PUBLIC NOTICE

The Boston Redevelopment Authority ("BRA"), pursuant to Article 80 of the Boston Zoning Code, hereby gives notice that an Expanded Project Notification Form for Large Project Review ("PNF") submitted by the Conservatory Lab Charter School Foundation, Inc. (the "Proponent") was received by the BRA on November 9, 2015 for the Conservatory Lab Charter School project (the "Proposed Project"), to be constructed on the approximately 1.25-acre "Lot C" within the approved Bartlett Place Development at 2565 Washington Street in Roxbury.

The proposed Project includes approximately 73,000 gross square feet of elementary and middle school. The Project includes a 4-story classroom building, a one-story cafeteria space, perimeter landscaping, and a series of outdoor recreational spaces including a secured play area and pedestrian courtyard.

The Proponent is seeking the issuance of a Scoping Determination by the BRA pursuant to Section 80B-5. The BRA in the Scoping Determination for such PNF may waive further review pursuant to Section 80B-5.3(d), if, after reviewing public comments, the BRA finds that such PNF adequately describes the Proposed Project's impacts.

The PNF may be reviewed in the office of the Secretary of the BRA, Room 910, Boston City Hall, 9th Floor, Boston MA 02201 between 9:00 AM and 5:00 PM, Monday through Friday, except legal holidays. Public comments on the PNF, including the comments of public agencies, should be submitted in writing to Gary Uter, BRA, at the address stated above on or before December 27, 2015.

BOSTON REDEVELOPMENT AUTHORITY
Brian P. Golden, Director

EXPANDED PROJECT NOTIFICATION FORM

Conservatory Lab Charter School At Bartlett Place

Submitted to:
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Submitted by:
Conservatory Lab Charter School
2120 Dorchester Avenue
Dorchester, MA 02124

Prepared by:
Epsilon Associates, Inc.
3 Clock Tower Place, Suite 250
Maynard, MA 01754

In Association with:
KVA Associates, Inc.
Robert Baldwin
Arrowstreet
Dain Torpy, LeRay, Weist & Garner, P.C.
Vanasse Hangen Brustlin, Inc.
Nitsch Engineering
Garcia, Galuska, DeSousa, Inc
McPhail Associates, LLC
Next Street Finance LLC
Bevco Associates, Inc
RWDI

November 9, 2015

Epsilon
ASSOCIATES INC.

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November 9, 2015

Epsilon
ASSOCIATES INC.

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Chapter 1.0

Project Summary

1.0 PROJECT SUMMARY

1.1 Project Overview

The Conservatory Lab Charter School Foundation, Inc. (the "Proponent") proposes to construct a permanent new school for their K-8 program on an approximately 1.25-acre site, known as Lot C, within the Bartlett Place development on Washington Street, south of Dudley Square in Roxbury. The proposed school includes a 4-story classroom wing, a single story cafeteria, a gymnasium, perimeter landscaping, and an outdoor tot-lot and pedestrian courtyard (the "Project"). At capacity, the 73,000 square foot (sf) building will house approximately 456 students and 67 full time faculty and staff. The new school will benefit students by creating a campus environment with improved classrooms, common spaces, ensemble rooms, and recreational amenities. The school's current operations are split between two facilities, one in Dorchester and the other in Brighton. Both are too small for full enrollment, subject to short-term lease arrangements, and lack adequate common and recreational spaces.

The proposed new charter school will be a vital new component of the overall Bartlett Place development. The Bartlett Place development, which was approved by the Boston Redevelopment Authority (BRA) in 2013, has been designed to create a mixed-use urban village that will transform the former MBTA bus depot from vacant, blighted site into a vibrant, sustainable community. The Charter School's El Sistema music infused mission and curriculum complement Bartlett Place's emphasis on developing a "creative village" that is focused on music and the arts.

The new school will offer assembly and athletic spaces to the community for events on nights and weekends, as well as after hour classroom space for local educational organizations.

This Expanded Project Notification Form (PNF) is being submitted to the BRA to initiate review of the Project under Article 80B, Large Project Review, of the Boston Zoning Code.

1.2 Development Team

Project Name:	Conservatory Lab Charter School at Bartlett Place
Location:	Bartlett Place Washington Street Roxbury, MA 02119
Proponent:	Conservatory Lab Charter School Foundation, Inc. 2120 Dorchester Ave. Dorchester, MA 02124

Construction Manager:	KVA Associates, Inc 303 Congress Street, 5th Floor Boston, MA 02210 (617) 695-0856 Lee Keller Frank Vanzler
Owner's Representative:	Robert Baldwin 50 Congress Street Boston, MA 02109 (617) 388-7750
Architect:	Arrowstreet 10 Post Office Square, Suite 700N Boston, MA 02109 (617) 623-5555 Laurence Spang, AIA Jonathan Garland
Landscape Architect	Copley Wolff Design Group 160 Boylston Street, 3rd Floor Boston, MA 02116 (617) 654-9000 Cortney Kirk
Legal Counsel:	Dain Torpy, Le Ray, Wiest & Garner, P.C. 745 Atlantic Avenue, 5th Floor Boston, MA 02111 (614) 542-4800 Donald Wiest
Permitting Consultants:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 David Hewett Talya Moked

Transportation and Parking Consultant	Vanasse Hangen Brustlin, Inc. 99 High Street, 10th floor Boston, MA 02110 (617) 728-7777 Sean Manning Meghan Houdlette
Civil Engineer	Nitsch Engineering 2 Center Plaza, Suite 430 Boston, MA 02108 (617) 338-0063 Chelsea Christenson
MEP Engineer	Garcia, Galuska, DeSousa, Inc 370 Faunce Corner Road Dartmouth, MA 02747 (508) 998-5700 Chris Garcia Carlos DeSousa
Geotechnical Consultant:	McPhail Associates, LLC 2269 Massachusetts Avenue Cambridge, MA 02140 (617) 868-1420 Jonathan Patch, P.E.
Socio-Economic Consultant:	Next Street Finance LLC 184 Dudley Street Roxbury, MA 02119 (617) 989-1300 Adina Astor Courtney Asher
Community Outreach:	Bevco Associates, Inc 202 W Selden Street, #2 Mattapan, MA 02126 (617) 296-7003 Beverly Johnson

1.3 Local Economic and Community Benefits

The relocation of the Conservatory Lab Charter School to Bartlett Place will generate a range of public benefits for the surrounding community. These benefits will advance many of the objectives set forth in the 2004 Roxbury Strategic Master Plan, most importantly:

- ***Job creation & access:*** The school will bring at least 151 *direct* resident construction jobs to the City of Boston and 9 direct resident jobs annually to the immediate neighborhood during school operations. Local spending will indirectly generate an *additional* 53 jobs throughout Suffolk County during the construction phase and an *additional* 10 jobs annually in the immediate neighborhood during school operations.

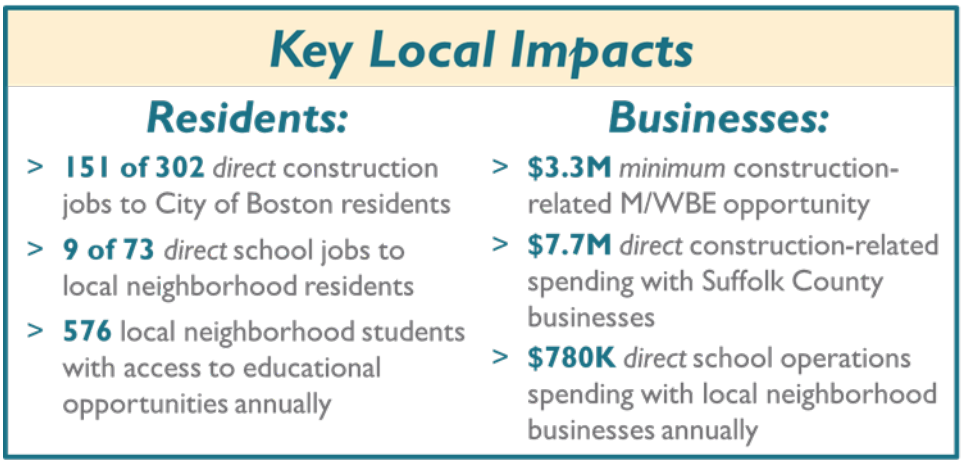
- ***Community wealth generation:*** The construction phase will generate over $11M in labor income across Suffolk County, with school operations generating over $800K in annual labor income within the immediate neighborhood. Local property owners may experience additional wealth generation associated with a rise in residential property values.

- ***Local business opportunities:*** The school's construction phase will create $7.7M of direct spending with Suffolk County businesses and a minimum of $3.3M in M/WBE opportunities. Neighborhood businesses will benefit from $780K in annual school operations spending for goods and services, as well as some amount of discretionary spending by school staff and visitors.

- ***Educational opportunities for Roxbury youth in the fields of arts and culture:*** The school will provide exceptional music-based education to nearly 600 local students each year through full-time enrollment, after-school programming, collaborations with local public schools, and a potential partnership with Roxbury Community College.

- ***Promotion of Roxbury as an artistic and cultural destination:*** The school's dual role as an arts-based institution will draw visitors from across the City – and beyond – to Roxbury and Dudley Square. The school will collaborate with existing Roxbury arts and music institutions in enhancing the cultural life and vibrancy of the neighborhood at large.

- ***Development of vacant property:*** The school's acquisition of the parcel will financially support and accelerate the development of the Bartlett Place site.



1.3.1 Economic Impacts

1.3.1.1 Economic Impact Analysis: Short-term Construction and Long-term Operations

This section estimates the local economic impact from two separate phases of the Conservatory Lab Charter School relocation – first, the 16-month construction interval, and second, the recurring annual school operations at the new site (based on FY2018 operating budget projections). Impact is defined as the change in jobs, earnings, or business sales in comparison to what would have existed in the local economy without the project. Impact is divided into two types:

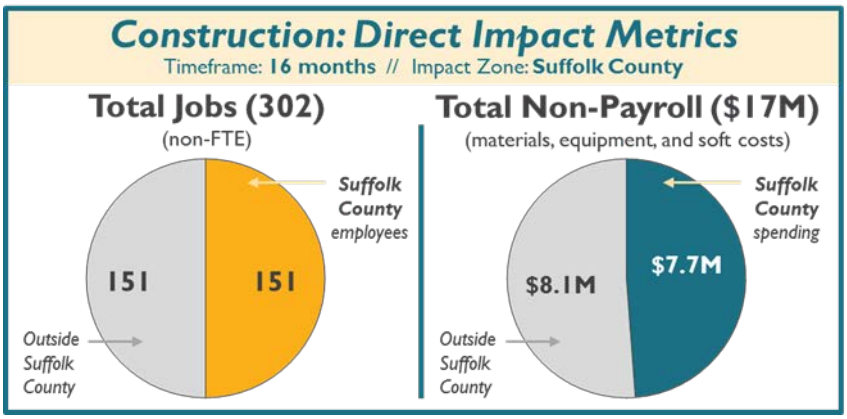
- Direct impact, which describes the level of activity at the construction site or at the school once operational; and
- Multiplier effects, which include both *indirect impact* (when businesses buy from other local businesses for supplies) and *induced impact* (when local after-tax earnings, or take-home pay, become household spending locally).

Key to understanding the multiplier effects is that they are based on the *portion* of the construction and school operation budgets that engage a local firm or a local working-age household. "Local" is determined separately for each phase based on a meaningful, minimum market definition for sourcing labor, goods, and services.

Short-term Economic Impact Resulting from Construction Phase

For purposes of estimating the short-term economic impact resulting from the construction phase, "local" is defined as the **Suffolk County** economy.

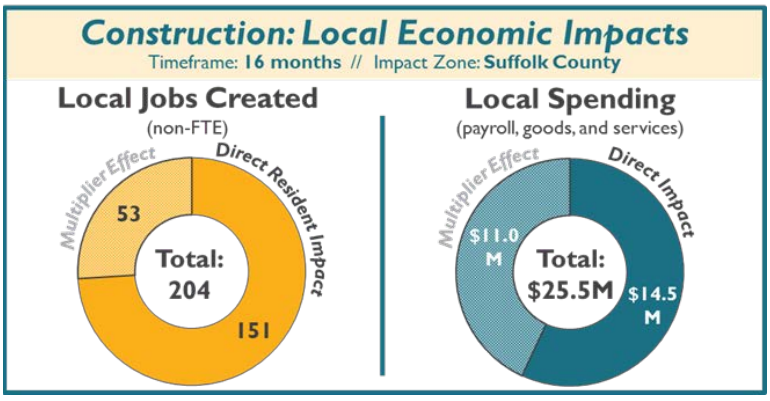
- Total projected construction-related expense for the new school facility is estimated to be **$30,408,749**, with a total of **302 job opportunities**[1].



- Assuming the 50% Boston Resident Employment Standards are met[2], at least **151 jobs** – associated with **$6,796,026 in labor income** – will go *directly* to City of Boston households. In addition, the school's construction management team expects that **$7,745,538** in non-payroll spending (including materials, equipment, and soft costs) will go *directly* to Suffolk County businesses.

- Based on county-level multipliers, these direct jobs and spending will generate an *additional* **53 jobs** (associated with **$4,373,233** in labor income) and an *additional* **$11,004,735** in sales activity within Suffolk County throughout the 16-month construction phase.

- In total, as a result of *both local direct* and *multiplier* effects, the school's 16-month construction phase will generate a total of **204 jobs** (associated with **$11,169,259** in labor income) and **$25,546,299** in total sales impact within the Suffolk County economy.



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[1] Construction expense considered here omits all costs related to land acquisition, utility back charges, owners' contingency, and bond related fees.

[2] City of Boston Employment Standards (http://www.cityofboston.gov/brjp/emplo_stand.asp)

- Table 1-1 below summarizes the short-term economic impacts within the Suffolk County economy associated with the 16-month construction phase:

Table 1-1 Short-term Economic Impacts Associated with Construction

Impacts	Total Project Budget	Direct to Suffolk County Businesses or Households	Multiplier Effects (in Suffolk County)
Spending	$30,408,749	$14,541,564	$11,004,735
Payroll	$13,592,051	$6,796,026	$4,373,233
Jobs (non-FTE)	302	151*	53

* Direct jobs reported for City of Boston households. Associated jobs from multiplier effects represent all of Suffolk County.

- The immediate neighborhoods surrounding Bartlett Place will capture a portion of these Suffolk County impacts. The school's construction management team has estimated that one in five City of Boston construction jobs will be recruited from a household within the three "target" zip codes (defined as 02119, 02120, and 02121; described below).

- The portion of short-term economic impacts within Suffolk County that will accrue to these three zip codes as a result of paychecks to local workers hired during the 16-month construction phase are summarized in Table 1-2 below (no estimate was available on construction phase suppliers from the three zip code economy). Note that this table presents a subset of the table that precedes it.

Table 1-2 Short-term Economic Impacts to Target Zip Codes

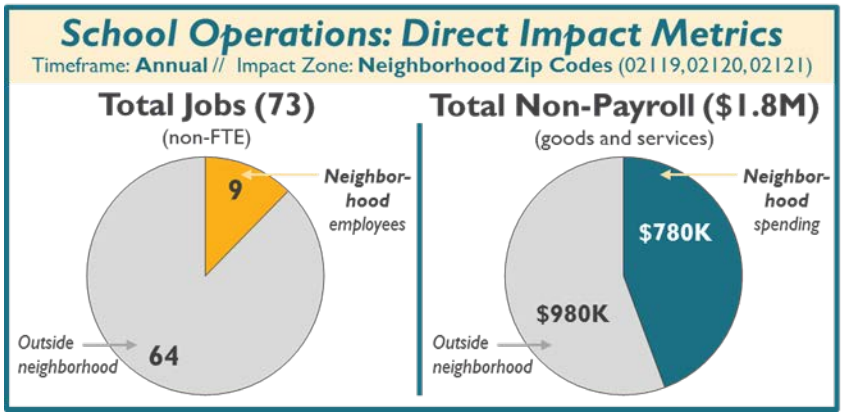
Impacts	Total Project Budget	Direct to Neighborhood Residents Hired	Multiplier Effects (in neighborhood zip codes)
Spending	$30,408,749	N/A	$480,185
Payroll	$13,592,051	$1,359,205	$182,940
Jobs (non-FTE)	302	30	3

Long-term Economic Impacts Resulting from Annual School Operations

For purposes of estimating the recurring economic impact resulting from annual school operations, "local" is defined as the economy comprised of the following three zip codes: 02119 (Dudley Square, the location of Bartlett Place); 02120 (Roxbury Crossing); and 02121 (Grove Hall). These "target" zip codes were determined based on discussions with key community stakeholders and an understanding of the immediate neighborhoods most impacted by the redevelopment of Bartlett Place.

