109	580
07:45 AM	27	**110**	0	137	173	132	0	305	73	**47**	0	**120**	562
08:00 AM	22	84	0	106	165	133	0	298	**75**	39	0	114	518
08:15 AM	**39**	108	0	**147**	183	145	0	328	70	39	0	109	**584**
Total Volume	119	385	0	504	732	556	0	1288	283	169	0	452	2244
% App. Total	23.6	76.4	0		56.8	43.2	0		62.6	37.4	0		
PHF	.763	.875	.000	.857	.867	.952	.000	.902	.943	.899	.000	.942	.961
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 01:00 PM													
01:00 PM	29	77	0	106	100	55	0	155	73	**51**	0	**124**	385
01:15 PM	26	93	0	119	98	74	0	172	**76**	33	**1**	110	401
01:30 PM	25	**118**	0	**143**	84	**78**	0	162	57	35	1	93	398
01:45 PM	**30**	104	0	134	**104**	75	0	**179**	75	40	0	115	**428**
Total Volume	110	392	0	502	386	282	0	668	281	159	2	442	1612
% App. Total	21.9	78.1	0		57.8	42.2	0		63.6	36	0.5		
PHF	.917	.831	.000	.878	.928	.904	.000	.933	.924	.779	.500	.891	.942
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	37	180	0	217	134	65	0	199	138	**46**	0	**184**	600
05:15 PM	46	**255**	0	**301**	**170**	66	0	**236**	128	35	0	163	700
05:30 PM	39	254	0	293	154	71	0	225	**144**	39	0	183	**701**
05:45 PM	**51**	236	0	287	137	**80**	0	217	127	36	0	163	667
Total Volume	173	925	0	1098	595	282	0	877	537	156	0	693	2668
% App. Total	15.8	84.2	0		67.8	32.2	0		77.5	22.5	0		
PHF	.848	.907	.000	.912	.875	.881	.000	.929	.932	.848	.000	.942	.951

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File Name : 122784 H
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Heavy Vehicles

	Hyde Park Avenue From North			Hyde Park Avenue From South			Ukraine Way From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
07:00 AM	6	21	0	13	1	0	6	2	0	49
07:15 AM	3	14	0	13	4	0	5	3	0	42
07:30 AM	5	6	0	9	4	0	3	4	0	31
07:45 AM	2	5	0	16	10	0	2	3	0	38
Total	16	46	0	51	19	0	16	12	0	160
08:00 AM	2	12	0	21	5	0	8	4	0	52
08:15 AM	7	13	0	10	7	0	4	5	0	46
08:30 AM	0	11	0	13	3	0	9	3	0	39
08:45 AM	2	8	0	10	4	0	8	7	0	39
Total	11	44	0	54	19	0	29	19	0	176
09:00 AM	4	12	0	17	5	0	4	4	0	46
09:15 AM	2	12	0	11	8	0	4	6	0	43
09:30 AM	5	14	0	11	2	0	6	6	0	44
09:45 AM	3	12	0	7	3	0	1	0	0	26
Total	14	50	0	46	18	0	15	16	0	159
10:00 AM	6	12	0	14	1	0	6	2	0	41
10:15 AM	2	13	0	6	4	0	6	5	0	36
10:30 AM	2	3	0	4	2	0	5	3	0	19
10:45 AM	2	4	0	10	1	0	2	6	0	25
Total	12	32	0	34	8	0	19	16	0	121
11:00 AM	5	9	0	7	5	0	3	2	0	31
11:15 AM	3	5	0	4	3	0	0	4	0	19
11:30 AM	4	6	0	9	1	0	4	2	0	26
11:45 AM	1	7	0	6	4	0	2	1	0	21
Total	13	27	0	26	13	0	9	9	0	97
12:00 PM	0	5	0	4	0	0	3	0	0	12
12:15 PM	0	5	0	6	1	0	3	1	0	16
12:30 PM	3	5	0	11	1	0	4	1	0	25
12:45 PM	1	8	0	10	2	0	5	3	0	29
Total	4	23	0	31	4	0	15	5	0	82
01:00 PM	4	6	0	9	2	0	2	0	0	23
01:15 PM	6	7	0	6	3	0	3	2	0	27
01:30 PM	4	3	0	8	4	0	6	1	0	26
01:45 PM	3	3	0	9	6	0	3	2	0	26
Total	17	19	0	32	15	0	14	5	0	102
02:00 PM	9	9	0	8	2	0	6	4	0	38
02:15 PM	3	11	0	5	5	0	2	1	0	27
02:30 PM	5	7	0	14	3	0	3	2	0	34
02:45 PM	5	13	0	11	4	0	3	2	0	38
Total	22	40	0	38	14	0	14	9	0	137
03:00 PM	2	11	0	11	2	0	5	5	0	36
03:15 PM	1	10	0	10	4	0	5	0	0	30
03:30 PM	0	7	0	11	0	0	4	6	0	28
03:45 PM	6	10	0	15	3	0	4	5	0	43
Total	9	38	0	47	9	0	18	16	0	137
04:00 PM	6	17	0	8	4	0	6	6	0	47
04:15 PM	5	13	0	9	3	0	5	1	0	36
04:30 PM	7	9	0	11	1	0	5	2	0	35
04:45 PM	7	13	0	10	4	0	3	3	0	40
Total	25	52	0	38	12	0	19	12	0	158

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File Name : 122784 H
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Heavy Vehicles

	Hyde Park Avenue From North			Hyde Park Avenue From South			Ukraine Way From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
05:00 PM	5	11	0	5	2	0	4	4	0	31
05:15 PM	5	7	0	4	1	0	1	1	0	19
05:30 PM	3	6	0	7	1	0	5	1	0	23
05:45 PM	2	6	0	5	2	0	0	1	0	16
Total	15	30	0	21	6	0	10	7	0	89
06:00 PM	0	10	0	8	0	0	1	1	0	20
06:15 PM	1	7	0	6	0	0	0	3	0	17
06:30 PM	1	7	0	5	2	0	0	1	0	16
06:45 PM	1	9	0	6	2	0	2	2	0	22
Total	3	33	0	25	4	0	3	7	0	75
Grand Total	161	434	0	443	141	0	181	133	0	1493
Apprch %	27.1	72.9	0	75.9	24.1	0	57.6	42.4	0	
Total %	10.8	29.1	0	29.7	9.4	0	12.1	8.9	0	

	Hyde Park Avenue From North				Hyde Park Avenue From South				Ukraine Way From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	2	12	0	14	**21**	5	0	**26**	8	4	0	12	**52**
08:15 AM	**7**	**13**	0	**20**	10	**7**	0	17	4	5	0	9	46
08:30 AM	0	11	0	11	13	3	0	16	**9**	3	0	12	39
08:45 AM	2	8	0	10	10	4	0	14	8	**7**	0	**15**	39
Total Volume	11	44	0	55	54	19	0	73	29	19	0	48	176
% App. Total	20	80	0		74	26	0		60.4	39.6	0		
PHF	.393	.846	.000	.688	.643	.679	.000	.702	.806	.679	.000	.800	.846
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 10:00 AM													
10:00 AM	**6**	12	0	**18**	**14**	1	0	**15**	**6**	2	0	8	**41**
10:15 AM	2	**13**	0	15	6	**4**	0	10	6	5	0	**11**	36
10:30 AM	2	3	0	5	4	2	0	6	5	3	0	8	19
10:45 AM	2	4	0	6	10	1	0	11	2	**6**	0	8	25
Total Volume	12	32	0	44	34	8	0	42	19	16	0	35	121
% App. Total	27.3	72.7	0		81	19	0		54.3	45.7	0		
PHF	.500	.615	.000	.611	.607	.500	.000	.700	.792	.667	.000	.795	.738
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:45 PM													
03:45 PM	6	10	0	16	**15**	3	0	**18**	4	5	0	9	43
04:00 PM	6	**17**	0	**23**	8	**4**	0	12	**6**	**6**	0	**12**	**47**
04:15 PM	5	13	0	18	9	3	0	12	5	1	0	6	36
04:30 PM	**7**	9	0	16	11	1	0	12	5	2	0	7	35
Total Volume	24	49	0	73	43	11	0	54	20	14	0	34	161
% App. Total	32.9	67.1	0		79.6	20.4	0		58.8	41.2	0		
PHF	.857	.721	.000	.793	.717	.688	.000	.750	.833	.583	.000	.708	.856

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File Name : 122784 H
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Peds and Bicycles

	Hyde Park Avenue From North			Hyde Park Avenue From South			Ukraine Way From West			
Start Time	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	Int. Total
07:00 AM	0	0	2	1	0	0	0	0	1	4
07:15 AM	0	0	1	1	0	0	0	0	2	4
07:30 AM	1	1	1	0	0	1	1	0	5	10
07:45 AM	0	0	8	1	0	1	1	0	7	18
Total	1	1	12	3	0	2	2	0	15	36
08:00 AM	0	2	2	1	1	0	0	0	6	12
08:15 AM	0	0	0	3	1	1	0	0	4	9
08:30 AM	0	0	1	0	0	0	0	0	0	1
08:45 AM	0	0	3	1	1	0	0	0	1	6
Total	0	2	6	5	3	1	0	0	11	28
09:00 AM	0	0	5	1	1	1	0	0	1	9
09:15 AM	0	0	0	3	1	0	0	0	5	9
09:30 AM	0	0	2	0	0	1	1	0	1	5
09:45 AM	0	0	3	2	0	0	0	0	1	6
Total	0	0	10	6	2	2	1	0	8	29
10:00 AM	0	0	2	0	0	0	0	0	4	6
10:15 AM	0	1	0	0	2	0	0	0	3	6
10:30 AM	0	1	0	1	0	0	0	0	4	6
10:45 AM	0	0	1	0	0	0	0	0	3	4
Total	0	2	3	1	2	0	0	0	14	22
11:00 AM	0	0	2	1	0	1	0	0	1	5
11:15 AM	0	0	0	0	0	0	0	0	5	5
11:30 AM	0	0	0	1	2	0	0	0	4	7
11:45 AM	0	2	3	1	0	0	0	0	1	7
Total	0	2	5	3	2	1	0	0	11	24
12:00 PM	0	0	1	2	0	0	0	0	1	4
12:15 PM	0	1	2	1	0	0	0	0	3	7
12:30 PM	0	0	3	0	0	0	0	0	3	6
12:45 PM	0	0	7	0	0	0	0	0	5	12
Total	0	1	13	3	0	0	0	0	12	29
01:00 PM	0	0	2	1	0	0	0	0	0	3
01:15 PM	0	1	3	0	0	1	1	0	4	10
01:30 PM	0	0	0	3	0	0	2	0	3	8
01:45 PM	0	0	0	1	0	0	0	0	7	8
Total	0	1	5	5	0	1	3	0	14	29
02:00 PM	0	0	1	1	0	1	0	0	8	11
02:15 PM	0	1	3	0	0	0	1	0	1	6
02:30 PM	0	0	1	1	1	1	1	1	7	13
02:45 PM	0	0	0	1	0	0	0	1	1	3
Total	0	1	5	3	1	2	2	2	17	33
03:00 PM	0	1	0	0	0	3	0	0	6	10
03:15 PM	0	1	1	2	1	0	1	0	3	9
03:30 PM	0	0	0	0	0	0	0	0	3	3
03:45 PM	2	2	0	1	0	1	0	1	2	9
Total	2	4	1	3	1	4	1	1	14	31
04:00 PM	0	0	3	0	0	0	1	0	2	6
04:15 PM	0	2	1	1	0	1	1	0	4	10
04:30 PM	0	0	0	0	0	0	0	0	4	4
04:45 PM	0	1	0	2	0	0	0	0	5	8
Total	0	3	4	3	0	1	2	0	15	28

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File Name : 122784 H
Site Code : 127-3946
Start Date : 2/28/2012

Groups Printed- Peds and Bicycles

	Hyde Park Avenue From North			Hyde Park Avenue From South			Ukraine Way From West			
Start Time	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	Int. Total
05:00 PM	0	1	3	0	2	0	0	0	3	9
05:15 PM	0	1	2	4	0	1	1	2	14	25
05:30 PM	0	1	0	1	0	0	0	0	4	6
05:45 PM	0	1	1	1	0	0	0	0	5	8
Total	0	4	6	6	2	1	1	2	26	48
06:00 PM	0	3	3	1	0	1	0	0	5	13
06:15 PM	0	2	5	0	0	2	0	0	5	14
06:30 PM	0	1	2	0	0	2	1	0	1	7
06:45 PM	0	0	0	2	0	1	1	0	3	7
Total	0	6	10	3	0	6	2	0	14	41
Grand Total	3	27	80	44	13	21	14	5	171	378
Apprch %	2.7	24.5	72.7	56.4	16.7	26.9	7.4	2.6	90	
Total %	0.8	7.1	21.2	11.6	3.4	5.6	3.7	1.3	45.2	

	Hyde Park Avenue From North				Hyde Park Avenue From South				Ukraine Way From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	**1**	1	1	3	0	0	**1**	1	**1**	0	5	6	10
07:45 AM	0	0	**8**	**8**	1	0	1	2	1	0	**7**	**8**	**18**
08:00 AM	0	**2**	2	4	1	**1**	0	2	0	0	6	6	12
08:15 AM	0	0	0	0	**3**	1	1	**5**	0	0	4	4	9
Total Volume	1	3	11	15	5	2	3	10	2	0	22	24	49
% App. Total	6.7	20	73.3		50	20	30		8.3	0	91.7		
PHF	.250	.375	.344	.469	.417	.500	.750	.500	.500	.000	.786	.750	.681
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 12:45 PM													
12:45 PM	0	0	**7**	**7**	0	0	0	0	0	0	**5**	**5**	**12**
01:00 PM	0	0	2	2	1	0	0	1	0	0	0	0	3
01:15 PM	0	**1**	3	4	0	0	**1**	1	1	0	4	5	10
01:30 PM	0	0	0	0	**3**	0	0	**3**	**2**	0	3	5	8
Total Volume	0	1	12	13	4	0	1	5	3	0	12	15	33
% App. Total	0	7.7	92.3		80	0	20		20	0	80		
PHF	.000	.250	.429	.464	.333	.000	.250	.417	.375	.000	.600	.750	.688
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:15 PM													
05:15 PM	0	1	2	3	**4**	0	**1**	**5**	**1**	**2**	**14**	**17**	**25**
05:30 PM	0	1	0	1	1	0	0	1	0	0	4	4	6
05:45 PM	0	1	1	2	1	0	0	1	0	0	5	5	8
06:00 PM	0	**3**	**3**	**6**	1	0	1	2	0	0	5	5	13
Total Volume	0	6	6	12	7	0	2	9	1	2	28	31	52
% App. Total	0	50	50		77.8	0	22.2		3.2	6.5	90.3		
PHF	.000	.500	.500	.500	.438	.000	.500	.450	.250	.250	.500	.456	.520