- As of FY2018, the school's annual output or educational services provided (i.e., the value of tuition) is budgeted to be **$7,505,417**, including **73 jobs**.

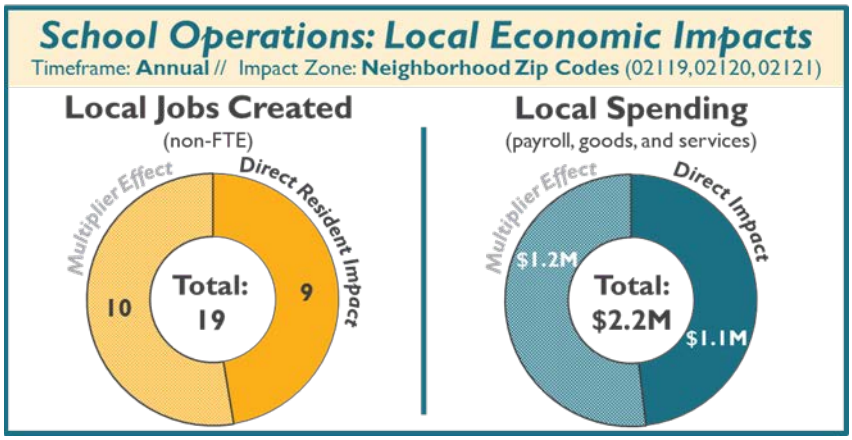
- The school's management team estimates that at least **nine jobs** – associated with **$300,254** in labor income – will go *directly* to neighborhood residents as of FY2018 (triple the amount of neighborhood residents employed by the school today). The school's management team also estimates that **$780,000** in annual non-payroll spending can be moved directly to neighborhood businesses. Primary procurement opportunities for local businesses include Food Services, Security, Cleaning Services, Maintenance & Repair, Landscaping, and other miscellaneous supplies.



- It is also estimated that 50% of non-resident employees will have a small amount of daily discretionary spending within the neighborhood during the work week (estimated $10 daily, Monday-Friday, for a mix of prepared meals, retail, and personal services).

- Based on the relevant zip code multipliers, these direct jobs and spending will generate an *additional* **10 jobs** (associated with **$551,552** in labor income) and an *additional* **$1,164,790** in sales activity within the three zip code economy annually.

- In total, as a result of both *local direct* and *multiplier* effects, the school's annual operations will generate a total of **19 jobs** (associated with **$851,806** in labor income) and **$2,245,321** in total sales impact within the 3 zip code economy annually.



- Table 1-3 below summarizes the recurring economic impacts within the 3 zip code economy associated with annual school operations

Table 1-3 Recurring Economic Impacts

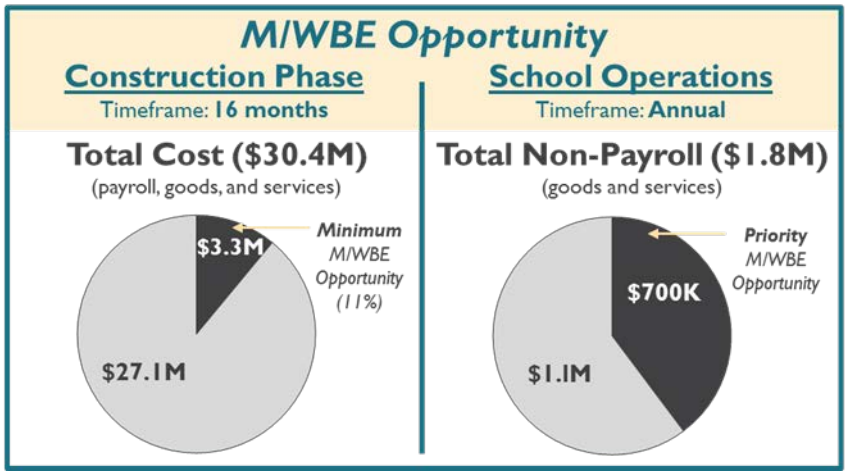
Impacts	Total Project Budget	Direct to Neighborhood Businesses or Households	Multiplier Effects (in neighborhood zip codes)
Spending	$7,505,417	$1,080,531	$1,164,790
Payroll	$4,456,259	$300,254	$551,552
Jobs (non-FTE)	73	9	10

1.3.1.2 Minority and Women-owned Business Enterprise (W/MBE) Opportunities

In addition to the opportunities for local residents and businesses described above, the relocation of the Conservatory Lab Charter School to Bartlett Place will also generate economic opportunities for minority- and woman-owned business enterprises. Based on existing goals and information, we anticipate the following impacts:

- ***Construction phase:*** At a minimum, the school's construction phase will adhere to the DCAMM guideline for building construction projects of at least 10.4% combined MBE & WBE participation[3]. At 11.0%, this would imply **$3.3M in business for M/WBE firms[4]**. The school has engaged professional service M/WBE firms in its pre-construction team, and will work with the Mass Minority Contractors Association, among others, to maximize opportunities for minority subcontractors.

- ***School Operations:*** As the school relocates its full-time operations to Bartlett Place, the school will seek opportunities with a variety of M/WBE and local vendors, prioritizing opportunities in the following areas: Landscaping, Security, Food Services (currently provided by a local, MBE vendor), Cleaning, Maintenance & Repair, Printing, and Web Design/Maintenance. Based on the school's projected budget for FY2018, the total potential opportunity in these priority categories is over $700,000.



1.3.1.3 Economic Impacts from Annual Concert Visits

Beyond the school's construction and ongoing operations, the range of concerts and performances hosted at the school's Bartlett Place facility will create additional economic impact for the local community. As described by *Americans for the Arts*, an organization that has extensively analyzed the economic impact of the nonprofit arts & culture industry, "arts and culture organizations leverage additional event-related spending by their

[3] Massachusetts Executive Office for Administration and Finance, "MBE/WBE Participation Goals on Building Projects" (www.mass.gov/anf/property-mgmt-and-construction/design-and-construction-of-public-bldgs/revised-mbe-wbe-participation-goals.html)

[4] Based on total projected construction-related expense of $30,408,749.

audiences that pumps revenue into the local economy. When patrons attend an arts event, they may pay for parking, eat dinner at a restaurant, shop in local retail stores, and have dessert on the way home."[5]

We forecast the annual economic impact of the school's concert visitors as follows:

- We estimate a total of **4,000 annual concert visitors**, based on projected attendance at the school's two winter concerts, two June concerts, and 20 bi-annual grade-level concerts. This figure understates the true volume of visitors the school will attract to the neighborhood, as it omits (1) larger concerts the school could host at nearby community venues such as Roxbury Community College or Hibernian Hall; (2) concerts that other groups such as the Roxbury Youth Orchestra could host at the new school facility; and (3) non-concert visitors such as Board members, donors, parents, collaborators, and other educators

- We assume that approximately 70% of all visitors (2,800) will come from outside of the immediate surrounding community, so as not to double-count discretionary spending that already occurs within the community.

- Using *Americans for the Arts'* "Arts & Economic Prosperity IV Calculator," we estimate that these 2,800 visitors will generate **$56,868 in annual event-related spending** (excluding the cost of admission).[6] This spending will help support local businesses within the neighborhood. Furthermore, the Calculator projects that this spending will generate an additional **$34,332** in labor income for community households.

1.3.1.4 Community Use of Facilities

The availability of school facilities for community use outside of school hours will bring additional economic impact to the local neighborhood. Although we lack sufficient data to quantify these impacts, we expect they will materialize in the following ways:

- ***Additional procurement from local vendors:*** Whether a local athletic team uses the school's gymnasium for a weekend tournament or a local non-profit organization uses the cafeteria for an evening gathering, groups that utilize the school's facilities will likely spend some amount on security, food service, equipment, and other supplies – a portion of which is very likely to come from local vendors. To the extent that these activities do not already take place within the community, such expenditures will generate new economic activity with both direct and multiplier effects.

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5 Americans for the Arts (2012), "Arts & Economic Prosperity IV Summary Report"

6 Americans for the Arts, "Arts & Economic Prosperity IV Calculator" (http://www.americansforthearts.org/sites/default/files/aepiv_calculator/calculator.html)

- *New income-generating opportunities:* The school facilities provide a potential venue for local residents to generate new sources of income – for example, by teaching music lessons in one of the ensemble rooms or coaching a clinic in the school gymnasium. To the extent that these activities would not have occurred without the school facilities, they will generate *direct* wealth or labor income and *multiplier effects* as those dollars are spent locally.

1.3.1.5 Other Levers for Economic Development

A review of the academic literature suggests two additional levers by which charter schools and arts-based institutions can create economic benefits for their communities.

Reinvestment in Local Neighborhoods

The academic literature suggests that the presence of charter schools is correlated with increased reinvestment in local neighborhoods – either by non-profits, for-profits, individuals, or public agencies.

- Based on data from 465 U.S. counties over 10 years, Penn State researcher Lindsay Eisenhut finds that the presence of charter schools is correlated with increased non-profit spending in the surrounding community. Specifically, "as the number of charter schools increases in a community, the more public charities [i.e., non-profits, excluding private foundations] invest in that community." Eisenhut concludes that these impacts extend "beyond the education sector" to include environment, healthcare, and human services.[7]

- A recent report prepared for the Athens City Schools in Alabama, concludes that "charter schools may actually improve economic conditions within their communities by maintaining a diverse and financially stable population and by improving existing infrastructure... because charter schools do not receive the same government support in the form of facilities, they may instead lease or rent existing buildings within the community. These buildings, many unused or out or repair, have in many cases been updated or remodeled by charter schools and thus increased their value to the community."[8]

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[7] Eisenhut, Lindsay (2012), "The Economic Impact of Charter Schools: An Empirical Study"

[8] Currier, Kirsten (2015), "The Impacts of Charter Schools on Their Communities: Research and Executive Summary Prepared for: The Athens City Schools"

- Recent research examining the relocation decisions of families with students enrolled at arts-based charter schools (discussed in detail below), concludes that arts-based charter schools can have significant impact in revitalizing urban areas and may be "even more powerful redevelopment tools" than urban development resources focused on jobs and affordable housing.[9]

- Anecdotally, we have seen this type of reinvestment play out with various charter schools across the country. For example:

  - KIPP Inspire Academy in St. Louis, Missouri attracted initial investment from IFF (a "mission-driven lender, real estate consultant, and developer"), who "has continued to work with local organizations that provide child care, education, healthy food options, affordable housing and many other services for the neighborhood."[10]

  - The Pueblo School Complex in Pomona, California was constructed in a deteriorated shopping complex and has since been heralded as a national example of the "school village concept" whereby schools can serve as "anchors for development that can help stabilize and revitalize community areas." Following the school's construction, the surrounding complex and neighborhood have seen a new transit center, new housing, rehabilitation of commercial properties, new commercial ventures, and investment in new public infrastructure. [11]

  - Drew Charter School in East Lake, Georgia has similarly been a catalyst for repeated investment by the East Lake Foundation, which has brought "a new grocery store, a YMCA, two preschool programs, a bank, a farmer's market, a community garden and two golf courses" to the immediate neighborhood.[12]

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[9] Danielsen & Zhao (2015), "Arts-Based Charter Schools as Urban Redevelopment Catalysts: Santa Ana, California's Orange County School of the Arts"

[10] Federal Reserve Bank of St. Louis, "CDAC Spotlight: Charter School Anchors St. Louis Neighborhood Revitalization"

[11] National Association of Realtors (2002), "New Schools for Older Neighborhoods: Strategies for Building our Communities' Most Important Assets"

[12] Garland, Sarah (2012), "Rich Kid, Poor Kid: How Mixed Neighborhoods Could Save America's Schools," *The Atlantic.*

Neighborhood Property Values

There is substantial evidence that housing prices are positively correlated with the presence of high-performing public schools[13]. While the literature on housing prices related to the presence of charter schools is inconclusive[14], recent research funded by the National Endowment for the Arts demonstrates the strong attractive power of arts-based charter schools, in particular, on family relocation decisions.[15]

- Based on 13 years of data from the Orange County School of the Arts in Santa Ana, California, Danielsen & Zhao find that "hundreds of families (669) have moved closer to Santa Ana after enrolling a child in the school, and a substantial fraction (97 families) moved from a non-Santa Ana address into the city." Furthermore, "families who live near the school (in Santa Ana, California) are substantially less likely to relocate than families who live farther away."

- The study concludes that the "attractive power" or "relocation impact" of the 2,000-student arts-based charter school is "similar to that of a work place with a similar number of employees." Interestingly, Danielsen has subsequently noted that family relocations were more prominent among "renter" families than "homeowner" families ("the more expensive the home a family lived in, the less likely they were to move").[16]

Depending on the degree of family attraction associated with Conservatory Lab Charter School, we expect to see some increase in residential property values, which would generate wealth for existing property owners in the community. That said, we expect the magnitude of these positive effects to be partially offset by factors including (1) the amount of nearby affordable and mixed-rate housing units; (2) the state's charter school lottery system, which does not yet guarantee enrollment for families living within a "catchment" area; and (3) the impacts of local housing policy.

1.3.2 Community Benefits

"Conservatory Lab Charter School empowers a diverse range of children as scholars, artists, and leaders through a unique and rigorous academic and music education. We enrich the larger community through performance, service, and collaboration. As a laboratory school,

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[13] Danielsen, Harrison & Zhao (2014), "It Makes a Village: Residential Relocation after Charter School Admission," *Real Estate Economics*, Vol. 42.

[14] Horowitz, Keil & Spector (2009), "Do Charter Schools Affect Property Values?" *The Review of Regional Studies*, Vol. 39, No 3.

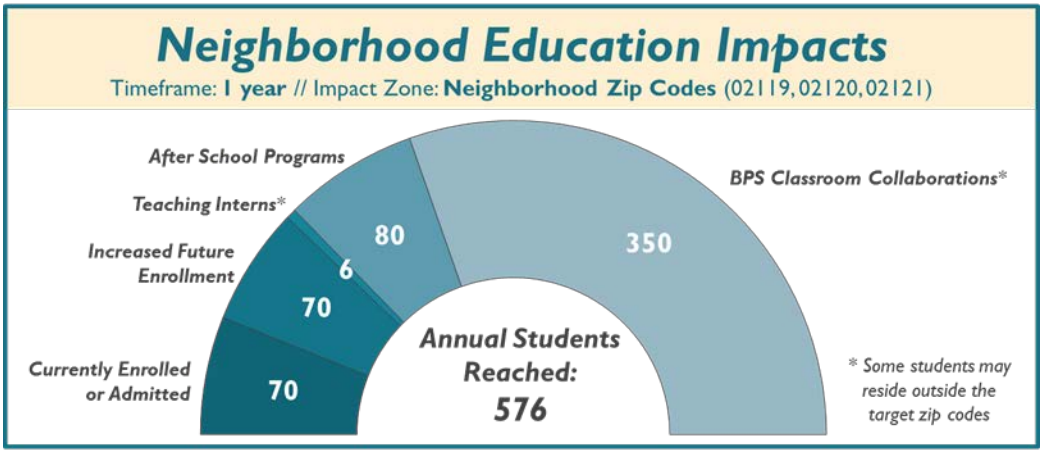
[15] Danielsen & Zhao (2015), "Arts-Based Charter Schools as Urban Redevelopment Catalysts: Santa Ana, California's Orange County School of the Arts"

[16] Bart Danielsen – personal correspondence (March 31, 2015)

we develop and disseminate innovative educational approaches that will positively impact children in other schools and programs." – Conservatory Lab Charter School Mission Statement

1.3.2.1 Education for Local Students

First and foremost, Conservatory Lab Charter School is committed to high-quality and innovative education, evidenced by the school's Level 1 rating from the Massachusetts Department of Elementary and Secondary Education. The school plans to provide educational opportunities to as many neighborhood students and families as possible, through a combination of full-time enrollments and community-based partnerships.