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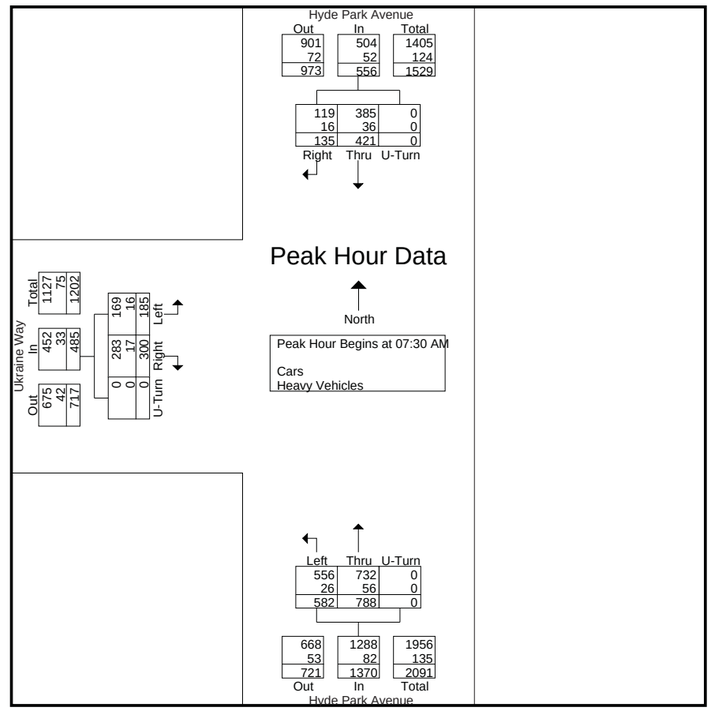
Site Code : 127-3946
Start Date : 2/28/2012

	Hyde Park Avenue From North				Hyde Park Avenue From South				Ukraine Way From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	36	89	0	125	**220**	150	0	**370**	68	48	0	116	611
07:45 AM	29	115	0	144	189	142	0	331	75	**50**	0	125	600
08:00 AM	24	96	0	120	186	138	0	324	**83**	43	0	**126**	570
08:15 AM	**46**	**121**	0	**167**	193	**152**	0	345	74	44	0	118	**630**
Total Volume	135	421	0	556	788	582	0	1370	300	185	0	485	2411
% App. Total	24.3	75.7	0		57.5	42.5	0		61.9	38.1	0		
PHF	.734	.870	.000	.832	.895	.957	.000	.926	.904	.925	.000	.962	.957
Cars	119	385	0	504	732	556	0	1288	283	169	0	452	2244
% Cars	88.1	91.4	0	90.6	92.9	95.5	0	94.0	94.3	91.4	0	93.2	93.1
Heavy Vehicles	16	36	0	52	56	26	0	82	17	16	0	33	167
% Heavy Vehicles	11.9	8.6	0	9.4	7.1	4.5	0	6.0	5.7	8.6	0	6.8	6.9



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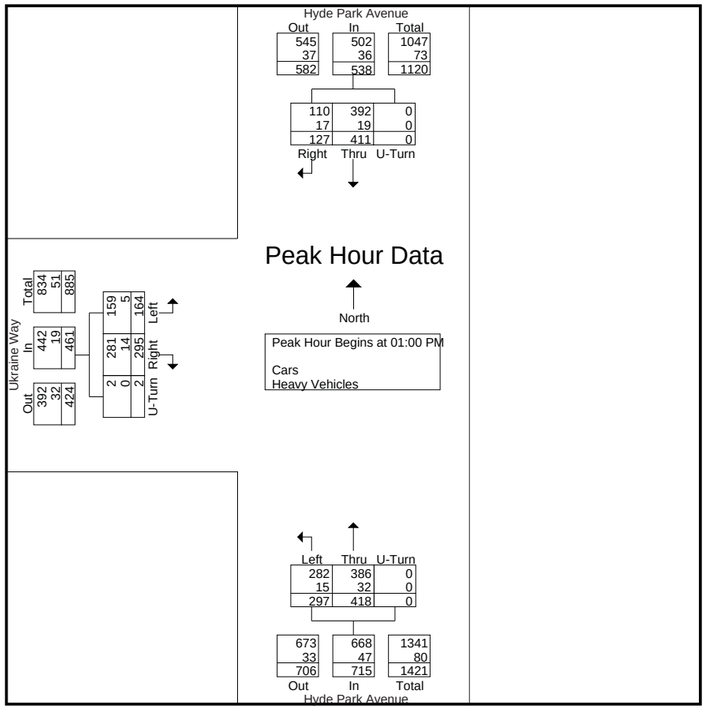
	Hyde Park Avenue From North				Hyde Park Avenue From South				Ukraine Way From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 01:00 PM													
01:00 PM	**33**	83	0	116	109	57	0	166	75	**51**	0	**126**	408
01:15 PM	32	100	0	132	104	77	0	181	**79**	35	**1**	115	428
01:30 PM	29	**121**	0	**150**	92	**82**	0	174	63	36	1	100	424
01:45 PM	33	107	0	140	**113**	81	0	**194**	78	42	0	120	**454**
Total Volume	127	411	0	538	418	297	0	715	295	164	2	461	1714
% App. Total	23.6	76.4	0		58.5	41.5	0		64	35.6	0.4		
PHF	.962	.849	.000	.897	.925	.905	.000	.921	.934	.804	.500	.915	.944
Cars	110	392	0	502	386	282	0	668	281	159	2	442	1612
% Cars	86.6	95.4	0	93.3	92.3	94.9	0	93.4	95.3	97.0	100	95.9	94.0
Heavy Vehicles	17	19	0	36	32	15	0	47	14	5	0	19	102
% Heavy Vehicles	13.4	4.6	0	6.7	7.7	5.1	0	6.6	4.7	3.0	0	4.1	6.0



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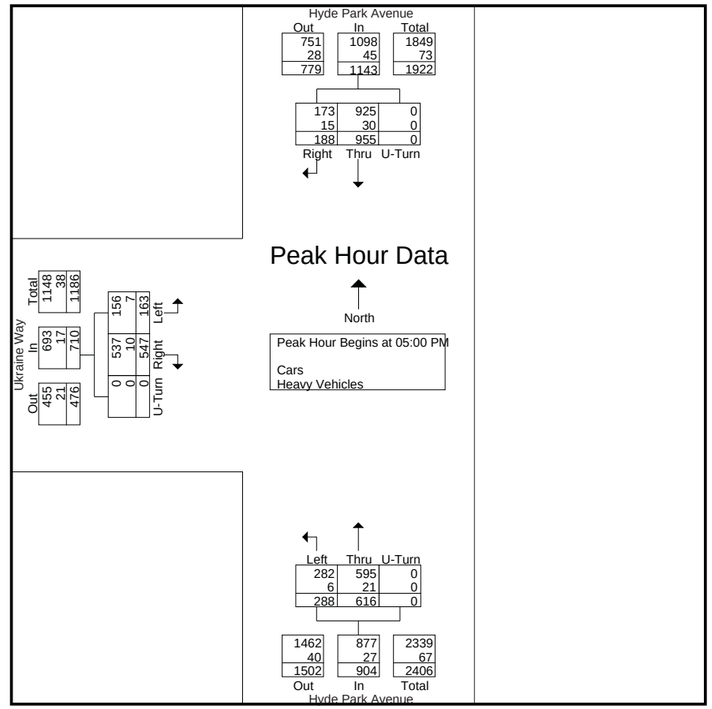
	Hyde Park Avenue From North				Hyde Park Avenue From South				Ukraine Way From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 06:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	42	191	0	233	139	67	0	206	142	**50**	0	**192**	631
05:15 PM	51	**262**	0	**313**	**174**	67	0	**241**	129	36	0	165	719
05:30 PM	42	260	0	302	161	72	0	233	**149**	40	0	189	**724**
05:45 PM	**53**	242	0	295	142	**82**	0	224	127	37	0	164	683
Total Volume	188	955	0	1143	616	288	0	904	547	163	0	710	2757
% App. Total	16.4	83.6	0		68.1	31.9	0		77	23	0		
PHF	.887	.911	.000	.913	.885	.878	.000	.938	.918	.815	.000	.924	.952
Cars	173	925	0	1098	595	282	0	877	537	156	0	693	2668
% Cars	92.0	96.9	0	96.1	96.6	97.9	0	97.0	98.2	95.7	0	97.6	96.8
Heavy Vehicles	15	30	0	45	21	6	0	27	10	7	0	17	89
% Heavy Vehicles	8.0	3.1	0	3.9	3.4	2.1	0	3.0	1.8	4.3	0	2.4	3.2



TRIP GENERATION CALCULATIONS

Parcel U
Trip Generation Assessment--Daily

HOWARD/STEIN-HUDSON ASSOCIATES
18-Jul-14

			Vehicular Trip Generation					Conversion to Person Trips		Vehicular Trips		
						Mode Share Split						
Land Use	Size	Category	Unadjusted Vehicle Trips	Internal trips	Pass-by %	Pass-By Trips	Less capture trips	Assumed national vehicle occupancy rate[3]	Converted to New Person trips	Assumed local auto occupancy rate for autos[3]	Total Adjusted Auto Trips	Total Adjusted Auto Trips (Pass-By)
Daily												
Apartment[1]	76	Total	584				584	1.13	660	1.13	362	
	Units	In	292				292	1.13	330	1.13	181	
		Out	292				292	1.13	330	1.13	181	
Condominium[2]	48	Total	340				340	1.13	384	1.13	211	
	Units	In	170				170	1.13	192	1.13	106	
		Out	170				170	1.13	192	1.13	105	
Retail[4]	1.6	Total	68				68	1.78	122	1.78	42	0
	KSF	In	34				34	1.78	61	1.78	21	0
		Out	34				34	1.78	61	1.78	21	0
Total		Total									615	0
		In									308	0
		Out									307	0
AM Peak Hour												
Apartment[1]	76	Total	41				41	1.13	46			
	Units	In	8				8	1.13	9	1.13	4	
		Out	33				33	1.13	37	1.13	15	
Condominium[2]	48	Total	29				29	1.13	33	1.13	14	
	Units	In	5				5	1.13	6	1.13	3	
		Out	24				24	1.13	27	1.13	11	
Retail[4]	1.6	Total	2				2	1.78	4	1.78	1	0
	KSF	In	1				1	1.78	2	1.78	1	0
		Out	1				1	1.78	2	1.78	0	0
Total		Total	**43**								**34**	**0**
		In	**9**								**8**	**0**
		Out	**34**								**26**	**0**
PM Peak Hour												
Apartment[1]	76	Total	59				59	1.13	59	1.13	26	
	Units	In	38				38	1.13	35	1.13	14	
		Out	21				21	1.13	24	1.13	12	
Condominium[2]	48	Total	33				33	1.13	37	1.13	16	
	Units	In	22				22	1.13	25	1.13	10	
		Out	11				11	1.13	12	1.13	6	
Retail[4]	1.6	Total	6				6	1.78	10	1.78	3	0
	KSF	In	3				3	1.78	5	1.78	1	0
		Out	3				3	1.78	5	1.78	2	0
Total		Total									**45**	**0**
		In									**25**	**0**
		Out									**20**	**0**
Summary												
Net Trips Total												
Net Trips In												
Net Trips Out												

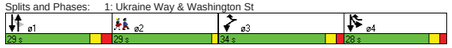
1. 2009 National vehicle occupancy rates - 1.13 home to work, 1.84 family/personal business, 1.78 shopping, 2.2 social/recreational
2. Mode shares based on peak-hour BTD Data for Area 6.
3. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates.
4. ITE Trip Generation Rate, 9th Edition, LUC 220 (Residential), Equation
5. ITE Trip Generation Rate, 9th Edition, LUC 230 (Residential Condominium/Townhouse), Equation
6. ITE Trip Generation, 9th Edition, LUC 820 (Shopping Center), Average Rate

INTERSECTION CAPACITY ANALYSIS WORKSHEETS

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	10	10	11	11	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Leading Detector (ft)	20	20	100		20	100	
Trailing Detector (ft)	0	0	0		0	0	
Turning Speed (mph)	15	9		9	15		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00	
Frt		0.850	0.953				
Flt Protected	0.950				0.950		
Satd. Flow (prot)	1526	1444	2608	0	1481	1366	
Flt Permitted	0.950				0.160		
Satd. Flow (perm)	1526	1444	2608	0	250	1366	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		611	56				
Headway Factor	1.10	1.10	1.25	1.25	1.19	1.19	
Link Speed (mph)	30		30			30	
Link Distance (ft)	293		1282			388	
Travel Time (s)	6.7		29.1			8.8	
Volume (vph)	142	562	444	197	273	250	
Peak Hour Factor	0.79	0.90	0.92	0.89	0.90	0.86	
Heavy Vehicles (%)	10%	4%	13%	6%	6%	21%	
Adj. Flow (vph)	180	624	483	221	303	291	
Lane Group Flow (vph)	180	624	704	0	303	291	
Turn Type		pt+ov			D.P+P		
Protected Phases	3	3 4	1		4	1 4	2
Permitted Phases					1		
Detector Phases	3	3 4	1		4	1 4	
Minimum Initial (s)	8.0		10.0		8.0		4.0
Minimum Split (s)	17.0		19.0		19.0		29.0
Total Split (s)	34.0	62.0	29.0	0.0	28.0	57.0	29.0
Total Split (%)	28.3%	51.7%	24.2%	0.0%	23.3%	47.5%	24%
Maximum Green (s)	29.0		23.0		23.0		27.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	2.0		3.0		2.0		0.0
Lead/Lag	Lead		Lead		Lag		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							20.0
Pedestrian Calls (#/hr)							45
Act Effct Green (s)	20.7	47.7	41.1		64.1	68.1	
Actuated g/C Ratio	0.17	0.40	0.34		0.53	0.57	
v/c Ratio	0.68	0.66	0.76		0.82	0.38	
Control Delay	64.5	6.4	41.9		51.1	19.1	
Queue Delay	0.4	9.3	0.4		0.2	0.0	
Total Delay	64.9	15.7	42.3		51.3	19.1	
LOS	E	B	D		D	B	
Approach Delay	26.7		42.3			35.6	
Approach LOS	C		D			D	
90th %ile Green (s)	28.9		23.1		23.0		27.0
90th %ile Term Code	Gap		Coord		Max		Ped
70th %ile Green (s)	21.7		30.3		23.0		27.0
70th %ile Term Code	Gap		Coord		Max		Ped
50th %ile Green (s)	17.9		34.1		23.0		27.0
50th %ile Term Code	Gap		Coord		Max		Ped
30th %ile Green (s)	17.7		34.3		23.0		27.0
30th %ile Term Code	Gap		Coord		Max		Ped
10th %ile Green (s)	12.2		73.8		18.0		0.0
10th %ile Term Code	Gap		Coord		Gap		Skip
Stops (vph)	118	114	457		175	134	
Fuel Used(gal)	3	3	14		5	2	
CO Emissions (g/hr)	199	185	1006		324	173	
NOx Emissions (g/hr)	39	36	196		63	34	
VOC Emissions (g/hr)	46	43	233		75	40	
Dilemma Vehicles (#)	0	0	0		0	0	
Queue Length 50th (ft)	130	86	251		190	129	
Queue Length 95th (ft)	m116	m131	#454		#319	184	
Internal Link Dist (ft)	213		1202			308	
Turn Bay Length (ft)							
Base Capacity (vph)	382	944	931		381	775	
Starvation Cap Reductn	35	286	0		0	0	
Spillback Cap Reductn	0	0	37		3	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.52	0.95	0.79		0.80	0.38	

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 20 (17%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 34.4 Intersection LOS: C
Intersection Capacity Utilization 66.0% ICU Level of Service C
Analysis Period (min) 15
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.