Full-time Enrollment

As with all Massachusetts charter schools, current state law requires that admission to Conservatory Lab Charter School be based upon a lottery system. Enrolled students are representative of the overall applicant pool, meaning that as more community-based families enter the lottery, they will have a statistically better chance of enrolling their students. Furthermore, the school gives preference to siblings of *already enrolled* students.

- Today the school enrolls **56 students** from the three "target" neighborhood zip codes (02119, 02120, and 02121), representing 14% of the total student body (398). In the most recent lottery for the upcoming school year, **14 new students** from those zip codes were admitted, representing 20% of all newly admitted students (68)[17].

- We expect the school to serve an even greater portion of Roxbury students in the future as more Roxbury families apply to the lottery, similar to the school's experience within the Brighton community to-date.

[17] Conservatory Lab Charter School internal admissions data

- Brighton (defined as zip code 02135) represents only 4% of all Boston Public School students, but comprises 19% of the students enrolled at Conservatory Lab Charter School[18]. Given that the lottery is representative of the applicant pool, this implies mathematically that Brighton families are roughly six times more likely to *apply* as non-Brighton families.

- Assuming local Roxbury families apply at a similar rate once the school relocates to Bartlett Place, as many as 50% of incoming students in a given year could be from the surrounding zip codes (02119, 02120, 02121)[19]. Within three years of operations at the new facility, this would translate into as many as **70 additional enrolled students** from these Roxbury zip codes.

After School Programming

In order to better serve the community, the school plans to offer and support after-school programming specifically for neighborhood students not enrolled at the school.

- The school's after-school programming would include afternoon sessions on weekdays and Saturday "expeditions" based upon the same core principles as the full-time El Sistema curriculum.

- The school expects to operate two after-school "cycles" per year – one in the fall and one in the spring. The school will flexibly determine overall after-school program enrollment based upon community demand. *At a minimum* the school expects to serve **35-40 students per cycle, or 70-80 students per year.**

- In addition to its own after-school programming, the school expects to support existing and future Roxbury-based El Sistema núcleos.

- El Sistema programs not only build musical skills but enhance the social development of children through the power of music. The orchestra model teaches children values such as cooperation and mutual support. By learning to help each other and work as a team towards a common goal, they are developing perseverance and in the process building confidence and self-esteem, thus laying the foundation for a vigorous and healthy community.

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[18] U.S. Census, American Community Survey – 2013 population data; Conservatory Lab Charter School internal admissions data

[19] Assuming that Roxbury students represent 20% of total Boston Public School students (per 2013 population data from the U.S. Census, American Community Survey)

Collaboration with Local Public Schools

As highlighted in the mission statement, Conservatory Lab will regularly "develop and disseminate innovative educational approaches that will positively impact children in other schools and programs." Conservatory Lab has already worked extensively with several Boston public schools, where its collaborations leverage and expand upon existing BPS funding and resources for music education.

- Conservatory Lab currently has grant funding to support collaboration with three Boston public schools: Pauline A. Shaw Elementary in Dorchester, Thomas J. Kenny Elementary in Dorchester, and the Elihu Greenwood School in Hyde Park. Through one-on-one teacher relationships, Conservatory Lab *directly* impacts a total of **330 students** per year through their enhanced classroom experience. Dissemination of curriculum and collaboration with each school's administration ensures that these benefits ultimately extend to the entire school population (approximately **750 students**).

- Additional grant funding would allow Conservatory Lab to replicate these collaborations with local Roxbury public schools such as Trotter Elementary, Timilty Middle School, and Higginson/Lewis K-8. Through one-on-one relationships with teachers, Conservatory Lab would directly impact the classroom experience of approximately **350 students** each year, while ultimately enhancing the educational experience of the complete student body (approximately **1,350 students**).

Teaching Internships

Conservatory Lab is in active conversations with Roxbury Community College (RCC) regarding potential internship opportunities for students in the Early Childhood Education Associate's Degree program as well as general studies students who plan to pursue an education degree. Recent discussions indicate that Conservatory Lab could accommodate a *minimum* of **six student interns per year**, with increasing volume expected over time. Teaching interns would receive valuable training and experience as well as a stipend. Such a partnership would ensure that:

- Even more RCC students have access to high-quality internship experience, which will solidify their ability to obtain a job upon graduation; and

- Conservatory Lab has an active pipeline for hiring local talent from the Roxbury community. The school currently anticipates having six total employees from the surrounding zip codes (02119, 02120, 02121) as of FY2018, with expectations that this number will increase over time through outreach on job postings and collaborations with organizations like RCC.

1.3.2.2 Other Neighborhood Benefits

Through and beyond its educational programs, Conservatory Lab Charter School is committed to enriching the larger community. As both a charter school and an arts-based institution, the school will provide a host of *non-economic* benefits for neighborhood residents and organizations.

Neighborhood Benefits of Arts-based Institutions

With the construction of a permanent facility, Conservatory Lab seeks to become a more prominent "hub" and "convener" for music education, learning, and performances within the City of Boston. As part of the local arts community – at Bartlett Place, in Dudley Square, and in Roxbury – the school would supplement and collaborate with existing institutions such as Discover Roxbury, The Roxbury Arts Group, Roxbury Youth Orchestra, and Hibernian Hall to realize many of the "Arts & Culture" objectives set forth in the Roxbury Strategic Master Plan.[20] In so doing, the school will expand the scope of local neighborhood benefits typically associated with arts-based institutions (beyond the economic impacts associated with event-related spending, as demonstrated above).

- As explained by sociologist Dr. Joshua Guetzkow, there are several mechanisms by which community arts programs build social capital within a neighborhood, including:
  - "Creating a venue that draws people together who would otherwise not be engaged in constructive social activity;
  - Fostering trust between participants and thereby increasing their generalized trust of others;
  - Providing an experience of collective efficacy and civic engagement, which spurs participants to further collective action; ... [and]
  - Increasing the scope of individuals' social networks."[21]
- In a similar vein, ArtsBoston has outlined several channels through which the local arts & cultural sectors ***build stronger communities***[22]:

[20] Roxbury Strategic Master Plan (2004), p. 17.
[21] Guetzkow, Joshua (2002), "How the Arts Impact Communities: An Introduction to the Literature on Arts Impact Studies" *Princeton University Center for Arts and Cultural Policy Studies Working Paper Series*.
[22] ArtsBoston (2014), "The Arts Factor"

- "Arts and cultural organizations help CEOs across industries – from health care to biotechnology to education and finance – attract and retain a dynamic, smart, and creative workforce ... A study by the Knight Foundation found that opportunities to engage with arts and culture influenced whether people loved where they lived more than any other available social offering."

- "Accessibility of arts and cultural experiences does more than change individual lives; it can transform entire communities. The arts bring people together, encourage dialogue among our region's diverse population, and create pride in our local history."

Neighborhood Benefits of Charter Schools

In addition to the economic impacts of charter schools discussed above, the academic and policy literature suggests a broad range of community benefits associated with the presence of charter schools:

- As part of their research on family relocation decisions, Danielsen & Zhao make note of the "***community creating power***" of arts-based charter schools. [23]

- Charter schools have been shown to produce a "heightened sense of ***belonging***" as well as "increases in ***self-confidence and self-esteem***, and improved acceptance of others" among students, parents, and teachers, which disseminate into the local community.[24]

- Though not specific to charter schools, the availability of school ***space for community recreational use*** has been linked to community safety and other benefits including greater engagement in physical activity, increases in social networks and enhanced community connections, as well as reduced delinquency and improved academic performance for students.[25] Conservatory Lab's partnership with the Boys & Girls Club, for example, would likely promote the use of school facilities among community members and organizations.

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[23] Danielsen & Zhao (2015), "Arts-Based Charter Schools as Urban Redevelopment Catalysts: Santa Ana, California's Orange County School of the Arts"

[24] Currier, Kirsten (2015), "The Impacts of Charter Schools on Their Communities: Research and Executive Summary Prepared for: The Athens City Schools"

[25] Public Health Law Center (2012), "Finding Space to Play: Legal and Policy Issues Impacting Community Recreational Use of School Property"

- KIPP Inspire Academy in St. Louis, Missouri provides strong anecdotal evidence of these neighborhood benefits: "Beyond the academic benefits to its students, neighbors say the KIPP charter school has become a catalyst for community revitalization. The success of KIPP Inspire has extended beyond the school grounds and engaged the entire community in a shared sense of purpose. Crime is observed by residents to be down, housing is being renovated and there is a renewed sense of pride in the air."[26]

1.3.3 Bartlett Project Benefits

The Conservatory Lab Charter School relocation will provide several direct benefits to the Bartlett Place project.

A. School acquisition of the parcel will financially support and accelerate the development of other buildings within the Bartlett Place site.

B. Construction of the school will accelerate the timeline for construction of Marcia Street, which will bring public funding and jobs to the site and surrounding community.

C. The school will serve as an "anchor" tenant at Bartlett Place, bringing regular daytime and evening visitors – including staff, parents, and audiences – who will patronize on-site retail locations and bring activity and vibrancy to the entire property.

Report prepared as of May 1, 2015 by:

- Next Street Financial (Adina Astor, Partner & Courtney Asher, *Associate*)
- Economic Development Research Group (Lisa Petraglia, *Vice President*)

1.4 Preliminary Project Schedule

Construction of the new school is expected to begin in the Fall of 2015, and will last approximately 15 months. The school plans to open for students in early 2017.

[26] Federal Reserve Bank of St. Louis, "CDAC Spotlight: Charter School Anchors St. Louis Neighborhood Revitalization"

1.5 Consistency with Zoning

The Project site is subject to the provisions of Article 50 of the Boston Zoning Code, the Roxbury Neighborhood District Article. It is further located within an Economic Development Area subdistrict of Article 50, as indicated on Map 6A/6B/6C of the Boston Zoning Maps. Code Section 50-12 establishes that the site is eligible for establishment as a Planned Development Area, or PDA.

According to Map 6A/6B/6C, the site is within an established PDA area. Use, dimensional, parking, and other land-use controls for the site are accordingly as set forth in the Master Plan for Planned Development Area No. 94 (the "PDA Master Plan"). The Proponent will work collaboratively with Bartlett Place Land, Inc., to amend the PDA Master Plan and establish a new PDA Development Plan pertaining specifically to the redevelopment and future use of the Project site.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

The Proponent is not aware of any legal judgments or actions pending concerning the Project or the Project site.

1.6.2 History of Tax Arrears on Property Owned in Boston by the Proponent

The Proponent owns no real estate in Boston on which real estate tax payments are in arrears.

1.6.3 Site Control/ Public Easements

The Proponent has an agreement with Bartlett Place Land, Inc to purchase the property. There are no public easements into, through, or surrounding the Project Site.

1.7 Regulatory Controls and Permits

Table 1-4 presents a preliminary list of local, state, and federal permits and approvals that the Proponent expects may be required for the proposed Project. The list is based on current information about the Project and is subject to change as the design of the Project advances.

Table 1-4 Preliminary List of Permits and Approvals

Agency	Approval
Federal	
Environmental Protection Agency	NPDES Approvals
Boston	
Boston Redevelopment Authority	Article 80B Large Project Review/Article 80C Planned Development Area Review
Boston Zoning Commission	Planned Development Area Review
Boston Civic Design Commission	Design Review
Boston Water and Sewer Commission	Site Plan Review/General Service Application/Water and Sewer Connection Permits
Public Improvement Commission	Specific Repairs/Discontinuances/Earth Retention (if required)
Boston Transportation Department	Construction Management Plan/Transportation Access Plan Agreement
Boston Public Works Department	Curb Cut Permit(s)
Joint Committee on Licenses	Flammable Storage License (if required)
Boston Inspectional Services Department	Building Permit

1.8 Community Engagement

The Conservatory Lab Charter School is committed to establishing positive and collaborative relationships with key academic and artistic institutions and community civic groups in the Roxbury community. Becoming part of the fabric of the community is critically important to the school's future success. Just as importantly, ongoing engagement with the Roxbury community will help the Conservatory Lab Charter School achieve its goal of creating a world-class institution that is a source of pride within the neighborhood.

Toward that end, the Conservatory Lab Charter School developed a three-pronged strategy to informally engage the community in an effort to begin achieving the above-referenced goals and commitments as noted below.

1. Engaging the Community - The Conservatory Lab Charter School initiated informal dialogue with parents, community leaders, community institutions, and general supporters during the pre-filing phase of the Project. These conversations provided invaluable feedback relating to how the school should proceed in shaping their public benefits plan, and also offered meaningful ideas about other potential public benefits and economic development opportunities for consideration. This informal public engagement process was invaluable to the school relative to the scope and substance of the ideas and visions that were shared. The school looks forward to

participating in a more structured public engagement process under the sponsorship of the BRA that will provide broader opportunities to discuss the merits of the Project and the public benefits/economic opportunity plan.

2. Collaborating with the Community - The Conservatory Lab Charter is excited and inspired by the discussions with community artistic institutions about possible "arts-focused" collaborations, under which resources and programming activities might be shared to broaden the artistic impact and cultural influence of these activities on youth and adults in the Roxbury community. Just as importantly, the school looks forward to continuing its discussions with local academic institutions about designing and implementing "work study" programs that create internships for students of great promise who are interested in pursuing careers as educators.

3. Becoming Part of the Fabric of the Community - The Conservatory Lab Charter School looks forward to becoming a good neighbor. It is the school's intention to become a key community resource that opens its doors for special community events and meetings, and supports the ongoing economic and physical revitalization of the Dudley Square Business District, including the remaining Roxbury Master Plan parcels.

Chapter 2.0

Project Description

2.0 PROJECT DESCRIPTION

This Chapter describes the proposed Project in detail, including its location, Project site plan, and proposed building program.

2.1 Project Setting and Site

The proposed charter school will be built on the approximately 1.25-acre Lot C within the roughly 8.6-acre, BRA approved Bartlett Place Development on Washington Street in Roxbury. The Project site, as shown in Figure 2-1 at the end of this section, is larger than Lot C shown as part of the Bartlett Place Development. Bartlett Place is a new mixed use residential, retail, and commercial development being developed on the site of a former MBTA bus depot. Lot C is located on the north central portion of Bartlett Place and will have frontage on the proposed Marcia Street, the proposed new roadway that will pass through the central portion of Bartlett Place, and on Bartlett Street which forms the northern border of the Bartlett Place Development. See Figures 2-2 and 2-3 for images of the existing conditions on and around the site.

2.2 Permitting History

2.2.1 BRA Review of Bartlett Place

On March 1, 2013, Bartlett Place Land Inc. (the "Bartlett Place Proponent") submitted an Expanded Project Notification Form pursuant to Article 80B of the Zoning Code for Bartlett Place. The PNF described Phase 1A and 1B of Bartlett Place.

The BRA held a Scoping Session with various City agencies on March 13, 2013, and the same evening a community meeting was held at the Boston B2 Police Station in Roxbury. The public comment period for the PNF ended on April 1, 2013.

On July 29, 2013, the Bartlett Place Proponent filed a Master Plan pursuant to Article 80C of the Zoning Code describing the Bartlett Place development as four Proposed Projects and the Phase 1 Development Plan for the First Phase of the Master Plan. A community meeting was held on August 8, 2013, at the B2 Police Station, which focused on the Master Plan and the Phase 1 Development Plan. Subsequently, a separate Impact Advisory Group/PRC meeting was held on August 22, 2013 at the B2 Police Station. The public comment period associated with Article 80C of the Code ended on September 11, 2013.

The First Phase Project of the Bartlett Place project appeared before the Boston Civic Design Commission ("BCDC") on April 2, 2013, and on August 6, 2013 the BCDC recommended the approval of the First Phase Project and Master Plan and Phase 1 Development Plan.

On September 12, 2013, the BRA Board voted to approve the Bartlett Place PDA Master Plan (No. 94) for Bartlett Place and issued a Scoping Determination waiving further review of Phase 1 of Bartlett Place. On November 20, the Boston Zoning Commission voted to approve the PDA Master Plan for Bartlett Place.

Figure 2-4 presents where the proposed Charter School will be built within the context of the Bartlett Place Master Plan.

As the project was reviewed by the BRA, Lot C was to include 28 elderly residential housing units and 28 townhouse units, totaling approximately 50,000 gross square feet. These uses have been relocated within Bartlett Place. Table 2-1 presents the changes made to the overall Bartlett Place Project as a result of incorporating the Proposed Charter School.

Table 2-1 Bartlett Place Program

Lot	Building	Program	Square Feet	Building Height	Floors	Units	Parking	Amended Program
A	A	Commercial – TBD	20,502	65 Feet	5		20	
		Retail – TBD	12,708				12	
		Residential (Market Rate)	52,411			18		
		Residential (Affordable)				24	5	
		Structured Parking	15,478	N/A	1		0	
B	B	Retail Harvest Co-op Grocery	12,150	65 feet	6		26	
		Residential (Market Rate)	74,643			28	28	
		Residential (Affordable)				32	18	
		Structured Parking	18,320	N/A	2		0	
	Plaza	Plaza	15,500				84	
C	C	Charter School	73,000	50 feet	4		37	Removed 56 housing units

Table 2-1 Bartlett Place Program (Continued)

Lot	Building	Program	Square Feet	Building Height	Floors	Units	Parking	Amended Program
D	D	Residential (Elderly)	52,000	55 feet	5	42	0	Added 6 housing units
		Retail	3,000				4	
		Structured Parking	14,000				21	
E	E1	Residential	27,732	45 feet	4	16	16	Removed 19 housing units
F	F1	Residential	18,000	TBD	TBD	16	10	Added 8 housing units
	F2	Residential	22,000	TBD	TBD	20	12	Added 10 housing units
	F3	Residential parking underneath	22,000	TBD	TBD	20	10	Added 6 housing units
	F4	Residential	22,000	TBD	TBD	20	15	Added 8 housing units
	F5	Residential	18,000	TBD	TBD	16	10	Added 8 housing units
	F6	Residential parking underneath	24,000	TBD	TBD	21	11	Added 7 housing units
	F7	Residential	70,000	TBD	TBD	50	0	Added 22 housing units
		Structured parking (F7)	18,000				37	
Total	**12**		**605,444**			**323**	**376**	

2.2.2 Massachusetts Environmental Policy Act Review of Bartlett Place

Bartlett Place has also undergone Massachusetts Environmental Policy Act (MEPA) review. On June 30, 2014, Bartlett Place Land, Inc. filed an Expanded Environmental Notification Form (ENF) and a Request for Waiver of a Mandatory Environmental Impact Report (EIR). On August 15, 2014, the Secretary of Energy and Environmental Affairs (EEA) issued a Certificate on the Expanded ENF finding that the project did not require a the submission of an EIR, along with a Draft Record of Decision proposing to grant a Waiver from the requirement to prepare the EIR. The Secretary issued a Final Record of Decision granting the Waiver on September 12, 2014.

The Proponent for Bartlett Place is coordinating with the MEPA Office to determine if the proposed addition of the school will necessitate any further MEPA review. If so, it would be the responsibility of the Bartlett Place developer to file a Notice of Project Change for its project with the MEPA Office.

2.3 Proposed Project

2.3.1 Proposed School Building

The proposed new school is an approximately 73,500 gross square foot (GSF) elementary and middle school. Approximately 63,500 sf will be composed of classroom space and the remaining 9,500 square feet will comprise a cafeteria, media library, a gym, and building support functions.

The Project includes a 4-story classroom wing with a maximum height of 68 feet, a one-story cafeteria space, a gymnasium, perimeter landscaping, and a series of outdoor recreational spaces including a secured play area and pedestrian courtyard. At capacity, the school will house approximately 456 students and 67 full time equivalent faculty and staff. Parking will be provided on-site for faculty/staff in the form of approximately 37 permanent on-site spaces, including 10 spaces along the courtyard and 27 dedicated spaces in a nearby off-street parking lot.

The school building will front on Marcia and Bartlett Streets with a pedestrian courtyard between lots A and C. See Figure 2-5 for a site plan. At pick-up and drop-off times, the courtyard will provide two parallel bus lanes. During school hours, the courtyard will provide outdoor educational activity space for students, while the remaining space will accommodate staff parking. Pedestrian activity and use of the courtyard will be made available to the public on nights and weekends for planned events and community gatherings, but is not considered a vehicular through-street or public way.

The school, designed with a four-story classroom wing oriented north-south along Marcia Street, will accommodate middle school students on the top two floors and the elementary students on the lower two floors of the facility. Kindergarten classrooms, gymnasium, and a double-height common space known as the "Promenade" will be provided on the first floor adjacent to administration and building support spaces. A cafeteria – programmed to house informal performances – and a double-height large ensemble room are also located on the ground level with direct access to the outdoor courtyard. See Figures 2-6 through 2-9 for floor plans.

A signature component of the new building will be a collection of eight acoustically tuned ensemble rooms to support the schools robust orchestral El Sistema music program. The ensemble rooms are designed to accommodate a range of 45 – 60 instrumentalists in varying room sizes from 1,300 sf to 1,800 sf. The large, double-height ensemble room on the ground floor will become a visual hallmark and allow the schools unique programming

to extend out toward the community. Ancillary spaces for instrument storage will be provided in each room as well as an upper view deck for visitors in the large ensemble. Special attention is being paid to the acoustical nature of each of these spaces to create the ideal blend of reflective and absorptive surfaces within the rooms but also control the extent of sound bleed into adjacent spaces.

The El Sistema program is further celebrated on the exterior by introducing a mix of warm-toned vertical siding to contrast the iron-spot brick and accentuate the massing. At the fourth floor, a row of three double-height ensemble rooms are ganged together along Bartlett Street and pop-up above the mean roof level to create a visual beacon from Dudley Square and allow even North-facing daylight to enter each of these spaces.

In addition to the ensemble rooms, the open cafeteria at the ground floor will also function as assembly space for informal music performances. A series of glass accordion style doors are located along the edge of the green entry forecourt to allow performances and other functions to extend outdoors and engage the community.

2.3.2 Open Space, Pedestrian Ways, and Amenities

As shown in Figure 2-5, two vehicular traffic routes are designed for the site: the one-way parent pick-up/drop-off loop, and the bus queuing one-way loop. Egress for parent drop-off and pick-up will be accommodated via Bartlett Street to the north of the site. During morning drop-off and pick-up times, buses will access the courtyard via Bartlett Street and will exit via Marcia Street to Washington Street. Bus operations have been accommodated on-site to minimize adverse impacts on the neighborhood. Accessible pedestrian paths will follow the vehicular circulation, providing a connection between Marcia and Bartlett Streets.

The site will incorporate a fenced tot-lot along Marcia Street. The enclosed play area will be available for use during recess.

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 2-1

Aerial Locus Map

Bartlett Street Eastbound towards Washington Street

Bartlett Street / Lambert Avenue Intersection

Washington Street Southbound towards Bartlett Yard

Bartlett Yard Bus Depot along Washington Street

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 2-2

Existing Conditions

Washington Street (across from Bartlett Yard)

Washington Street / Guild Street Intersection

Bartlett Yard at Washington Street / St. James Street Intersection

Bartlett Yard

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 2-3

Existing Conditions

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 2-4

Bartlett Place Master Plan

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 2-5
Site Plan

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 2-6

Ground Level Plan

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 2-7

Level 2 Floor Plan

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 2-8

Level 3 Floor Plan

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 2-9

Level 4 Floor Plan

Chapter 3.0

Transportation Component

3.0 TRANSPORTATION

3.1 Introduction

This chapter presents an evaluation and summary of existing and future transportation infrastructure and operations that are expected relative to the development of the Conservatory Lab Charter School (CLCS) within the Bartlett Place Development on the corner of Washington Street and Bartlett Street in Boston's Roxbury neighborhood. As previously described in Chapter 2, the Project site was initially permitted under the City of Boston's Article 80 process as part of the Bartlett Place development. A comprehensive transportation study was completed for both Phase 1 and Full Build out of Bartlett Place as part of the MEPA and Article 80 reviews. In those prior filings, Lot C, the site of the proposed Charter School, was planned to contain 28 Elderly Residential housing units and 28 Townhouse units totaling 50,000 gross square feet.

This chapter presents the transportation impacts of the change in land use that is now proposed for Lot C, construction of the proposed 73,000 square-foot Charter School. It is assumed that the land uses previously approved for Lot C will still be accommodated within Bartlett Place at another location.

The School proposes to relocate their existing public school and programs supporting the school from their current locations at Carney Hospital in Dorchester and Washington Street in Brighton to this more spacious, dedicated 1.25-acre site. This transportation study has been developed to understand the transportation impacts of the Project and to develop appropriate transportation infrastructure improvements that will mitigate the impacts of the Project as required by Article 80B of the City of Boston Zoning Code. The scope of this study was developed in collaboration with the Boston Transportation Department (BTD) via ongoing consultation with the Proponent.

The transportation study includes an analysis of the following:

- Vehicle traffic on study area roadways and intersections;
- Parking conditions;
- Loading and service activities;
- Pedestrian activities;
- Public transportation services; and
- Accident history.

In addition, this chapter quantifies and assesses the transportation impacts that are expected under future conditions. The purposes of these analyses are to:

- Define and quantify existing transportation conditions in the Project study area;
- Estimate the transportation impacts that will be generated under future conditions based on anticipated traffic activities generated by the Project; and
- Develop a set of improvement strategies and measures, which will help to lessen the transportation effects of future growth and to provide improvements to the transportation infrastructure in the area.

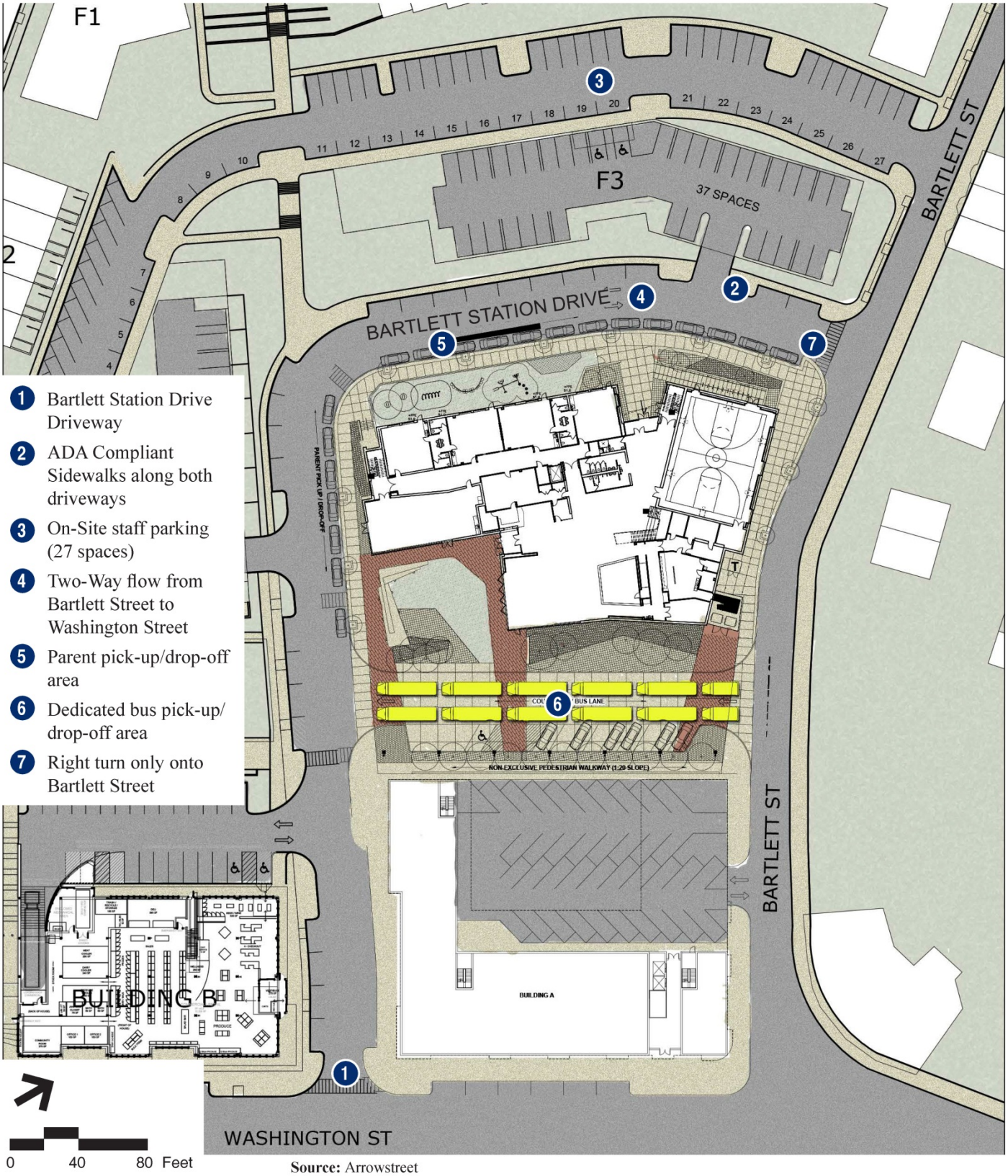
The following sections provide an overview of the Project and a summary of findings of the transportation analysis, including anticipated impacts, proposed improvements, a discussion of the study methodology, and a description of the study area. Subsequent sections provide detailed discussions of existing and future transportation conditions expected both with and without the Project.

3.1.1 Project Description

The Proponent proposes to construct an approximately 73,000 square foot Elementary and Middle School on the corner of Bartlett Station Drive and Bartlett Street in Boston's Roxbury neighborhood near Dudley Square. At capacity, the school will house approximately 456 students and 67 full-time equivalent faculty/staff.

Parking will be provided on-site for faculty/staff in the form of approximately 37 permanent on-site spaces, including 10 spaces along the bus lane and 27 dedicated spaces in a nearby off-street parking lot. Visitors and parents will use the on-street parking spaces available along Bartlett Station Drive. As part of ongoing project planning, the School will work to identify appropriate visitor, accessible, and charge station parking within the Project design.

The site circulation has been designed to carry school buses and passenger vehicles into the school campus in a one-way direction from Washington Street to Bartlett Street along Bartlett Station Drive during peak drop-off/pick-up time periods. The bus lane directly adjacent to the school to the east will be used for bus drop-off/pick-up. This space has been designed to accommodate up to 12 buses, which will enter the bus lane via Bartlett Street and exit the area via Bartlett Station Drive to Washington Street. Parents will travel along Bartlett Station Drive and use the curb adjacent to the school site for pick-up/drop-off activity. Figure 3-1 depicts the proposed site plan for the Project and the improvements that will be made.



Source: Arrowstreet

Conservatory Lab Charter School Boston, Massachusetts

Figure 3-1
Site and Traffic Management Improvement Plan

3.1.2 Site and Access Improvements

The Project site will be accessed via a proposed curb cut along Washington Street forming a new internal roadway named Bartlett Station Drive, as approved in the Bartlett Place Development, which will provide access to several Bartlett Street development parcels including the new School on Lot C. Egress for parent drop-off and pick-up will be accommodated via Bartlett Street to the north of the site. Since Bartlett Street is one-way eastbound, all traffic exiting the site will be required to take a right-turn onto Bartlett Street towards Washington Street. Buses will access the bus lane via Bartlett Street and will exit via Bartlett Station Drive to Washington Street. Bartlett Station Drive will provide access to the school with dedicated faculty/staff parking and school bus and parent drop-off/pick-up areas as illustrated on Figure 3-1. School dismissal may be staggered to reduce the conflicts between school buses and parent pick-up and to eliminate these activities from occurring on any adjacent neighborhood streets. It is expected that school buses, which the majority of students will use to get to and from school, will pick-up students first. If determined to be necessary to support efficient traffic operations in the area, parents may be required to wait until ten minutes after bus dismissal to pick-up their children. This plan will be managed via a proactive traffic management plan that is intended to eliminate school bus/passenger vehicle conflicts on-site and streamline the pick-up activities. School faculty/staff will implement this plan daily, as required.