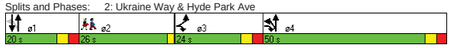
Splits and Phases: 1: Ukraine Way & Washington St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	11	11	11	11	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	
Leading Detector (ft)	20	20	20	100	100		
Trailing Detector (ft)	0	0	0	0	0		
Turning Speed (mph)	15	9	15			9	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Frt		0.850			0.959		
Flt Protected	0.950			0.980			
Satd. Flow (prot)	1584	1417	0	2938	2707	0	
Flt Permitted	0.950			0.645			
Satd. Flow (perm)	1584	1417	0	1933	2707	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		328			38		
Headway Factor	1.10	1.10	1.19	1.19	1.19	1.19	
Link Speed (mph)	30			30	30		
Link Distance (ft)	293			828	489		
Travel Time (s)	6.7			18.8	11.1		
Volume (vph)	188	282	565	796	412	139	
Peak Hour Factor	0.94	0.86	0.93	0.90	0.90	0.80	
Heavy Vehicles (%)	6%	6%	3%	6%	11%	12%	
Adj. Flow (vph)	200	328	608	884	458	174	
Lane Group Flow (vph)	200	328	0	1492	632	0	
Turn Type		pt+ov	D.P+P				
Protected Phases	3	3 4	4	1 4	1		2
Permitted Phases			1				
Detector Phases	3	3 4	4	1 4	1		
Minimum Initial (s)	8.0		8.0		10.0		7.0
Minimum Split (s)	14.0		14.0		17.0		26.0
Total Split (s)	24.0	74.0	50.0	70.0	20.0	0.0	26.0
Total Split (%)	20.0%	61.7%	41.7%	58.3%	16.7%	0.0%	22%
Maximum Green (s)	18.0		44.0		14.0		24.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	3.0		3.0		3.0		0.0
Lead/Lag	Lead		Lag		Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		3.0
Recall Mode	None		None		C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							17.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	17.8	67.8		76.8	31.8		
Actuated g/C Ratio	0.15	0.56		0.64	0.26		
v/c Ratio	0.85	0.35		0.92	0.85		
Control Delay	65.6	11.8		21.0	52.3		
Queue Delay	2.2	2.9		0.0	0.0		
Total Delay	67.8	14.7		21.0	52.3		
LOS	E	B		C	D		
Approach Delay	34.8			21.0	52.3		
Approach LOS	C			C	D		
90th %ile Green (s)	18.0		44.0		14.0		24.0
90th %ile Term Code	Max		Max		Coord		Ped
70th %ile Green (s)	18.0		44.0		14.0		24.0
70th %ile Term Code	Max		Max		Coord		Ped
50th %ile Green (s)	18.0		44.0		40.0		0.0
50th %ile Term Code	Max		Max		Coord		Skip
30th %ile Green (s)	17.4		44.0		40.6		0.0
30th %ile Term Code	Gap		Max		Coord		Skip
10th %ile Green (s)	12.6		44.0		45.4		0.0
10th %ile Term Code	Gap		Max		Coord		Skip
Stops (vph)	179	146		1023	327		
Fuel Used(gal)	4	2		20	10		
CO Emissions (g/hr)	275	149		1416	683		
NOx Emissions (g/hr)	53	29		275	133		
VOC Emissions (g/hr)	64	35		328	158		
Dilemma Vehicles (#)	0	0		0	0		
Queue Length 50th (ft)	167	66		580	205		
Queue Length 95th (ft)	m#213	m182		#703	#489		
Internal Link Dist (ft)	213			748	409		
Turn Bay Length (ft)							
Base Capacity (vph)	251	935		1614	745		
Starvation Cap Reductn	11	486		0	0		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.83	0.73		0.92	0.85		

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 10 (8%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 31.2 Intersection LOS: C
Intersection Capacity Utilization 84.3% ICU Level of Service E
Analysis Period (min) 15
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.

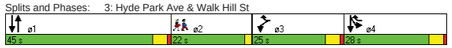
Splits and Phases: 2: Ukraine Way & Hyde Park Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	10	11	
Storage Length (ft)	0	0		0	200		
Storage Lanes	1	1		0	1		
Total Lost Time (s)	5.0	4.0	5.0	4.0	5.0	5.0	
Leading Detector (ft)	20	20	100		20	100	
Trailing Detector (ft)	0	0	0		0	0	
Turning Speed (mph)	15	9		9	15		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95	
Frt		0.850	0.995				
Flt Protected	0.950				0.950		
Satd. Flow (prot)	1252	1197	2928	0	1501	2908	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	1252	1197	2928	0	1501	2908	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		371	3				
Headway Factor	1.42	1.42	1.25	1.25	1.25	1.19	
Link Speed (mph)	30		30			30	
Link Distance (ft)	111		478			828	
Travel Time (s)	2.5		10.9			18.8	
Volume (vph)	22	358	1003	26	188	506	
Peak Hour Factor	0.79	0.85	0.89	0.72	0.63	0.89	
Heavy Vehicles (%)	9%	2%	3%	4%	1%	8%	
Parking (#/hr)	0	0					
Adj. Flow (vph)	28	421	1127	36	298	569	
Lane Group Flow (vph)	28	421	1163	0	298	569	
Turn Type		pt+ov			Prot		
Protected Phases	3	3 4	1		4	1 4	2
Permitted Phases							
Detector Phases	3	3 4	1		4	1 4	
Minimum Initial (s)	8.0		10.0		4.0		7.0
Minimum Split (s)	13.0		15.0		9.0		22.0
Total Split (s)	25.0	53.0	45.0	0.0	28.0	73.0	22.0
Total Split (%)	20.8%	44.2%	37.5%	0.0%	23.3%	60.8%	18%
Maximum Green (s)	20.0		40.0		23.0		20.0
Yellow Time (s)	4.0		4.0		4.0		2.0
All-Red Time (s)	1.0		1.0		1.0		0.0
Lead/Lag	Lead		Lead		Lag		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		3.0		3.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							13.0
Pedestrian Calls (#/hr)							30
Act Effct Green (s)	12.3	41.3	56.5		23.0	84.5	
Actuated g/C Ratio	0.10	0.34	0.47		0.19	0.70	
v/c Ratio	0.22	0.64	0.84		1.03	0.28	
Control Delay	50.8	9.4	37.7		92.2	6.2	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	50.8	9.4	37.7		92.2	6.2	
LOS	D	A	D		F	A	
Approach Delay	12.0		37.7			35.8	
Approach LOS	B		D			D	
90th %ile Green (s)	20.0		40.0		23.0		20.0
90th %ile Term Code	Max		Coord		Max		Ped
70th %ile Green (s)	16.0		44.0		23.0		20.0
70th %ile Term Code	Gap		Coord		Max		Ped
50th %ile Green (s)	9.7		50.3		23.0		20.0
50th %ile Term Code	Gap		Coord		Max		Ped
30th %ile Green (s)	8.0		74.0		23.0		0.0
30th %ile Term Code	Min		Coord		Max		Skip
10th %ile Green (s)	8.0		74.0		23.0		0.0
10th %ile Term Code	Min		Coord		Max		Skip
Stops (vph)	20	56	734		148	221	
Fuel Used(gal)	0	3	16		6	5	
CO Emissions (g/hr)	31	196	1104		389	358	
NOx Emissions (g/hr)	6	38	215		76	70	
VOC Emissions (g/hr)	7	45	256		90	83	
Dilemma Vehicles (#)	0	0	0		0	0	
Queue Length 50th (ft)	21	27	448		~202	52	
Queue Length 95th (ft)	41	87	#698		233	m201	
Internal Link Dist (ft)	31		398			748	
Turn Bay Length (ft)					200		
Base Capacity (vph)	209	656	1379		288	2047	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.64	0.84		1.03	0.28	

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 66 (55%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 32.4 Intersection LOS: C
Intersection Capacity Utilization 63.9% ICU Level of Service B
Analysis Period (min) 15
~ 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.

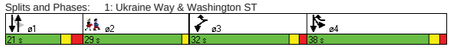
Splits and Phases: 3: Hyde Park Ave & Walk Hill St



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	10	10	11	11	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Leading Detector (ft)	20	20	100		20	100	
Trailing Detector (ft)	0	0	0		0	0	
Turning Speed (mph)	15	9		9	15		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00	
Frt		0.850	0.944				
Flt Protected	0.950				0.950		
Satd. Flow (prot)	1599	1391	2564	0	1525	1489	
Flt Permitted	0.950				0.235		
Satd. Flow (perm)	1599	1391	2564	0	377	1489	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		334	84				
Headway Factor	1.10	1.10	1.25	1.25	1.19	1.19	
Link Speed (mph)	30		30			30	
Link Distance (ft)	293		1282			388	
Travel Time (s)	6.7		29.1			8.8	
Volume (vph)	193	307	344	217	531	376	
Peak Hour Factor	0.84	0.92	0.83	0.89	0.92	0.90	
Heavy Vehicles (%)	5%	8%	15%	6%	3%	11%	
Adj. Flow (vph)	230	334	414	244	577	418	
Lane Group Flow (vph)	230	334	658	0	577	418	
Turn Type		pt+ov			D.P+P		
Protected Phases	3	3 4	1		4	1 4	2
Permitted Phases					1		
Detector Phases	3	3 4	1		4	1 4	
Minimum Initial (s)	10.0		10.0		8.0		7.0
Minimum Split (s)	17.0		19.0		20.0		29.0
Total Split (s)	32.0	70.0	21.0	0.0	38.0	59.0	29.0
Total Split (%)	26.7%	58.3%	17.5%	0.0%	31.7%	49.2%	24%
Maximum Green (s)	27.0		15.0		33.0		27.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	2.0		3.0		2.0		0.0
Lead/Lag	Lead		Lead		Lag		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							20.0
Pedestrian Calls (#/hr)							30
Act Effct Green (s)	22.0	60.0	34.6		68.6	72.6	
Actuated g/C Ratio	0.18	0.50	0.29		0.57	0.60	
v/c Ratio	0.78	0.39	0.82		1.07	0.46	
Control Delay	55.0	15.9	47.3		93.0	19.2	
Queue Delay	4.7	6.4	1.9		5.3	0.1	
Total Delay	59.7	22.3	49.2		98.2	19.3	
LOS	E	C	D		F	B	
Approach Delay	37.6		49.2			65.1	
Approach LOS	D		D			E	
90th %ile Green (s)	27.0		15.0		33.0		27.0
90th %ile Term Code	Max		Coord		Max		Ped
70th %ile Green (s)	25.0		17.0		33.0		27.0
70th %ile Term Code	Gap		Coord		Max		Ped
50th %ile Green (s)	21.7		20.3		33.0		27.0
50th %ile Term Code	Gap		Coord		Max		Ped
30th %ile Green (s)	18.0		53.0		33.0		0.0
30th %ile Term Code	Gap		Coord		Max		Skip
10th %ile Green (s)	13.3		57.7		33.0		0.0
10th %ile Term Code	Gap		Coord		Max		Skip
Stops (vph)	192	131	304		317	192	
Fuel Used(gal)	4	2	13		13	4	
CO Emissions (g/hr)	256	169	887		937	256	
NOx Emissions (g/hr)	50	33	173		182	50	
VOC Emissions (g/hr)	59	39	206		217	59	
Dilemma Vehicles (#)	0	0	0		0	0	
Queue Length 50th (ft)	191	123	~298		~484	213	
Queue Length 95th (ft)	m220	m165	#414		#687	284	
Internal Link Dist (ft)	213		1202			308	
Turn Bay Length (ft)							
Base Capacity (vph)	373	859	799		541	901	
Starvation Cap Reductn	86	464	0		0	58	
Spillback Cap Reductn	0	0	53		7	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.80	0.85	0.88		1.08	0.50	

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 2 (2%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 53.4 Intersection LOS: D
Intersection Capacity Utilization 72.9% ICU Level of Service C
Analysis Period (min) 15
~ 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: Ukraine Way & Washington ST



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	11	11	11	11	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	
Leading Detector (ft)	20	20	20	100	100		
Trailing Detector (ft)	0	0	0	0	0		
Turning Speed (mph)	15	9	15			9	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Frt		0.850			0.971		
Flt Protected	0.950			0.982			
Satd. Flow (prot)	1584	1458	0	2922	2868	0	
Flt Permitted	0.950			0.558			
Satd. Flow (perm)	1584	1458	0	1660	2868	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		418			27		
Headway Factor	1.10	1.10	1.19	1.19	1.19	1.19	
Link Speed (mph)	30			30	30		
Link Distance (ft)	293			828	489		
Travel Time (s)	6.7			18.8	11.1		
Volume (vph)	176	572	302	528	859	198	
Peak Hour Factor	0.88	0.94	0.90	0.89	0.88	0.85	
Heavy Vehicles (%)	6%	3%	3%	7%	5%	12%	
Adj. Flow (vph)	200	609	336	593	976	233	
Lane Group Flow (vph)	200	609	0	929	1209	0	
Turn Type		pt+ov	D.P+P				
Protected Phases	3	3 4	4	1 4	1		2
Permitted Phases			1				
Detector Phases	3	3 4	4	1 4	1		
Minimum Initial (s)	8.0		8.0		10.0		7.0
Minimum Split (s)	14.0		14.0		17.0		26.0
Total Split (s)	32.0	47.0	15.0	62.0	47.0	0.0	26.0
Total Split (%)	26.7%	39.2%	12.5%	51.7%	39.2%	0.0%	22%
Maximum Green (s)	26.0		9.0		41.0		24.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	3.0		3.0		3.0		0.0
Lead/Lag	Lead		Lag		Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		3.0
Recall Mode	None		None		C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							17.0
Pedestrian Calls (#/hr)							35
Act Effct Green (s)	20.7	35.7		68.7	58.7		
Actuated g/C Ratio	0.17	0.30		0.57	0.49		
v/c Ratio	0.73	0.84		1.66dl	0.85		
Control Delay	71.3	23.0		36.7	36.9		
Queue Delay	1.5	81.9		1.2	0.9		
Total Delay	72.8	104.9		37.8	37.8		
LOS	E	F		D	D		
Approach Delay	97.0			37.8	37.8		
Approach LOS	F			D	D		
90th %ile Green (s)	26.0		9.0		41.0		24.0
90th %ile Term Code	Max		Max		Coord		Ped
70th %ile Green (s)	20.8		9.0		46.2		24.0
70th %ile Term Code	Gap		Max		Coord		Ped
50th %ile Green (s)	20.8		9.0		46.2		24.0
50th %ile Term Code	Gap		Max		Coord		Ped
30th %ile Green (s)	17.7		9.0		75.3		0.0
30th %ile Term Code	Gap		Max		Coord		Skip
10th %ile Green (s)	13.1		9.0		79.9		0.0
10th %ile Term Code	Gap		Max		Coord		Skip
Stops (vph)	157	263		943	729		
Fuel Used(gal)	4	5		17	16		
CO Emissions (g/hr)	267	380		1172	1118		
NOx Emissions (g/hr)	52	74		228	218		
VOC Emissions (g/hr)	62	88		272	259		
Dilemma Vehicles (#)	0	0		0	0		
Queue Length 50th (ft)	147	188		~394	~534		
Queue Length 95th (ft)	m149	m88		#567	#699		
Internal Link Dist (ft)	213			748	409		
Turn Bay Length (ft)							
Base Capacity (vph)	356	727		1056	1417		
Starvation Cap Reductn	55	209		0	0		
Spillback Cap Reductn	0	0		33	58		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.66	1.18		0.91	0.89		