The Project will construct approximately 37 permanent parking spaces, including 10 spaces along the bus lane and an additional 27 spaces located on-site across Bartlett Station Drive to the west of the school. These 27 permanent spaces, as indicated on Figure 3-1, may not be available at the time of initial school opening. As such, CLCS will be provided with 27 temporary surface parking spaces within Bartlett Place until those permanent spaces are constructed. The School's main egress on Bartlett Station Drive will be stop-controlled and right-only onto Bartlett Street eastbound. Bartlett Station Drive will be constructed with ABA/AAB accessible pedestrian amenities in order to safely manage pedestrian traffic in conjunction with vehicular movements as part of the larger Master Plan for Bartlett Place. The school bus pick-up/drop-off will occur to the east of the school building while parent pick-up/drop-off will occur to the west of the school along Bartlett Station Drive. On-site pedestrian amenities include sidewalks surrounding the school buildings and crosswalks to safely guide students between the drop-off/pick-up area and the school sidewalk. Additionally, a crossing will be provided on Bartlett Station Drive so students can access the Bartlett Place public plaza.

3.1.3 Summary of Findings

The primary finding of this transportation analysis is that the transportation improvement plan proposed by the School will safely and efficiently manage traffic and pedestrian movements to and from the school. A summary of those improvements is illustrated in Figure 3-1. A series of actions have been developed to provide vehicular and pedestrian access. The proposed on-site parking for the Project will satisfy the expected parking

demands generated by the Project (which is driven almost entirely by the faculty/staff population). Finally, the Proponent will explore proactive Transportation Demand Management (TDM) measures and amenities to encourage and support the use of carpooling, transit, walking, and cycling.

A summary of key findings of the transportation analysis for the Project is as follows:

- The Project will generate approximately 103 entering and 88 exiting additional vehicle trips during the weekday morning peak hour and approximately 80 entering and 96 exiting vehicle trips during the weekday evening peak hour.

- A dedicated drop-off/pick-up area will be provided for parents west of the school with a separate a pick-up/drop-off area provided for school buses to the east of the school.

- Morning arrival is expected to begin about 30 minutes before the start of the school day (expected to be at 7:15 AM). School buses will unload students to the east of the school. Parents will drop-off their children to the west of the school along Bartlett Station Drive.

- Afternoon dismissal may be staggered, if determined to be necessary to support efficient traffic operations in the area. If deemed necessary, students that take the school bus, walk, or take the MBTA will be dismissed together. The east drop-off has the ability to load all 12 school buses concurrently. Students that are picked-up by their parents will be dismissed 10 minutes later. Parents will be able to use the dedicated drop-off area located to the west along Bartlett Station Drive.

- The School will maintain an active faculty/staff presence in the drop-off area during both the drop-off and pick-up periods to ensure student safety and streamline loading/unloading.

- The School will work with the BTD to develop appropriate on-street parking regulations along Bartlett Station Drive that support school operations and efficient parking use during off hours

- The study area intersections will continue to operate at the same levels of service when the school opens as under future No-Build conditions, with the exception of Guild Street at Washington Street during the morning peak hour.

- The School will provide accessible sidewalks along both driveways and accessible ramps, crosswalks, and sidewalks throughout the Project site.

- On-site parking will comprise of approximately 37 permanent parking spaces, which will provide parking for most of the faculty/staff, including 10 spaces along the bus lane and an additional 27 spaces located on-site across Bartlett Station Drive

to the west of the school. These 27 permanent spaces, as indicated on Figure 3-1, may not be available at the time of initial school opening. As such, CLCS will be provided with 27 temporary surface parking spaces within Bartlett Place until those permanent spaces are constructed.

- The Proponent is committed to providing and enhancing a wide array of Transportation Demand Management measures offered to faculty and staff as a means to encourage the use of alternative transportation modes.

3.1.4 Study Methodology

The transportation analysis provides an evaluation of anticipated impacts of the Project on the surrounding transportation environment. This analysis was conducted in three phases. The first phase involved defining and quantifying the existing transportation conditions in the Project study area including roadway and intersection geometrics and traffic characteristics for the surrounding transportation infrastructure.

The second phase of the study estimates the future transportation conditions in the Project study area by adding the traffic impacts from projected background traffic growth and other planned developments in the area, and an estimate of traffic demands to be generated by the Project to the existing conditions defined in phase one. The first and second phases utilize Synchro version 8.0 to analyze the 2015 Existing Condition as well as the 2020 No-Build and Build Conditions.

The third phase of the study identified measures to improve future transportation conditions including developing improvement strategies, such as Transportation Demand Management actions and Project site access/circulation improvements, to lessen the transportation impacts of the Project.

3.1.5 Study Area

The Project location is generally bound by Bartlett Street to the north, Washington Street to the east, and the rest of the Bartlett Place Development to the south and west. The study area includes ten key intersections as illustrated in Figure 3-2:

1. Roxbury Street/Malcolm X Boulevard/Shawmut Avenue (signalized);
2. Malcolm X Boulevard/Dudley Street/Washington Street (signalized);
3. Dudley Street/Warren Street (signalized);
4. Dudley Street/Harrison Avenue (signalized);
5. Shawmut Avenue/Washington Street (unsignalized);
6. Bartlett Street/Washington Street (unsignalized);

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Figure 3-2
Study Area Intersections

7. St. James Street/Washington Street (unsignalized);
8. Guild Street/Washington Street (unsignalized);
9. Millmont Street/Guild Street/Lambert Avenue (unsignalized); and
10. Bartlett Street/Lambert Avenue (unsignalized).

3.2 Existing Conditions

Evaluation of transportation impacts associated with the Project is based upon an understanding of the existing transportation system in the Project study area. The evaluation of existing transportation conditions in the study area includes roadway geometry, traffic controls, daily and peak hour traffic volumes, traffic safety data, pedestrian, and public transportation information. Each of these elements is described in the following sections.

3.2.1 Roadway Conditions

The principal roadways and intersections in the Project study area are described briefly below. The descriptions of the roadways include physical characteristics, adjacent land uses and traffic control devices.

3.2.1.1 Roadways

The following are the key roadways evaluated in this transportation analysis:

Roxbury Street is a one-way eastbound local road that runs east-west from Malcolm X Boulevard to Washington Street. East of Washington Street, the Roxbury Street alignment becomes Zeigler Street but only MBTA Buses are allowed through. Roxbury Street is approximately 34 feet wide. There is a single travel lane and on-street parking is available on both sides of the street. Sidewalks are provided on both sides of the street and are seven feet wide on the north side and eight feet wide on the south side.

Malcolm X Boulevard is a median-divided roadway with two lanes in each direction. It is classified as an urban minor arterial and runs east-west from Columbus Avenue to Washington Street in Roxbury. The Malcolm X Boulevard alignment continues in both directions as Tremont Street west of Columbus Avenue and Dudley Street east of Washington Street. Malcolm X Boulevard varies from approximately 65 to 68 feet wide with an 8-foot median. Sidewalks are provided on both sides of the street and are approximately seven feet wide. Within the study area, MBTA bus routes 15, 23, 28, 44, 45 and 66 run along Malcolm X Boulevard.

Shawmut Avenue is a two lane urban minor arterial that runs north-south from Oak Street to Washington Street in Boston. Shawmut Avenue runs in a one way northbound direction north of West Dedham Street in Boston's South End and in a one way southbound direction south of West Dedham Street until Malcolm X Boulevard where it turns into a two-way street until it ends on Washington Street. North of Malcolm X Boulevard, Shawmut Avenue is approximately 60 feet wide with two travel lanes and on-street parking available on both sides of the street. South of Malcolm X Boulevard, Shawmut Avenue consists of two 11-foot travel lanes in each direction, which merge into one 20-foot wide lane in each direction. There is no on-street parking provided south of Malcolm X Boulevard. Sidewalks are seven feet wide and are provided on both sides of the street.

Dudley Street is a two-way urban minor arterial that runs east-west from Washington Street in Dudley Square to Columbia Road in Uphams Corner. The Dudley Street alignment continues in both directions as Malcolm X Boulevard west of Washington Street and Stoughton Street east of Columbia Road. Between Washington Street and Warren Street, Dudley Street consists of two lanes in each direction with an eastbound left turning lane and an eight foot median. Between Warren Street and Harrison Street, Dudley Street consists of one lane in each direction with an eastbound left turn lane. East of Harrison Avenue, Dudley Street consists of just one lane in each direction. Parking is provided on both sides of Dudley Street as are seven to eight foot sidewalks. Within the study area, MBTA Bus Routes 15, 41, and 45 run along Dudley Street.

Washington Street is an urban principal arterial that runs north-south from Court Street/State Street in downtown Boston, through Roxbury, Jamaica Plain, West Roxbury and Roslindale. Eventually, Washington Street becomes Route 1A in Dedham, Massachusetts. Washington Street is one way southbound from Palmer/Warren Street to Dudley Street and consists of two travel lanes. South of Dudley Street, Washington Street consists of one travel lane in each direction varying in width from 11 to 20 feet wide. Sidewalks are eight feet wide and provided on both sides of the street. On-street parking is allowed near the study area. Within the Study area, MBTA Bus Route 42 runs along Washington Street

Warren Street is an urban minor arterial that runs north-south from Washington Street to Blue Hill Avenue. Warren Street is a two way roadway from Blue Hill Avenue to Dudley Street. North of Dudley Street, Warren Street is one way northbound with parking allowed on both sides of the road. South of Dudley Street, Warren Street merges with Harrison Avenue and continues as a two way road with two lanes in each direction, and parking is allowed on both sides of the street. Sidewalks are approximately seven feet wide and are provided along both sides of the street. Within the study area, MBTA Bus Routes 14, 15, 19, 23, 28, 44, and 45 run along Warren Street.

Harrison Avenue is a two-way urban minor arterial that runs north-south from Avenue de Lafayette in Boston to Warren Street in Roxbury. South of Dudley Street, Harrison Avenue consists of one lane in the southbound direction with adjacent parking and two lanes in the northbound direction. A bicycle lane is provided on the southbound direction and on the

northbound direction a sharrow is painted on the lane. North of Dudley Street, Harrison Avenue consists of one lane in each direction with parking allowed on both sides. Sidewalks vary in width from 6 to 10 feet and are provided on both sides of the road.

Bartlett Street is a local road that runs east from Dudley Street to Washington Street in Roxbury. Bartlett Street is one-way eastbound and is approximately 16 feet wide. Unrestricted on-street parking and varying sidewalks widths from five to eight feet are provided on both sides of the roadway.

St. James Street is a one-way westbound local road that runs from Washington Street to Warren Street in Roxbury. Within the study area, St. James Street is approximately 39 feet wide and consists of one travel lane with on-street parking provided on the north side of the street. Sidewalks are provided on both sides of the street and are approximately six feet wide. At the intersection of St. James Street and Washington Street, it was observed that St. James Street acts as two lanes, a left and right turn lane.

Guild Street is a local road that runs east-west from Lambert Avenue to Washington Street in Roxbury. Guild Street varies in width from 24 to 28 feet wide and consists of one travel lane in each direction. On-street parking is unrestricted along both sides of the street. Sidewalks are provided along both sides of the street and vary in width between five to six feet wide.

Millmont Street is a local road that runs east-west from Highland Street to Lambert Avenue in Roxbury. Millmont Street is approximately 26 feet wide and consists of one travel lane in each direction and on-street parking on both sides of the street. Sidewalks are provided on both sides of the street and vary from six feet on the north side to five feet on the south side.

Lambert Avenue is a one-way local road that runs northbound from Cedar Street to Dudley Street in Roxbury. Lambert Avenue is approximately 19 feet wide and consists of one northbound travel lane. On-street parking is permitted intermittently along both sides of Lambert Avenue and in the vicinity of the Project site, on-street parking is unrestricted on the east side and prohibited on the west side of Lambert Avenue. Sidewalks are provided along both sides of the street and are approximately four feet wide.

3.2.1.2 Intersections

The following study area intersections are evaluated in the transportation analysis:

Roxbury Street/Malcolm X Boulevard/Shawmut Avenue is a five legged signalized intersection with four approaches which operates with three phases including an actuated, exclusive pedestrian phase. The Malcolm X Boulevard eastbound approach consists of a 12-foot shared bear left /through lane and an 18-foot shared through/right turn lane with adjacent, on-street parking. The Malcolm X Boulevard westbound approach consists of a 13-foot shared left turn/through lane and a 10-foot shared through/hard right lane with

adjacent on-street parking. The Malcolm X Boulevard eastbound and westbound travel lanes are separated by a six foot wide raised median. The Shawmut Avenue northbound approach consists of an 11-foot left turn lane and an 11-foot shared bear right/right turn lane. The Shawmut Avenue southbound approach is 30 feet wide and unmarked. It functions as a shared hard left/bear left turn lane, a through lane, and a right turn lane. Right turn on red is prohibited at both Shawmut Avenue approaches and the Malcolm X Boulevard westbound approach. Roxbury Street is one-way northbound with on-street parking along both sides.

West of the intersection, there are MBTA bus stops on each side of the Malcolm X Boulevard. Crosswalks and handicapped-accessible ramps are provided at every corner. There are sidewalks provided on both sides of Malcolm X Boulevard, Shawmut Avenue, and Roxbury Street. Sidewalks are approximately seven feet wide. Pedestrian signals and push buttons are provided at every intersection approach. Sidewalks, pavement, and pavement markings are in fair condition.

Malcolm X Boulevard/Dudley Street/Washington Street is a four-way, signalized intersection which operates with four phases including an exclusive, actuated pedestrian phase. The Malcolm X Boulevard eastbound approach consists of a 12-foot through lane and an 18-foot shared through/right turn lane. Right turn on red is prohibited at this approach. The Malcolm X Boulevard eastbound and westbound travel lanes are separated by a six foot wide raised median. The Dudley Street westbound approach consists of a 12-foot shared left turn/through lane and a 14-foot through lane with adjacent on-street parking. The Dudley Street eastbound and westbound travel lanes are separated by a four foot wide raised median. U-turns are prohibited at both the Malcolm X Boulevard eastbound and the Dudley Street westbound approaches. The Washington Street northbound approach consists of an 11-foot shared left turn/right turn lane and a 12-foot right turn lane. The Washington Street one-way, southbound approach consists of a 13-foot left turn lane and an 11-foot shared through/right turn lane with adjacent, on-street parking. Right turn on red is prohibited at both Washington Street approaches. There is a driveway for the Boston Police Department located just east of the intersection on the south side of Dudley Street. There is an MBTA bus stop located on the Washington Street northbound approach.

Crosswalks and wheelchair ramps are provided across all intersection approaches. Sidewalks are provided on both sides of Malcolm X Boulevard, Washington Street, and Dudley Street. Sidewalks along Malcolm X Boulevard and Dudley Street vary from seven to nine feet in width. Sidewalks along Washington Street vary from seven to sixteen feet in width in the vicinity of the intersection. Pedestrian signal indications and push buttons are provided at every corner. Pavement and pavement markings are in fair condition.

Dudley Street/Warren Street is a four legged, signalized intersection with three approaches which operates with four phases, including an exclusive, actuated pedestrian phase. The Dudley Street eastbound approach consists of a 10-foot left turn lane, 11 and 14-foot through lanes, and a 20-foot right turn lane. The Dudley Street eastbound and westbound

travel lanes are separated by a six-foot wide raised median at this approach. The through lanes and right turn lane are separated by a splitter island. The Dudley Street westbound approach consists of two approximately 10-foot lanes, one through lane and one shared through/right turn lane. The Warren Street northbound approach consists of a 15-foot shared left turn/through lane, a 14-foot through lane, and a 20-foot right turn lane with adjacent on-street parking. There is a splitter island separating the two through lanes from the right-turn lane. The Warren Street northbound and southbound travel lanes are separated by a raised median that varies in width. Warren Street, north of the intersection, is one-way northbound and consists of two travel lanes with adjacent parking allowed on both sides.

There are crosswalks provided across all approaches. There are no handicapped-accessible ramps provided at the crosswalks except for the Warren Street northern crosswalk and the right side of the Dudley Street eastbound right turn lane. Sidewalks are provided along both sides of Dudley and Warren streets and vary in width from six to nine feet. Pedestrian signal indications and push buttons are provided at every approach. Pavement, pavement markings, and sidewalks are in poor condition.

Dudley Street/Harrison Avenue is a four-way, signalized intersection which operates with three phases. There is no exclusive pedestrian phase. The Dudley Street eastbound approach consists of a 10-foot left turn lane and 12-foot shared through/right turn lane. The Dudley Street westbound approach consists of a single lane that is approximately 21 feet wide. However, it was observed in the field that this approach behaves as one shared left turn/through lane and one shared through/right turn lane. The Harrison Avenue northbound approach consists of one approximately 12-foot shared left turn/through lane with a sharrow symbol and an eight-foot right-turn lane. The Harrison Avenue southbound approach is approximately 20 feet wide and consists of a shared left-turn/through lane and a right-turn lane. The Harrison Avenue southbound receiving approach has a five foot bike lane.

There is a Boston Fire Department driveway located just east of the intersection on the north side of Dudley Street. Crosswalks and handicap-accessible ramps are provided across all intersection approaches. Sidewalks are provided along both sides of Dudley Street and Harrison Avenue. In the vicinity of the intersection, sidewalks on Dudley Street and Harrison Avenue vary from six to ten feet wide. There are pedestrian signals provided, however, there are no push buttons at any intersection approach. Pavement and pavement markings are in poor condition.

Shawmut Avenue/Washington Street is a four-way, unsignalized intersection. The Shawmut Avenue eastbound approach consists of one 20-foot right-turn lane. Left-turns and U-turns are prohibited at this intersection approach. There is a 10-foot wide island separating the eastbound approach lanes from the westbound receiving lanes. The Boston Police driveway on the westbound approach is a 23 foot wide, one-way exit that behaves like an all-purpose

lane. The Washington Street northbound approach consists of two approximately 11-foot travel lanes; one shared left/through lane and one through lane. The Washington Street southbound approach consists of one 11-foot shared right-turn/through lane.

Crosswalks are provided across the western, eastern and northern legs of the intersection. Sidewalks are provided on both sides of Shawmut Avenue and Washington Street. Sidewalks vary in width from six to eight feet. Sidewalks, pavement, and pavement markings are all in good condition.

Bartlett Street/Washington Street is a three-way, unsignalized intersection. The Bartlett Street approach is one-way eastbound and is 26 feet wide. The Washington Street northbound approach consists of one 12-foot through lane and adjacent parking lane. The Washington Street southbound approach consists of one 12-foot through lane and adjacent parking lane. A crosswalk is provided across Bartlett Street with handicapped-accessible ramps provided at both ends. Sidewalks are provided on both sides of Bartlett Street and Washington Street. Sidewalks on Bartlett Street are approximately five to eight feet wide. Sidewalks on Washington Street are 10 and 8 feet wide on the east and west sides, respectively. Sidewalks, pavement, and crosswalks are in fair condition, but the pavement markings are in poor condition.

St. James Street/Washington Street is a three-way, unsignalized intersection. On the west side of the intersection, there is a gated and locked Site driveway approximately 40 feet wide. The St. James Street approach is one-way westbound and is 39 feet wide. There is on-street parking along the north side of the street. Field observations noted that this intersection behaves as two lanes; a left-turn lane and a right-turn lane. The Washington Street northbound and southbound approaches consist of one 20-foot through lane. Another Site driveway is located 21 feet north of the intersection on the west side of Washington Street.

There is an MBTA bus stop north of the intersection, on the west side of Washington Street and south of the intersection, on the east side of Washington Street. A crosswalk with handicapped-accessible ramps is provided across St. James Street. Sidewalks are provided on both sides of St. James Street and Washington Street. Sidewalks range in width from 6 to 12 feet. Sidewalks, pavement, and the crosswalk are in good condition.

Guild Street/Washington Street is three-way, unsignalized intersection. The Guild Street eastbound approach is approximately 28 feet wide and unmarked. It behaves as one shared left-turn/right-turn lane and one receiving lane. The Washington Street northbound approach consists of one 19-foot shared left-turn/through lane. The Washington Street southbound approach is approximately 20 feet wide and acts as one through lane and one right-turn lane. A gated Site driveway is located 23 feet north of the intersection, on the west side of Washington Street. The driveway is approximately 27 feet wide.

MBTA bus stops are located on both sides of Washington Street just south of the intersection. A crosswalk and handicapped-accessible ramps are provided across Guild Street. Sidewalks are provided along both sides of Guild Street and Washington Street. Sidewalks along Guild Street range in width from five to seven feet. Sidewalks along Washington Street range in width from five to nine feet.

Millmont Street/Guild Street/Lambert Avenue is a four legged, unsignalized intersection with three approaches. The Millmont Street eastbound approach consists of one 11-foot shared left-turn/through lane with on-street parking on both sides. The Guild Street westbound approach consists of one 10-foot right-turn lane with on-street parking on both sides. The Lambert Avenue northbound approach consists of one 11-foot shared through/right-turn lane with adjacent on-street parking on the east side of the roadway. This intersection is an all-way stop. No crosswalks are provided, however handicapped – accessible ramps are provided at each corner of the intersection. Sidewalks are provided on both sides of Millmont Street, Lambert Avenue, and Guild Street and are approximately five to six feet wide and in fair to poor condition. Pavement is in fair condition.

Bartlett Street/Lambert Avenue is a four legged, unsignalized intersection with two approaches. The Lambert Street westbound approach consists of one 11-foot shared through/right-turn lane with on-street parking provided on the south side of the street. The Bartlett Street northbound approach consists of one eight foot shared left-turn/through lane with adjacent parking on both sides of the roadway. Both of these two approaches are stop-controlled. There are no crosswalks provided at this intersection, however one handicapped-accessible ramp is provided on both corners of the eastern leg of Bartlett Street and both are in poor condition. There are sidewalks provided on both sides of Bartlett Street and Lambert Avenue. Sidewalks are approximately four to seven feet wide and are in fair condition. Pavement is in fair to poor condition.

3.2.2 Traffic Volume Data Collection

To better assess the study area's existing conditions, traffic volumes that were collected as part of the Bartlett Place ENF and PNF Transportation Study were used for this analysis. Manual Turning Movement Counts (TMCs) were conducted on Wednesday, October 3, 2012, for all intersections along Dudley Street/Malcolm X Boulevard and Wednesday, November 28, 2012, for all other intersections. TMCs took place during the morning peak period of 7:00 AM – 9:00 AM and the evening peak period of 4:00 PM – 6:00 PM.

TMC and ATR raw data are compiled in Appendix A of this Expanded PNF.

3.2.3 Existing Traffic Volumes

TMCs were used to determine the traffic volumes for the 2015 Existing Condition. The intersection TMCs were used to establish traffic networks for the 2015 Existing Condition for the weekday morning and evening peak hours. The study area's overall weekday

morning peak hour was determined to occur between 7:30 AM and 8:30 AM, which coincides with the morning peak hour for the school-generated traffic. The area's overall evening peak hour was determined to occur between 4:15 PM and 5:15 PM. The 2015 Existing Condition weekday morning and evening peak hour traffic volumes are shown in Figures 3-3 and 3-4, respectively.

3.2.4 Existing Parking Conditions

3.2.4.1 Off-Street Parking

There was previously surface parking throughout the entire Bartlett Place site area. There are no public parking garages within a quarter mile of the Project site. The only off-street parking facilities in the area are privately owned, one of which is for the Roxbury Police Station. The closest garages are near Ruggles Station which is approximately one mile from the study area.

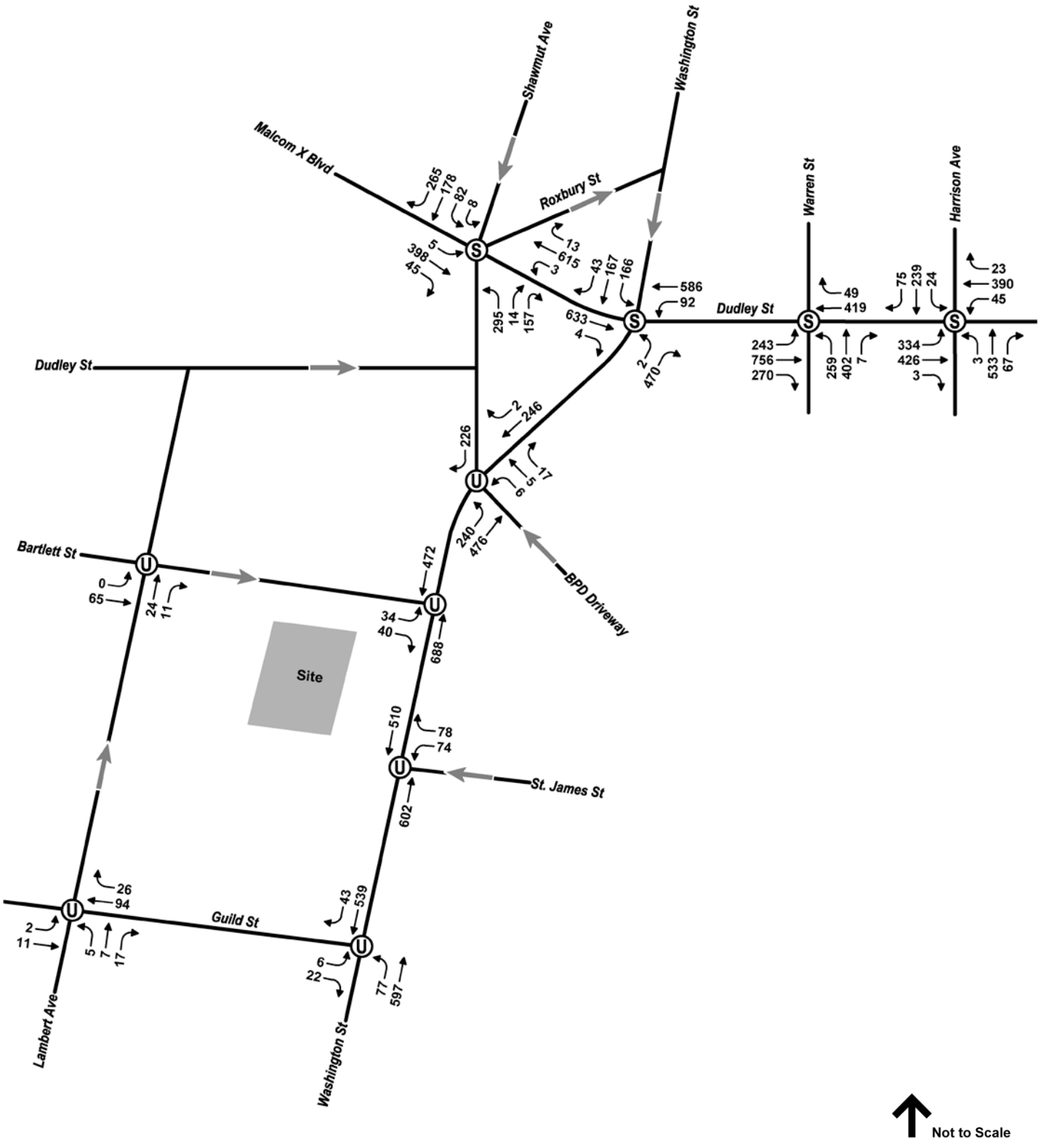
3.2.4.2 On-Street Parking

This study provides an inventory of curb use and parking restrictions within a quarter mile radius of the site. Figure 3-5 illustrates an inventory of existing curb use and parking restrictions in the study area. On-street parking in the study area is mostly unrestricted with some areas where on-street parking is prohibited.

3.2.5 Pedestrians & Bicyclists

Weekday morning and evening peak hour pedestrian and bicycle counts for each study area intersection are presented in Figures 3-6 and 3-7, respectively. Key observations of pedestrian and bicycle activities in the study area include:

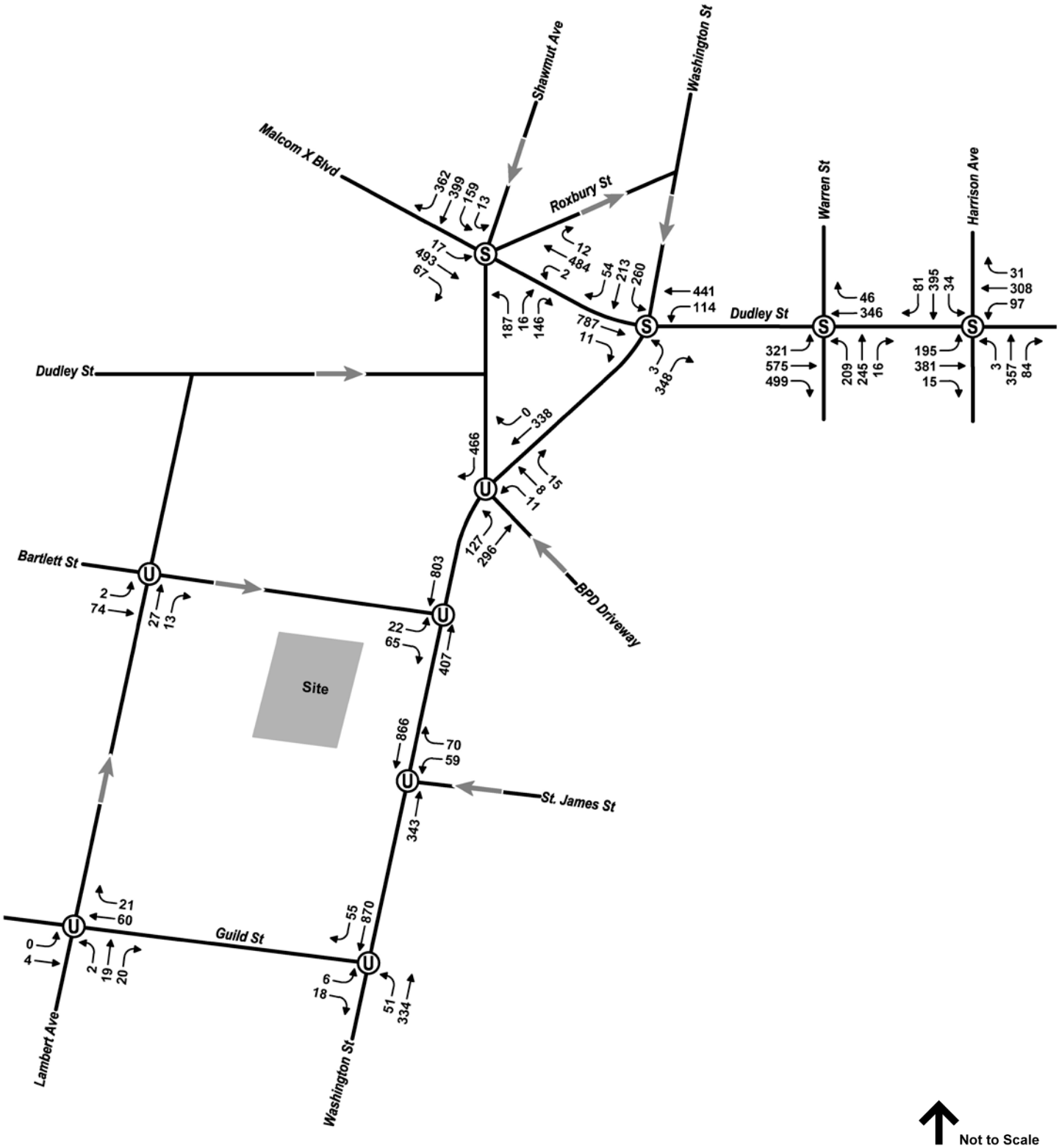
- Sidewalks are provided along and at all study area streets and intersections.
- Crosswalks are provided across all streets at all study area intersections.
- The study area intersections with the highest pedestrian volumes were Roxbury Street/Shawmut Avenue and Malcolm X Boulevard and Warren Street/Dudley Street. The intersection of Roxbury Street/Shawmut Avenue and Malcolm X Boulevard experienced a total of 185 and 180 pedestrian crossings per hour during the weekday morning and evening peak hours, respectively. The intersection of Warren Street/Dudley Street experienced a total of 192 and 291 pedestrian crossings per hour during the weekday morning and evening peak hours respectively.