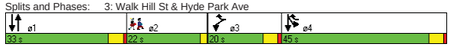
Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 117 (98%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 54.0 Intersection LOS: D
Intersection Capacity Utilization 82.7% ICU Level of Service E
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Ukraine Way & Hyde Park Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	10	10	10	11	
Storage Length (ft)	0	0		0	200		
Storage Lanes	1	1		0	1		
Total Lost Time (s)	5.0	4.0	5.0	4.0	5.0	5.0	
Leading Detector (ft)	20	20	100		20	100	
Trailing Detector (ft)	0	0	0		0	0	
Turning Speed (mph)	15	9		9	15		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95	
Frt		0.850	0.994				
Flt Protected	0.950				0.950		
Satd. Flow (prot)	1373	1275	2846	0	1501	3049	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	1373	1275	2846	0	1501	3049	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		254	3				
Headway Factor	1.25	1.25	1.25	1.25	1.25	1.19	
Link Speed (mph)	30		30			30	
Link Distance (ft)	111		478			828	
Travel Time (s)	2.5		10.9			18.8	
Volume (vph)	21	226	604	23	444	987	
Peak Hour Factor	0.38	0.89	0.85	0.72	0.87	0.84	
Heavy Vehicles (%)	10%	6%	6%	4%	1%	3%	
Parking (#/hr)	0	0					
Adj. Flow (vph)	55	254	711	32	510	1175	
Lane Group Flow (vph)	55	254	743	0	510	1175	
Turn Type		pt+ov			Prot		
Protected Phases	3	3 4	1		4	1 4	2
Permitted Phases							
Detector Phases	3	3 4	1		4	1 4	
Minimum Initial (s)	8.0		10.0		4.0		7.0
Minimum Split (s)	13.0		15.0		9.0		22.0
Total Split (s)	20.0	65.0	33.0	0.0	45.0	78.0	22.0
Total Split (%)	16.7%	54.2%	27.5%	0.0%	37.5%	65.0%	18%
Maximum Green (s)	15.0		28.0		40.0		20.0
Yellow Time (s)	4.0		4.0		4.0		2.0
All-Red Time (s)	1.0		1.0		1.0		0.0
Lead/Lag	Lead		Lead		Lag		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		3.0		3.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							13.0
Pedestrian Calls (#/hr)							25
Act Effct Green (s)	9.9	55.9	41.9		40.0	86.9	
Actuated g/C Ratio	0.08	0.47	0.35		0.33	0.72	
v/c Ratio	0.49	0.35	0.75		1.02	0.53	
Control Delay	66.4	3.5	42.5		63.4	10.0	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	66.4	3.5	42.5		63.4	10.0	
LOS	E	A	D		E	B	
Approach Delay	14.7		42.5			26.2	
Approach LOS	B		D			C	
90th %ile Green (s)	13.5		29.5		40.0		20.0
90th %ile Term Code	Gap		Coord		Max		Ped
70th %ile Green (s)	10.9		32.1		40.0		20.0
70th %ile Term Code	Gap		Coord		Max		Ped
50th %ile Green (s)	9.1		33.9		40.0		20.0
50th %ile Term Code	Gap		Coord		Max		Ped
30th %ile Green (s)	8.0		57.0		40.0		0.0
30th %ile Term Code	Min		Coord		Max		Skip
10th %ile Green (s)	8.0		57.0		40.0		0.0
10th %ile Term Code	Min		Coord		Max		Skip
Stops (vph)	19	17	487		363	633	
Fuel Used(gal)	0	1	10		11	12	
CO Emissions (g/hr)	35	97	730		741	831	
NOx Emissions (g/hr)	7	19	142		144	162	
VOC Emissions (g/hr)	8	23	169		172	193	
Dilemma Vehicles (#)	0	0	0		0	0	
Queue Length 50th (ft)	42	0	293		~363	251	
Queue Length 95th (ft)	33	41	#416		m#561	464	
Internal Link Dist (ft)	31		398			748	
Turn Bay Length (ft)					200		
Base Capacity (vph)	172	725	996		500	2208	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.32	0.35	0.75		1.02	0.53	

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 65 (54%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 29.3 Intersection LOS: C
Intersection Capacity Utilization 65.9% ICU Level of Service C
Analysis Period (min) 15
~ 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.

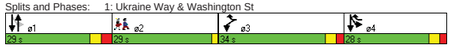
Splits and Phases: 3: Walk Hill St & Hyde Park Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	10	10	11	11	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Leading Detector (ft)	20	20	100		20	100	
Trailing Detector (ft)	0	0	0		0	0	
Turning Speed (mph)	15	9		9	15		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00	
Frt		0.850	0.953				
Flt Protected	0.950				0.950		
Satd. Flow (prot)	1526	1444	2608	0	1481	1366	
Flt Permitted	0.950				0.160		
Satd. Flow (perm)	1526	1444	2608	0	250	1366	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		610	56				
Headway Factor	1.10	1.10	1.25	1.25	1.19	1.19	
Link Speed (mph)	30		30			30	
Link Distance (ft)	293		1282			388	
Travel Time (s)	6.7		29.1			8.8	
Volume (vph)	146	576	455	202	280	256	
Peak Hour Factor	0.79	0.90	0.92	0.89	0.90	0.86	
Heavy Vehicles (%)	10%	4%	13%	6%	6%	21%	
Adj. Flow (vph)	185	640	495	227	311	298	
Lane Group Flow (vph)	185	640	722	0	311	298	
Turn Type		pt+ov			D.P+P		
Protected Phases	3	3 4	1		4	1 4	2
Permitted Phases					1		
Detector Phases	3	3 4	1		4	1 4	
Minimum Initial (s)	8.0		10.0		8.0		4.0
Minimum Split (s)	17.0		19.0		19.0		29.0
Total Split (s)	34.0	62.0	29.0	0.0	28.0	57.0	29.0
Total Split (%)	28.3%	51.7%	24.2%	0.0%	23.3%	47.5%	24%
Maximum Green (s)	29.0		23.0		23.0		27.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	2.0		3.0		2.0		0.0
Lead/Lag	Lead		Lead		Lag		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							20.0
Pedestrian Calls (#/hr)							45
Act Effct Green (s)	21.0	48.2	40.6		63.8	67.8	
Actuated g/C Ratio	0.18	0.40	0.34		0.53	0.56	
v/c Ratio	0.69	0.68	0.79		0.84	0.39	
Control Delay	63.8	6.7	43.5		53.2	19.5	
Queue Delay	0.5	11.4	0.6		0.3	0.0	
Total Delay	64.3	18.1	44.1		53.4	19.5	
LOS	E	B	D		D	B	
Approach Delay	28.4		44.1			36.8	
Approach LOS	C		D			D	
90th %ile Green (s)	29.0		23.0		23.0		27.0
90th %ile Term Code	Max		Coord		Max		Ped
70th %ile Green (s)	22.1		29.9		23.0		27.0
70th %ile Term Code	Gap		Coord		Max		Ped
50th %ile Green (s)	18.3		33.7		23.0		27.0
50th %ile Term Code	Gap		Coord		Max		Ped
30th %ile Green (s)	18.1		33.9		23.0		27.0
30th %ile Term Code	Gap		Coord		Max		Ped
10th %ile Green (s)	12.5		72.4		19.1		0.0
10th %ile Term Code	Gap		Coord		Gap		Skip
Stops (vph)	122	122	469		180	138	
Fuel Used(gal)	3	3	15		5	3	
CO Emissions (g/hr)	203	194	1047		341	178	
NOx Emissions (g/hr)	40	38	204		66	35	
VOC Emissions (g/hr)	47	45	243		79	41	
Dilemma Vehicles (#)	0	0	0		0	0	
Queue Length 50th (ft)	133	102	261		196	134	
Queue Length 95th (ft)	m116	m131	#471		#335	189	
Internal Link Dist (ft)	213		1202			308	
Turn Bay Length (ft)							
Base Capacity (vph)	382	950	919		381	771	
Starvation Cap Reductn	38	287	0		0	0	
Spillback Cap Reductn	0	0	41		3	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.54	0.97	0.82		0.82	0.39	

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 20 (17%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 36.1 Intersection LOS: D
Intersection Capacity Utilization 67.4% ICU Level of Service C
Analysis Period (min) 15
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.

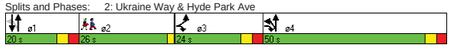
Splits and Phases: 1: Ukraine Way & Washington St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	11	11	11	11	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	
Leading Detector (ft)	20	20	20	100	100		
Trailing Detector (ft)	0	0	0	0	0		
Turning Speed (mph)	15	9	15			9	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Frt		0.850			0.959		
Flt Protected	0.950			0.980			
Satd. Flow (prot)	1584	1417	0	2938	2707	0	
Flt Permitted	0.950			0.645			
Satd. Flow (perm)	1584	1417	0	1933	2707	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		336			38		
Headway Factor	1.10	1.10	1.19	1.19	1.19	1.19	
Link Speed (mph)	30			30	30		
Link Distance (ft)	293			828	489		
Travel Time (s)	6.7			18.8	11.1		
Volume (vph)	193	289	579	816	422	143	
Peak Hour Factor	0.94	0.86	0.93	0.90	0.90	0.80	
Heavy Vehicles (%)	6%	6%	3%	6%	11%	12%	
Adj. Flow (vph)	205	336	623	907	469	179	
Lane Group Flow (vph)	205	336	0	1530	648	0	
Turn Type		pt+ov	D.P+P				
Protected Phases	3	3 4	4	1 4	1		2
Permitted Phases			1				
Detector Phases	3	3 4	4	1 4	1		
Minimum Initial (s)	8.0		8.0		10.0		7.0
Minimum Split (s)	14.0		14.0		17.0		26.0
Total Split (s)	24.0	74.0	50.0	70.0	20.0	0.0	26.0
Total Split (%)	20.0%	61.7%	41.7%	58.3%	16.7%	0.0%	22%
Maximum Green (s)	18.0		44.0		14.0		24.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	3.0		3.0		3.0		0.0
Lead/Lag	Lead		Lag		Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		3.0
Recall Mode	None		None		C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							17.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	18.0	68.0		76.6	31.6		
Actuated g/C Ratio	0.15	0.57		0.64	0.26		
v/c Ratio	0.86	0.35		0.95	0.88		
Control Delay	65.4	12.0		23.3	54.8		
Queue Delay	2.6	2.8		0.0	0.0		
Total Delay	67.9	14.8		23.3	54.8		
LOS	E	B		C	D		
Approach Delay	34.9			23.3	54.8		
Approach LOS	C			C	D		
90th %ile Green (s)	18.0		44.0		14.0		24.0
90th %ile Term Code	Max		Max		Coord		Ped
70th %ile Green (s)	18.0		44.0		14.0		24.0
70th %ile Term Code	Max		Max		Coord		Ped
50th %ile Green (s)	18.0		44.0		40.0		0.0
50th %ile Term Code	Max		Max		Coord		Skip
30th %ile Green (s)	18.0		44.0		40.0		0.0
30th %ile Term Code	Max		Max		Coord		Skip
10th %ile Green (s)	13.2		44.0		44.8		0.0
10th %ile Term Code	Gap		Max		Coord		Skip
Stops (vph)	183	109		1076	335		
Fuel Used(gal)	4	2		22	10		
CO Emissions (g/hr)	281	138		1508	721		
NOx Emissions (g/hr)	55	27		293	140		
VOC Emissions (g/hr)	65	32		349	167		
Dilemma Vehicles (#)	0	0		0	0		
Queue Length 50th (ft)	170	68		594	213		
Queue Length 95th (ft)	m208	m182		#735	#503		
Internal Link Dist (ft)	213			748	409		
Turn Bay Length (ft)							
Base Capacity (vph)	251	949		1610	740		
Starvation Cap Reductn	11	489		0	0		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.85	0.73		0.95	0.88		

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 10 (8%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 33.1 Intersection LOS: C
Intersection Capacity Utilization 86.2% ICU Level of Service E
Analysis Period (min) 15
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.