Conservatory Lab Charter School Boston, Massachusetts

Figure 3-3

2015 Existing Condition, Morning Peak Hour Traffic Volumes



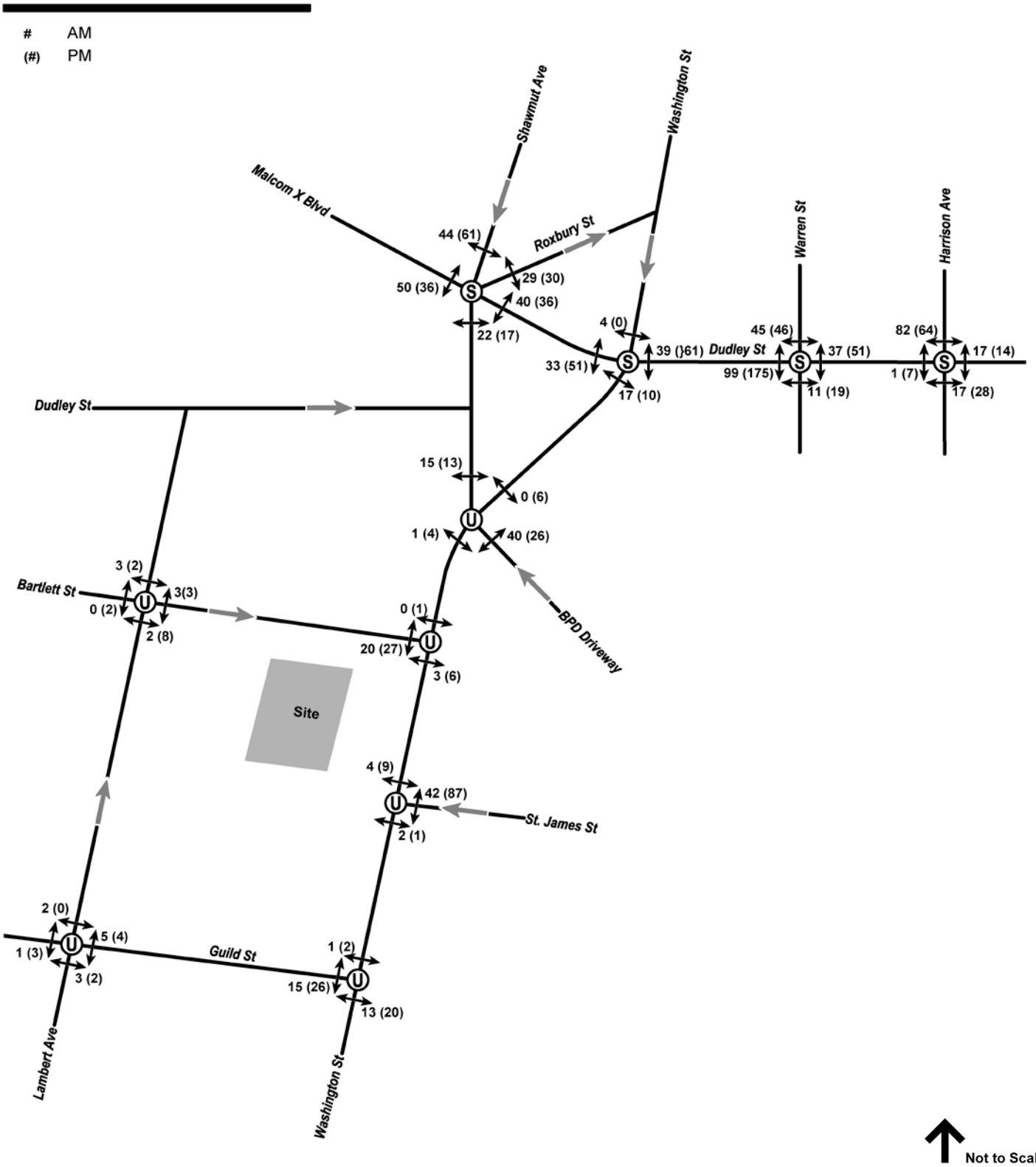
Conservatory Lab Charter School Boston, Massachusetts

Figure 3-4

2015 Existing Condition, Evening Peak Hour Traffic Volumes

Conservatory Lab Charter School Boston, Massachusetts

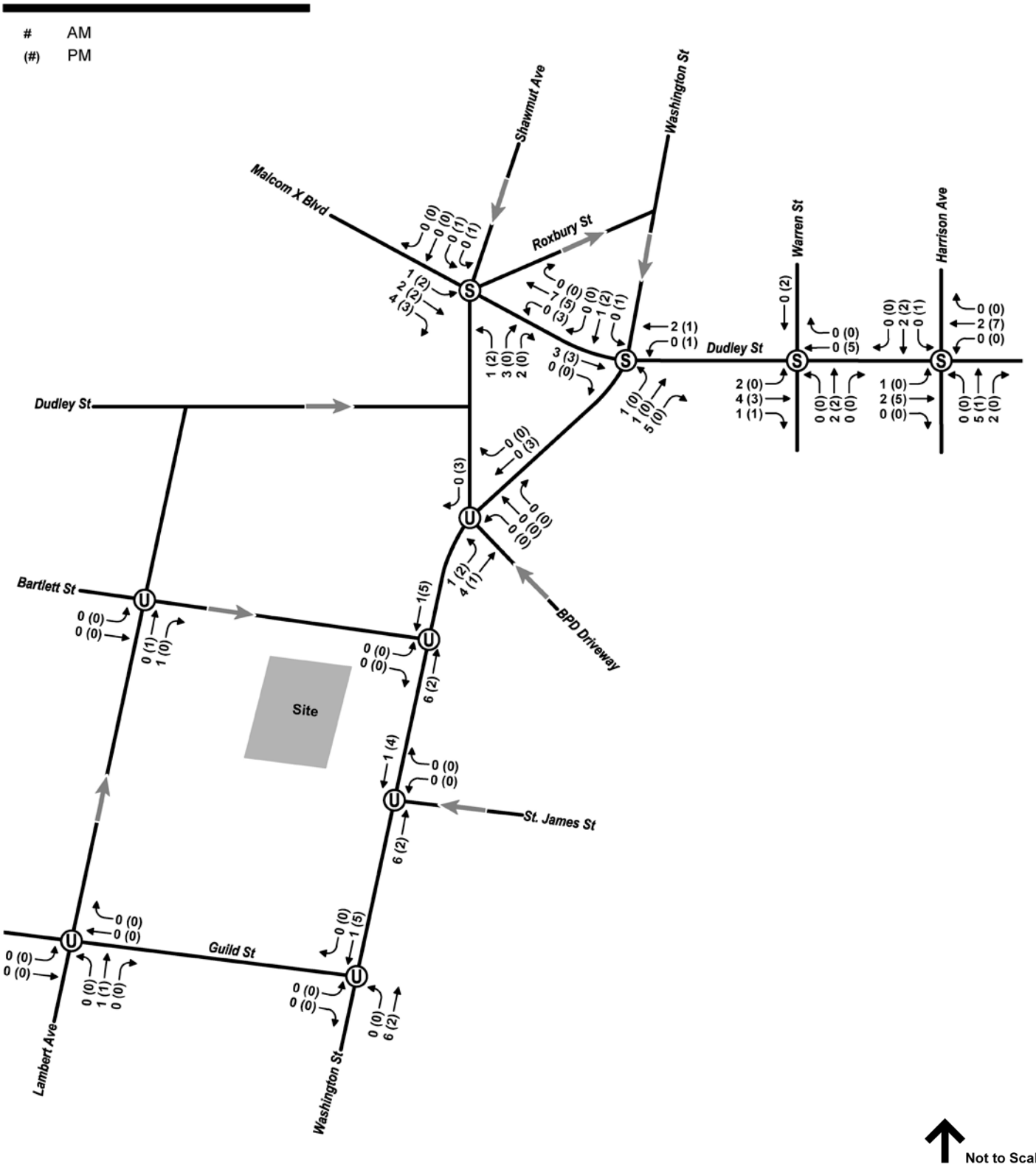
Figure 3-5
On-Street Parking Regulations



Conservatory Lab Charter School Boston, Massachusetts

Figure 3-6

2015 Existing Morning/Evening Peak Hour Pedestrian Volumes



Conservatory Lab Charter School Boston, Massachusetts

Figure 3-7

2015 Existing Morning/Evening Peak Hour Bicycle Volumes

- There are several pedestrian and bicycle accommodations within the study area. The Paul Dudley White Bicycle Path runs along the Charles River between downtown Boston and Watertown Square which is approximately a mile from the site. The South Bay Harbor Trail is along Melnea Cass Boulevard and provides access between Columbus Avenue and connects to the Boston Harborwalk in Rolling Bridge Park on the Fort Point Channel. The Southwest Corridor Park, a five mile mixed-use path for pedestrians and bicyclists, connects with the South Bay Harbor Trail at Columbus Avenue. The Pierre Lallement Southwest Corridor Bicycle Path runs along the Orange Line from Back Bay Station to Forest Hills Station.

- Bicycle volumes around the site are light with ten or fewer bicyclists along Washington Street during the peak hours.

- Bicycle racks are not currently provided at the existing Project site.

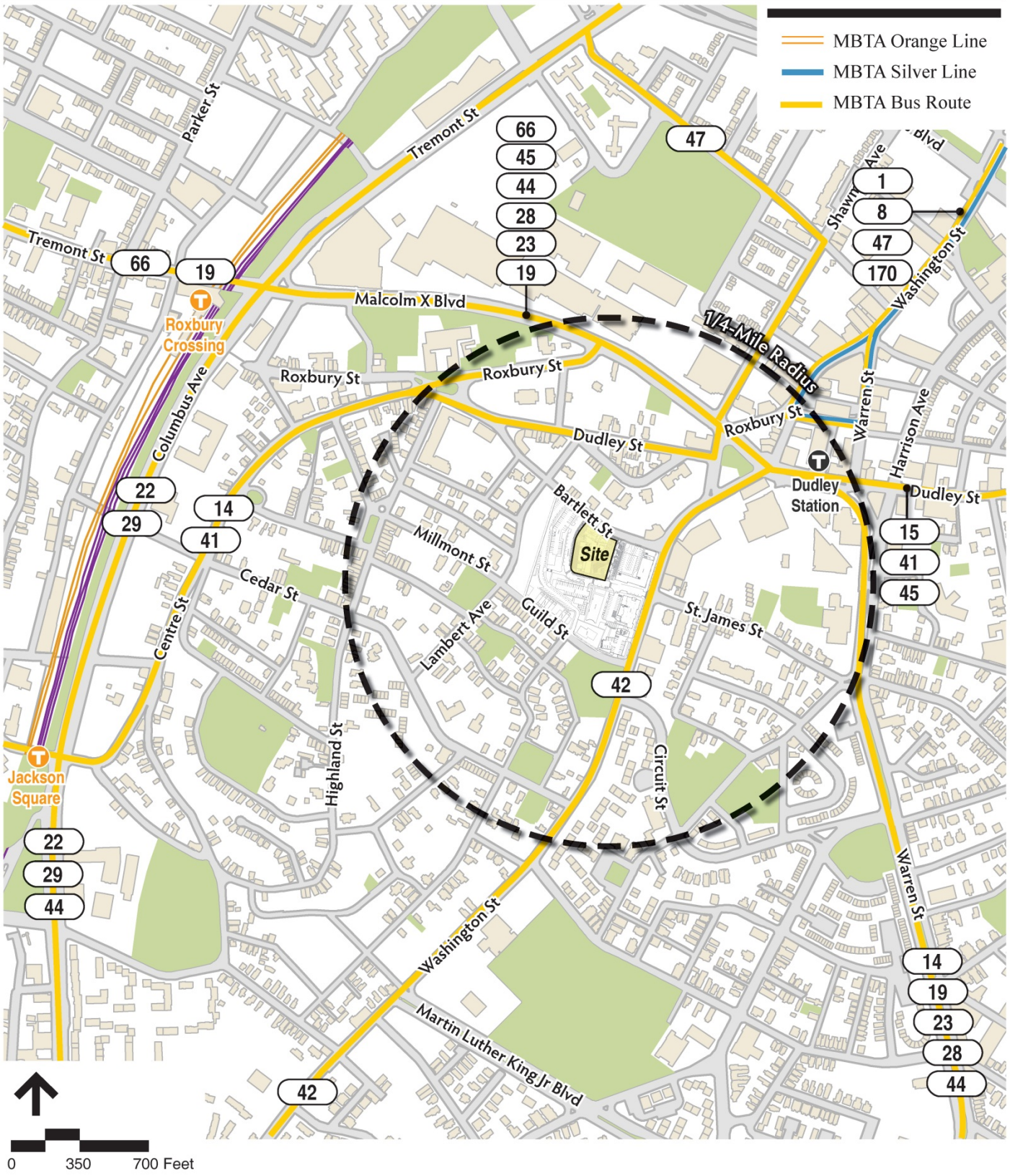
3.2.6 Bicycle and Car Sharing Services

Hubway is a bicycle sharing system in Boston, Brookline, Cambridge, and Somerville that provides more than 1,300 bicycles at 140 stations. Within the study area, the closest Hubway station is at Dudley Square which provides a total of 15 bicycles for shared use.

Zipcar is a car sharing service provided to users as an alternative to owning and traditionally renting a vehicle. Members of Zipcar rent vehicles by the hour or day, and gas and insurance is included in the rental. There are several Zipcar locations to the west of the site along Columbus Avenue between Jackson Square and Roxbury Crossing. These locations provide members with 14 vehicles for rent. To the north of the site on Washington Street, there is another Zipcar available for rent.

3.2.7 Existing Public Transportation in the Study Area

Massachusetts Bay Transportation Authority (MBTA) services near the Project site include fourteen bus lines, the Orange Line, Commuter Rail and two Silver Line Bus lines. These services, listed in Table 3-1, are described in further detail below. Figure 3-8 shows the MBTA bus routes surrounding the study area.



Conservatory Lab Charter School Boston, Massachusetts

Figure 3-8
Public Transportation

Table 3-1 MBTA Transit Service in the Study Area

Transit Line/ Bus Route	Origin/Destination	Rush Hour Frequency (Minutes)
MBTA Orange Line	Forest Hills Station – Oak Grove Station	6-10
1	Harvard/Holyoke Gate – Dudley Station	8-12
8	Harbor Point/U Mass – Kenmore Station	14-20
14	Roslindale Square - Heath Street via Dudley Station	35-40
15	Kane Square or Fields Corner Station	6-9
19	Fields Corner Station –Ruggles or Kenmore Station	12-20
22	Ashmont Station – Ruggles Station via Jackson Square Station	7-8
23	Ashmont Station – Ruggles Station via Washington Street	5-7
28	Mattapan Station – Ruggles Station via Dudley Station	6-8
41	Centre & Eliot Streets – JFK/UMASS Station via Dudley Station, Centre Street, and Jackson Square Station	22-24
44	Jackson Square Station – Ruggles Station via Seaver Street and Humboldt Avenue	12-14
45	Franklin Park Zoo – Ruggles Station via Blue Hill Avenue	10-12
47	Central Square, Cambridge – Broadway Station	10-20
66	Harvard Square – Dudley Square	8-10
170	Oak Park – Dudley Station (Limited Service)	X
SL4	Dudley Station – South Station	4-5
SL5	Dudley Station – Downtown Crossing	15

X = Irregular Headways

Source: *mbta.com*, Ridership and Service Statistics, Thirteenth Edition 2010. Headways are approximate.