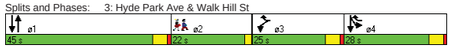
Splits and Phases: 2: Ukraine Way & Hyde Park Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	10	11	
Storage Length (ft)	0	0		0	200		
Storage Lanes	1	1		0	1		
Total Lost Time (s)	5.0	4.0	5.0	4.0	5.0	5.0	
Leading Detector (ft)	20	20	100		20	100	
Trailing Detector (ft)	0	0	0		0	0	
Turning Speed (mph)	15	9		9	15		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95	
Frt		0.850	0.995				
Flt Protected	0.950				0.950		
Satd. Flow (prot)	1252	1197	2928	0	1501	2908	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	1252	1197	2928	0	1501	2908	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		370	3				
Headway Factor	1.42	1.42	1.25	1.25	1.25	1.19	
Link Speed (mph)	30		30			30	
Link Distance (ft)	111		478			828	
Travel Time (s)	2.5		10.9			18.8	
Volume (vph)	23	367	1028	27	193	519	
Peak Hour Factor	0.79	0.85	0.89	0.72	0.63	0.89	
Heavy Vehicles (%)	9%	2%	3%	4%	1%	8%	
Parking (#/hr)	0	0					
Adj. Flow (vph)	29	432	1155	38	306	583	
Lane Group Flow (vph)	29	432	1193	0	306	583	
Turn Type		pt+ov			Prot		
Protected Phases	3	3 4	1		4	1 4	2
Permitted Phases							
Detector Phases	3	3 4	1		4	1 4	
Minimum Initial (s)	8.0		10.0		4.0		7.0
Minimum Split (s)	13.0		15.0		9.0		22.0
Total Split (s)	25.0	53.0	45.0	0.0	28.0	73.0	22.0
Total Split (%)	20.8%	44.2%	37.5%	0.0%	23.3%	60.8%	18%
Maximum Green (s)	20.0		40.0		23.0		20.0
Yellow Time (s)	4.0		4.0		4.0		2.0
All-Red Time (s)	1.0		1.0		1.0		0.0
Lead/Lag	Lead		Lead		Lag		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		3.0		3.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							13.0
Pedestrian Calls (#/hr)							30
Act Effct Green (s)	12.9	41.9	55.9		23.0	83.9	
Actuated g/C Ratio	0.11	0.35	0.47		0.19	0.70	
v/c Ratio	0.22	0.66	0.87		1.06	0.29	
Control Delay	50.2	10.1	40.0		99.5	6.5	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	50.2	10.1	40.0		99.5	6.5	
LOS	D	B	D		F	A	
Approach Delay	12.6		40.0			38.5	
Approach LOS	B		D			D	
90th %ile Green (s)	20.0		40.0		23.0		20.0
90th %ile Term Code	Max		Coord		Max		Ped
70th %ile Green (s)	17.3		42.7		23.0		20.0
70th %ile Term Code	Gap		Coord		Max		Ped
50th %ile Green (s)	11.0		49.0		23.0		20.0
50th %ile Term Code	Gap		Coord		Max		Ped
30th %ile Green (s)	8.0		74.0		23.0		0.0
30th %ile Term Code	Min		Coord		Max		Skip
10th %ile Green (s)	8.0		74.0		23.0		0.0
10th %ile Term Code	Min		Coord		Max		Skip
Stops (vph)	21	63	750		149	232	
Fuel Used(gal)	0	3	17		6	5	
CO Emissions (g/hr)	33	207	1166		418	372	
NOx Emissions (g/hr)	6	40	227		81	72	
VOC Emissions (g/hr)	8	48	270		97	86	
Dilemma Vehicles (#)	0	0	0		0	0	
Queue Length 50th (ft)	21	34	476		~247	53	
Queue Length 95th (ft)	43	98	#725		#244	m201	
Internal Link Dist (ft)	31		398			748	
Turn Bay Length (ft)					200		
Base Capacity (vph)	209	657	1367		288	2034	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.14	0.66	0.87		1.06	0.29	

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 66 (55%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 34.5 Intersection LOS: C
Intersection Capacity Utilization 65.3% ICU Level of Service C
Analysis Period (min) 15
~ 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.

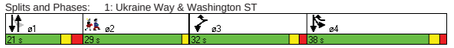
Splits and Phases: 3: Hyde Park Ave & Walk Hill St



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	10	10	11	11	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Leading Detector (ft)	20	20	100		20	100	
Trailing Detector (ft)	0	0	0		0	0	
Turning Speed (mph)	15	9		9	15		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00	
Frt		0.850	0.945				
Flt Protected	0.950				0.950		
Satd. Flow (prot)	1599	1391	2566	0	1525	1489	
Flt Permitted	0.950				0.235		
Satd. Flow (perm)	1599	1391	2566	0	377	1489	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		342	82				
Headway Factor	1.10	1.10	1.25	1.25	1.19	1.19	
Link Speed (mph)	30		30			30	
Link Distance (ft)	293		1282			388	
Travel Time (s)	6.7		29.1			8.8	
Volume (vph)	198	315	353	222	544	385	
Peak Hour Factor	0.84	0.92	0.83	0.89	0.92	0.90	
Heavy Vehicles (%)	5%	8%	15%	6%	3%	11%	
Adj. Flow (vph)	236	342	425	249	591	428	
Lane Group Flow (vph)	236	342	674	0	591	428	
Turn Type		pt+ov			D.P+P		
Protected Phases	3	3 4	1		4	1 4	2
Permitted Phases					1		
Detector Phases	3	3 4	1		4	1 4	
Minimum Initial (s)	10.0		10.0		8.0		7.0
Minimum Split (s)	17.0		19.0		20.0		29.0
Total Split (s)	32.0	70.0	21.0	0.0	38.0	59.0	29.0
Total Split (%)	26.7%	58.3%	17.5%	0.0%	31.7%	49.2%	24%
Maximum Green (s)	27.0		15.0		33.0		27.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	2.0		3.0		2.0		0.0
Lead/Lag	Lead		Lead		Lag		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							20.0
Pedestrian Calls (#/hr)							30
Act Effct Green (s)	22.4	60.4	34.2		68.2	72.2	
Actuated g/C Ratio	0.19	0.50	0.28		0.57	0.60	
v/c Ratio	0.79	0.39	0.85		1.09	0.48	
Control Delay	54.3	15.9	49.7		101.8	19.6	
Queue Delay	6.1	7.1	3.9		7.4	0.1	
Total Delay	60.4	23.1	53.7		109.2	19.7	
LOS	E	C	D		F	B	
Approach Delay	38.3		53.7			71.6	
Approach LOS	D		D			E	
90th %ile Green (s)	27.0		15.0		33.0		27.0
90th %ile Term Code	Max		Coord		Max		Ped
70th %ile Green (s)	25.5		16.5		33.0		27.0
70th %ile Term Code	Gap		Coord		Max		Ped
50th %ile Green (s)	22.2		19.8		33.0		27.0
50th %ile Term Code	Gap		Coord		Max		Ped
30th %ile Green (s)	18.5		52.5		33.0		0.0
30th %ile Term Code	Gap		Coord		Max		Skip
10th %ile Green (s)	13.6		57.4		33.0		0.0
10th %ile Term Code	Gap		Coord		Max		Skip
Stops (vph)	197	135	306		322	201	
Fuel Used(gal)	4	2	13		15	4	
CO Emissions (g/hr)	261	174	925		1027	266	
NOx Emissions (g/hr)	51	34	180		200	52	
VOC Emissions (g/hr)	60	40	214		238	62	
Dilemma Vehicles (#)	0	0	0		0	0	
Queue Length 50th (ft)	196	126	~318		~505	219	
Queue Length 95th (ft)	m220	m162	#429		#710	290	
Internal Link Dist (ft)	213		1202			308	
Turn Bay Length (ft)							
Base Capacity (vph)	373	865	791		540	896	
Starvation Cap Reductn	90	468	0		0	55	
Spillback Cap Reductn	0	0	64		9	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.83	0.86	0.93		1.11	0.51	

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 2 (2%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 57.8 Intersection LOS: E
Intersection Capacity Utilization 74.4% ICU Level of Service D
Analysis Period (min) 15
~ 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: Ukraine Way & Washington ST



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	11	11	11	11	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	
Leading Detector (ft)	20	20	20	100	100		
Trailing Detector (ft)	0	0	0	0	0		
Turning Speed (mph)	15	9	15			9	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Frt		0.850			0.971		
Flt Protected	0.950			0.982			
Satd. Flow (prot)	1584	1458	0	2922	2868	0	
Flt Permitted	0.950			0.563			
Satd. Flow (perm)	1584	1458	0	1675	2868	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		417			27		
Headway Factor	1.10	1.10	1.19	1.19	1.19	1.19	
Link Speed (mph)	30			30	30		
Link Distance (ft)	293			828	489		
Travel Time (s)	6.7			18.8	11.1		
Volume (vph)	180	586	310	541	881	203	
Peak Hour Factor	0.88	0.94	0.90	0.89	0.88	0.85	
Heavy Vehicles (%)	6%	3%	3%	7%	5%	12%	
Adj. Flow (vph)	205	623	344	608	1001	239	
Lane Group Flow (vph)	205	623	0	952	1240	0	
Turn Type		pt+ov	D.P+P				
Protected Phases	3	3 4	4	1 4	1		2
Permitted Phases			1				
Detector Phases	3	3 4	4	1 4	1		
Minimum Initial (s)	8.0		8.0		10.0		7.0
Minimum Split (s)	14.0		14.0		17.0		26.0
Total Split (s)	32.0	47.0	15.0	62.0	47.0	0.0	26.0
Total Split (%)	26.7%	39.2%	12.5%	51.7%	39.2%	0.0%	22%
Maximum Green (s)	26.0		9.0		41.0		24.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	3.0		3.0		3.0		0.0
Lead/Lag	Lead		Lag		Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		3.0
Recall Mode	None		None		C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							17.0
Pedestrian Calls (#/hr)							35
Act Effct Green (s)	21.1	36.1		68.3	58.3		
Actuated g/C Ratio	0.18	0.30		0.57	0.49		
v/c Ratio	0.74	0.85		1.71dl	0.88		
Control Delay	68.8	22.0		38.5	39.0		
Queue Delay	1.8	92.9		1.8	1.5		
Total Delay	70.6	114.9		40.3	40.5		
LOS	E	F		D	D		
Approach Delay	103.9			40.3	40.5		
Approach LOS	F			D	D		
90th %ile Green (s)	26.0		9.0		41.0		24.0
90th %ile Term Code	Max		Max		Coord		Ped
70th %ile Green (s)	21.8		9.0		45.2		24.0
70th %ile Term Code	Gap		Max		Coord		Ped
50th %ile Green (s)	21.1		9.0		45.9		24.0
50th %ile Term Code	Gap		Max		Coord		Ped
30th %ile Green (s)	18.1		9.0		74.9		0.0
30th %ile Term Code	Gap		Max		Coord		Skip
10th %ile Green (s)	13.4		9.0		79.6		0.0
10th %ile Term Code	Gap		Max		Coord		Skip
Stops (vph)	161	233		956	735		
Fuel Used(gal)	4	5		17	17		
CO Emissions (g/hr)	267	367		1220	1175		
NOx Emissions (g/hr)	52	71		237	229		
VOC Emissions (g/hr)	62	85		283	272		
Dilemma Vehicles (#)	0	0		0	0		
Queue Length 50th (ft)	151	84		~413	~563		
Queue Length 95th (ft)	m148	m87		#587	#726		
Internal Link Dist (ft)	213			748	409		
Turn Bay Length (ft)							
Base Capacity (vph)	356	728		1058	1408		
Starvation Cap Reductn	57	210		0	0		
Spillback Cap Reductn	0	0		36	62		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.69	1.20		0.93	0.92		

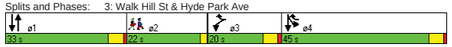
Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 117 (98%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 57.9 Intersection LOS: E
Intersection Capacity Utilization 84.5% ICU Level of Service E
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Ukraine Way & Hyde Park Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	10	10	10	11	
Storage Length (ft)	0	0		0	200		
Storage Lanes	1	1		0	1		
Total Lost Time (s)	5.0	4.0	5.0	4.0	5.0	5.0	
Leading Detector (ft)	20	20	100		20	100	
Trailing Detector (ft)	0	0	0		0	0	
Turning Speed (mph)	15	9		9	15		
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95	
Frt		0.850	0.993				
Flt Protected	0.950				0.950		
Satd. Flow (prot)	1373	1275	2843	0	1501	3049	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	1373	1275	2843	0	1501	3049	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		261	4				
Headway Factor	1.25	1.25	1.25	1.25	1.25	1.19	
Link Speed (mph)	30		30			30	
Link Distance (ft)	111		478			828	
Travel Time (s)	2.5		10.9			18.8	
Volume (vph)	22	232	619	24	455	1012	
Peak Hour Factor	0.38	0.89	0.85	0.72	0.87	0.84	
Heavy Vehicles (%)	10%	6%	6%	4%	1%	3%	
Parking (#/hr)	0	0					
Adj. Flow (vph)	58	261	728	33	523	1205	
Lane Group Flow (vph)	58	261	761	0	523	1205	
Turn Type		pt+ov			Prot		
Protected Phases	3	3 4	1		4	1 4	2
Permitted Phases							
Detector Phases	3	3 4	1		4	1 4	
Minimum Initial (s)	8.0		10.0		4.0		7.0
Minimum Split (s)	13.0		15.0		9.0		22.0
Total Split (s)	20.0	65.0	33.0	0.0	45.0	78.0	22.0
Total Split (%)	16.7%	54.2%	27.5%	0.0%	37.5%	65.0%	18%
Maximum Green (s)	15.0		28.0		40.0		20.0
Yellow Time (s)	4.0		4.0		4.0		2.0
All-Red Time (s)	1.0		1.0		1.0		0.0
Lead/Lag	Lead		Lead		Lag		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		3.0		3.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							13.0
Pedestrian Calls (#/hr)							25
Act Effct Green (s)	10.1	56.1	41.7		40.0	86.7	
Actuated g/C Ratio	0.08	0.47	0.35		0.33	0.72	
v/c Ratio	0.50	0.36	0.77		1.05	0.55	
Control Delay	67.1	3.4	43.4		70.0	10.5	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	67.1	3.4	43.4		70.0	10.5	
LOS	E	A	D		E	B	
Approach Delay	15.0		43.4			28.5	
Approach LOS	B		D			C	
90th %ile Green (s)	13.9		29.1		40.0		20.0
90th %ile Term Code	Gap		Coord		Max		Ped
70th %ile Green (s)	11.1		31.9		40.0		20.0
70th %ile Term Code	Gap		Coord		Max		Ped
50th %ile Green (s)	9.3		33.7		40.0		20.0
50th %ile Term Code	Gap		Coord		Max		Ped
30th %ile Green (s)	8.0		57.0		40.0		0.0
30th %ile Term Code	Min		Coord		Max		Skip
10th %ile Green (s)	8.0		57.0		40.0		0.0
10th %ile Term Code	Min		Coord		Max		Skip
Stops (vph)	21	17	494		371	663	
Fuel Used(gal)	1	1	11		11	12	
CO Emissions (g/hr)	37	100	755		802	864	
NOx Emissions (g/hr)	7	19	147		156	168	
VOC Emissions (g/hr)	9	23	175		186	200	
Dilemma Vehicles (#)	0	0	0		0	0	
Queue Length 50th (ft)	44	0	303		~428	279	
Queue Length 95th (ft)	35	41	#436		m#564	506	
Internal Link Dist (ft)	31		398			748	
Turn Bay Length (ft)					200		
Base Capacity (vph)	172	730	992		500	2204	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.34	0.36	0.77		1.05	0.55	

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 65 (54%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 31.0 Intersection LOS: C
Intersection Capacity Utilization 67.0% ICU Level of Service C
Analysis Period (min) 15
~ 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.

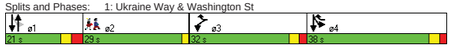
Splits and Phases: 3: Walk Hill St & Hyde Park Ave



Lane Group	WBL	WBR	NBT	NBP	SBL	SBT	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	10	10	11	11	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Leading Detector (ft)	20	20	100		20	100	
Trailing Detector (ft)	0	0	0		0	0	
Turning Speed (mph)	15	9		9	15		
Satd. Flow (prot)	1599	1391	2564	0	1525	1489	
Flt Permitted	0.950				0.235		
Satd. Flow (perm)	1599	1391	2564	0	377	1489	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		350	84				
Link Speed (mph)	30		30			30	
Link Distance (ft)	293		1282			388	
Travel Time (s)	6.7		29.1			8.8	
Volume (vph)	199	322	353	223	554	385	
Peak Hour Factor	0.84	0.92	0.83	0.89	0.92	0.90	
Heavy Vehicles (%)	5%	8%	15%	6%	3%	11%	
Adj. Flow (vph)	237	350	425	251	602	428	
Lane Group Flow (vph)	237	350	676	0	602	428	
Turn Type		pt+ov			D.P+P		
Protected Phases	3	3 4	1		4	1 4	2
Permitted Phases					1		
Detector Phases	3	3 4	1		4	1 4	
Minimum Initial (s)	8.0		10.0		8.0		7.0
Minimum Split (s)	17.0		19.0		19.0		29.0
Total Split (s)	32.0	70.0	21.0	0.0	38.0	59.0	29.0
Total Split (%)	26.7%	58.3%	17.5%	0.0%	31.7%	49.2%	24%
Maximum Green (s)	27.0		15.0		33.0		27.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	2.0		3.0		2.0		0.0
Lead/Lag	Lead		Lead		Lag		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							20.0
Pedestrian Calls (#/hr)							30
Act Effct Green (s)	22.4	60.4	34.2		68.2	72.2	
Actuated g/C Ratio	0.19	0.50	0.28		0.57	0.60	
v/c Ratio	0.80	0.40	0.85		1.11	0.48	
Control Delay	52.0	15.9	49.8		103.0	20.5	
Queue Delay	6.3	10.9	2.8		6.0	0.0	
Total Delay	58.3	26.8	52.6		109.0	20.5	
LOS	E	C	D		F	C	
Approach Delay	39.5		52.6			72.2	
Approach LOS	D		D			E	
Queue Length 50th (ft)	197	140	~318		~513	226	
Queue Length 95th (ft)	m212	m154	#428		#766	361	
Internal Link Dist (ft)	213		1202			308	
Turn Bay Length (ft)							
Base Capacity (vph)	373	870	791		540	896	
Starvation Cap Reductn	90	486	0		0	0	
Spillback Cap Reductn	0	0	51		7	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.84	0.91	0.91		1.13	0.48	

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 2 (2%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.11
Intersection Signal Delay: 58.1 Intersection LOS: E
Intersection Capacity Utilization 75.1% ICU Level of Service D
Analysis Period (min) 15
~ 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.

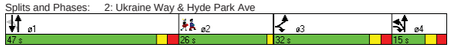
Splits and Phases: 1: Ukraine Way & Washington St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	13	13	11	11	11	11	
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	
Leading Detector (ft)	20	20	20	100	100		
Trailing Detector (ft)	0	0	0	0	0		
Turning Speed (mph)	15	9	15			9	
Satd. Flow (prot)	1584	1458	0	2922	2868	0	
Flt Permitted	0.950			0.567			
Satd. Flow (perm)	1584	1458	0	1687	2868	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		416			26		
Link Speed (mph)	30			30	30		
Link Distance (ft)	293			349	489		
Travel Time (s)	6.7			7.9	11.1		
Volume (vph)	180	597	318	554	896	203	
Peak Hour Factor	0.88	0.94	0.90	0.89	0.88	0.85	
Heavy Vehicles (%)	6%	3%	3%	7%	5%	12%	
Adj. Flow (vph)	205	635	353	622	1018	239	
Lane Group Flow (vph)	205	635	0	975	1257	0	
Turn Type		pt+ov	D.P+P				
Protected Phases	3	3 4	4	1 4	1		2
Permitted Phases			1				
Detector Phases	3	3 4	4	1 4	1		
Minimum Initial (s)	8.0		8.0		10.0		7.0
Minimum Split (s)	14.0		14.0		17.0		26.0
Total Split (s)	32.0	47.0	15.0	62.0	47.0	0.0	26.0
Total Split (%)	26.7%	39.2%	12.5%	51.7%	39.2%	0.0%	22%
Maximum Green (s)	26.0		9.0		41.0		24.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	3.0		3.0		3.0		0.0
Lead/Lag	Lead		Lag		Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		3.0
Recall Mode	None		None		C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							17.0
Pedestrian Calls (#/hr)							35
Act Effct Green (s)	22.9	37.9		66.5	56.5		
Actuated g/C Ratio	0.19	0.32		0.55	0.47		
v/c Ratio	0.68	0.85		1.78dl	0.92		
Control Delay	64.5	20.5		40.7	44.2		
Queue Delay	4.4	93.0		3.9	3.5		
Total Delay	68.8	113.5		44.7	47.7		
LOS	E	F		D	D		
Approach Delay	102.6			44.7	47.7		
Approach LOS	F			D	D		
Queue Length 50th (ft)	135	169		~463	~629		
Queue Length 95th (ft)	m146	m88		m#567	#741		
Internal Link Dist (ft)	213			269	409		
Turn Bay Length (ft)							
Base Capacity (vph)	356	745		1038	1365		
Starvation Cap Reductn	90	217		0	0		
Spillback Cap Reductn	0	0		36	62		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.77	1.20		0.97	0.96		

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 117 (98%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 61.7 Intersection LOS: E
Intersection Capacity Utilization 85.6% ICU Level of Service E
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

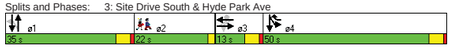
Splits and Phases: 2: Ukraine Way & Hyde Park Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	10	12	10	12	10	10	10	11	12	
Storage Length (ft)	0		0	0		0	0		0	200		0	
Storage Lanes	0		0	0		1	0		0	1		0	
Total Lost Time (s)	4.0	4.0	4.0	5.0	4.0	4.0	4.0	5.0	4.0	5.0	5.0	4.0	
Leading Detector (ft)	50	50		20	50	20	50	100		20	100		
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0		
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Satd. Flow (prot)	0	1593	0	0	1483	1152	0	2846	0	1501	3046	0	
Flt Permitted		0.715			0.715			0.835		0.950			
Satd. Flow (perm)	0	1190	0	0	1113	1152	0	2376	0	1501	3046	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		1				261		4			1		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		159			111			478			479		
Travel Time (s)		3.6			2.5			10.9			10.9		
Volume (vph)	17	1	1	22	1	232	1	623	24	455	1015	9	
Peak Hour Factor	0.92	0.92	0.92	0.38	0.92	0.89	0.92	0.85	0.72	0.87	0.84	0.92	
Heavy Vehicles (%)	2%	2%	2%	10%	2%	6%	2%	6%	4%	1%	3%	2%	
Parking (#/hr)				0		0							
Adj. Flow (vph)	18	1	1	58	1	261	1	733	33	523	1208	10	
Lane Group Flow (vph)	0	20	0	0	59	261	0	767	0	523	1218	0	
Turn Type	Perm			Perm		pm+ov	Perm			Prot			
Protected Phases		3			3	4		1		4	1 4		2
Permitted Phases	3			3		3	1						
Detector Phases	3	3		3	3	4	1	1		4	1 4		
Minimum Initial (s)	8.0	8.0		8.0	8.0	4.0	10.0	10.0		4.0			7.0
Minimum Split (s)	13.0	13.0		13.0	13.0	9.0	15.0	15.0		9.0			22.0
Total Split (s)	13.0	13.0	0.0	13.0	13.0	50.0	35.0	35.0	0.0	50.0	85.0	0.0	22.0
Total Split (%)	10.8%	10.8%	0.0%	10.8%	10.8%	41.7%	29.2%	29.2%	0.0%	41.7%	70.8%	0.0%	18%
Maximum Green (s)	8.0	8.0		8.0	8.0	45.0	30.0	30.0		45.0			20.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0			2.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0			0.0
Lead/Lag	Lead	Lead		Lead	Lead	Lag	Lead	Lead		Lag			Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0		2.0	2.0	3.0	2.0	2.0		3.0			3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		None			None
Walk Time (s)													7.0
Flash Dont Walk (s)													13.0
Pedestrian Calls (#/hr)													25
Act Effct Green (s)		9.0			9.0	55.8		42.0		44.4	92.4		
Actuated g/C Ratio		0.08			0.08	0.46		0.35		0.37	0.77		
v/c Ratio		0.22			0.71	0.39		0.92		0.94	0.52		
Control Delay		56.7			95.9	3.8		56.9		40.3	7.9		
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0		
Total Delay		56.7			95.9	3.8		56.9		40.3	7.9		
LOS		E			F	A		E		D	A		
Approach Delay		56.7			20.8			56.9			17.6		
Approach LOS		E			C			E			B		
Queue Length 50th (ft)		14			46	0		~398		285	235		
Queue Length 95th (ft)		40			#118	42		#482		m#497	348		
Internal Link Dist (ft)		79			31			398			399		
Turn Bay Length (ft)										200			
Base Capacity (vph)	90			83	680	835		563		2336			
Starvation Cap Reductn	0			0	0	0		0		0			
Spillback Cap Reductn	0			0	0	0		0		0			
Storage Cap Reductn	0			0	0	0		0		0			
Reduced v/c Ratio	0.22			0.71	0.38	0.92		0.93		0.52			

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 65 (54%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 28.8 Intersection LOS: C
Intersection Capacity Utilization 71.0% ICU Level of Service C
Analysis Period (min) 15
~ 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: 3: Site Drive South & Hyde Park Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	872	1479	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	948	1608	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				479	349	
pX, platoon unblocked	0.73	0.63	0.63			
vC, conflicting volume	2089	811	1623			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1283	113	1401			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	115	579	304			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	316	632	1072	551
Volume Left	0	0	0	0
Volume Right	0	0	0	15
cSH	304	1700	1700	1700
Volume to Capacity	0.00	0.37	0.63	0.32
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	5	29	1026	5	5	531
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	32	1115	5	5	577
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			388			
pX, platoon unblocked						
vC, conflicting volume	1417	560			1121	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1417	560			1121	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	93			99	
cM capacity (veh/h)	127	471			619	

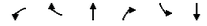
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	37	743	377	198	385
Volume Left	5	0	0	5	0
Volume Right	32	0	5	0	0
cSH	337	1700	1700	619	1700
Volume to Capacity	0.11	0.44	0.22	0.01	0.23
Queue Length 95th (ft)	9	0	0	1	0
Control Delay (s)	17.0	0.0	0.0	0.4	0.0
Lane LOS	C			A	
Approach Delay (s)	17.0	0.0		0.1	
Approach LOS	C				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	16	66	1009	0	0	549
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	72	1097	0	0	597
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			489			
pX, platoon unblocked						
vC, conflicting volume	1395	548			1097	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1395	548			1097	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	85			100	
cM capacity (veh/h)	132	480			632	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	89	548	548	298	298
Volume Left	17	0	0	0	0
Volume Right	72	0	0	0	0
cSH	317	1700	1700	1700	1700
Volume to Capacity	0.28	0.32	0.32	0.18	0.18
Queue Length 95th (ft)	28	0	0	0	0
Control Delay (s)	20.7	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	20.7	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	39.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	2	1	1054	5	7	535
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	1	1146	5	8	582
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						478
pX, platoon unblocked						
vC, conflicting volume	1454	576			1151	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1454	576			1151	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			99	
cM capacity (veh/h)	119	461			603	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	3	764	387	201	388
Volume Left	2	0	0	8	0
Volume Right	1	0	5	0	0
cSH	159	1700	1700	603	1700
Volume to Capacity	0.02	0.45	0.23	0.01	0.23
Queue Length 95th (ft)	2	0	0	1	0
Control Delay (s)	28.2	0.0	0.0	0.6	0.0
Lane LOS	D			A	
Approach Delay (s)	28.2	0.0		0.2	
Approach LOS	D				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	39.3%	ICU Level of Service	A	
Analysis Period (min)	15			

APPENDIX E
ACCESSIBILITY CHECKLIST

Article 80 | ACCESSIBILTY CHECKLIST

Project Information

Project Name:	**Parcel U**
Project Address Primary:	**Hyde Park Avenue**
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	**Urbanica, Inc / Kamran Zahedi/ Principal/ kzahedi@urbanicaboston.com/** **617-654-8900**

Team Description

Owner / Developer:	**Urbanica, Inc ; The Community Builders, Inc**
Architect:	**Urbanica Design**
Engineer (building systems):	**n/a**
Sustainability / LEED:	**Conservation Services Group**
Permitting:	**MLF Consulting LLC**
Construction Management:	**Urbanica Construction**

Project Permitting and Phase

At what phase is the project – at time of this questionnaire?

☑ PNF / Expanded PNF Submitted	Draft / Final Project Impact Report Submitted	BRA Board Approved
BRA Design Approved	Under Construction	Construction just completed:

Building Classification and Description

What are the principal Building Uses - select all appropriate uses?

Residential – One to Three Unit	☑ Residential - Multi-unit, Four +	Institutional	Education
Commercial	Office	Retail	Assembly
Laboratory / Medical	Manufacturing / Industrial	Mercantile	Storage, Utility and Other
First Floor Uses (List)	*Residential, Amenity Space, Accessory Retail Space*		

What is the Construction Type – select most appropriate type?

☑ Wood Frame	Masonry	Steel Frame	Concrete

Describe the building?

Site Area:	126, 070 SF	Building Area:	Approx. 190,000 GSF +/-
Building Height:	42'6"/ 55' / 65'	Number of Stories:	3 / 4 /5 with basements
First Floor Elevation:	Varying, 52.0-54.0' +/- across the site. *Final Elevation to be determined during Construction Drawing phase*	Are there below grade spaces:	*Yes* / ☑*No* ** Due to the grade change, there is a partial basement level that is also at grade to the rear service road

Assessment of Existing Infrastructure for Accessibility:

This section explores the proximity to accessible transit lines and proximate institutions such as, but not limited to hospitals, elderly and disabled housing, and general neighborhood information. The proponent should identify how the area surrounding the development is accessible for people with mobility impairments and should analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports.

Provide a description of the development neighborhood and identifying characteristics.	Parcel U is located in the Forest Hills section of Jamaica Plain. Jamaica Plain has an interesting blend of socio-economic and cultural diversity that is reflected in local businesses and residents. Parcel U is bounded by Hyde Park Avenue, Ukraine Way, Tollgate Cemetery and MBTA Commuter Rail /Amtrak train tracks. The proportion of the site is approximately 120' x 1000'. The site is naturally sloping from Hyde Park Avenue towards the train tracks. The existing sidewalk along Hyde Park Avenue and Ukraine Way is in good condition and has a line of street trees that the developer will intend to preserve. There is a bus stand located at the Hyde Park Avenue and Walk Hill intersection. The urban context that surrounds the site is a mix of single family, triple deckers, townhouses, mid-rise apartments, neighborhood retail spaces and larger institutional/transportation landmarks like the State Lab, Forest Hill T station, Arnold Arboretum and the Forest Hills Cemetery.
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	Forest Hills MBTA Station (0.25 miles away – one block away along Hyde Park Avenue) • Orange Line Subway • Needham Commuter Rail Line • Bus 16,21,30,31,32,34,34E,35,36,37,38,39,40,42,50,51
List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	**Affordable/Public Housing:** Bromley Park, South Street, Heath Street, Woodbourne Apartments, Farnsworth House and others **School:** Manning Elementary, Match Community Day Charter Public School, Curley K-8 School, Boston Teachers Union School, Hennigan School and others. **Public Library:** Boston Public Library (Jamaica Plain Branch) **Community Center:** Curtis Hall Community Center, Hennigan Community Center **Police:** E-13 and E-18 Police Station **Fire:** Engine 28 Fire Station **Hospitals:** Faulkner Hospital, Arbor Hospital, Lemuel Shattuck Hospital, Southern Jamaica Plain Health Center, Brookside Community Health Center, VA Boston Hospital, Ambulance 5 and 13, Paramedic 5
Is the proposed development on a priority accessible route to a key public use facility? List the surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.	Site is located adjacent (0.25 miles) to the Forest Hills Transportation Hub that links the site to major Boston public facilities.

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Surrounding Site Conditions – Existing:

This section identifies the current condition of the sidewalks and pedestrian ramps around the development site.

Are there sidewalks and pedestrian ramps existing at the development site?	Yes, an existing sidewalk abuts the project site to the east. The existing sidewalk includes pedestrian ramps.
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	The existing sidewalk material is concrete with granite curbing. The physical condition of the existing concrete sidewalk and pedestrian ramps is good.
Are the sidewalks and pedestrian ramps existing-to-remain? **If yes,** have the sidewalks and pedestrian ramps been verified as compliant? **If yes,** please provide surveyors report.	Yes with modifications for new driveway entrances into the property. No, the existing sidewalks and pedestrian ramps have not been verified as being in compliance at this time but will be verified during the project design.
Is the development site within a historic district? **If yes,** please identify.	The project site is not located within an historic district.

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Typically, a five foot wide Pedestrian Zone supports two people walking side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org	Yes (pending confirmation of existing cross slopes and clearances).

Article 80 | ACCESSIBILTY CHECKLIST

If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	Neighborhood Connector
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	The sidewalk width varies from approximately 6 feet to 8 feet (including the curb) depending on the location in the project. The majority of the project has a pedestrian zone adjacent to a planted area. Existing street furnishing including a narrow bus shelter, and street lights sit within the existing pedestrian zone. In the wide paved area on Hyde Park Avenue close to Ukraine Way, the frontage zone and pedestrian zone combine to a total of approximately 28 feet.
List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on the City of Boston pedestrian right-of-way?	The paving material for the pedestrian zone will be poured in place concrete. The majority of the pedestrian zone will reuse the existing concrete sidewalk and is in the City of Boston right-of-way. A portion of the walkway along Hyde Park Avenue in front of the apartment building will be within private property.
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	Yes, for a portion of the site. This easement will occur along Hyde Park Avenue for the rental apartment portion, where the existing sidewalk is carved out to accommodate on street parking. The pedestrian right-of-way (sidewalk) will be relocated inside the property line.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	There are locations for potential outdoor seating but they are not within the pedestrian right-of-way. There are existing locations where the street lights, bus shelters and some other street furniture sit within the pedestrian right-of-way.
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	On visual inspection of existing conditions it appears that there is at least 4 or 5 feet clear in all locations, to be verified during project design. In all new pedestrian sidewalk areas, at least 5 feet clear width will be maintained.

Proposed Accessible Parking:

See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability Handicap Parking Regulations.

What is the total number of parking spaces provided at the development site parking lot or garage?	90 spaces

What is the total number of accessible spaces provided at the development site?	4 spaces
Will any on street accessible parking spaces be required? **If yes,** has the proponent contacted the Commission for Persons with Disabilities and City of Boston Transportation Department regarding this need?	1 on street accessible space can be accommodated pending coordination with City departments
Where is accessible visitor parking located?	1 on street accessible space can be accommodated pending coordination with City departments. This will also function as the accessible visitor parking
Has a drop-off area been identified? **If yes,** will it be accessible?	No drop-off area.
Include a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations. Please include route distances.	See attached drawings A103.1 and A103.2.

Circulation and Accessible Routes:

The primary objective in designing smooth and continuous paths of travel is to accommodate persons of all abilities that allow for universal access to entryways, common spaces and the visit-ability* of neighbors.

**Visit-ability – Neighbors ability to access and visit with neighbors without architectural barrier limitations*

Provide a diagram of the accessible route connections through the site.	The accessible route is along the Hyde Park Avenue sidewalk. All entryways to the townhouse units and the apartment building will be accessible. See attached A100.1 for reference.
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	Flush Condition at most if not all entryway locations. Ramps to be added where/if needed. The ground floor living spaces for the townhouses will be flush with the street grade. This will enable access and promote “Visit-ability”. The apartment building is serviced by an elevator and flush condition at the entryway. All common areas are accessible and all units will have good “Visit-ability”.

Article 80 | ACCESSIBILTY CHECKLIST

Are the accessible entrance and the standard entrance integrated?	Yes
If no above, what is the reason?	-
Will there be a roof deck or outdoor courtyard space? **If yes,** include diagram of the accessible route.	Private roof decks for the townhouses. (Townhouses are exempted from the 521 CMR AAB). No roof or outdoor spaces for the apartment building
Has an accessible routes way-finding and signage package been developed? **If yes,** please describe.	Not yet but all future way finding signage will be developed to meet Building Code and Accessibility Board Requirements

Accessible Units: (If applicable)

In order to facilitate access to housing opportunities this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing choice.

What is the total number of proposed units for the development?	124 units +/-
How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	48 +/- townhouses units for sale; 76 +/- rental apartment units (80 +/- market rate units; 44 +/- affordable units)
How many accessible units are being proposed?	7 units in the rental apartment building • Two x 1BR Units • Three x 2-BRs Units • Two x 3-BRs Units The locations will be distributed in the building, See attached drawings A103.1-103.3 for locations. (Townhouses are exempted from the 521 CMR AAB)
Please provide plan and diagram of the accessible units.	See attached drawing, A103.1-103.3
How many accessible units will also be affordable? If none, please describe reason.	It will be a mix of affordable and market rate units. Final combination to be determined.
Do standard units have architectural barriers that would prevent entry or use of common	No

ATTACHMENTS TO ACCESSIBILITY CHECKLIST

space for persons with mobility impairments? Example: stairs at entry or step to balcony. **If yes,** please provide reason.	
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	Yes
Did the Advisory Board vote to support this project? **If no,** what recommendations did the Advisory Board give to make this project more accessible?	Decision Pending

Thank you for completing the Accessibility Checklist!

For questions or comments about this checklist or accessibility practices, please contact:

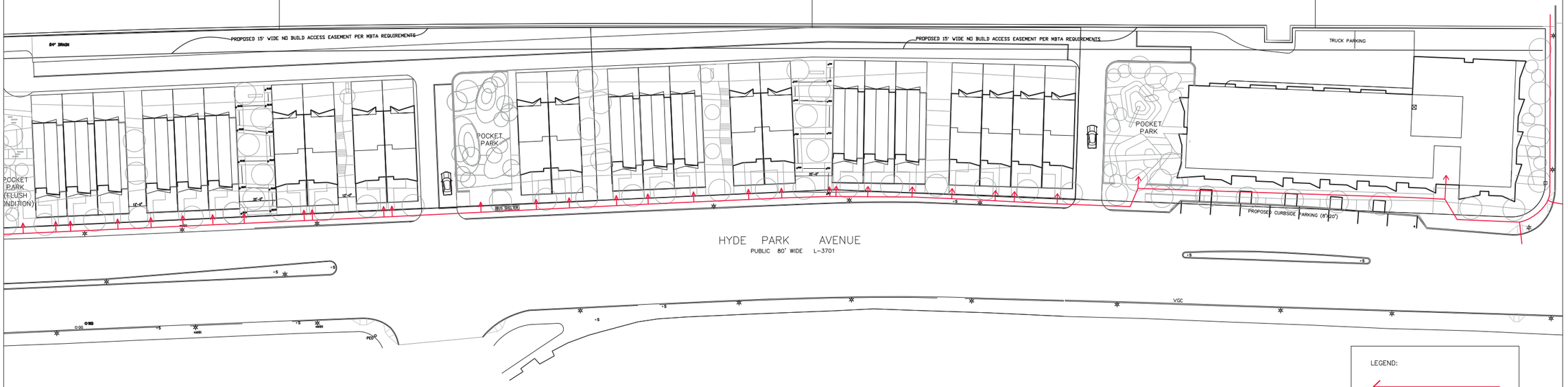
kathryn.quigley@boston.gov | Mayors Commission for Persons with Disabilities

PARCEL U
126,070±S.F.
2.8942±ACRES

PHASE A (Townhouses)

PHASE B (Townhouses)

PHASE C (Rental Apartment)



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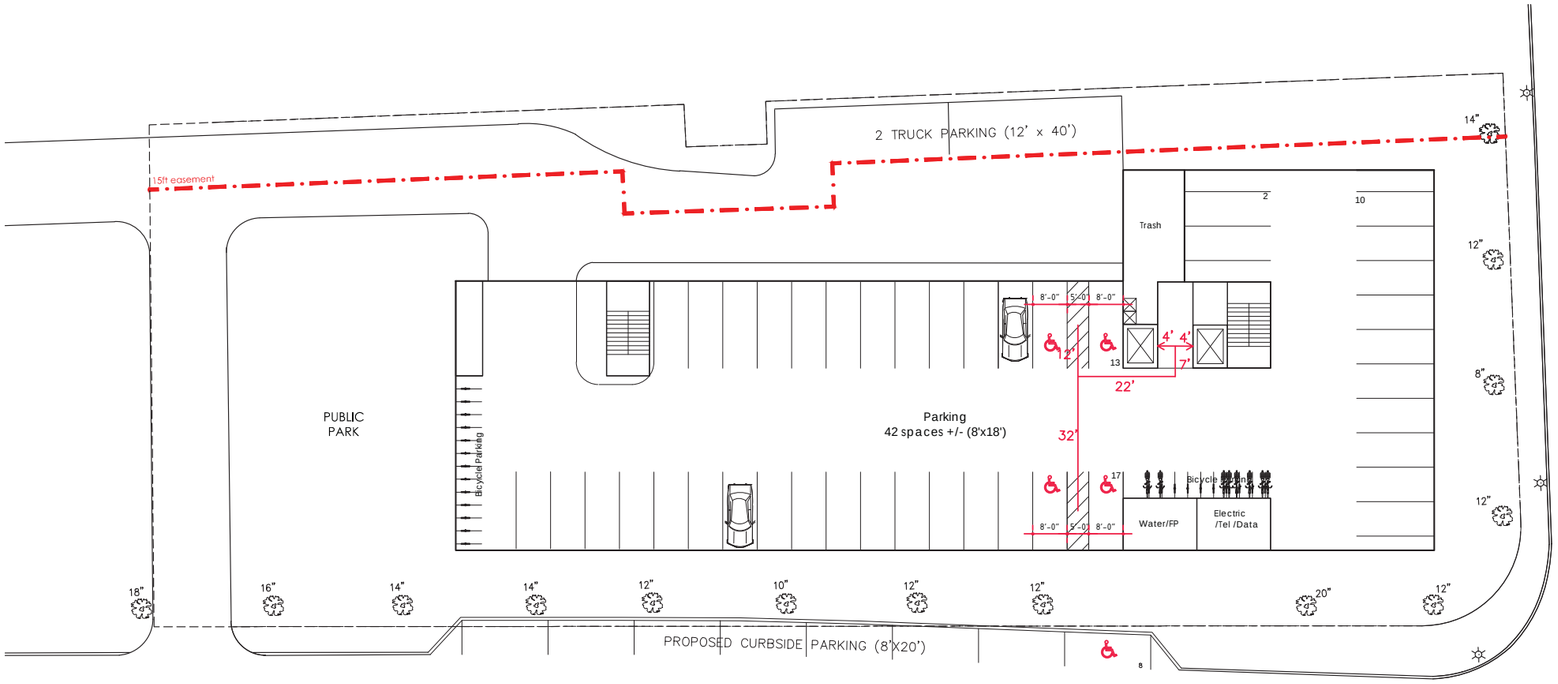
DATE	ISSUE	DESCRIPTION	BY	CHECK
11.11.2013	BRA KICKOFF MEETING		SP	SC
03.18.2014	JPNC Zoning		SP	SC
06.13.2014	BRA Design Meeting		SP	SC
07.15.2014	EPNF Filing		SP	SC

PROJECT
PARCEL U
JAMAICA PLAIN

DRAWING TITLE
PROPOSED SITE PLAN

SCALE
1/64" = 1'-0"

DRAWING NUMBER
A100.1



Basement Plan
16,075 gsf

LEGEND:

ACCESIBLE ROUTE

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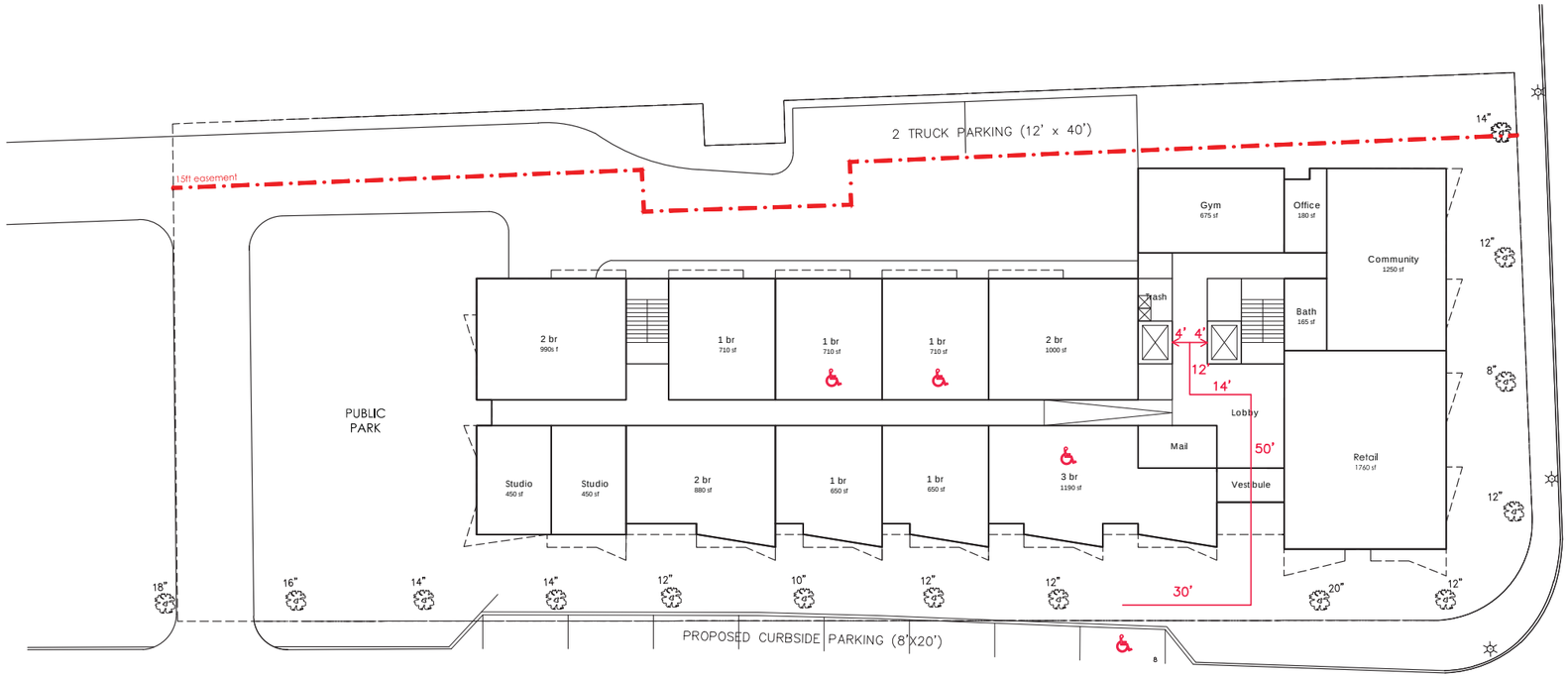
DATE	ISSUE DESCRIPTION	BY	CHECK
05.08.2014	Consultant Set	SP	SC
06.12.2014	Design Meeting	SP	SC
07.08.2014	EPNF Final	SP	SC

PROJECT
Parcel U | Forest Hills

DRAWING TITLE
FLOOR PLAN
- 5 story apartment

DRAWING NUMBER
A103.1

SCALE
1/32" = 1'-0"



1st Floor Plan
15,500 gsf

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06.12.2014	Design Meeting	SP	SC
07.08.2014	EPNF Final	SP	SC

PROJECT
Parcel U | Forest Hills

DRAWING TITLE
FLOOR PLAN
- 5 story apartment

DRAWING NUMBER
A103.2

SCALE
1/32" = 1'-0"

Typical Upper Floor Plan - 2nd, 3rd, 4th Floors
16,435 gsf

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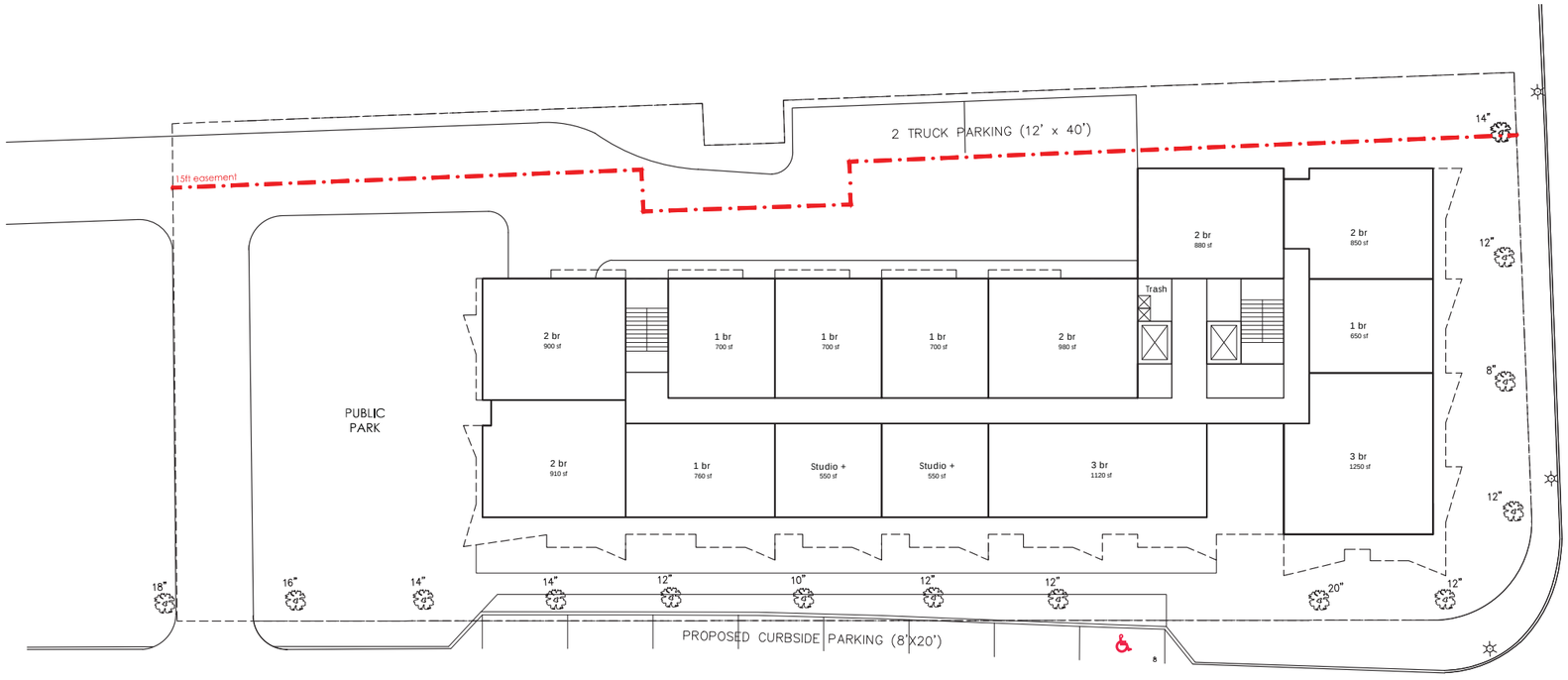
05.08.2014	Consultant Set	SP	SC
06.12.2014	Design Meeting	SP	SC
07.08.2014	EPNF Final	SP	SC

PROJECT
Parcel U | Forest Hills

DRAWING TITLE
FLOOR PLAN
- 5 story apartment

DRAWING NUMBER
A103.3

SCALE
1/32" = 1'-0"



5th Floor Penthouse Floor Plan
13,910 gsf

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DATE	ISSUE DESCRIPTION	BY	CHECK
05.08.2014	Consultant Set	SP	SC
06.12.2014	Design Meeting	SP	SC
07.08.2014	EPNF Final	SP	SC

PROJECT
Parcel U | Forest Hills

DRAWING TITLE
FLOOR PLAN
- 5 story apartment

DRAWING NUMBER
A103.4

SCALE
1/32" = 1'-0"

APPENDIX F

CLIMATE CHANGE PREPAREDNESS AND RESILIENCY CHECKLIST FOR NEW CONSTRUCTION

A.1 - Project Information

Project Name:	Parcel U
Project Address Primary:	Hyde Park Avenue
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Urbanica, Inc / Kamran Zahedi/ Principal/ kzahedi@urbanicaboston.com/ 617-654-8900

A.2 - Team Description

Owner / Developer:	Urbanica, Inc ; The Community Builders, Inc
Architect:	Urbanica Design
Engineer (building systems):	TBD
Sustainability / LEED:	Conservation Services Group
Permitting:	MLF Consulting
Construction Management:	Urbanica Construction
Climate Change Expert:	n/a

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response?

☑ PNF / Expanded PNF Submission	Draft / Final Project Impact Report Submission	BRA Board Approved	Notice of Project Change
Planned Development Area	BRA Final Design Approved	Under Construction	Construction just completed:

A.4 - Building Classification and Description

List the principal Building Uses:	Multifamily Residential
List the First Floor Uses:	Residential, Amenity Space, Accessory Retail Space

What is the principal Construction Type – select most appropriate type?

☑ Wood Frame	Masonry	Steel Frame	Concrete

Describe the building?

Site Area:	126, 070 SF	Building Area:	*Approx. 190,000 GSF +/-*
Building Height:	42'6"/ 55' / 65'	Number of Stories:	*3/ 4 /5 Flrs. with basement*
First Floor Elevation (reference Boston City Base):	Varying, 52.0-54.0' +/- across the site. *Final Elevation to be determined during Construction Drawing phase*	Are there below grade spaces/levels, if yes how many:	*No /* ☑ *1 Number of Levels* *** Due to the grade change, there is a partial basement level that is also at the service road grade*

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?

Select by Primary Use:	New Construction	Core & Shell	Healthcare	Schools
	Retail	Homes Midrise	☑ Homes	Other
Select LEED Outcome:	Certified	☑ Silver	Gold	Platinum

Will the project be USGBC Registered and / or USGBC Certified?

Registered:	*Yes /* ☑*No*	Certified:	*Yes /* ☑ *No*

A.6 - Building Energy

What are the base and peak operating energy loads for the building?

Electric:	*128.3 (kW)*	Heating:	*2.14 (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*7.45 kWh/SF)*	Cooling:	*97.6 (Tons/hr)*

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	*11(kW)*	Heating:	*0 (MMBtu/hr)*
		Cooling:	*0 (Tons/hr)*

What is nature and source of your back-up / emergency generators?

Electrical Generation:	*14(kW)*		Fuel Source:	*Natural Gas*
System Type and Number of Units:	☑Combustion Engine	Gas Turbine	Combine Heat and Power	*1 (Units)*

B - Extreme Weather and Heat Events

Climate change will result in more extreme weather events including higher year round average temperatures, higher peak temperatures, and more periods of extended peak temperatures. The section explores how a project responds to higher temperatures and heat waves.

B.1 – Analysis

What is the full expected life of the project?

Select most appropriate:	10 Years	25 Years	50 Years	☑ 75 Years

What is the full expected operational life of key building systems (e.g. heating, cooling, ventilation)?

Select most appropriate:	10 Years	☑ 25 Years	50 Years	75 Years

What time span of future Climate Conditions was considered?

Select most appropriate:	10 Years	25 Years	50 Years	☑ 75 Years

Analysis Conditions - What range of temperatures will be used for project planning – Low/High?

7F/87F Deg.

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

N/A Deg.	*N/A Days*	*N/A Events / yr.*

What Drought characteristics will be used for project planning – Duration and Frequency?

N/A Days	*N/A Events / yr.*

What Extreme Rain Event characteristics will be used for project planning – Seasonal Rain Fall, Peak Rain Fall, and Frequency of Events per year?

N/A Inches / yr.	*N/A Inches*	*N/A Events / yr.*

What Extreme Wind Storm Event characteristics will be used for project planning – Peak Wind Speed, Duration of Storm Event, and Frequency of Events per year?

N/A Peak Wind	*N/A Hours*	*N/A Events / yr.*

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code:	*At least 20 %*
How is performance determined:	ASHRAE Energy Modeling

What specific measures will the project employ to reduce building energy consumption?

Select all appropriate:	☑ High performance building envelop	☑ High performance lighting & controls	Building day lighting	☑ EnergyStar equip. / appliances
	☑High performance HVAC equipment	☑ Energy recovery ventilation	No active cooling	No active heating
Describe any added measures:				

What are the insulation (R) values for building envelop elements?

Roof:	*R = 50*	Walls / Curtain Wall Assembly:	*R = 40*
Foundation:	*R = 40*	Basement / Slab:	*R =*
Windows:	*R = / U = 0.2*	Doors:	*R = / U = 0.2*

What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure?

On-site clean energy / CHP system(s)	Building-wide power dimming	Thermal energy storage systems	Ground source heat pump
☑ On-site Solar PV	On-site Solar Thermal	Wind power	None

Describe any added measures:

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems?

Select all appropriate:

☑ Connected to local distributed electrical	Building will be Smart Grid ready	Connected to distributed steam, hot, chilled water	Distributed thermal energy ready

Will the building remain operable without utility power for an extended period?

Yes / ☑ No		If yes, for how long:	*Days*
If Yes, is building "Islandable?			
If Yes, describe strategies:			

Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure:

Select all appropriate:

Solar oriented – longer south walls	Prevailing winds oriented	External shading devices	Tuned glazing,
Building cool zones	☑ Operable windows	☑ Natural ventilation	Building shading
Potable water for drinking / food preparation	Potable water for sinks / sanitary systems	Waste water storage capacity	☑ High Performance Building Envelop

Describe any added measures:

What measures will the project employ to reduce urban heat-island effect?

Select all appropriate:

High reflective paving materials	☑ Shade trees & shrubs	☑ High reflective roof materials	Vegetated roofs

Describe other strategies:

What measures will the project employ to accommodate rain events and more rain fall?

Select all appropriate:

On-site retention systems & ponds	☑ Infiltration galleries & areas	vegetated water capture systems	Vegetated roofs

Describe other strategies:

What measures will the project employ to accommodate extreme storm events and high winds?

Select all appropriate:

Hardened building structure & elements	☑ Buried utilities & hardened infrastructure	Hazard removal & protective landscapes	☑ Soft & permeable surfaces (water infiltration)

Describe other strategies:

C - Sea-Level Rise and Storms

Rising Sea-Levels and more frequent Extreme Storms increase the probability of coastal and river flooding and enlarging the extent of the 100 Year Flood Plain. This section explores if a project is or might be subject to Sea-Level Rise and Storm impacts.

C.1 - Location Description and Classification:

Do you believe the building to susceptible to flooding now or during the full expected life of the building?

Yes / ☑ No

Describe site conditions?

Site Elevation – Low/High Points:	*Boston City Base 36/55 Elev.(Ft.)*
Building Proximity to Water:	*More than 5,000 Ft.*

Is the site or building located in any of the following?

Coastal Zone:	*Yes / ☑ No*	Velocity Zone:	*Yes / ☑ No*
Flood Zone:	*Yes / ☑ No*	Area Prone to Flooding:	*Yes / ☑ No*

Will the 2013 Preliminary FEMA Flood Insurance Rate Maps or future floodplain delineation updates due to Climate Change result in a change of the classification of the site or building location?

2013 FEMA Prelim. FIRMs:	*Yes / ☑ No*	Future floodplain delineation updates:	*Yes / ☑ No*

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

More than 500 Ft.

If you answered YES to any of the above Location Description and Classification questions, please complete the following questions. ***Otherwise you have completed the questionnaire; thank you!***

C - Sea-Level Rise and Storms

This section explores how a project responds to Sea-Level Rise and / or increase in storm frequency or severity.

C.2 - Analysis

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

Sea Level Rise:	*Ft.*	Frequency of storms:	*per year*

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation:	*Boston City Base Elev.(Ft.)*	First Floor Elevation:	*Boston City Base Elev. (Ft.)*

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

	Yes / No	If Yes, to what elevation	*Boston City Base Elev. (Ft.)*
If Yes, describe:			

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

Systems located above 1st Floor.	Water tight utility conduits	Waste water back flow prevention	Storm water back flow prevention

Were the differing effects of fresh water and salt water flooding considered:

Yes / No

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

Yes / No	If yes, to what height above 100 Year Floodplain:	*Boston City Base Elev. (Ft.)*

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

Yes / No
If Yes, describe:

Will the building remain occupiable without utility power during an extended period of inundation:

Yes / No	If Yes, for how long:	*days*

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

Climate Change Resiliency and Preparedness Checklist

A.1 - Project Information

Project Name:	Parcel U
Project Address Primary:	Hyde Park Avenue
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Urbanica, Inc / Kamran Zahedi/ Principal/ kzahedi@urbanicaboston.com/ 617-654-8900

A.2 - Team Description

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Architect:	Urbanica Design
Engineer (building systems):	TBD
Sustainability / LEED:	Conservation Services Group
Permitting:	MLF Consulting
Construction Management:	Urbanica Construction
Climate Change Expert:	n/a

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