3.2.7.1 Commuter Rail

The closest MBTA commuter rail line station is Ruggles Station, located approximately one mile north-west from the Project site. Ruggles Station is serviced by the Franklin, Needham and Providence/Stoughton Line. These lines provide access to/from Boston to/from the south and southwestern regions of Massachusetts and Rhode Island.

All three lines that run through Ruggles Station terminate/originate at South Station in downtown Boston where connections to the MBTA's Red Line, Silver Line to Logan Airport/Design Studio and numerous bus routes are provided.

3.2.7.2 Rapid Transit

The MBTA Orange Line provides access to downtown Boston, extending north to Oak Grove Station and extending south to Forrest Hills Station in West Roxbury. The closest Orange Line Station to the Project site is Ruggles Station, located approximately one mile northwest.

The MBTA Silver Line Routes SL4 and SL5 provide access from Dudley Square in Roxbury to South Station and Downtown Crossing, respectively, in downtown Boston. The closest Silver Line station to the Project site is Dudley Station, and it is located approximately a third of a mile northeast.

3.2.7.3 Bus

Fourteen bus routes are available near the Project site are described below.

- **Route 1 (Harvard/Holyoke Gate – Dudley Station via Mass. Ave.)** provides service along Massachusetts Avenue from Harvard Square in Cambridge to Dudley Square in Roxbury. At Harvard Station, connections can be made for the Red Line, and at Dudley Station, connections can be made for the Silver Line. Bus service is provided from 4:37am to 1:10am Monday-Thursday, from 4:37am to 2:50am on Fridays, from 4:40am to 2:50am on Saturdays, and from 6:00am to 1:10am on Sundays.

- **Route 8 (Harbor Point/UMass – Kenmore Station)** provides service from Kenmore Station in Fenway, through the Longwood Medical area, Dudley Square and Uphams Corner until reaching UMass Boston in Dorchester. At the JFK/UMass Station connections to the Red Line can be made, and at Kenmore Station, connections can be made for the Green Line B, C, and D branches. Bus service is provided from 5:15am to 12:25am on weekdays, from 6:30am to 12:30am on Saturdays and from 6:30am to 12:28am on Sundays.

- **Route 14 (Roslindale Square – Heath Street Station)** provides service from Heath Street Station in Jamaica Plain, through Jackson Square, Dudley Square then heading south through Warren Street, Blue Hill Ave, and American Legion Highway until it reaches Roslindale Square Station. At Roslindale Village, connections for the Commuter Rail Needham Line can be made. Bus service is provided from 5:57am to 7:38pm on weekdays and from 6:45am to 7:00pm on Saturdays. No service is provided on Sundays.

- **Route 15 (Kane Square or Fields Corner Station – Ruggles Station)** provides service from Ruggles Station though Dudley Street until it reaches Kane Square. On nights and weekends, this route extends further south to Fields Corner. Connections can be made at Ruggles Station for the Commuter Rail Fairmont, Franklin, and Providence Lines, and the Orange Line and at Fields Corner for the Red Line. Bus service is

provided from 3:33am to 12:30am Monday-Thursday, from 3:33am to 2:35am on Fridays, from 3:29am to 2:35am on Saturdays, and from 3:29am to 12:57am on Sundays.

- **Route 19 (Fields Corner Station – Kenmore Station or Ruggles Station)** provides service from Kenmore Station through the Longwood Medical Area, Ruggles Station, Dudley Square heading south through Warren Street until it reaches Fields Corner in Dorchester. Connections can be made at Ruggles Station for the Commuter Rail and Orange Line, at Fields Corner for the Red Line and at Kenmore Station for the Green Line. Bus service is provided from 6:08am to 7:20pm on weekdays. No service is provided on weekends.

- **Route 23 (Ashmont Station – Ruggles Station via Washington Street)** provides service from Ruggles Station through Dudley Square heading south on Warren Street until it reaches Ashmont Station. Connections can be made at Ruggles Station for the Commuter Rail and Orange line and at Ashmont Station for the Red Line and the Mattapan Trolley. Bus service is provided from 4:55am to 12:45am Monday-Thursday, from 4:55am to 2:50am on Fridays, from 4:40am to 2:50am on Saturdays, and 5:40am to 1:06am on Sundays.

- **Route 28 (Mattapan Station – Ruggles Station)** provides service from Ruggles Station through Roxbury Crossing, Dudley Square and Blue Hill Avenue until it reaches Mattapan Station. Connections can be made at Ruggles Station for the Orange Line and Commuter Rail, and at Mattapan Station for the Mattapan High Speed Line. Bus service is provided from 3:20am to 12:40am Monday-Thursday, from 3:20am to 2:45am on Friday-Saturday, and from 3:20am to 1:17am on Sundays.

- **Route 41 (Centre and Elliot Streets – JFK/UMass Station)** provides service from Centre/Elliot Street in Jamaica Plain through Jackson Square, Dudley Square and Uphams Corner until it reaches JFK/UMass Station in Dorchester. Connections can be made at JFK/UMass for the Red Line. Bus service is provided from 4:58am to 9:00pm on weekdays, from 7:00am to 7:40pm on Saturdays, and from 10:00am to 6:16pm on Sundays.

- **Route 44 (Jackson Square Station – Ruggles Station)** provides service from Jackson Square in Jamaica Plain via Seaver Street and Humboldt Avenue to Ruggles Station in Roxbury. Connections can be made at Jackson Square Station for the Orange Line and at Ruggles Station for the Orange Line and Commuter Rail. Bus service is provided from 5:10am to 12:57am on weekdays, from 5:25am to 12:58am on Saturdays, and from 6:16am to 12:35am on Sundays.

- **Route 45 (Franklin Park Zoo – Ruggles Station)** provides service from the Franklin Park Zoo via Blue Hill Avenue to Ruggles Station in Roxbury. Connections can be made at Ruggles Station for the Orange Line and the Commuter Rail. Bus service is provided from 5:15am to 1:00am on weekdays, from 5:06am to 1:00am on Saturdays, and from 6:10am to 1:00am on Sundays.

- **Route 47 (Central Square, Cambridge – Broadway Station)** provides service from Central Square in Cambridge through the Longwood Medical Area and the South End until reaching Broadway Station in South Boston. Connections can be made at Central Square Station for the Red Line and at Ruggles Station for the Orange Line and Commuter Rail. Service is provided from 5:15am to 1:00am on weekdays, from 5:00am to 1:15am on Saturdays, and from 7:30am to 12:40am on Sundays.

- **Route 66 (Harvard Square – Dudley Station)** provides service from Harvard Square in Cambridge through Brookline and the Longwood Medical Area until reaching Dudley Station in Roxbury. Connections can be made at Harvard Square for the Red Line and at Dudley Square for the Silver Line. Service is provided from 4:45am to 1:05am Monday-Thursday, from 4:45am to 2:50am on Fridays, from 4:40am to 2:50am on Saturdays, and from 5:50am to 1:00am on Sundays.

- **Route 170 (Central Square, Waltham – Dudley Square)** is a limited service route that provides service from Central Square in Waltham to Dudley Square in Roxbury. Connections can be made at Dudley Square for the Silver Line. Service is only provided on weekdays from 6:15am to 6:40am and from 3:55pm to 4:55pm.

- **Silver Line (SL4) (Dudley Station – South Station at Essex Street)** provides service from Dudley Square in Roxbury via Washington Street in the South End to South Station in downtown Boston. Connections can be made at Dudley Station for the SL5 and South Station for the Red Line. Service is provided from 5:20am to 12:20am Monday-Thursday, from 5:20 to 2:20am on Fridays, from 5:23am to 2:20am on Saturdays, and from 6:02am to 12:40am on Sundays.

- **Silver Line (SL5) (Dudley Station – Downtown Crossing at Temple Place)** provides service from Dudley Square in Roxbury via Washington Street in the South End to Downtown Crossing in Downtown Boston. Connections can be made at Dudley Station for the SL4 and at Downtown Crossing for the Orange Line, Red Line, and Green Line. Service is provided from 5:15am to 1:02am Monday-Thursdays, from 5:15am to 2:30am on Fridays, from 5:19am to 2:30am on Saturdays and from 6:00am to 12:47am on Sundays.

3.2.8 Crash Data

To identify accident trends and/or roadway safety deficiencies in the study area, crash data were obtained from the MassDOT records for the City of Boston for the most recent three-year time period available (2009 through 2011). A summary of the crash data is presented in Table 3-2. The average crash rate (crashes per million entering vehicles) for District 6, the MassDOT district the Project site is in, is 0.76 for signalized intersections and 0.58 for unsignalized intersections.

There were forty-six recorded crashes at the study area over the three-year period that was studied. Dudley Street at Harrison Street had the most crashes with thirty-two total crashes. This intersection was the only intersection in the study area that is over the MassDOT District 6 average crash rate.

Table 3-2 Crash Data

	Malcolm X Blvd		Dudley St		Washington St				Lambert Ave	
	Shawmut Ave/Roxbury	Washington St/Dudley	Warren	Harrison	Shawmut	Bartlett	St James	Guild	Millmont St/Guild	Bartlett
Currently Signalized	Yes	Yes	Yes	Yes	No	No	No	No	No	No
MassHighway ACR	0.76	0.76	0.76	0.76	0.58	0.58	0.58	0.58	0.58	0.58
MassHighway CCR	0.10	0.18	0.18	1.33	0.00	0.00	0.06	0.00	0.00	0.00
Exceeds?	No	No	No	Yes	No	No	No	No	No	No
Year										
2010	2	0	2	15	0	0	0	0	0	0
2011	1	3	1	11	0	0	0	0	0	0
2012	0	2	2	6	0	0	1	0	0	0
Total	3	5	5	32	0	0	1	0	0	0
Collision Type										
Angle	0	3	0	9	0	0	0	0	0	0
Head-on	0	0	0	3	0	0	0	0	0	0
Rear End	0	1	0	2	0	0	0	0	0	0
Read-to-rear	0	0	0	1	0	0	0	0	0	0
Sideswipe, same direction	1	0	3	0	0	0	0	0	0	0
Sideswipe, opposite direction	0	1	0	2	0	0	0	0	0	0
Single Vehicle Crash	1	0	2	1	0	0	0	0	0	0
Unknown	0	0	0	1	0	0	0	0	0	0
Not reported	1	0	0	13	0	0	1	0	0	0
Total	3	5	5	32	0	0	1	0	0	0
Crash Severity										
Fatal Injury	0	0	0	0	0	0	0	0	0	0
Non-Fatal Injury	2	2	4	16	0	0	1	0	0	0
Property damage only (none	0	1	5	4	0	0	0	0	0	0
Not Reported	1	1	0	9	0	0	0	0	0	0
Unknown	0	1	0	3	0	0	0	0	0	0

Table 3-2 Crash Data (Continued)

	Malcolm X Blvd		Dudley St		Washington St				Lambert Ave	
	Shawmut Ave/Roxbury	Washington St/Dudley	Warren	Harrison	Shawmut	Bartlett	St James	Guild	Millmont St/Guild	Bartlett
Total	3	5	5	32	0	0	1	0	0	0
Time of Day										
Weekday, 7:00 AM - 9:00 AM	0	1	1	5	0	0	1	0	0	0
Weekday, 4:00 PM - 6:00 PM	2	0	1	0	0	0	0	0	0	0
Saturday, 11:00 AM - 2:00 PM	0	0	0	0	0	0	0	0	0	0
Weekday, other time	1	3	3	11	0	0	0	0	0	0
Weekend, other time	0	1	0	16	0	0	0	0	0	0
Total	3	5	5	32	0	0	1	0	0	0
Pavement Conditions										
Dry	1	5	2	15	0	0	0	0	0	0
Wet	1	0	3	4	0	0	0	0	0	0
Not reported	1	0	0	13	0	0	1	0	0	0
Total	3	0	5	32	0	0	1	0	0	0
Non Motorist (Bike, Pedestrian)	0	0	2	1	0	0	0	0	0	0
Total	0	0	2	1	0	0	0	0	0	0

Source: MassDOT Highway Division

3.3 2020 No-Build Condition

Traffic growth within a defined area is a function of expected land development, economic activity, and changes in demographics. A two-step process was employed to estimate future traffic activity in the Project study area under the 2020 No-Build Condition consistent with the ENF and PNF submitted on behalf of the Bartlett Place Development.

First, general area-wide traffic growth was estimated based on regional traffic growth trends along major study area roadways. The focus of this part of the analysis was to develop and apply an annualized growth rate that could be applied to existing condition peak hour traffic volumes to reasonably account for future traffic growth in the area.

Second, peak hour traffic generation estimates for specific developments that are either currently under construction, are approved, or are planned projects that have formally initiated the City of Boston Article 80 Development Review process were added to the resultant volumes produced under the first step. This process generates peak hour traffic volumes for the 2020 No-Build Condition. A more detailed discussion of the process employed to develop peak hour traffic estimates for the 2020 No-Build Condition is presented below.

3.3.1 Background Traffic Growth

As previously mentioned, in order to account for general background traffic growth, an annualized growth rate was developed and applied to the existing condition peak hour traffic volumes to reasonably account for future through traffic growth in the study area.

An annual growth rate of 0.5 percent per year between 2015 and 2020 was applied to the 2015 Existing Condition. This is a conservative rate of growth given the historical trend of traffic growth in the area has been flat over the past ten years. This rate is consistent with the growth rate assumed in the traffic analysis for the entire Bartlett Place Development. No off-site transportation improvements that would affect the analysis are planned within the study area by 2020.

3.3.2 Area Development Projects

Project trips for the following applicable Article 80-submitted projects were added to the 2015 Existing Condition, in addition to a general background growth rate, to develop the 2020 No-Build Condition. These projects are consistent with the analysis assumptions presented in the Bartlett Place analysis.

1. *2-14 Taber Street* This development consists of a three-story building with 23,559 sf of office and retail uses. Phase one includes 7,853 sf of retail space on the ground floor and phase two includes 15,706 sf of office space.

2. *Dudley Greenville Rental Housing* Dudley Greenville is a rental housing development on two sites totaling 43 affordable units and 3,000 sf of retail space on Dudley Street, near Dudley Square in Boston.

3. *Bruce Bolling Municipal Building* This project recently opened in April 2015 and includes a 200,000 sf headquarters building for Boston Public Schools, which will house over 500 employees. It will include 20,000 sf of street-level retail space, as well as open space to showcase student work, school events, and host community gatherings.

4. *Tremont Crossing (P-3)* The Draft Project Impact Report analyzed 404,475 sf of larger retail, 33,800 sf of smaller shops and boutiques, 233,784 sf of office space, 300 multifamily residential units, a 200 room extended stay hotel and 37,520 sf of cultural facilities that will primarily house a 21,000 sf new museum for the National Center for Afro-American Artists and other artist studio space. The development will include two public plazas, and a multi-level parking structure consisting of 1,052 parking spaces.

5. *Melnea Hotel and Residences* This project proposes a new five-story building with 8,000 sf of retail, 50 residential units, and 145 hotel rooms.

6. *Parcel 10* This recently constructed mixed use development includes a 44,308 sf Tropical Foods Supermarket, a new 60,000 sf mixed use building housing retail and office space, and rehabilitation of 2101 Washington Street, the existing Tropical Foods supermarket for 44,000 sf of residential and retail uses. A 173 off-street surface and below grade parking lot will be provided.

7. *Dudley Crossing* The development contemplates a ten unit building on Hampton Street and the rehabilitation of two existing buildings on Dudley, Hampton, and Dunmore streets for a total of 42 units and 3,296 sf of commercial space.

8. *2451 Washington Street* This project proposes construction of a 4 story 45,000 sf building with 37 two bedroom units and 27 below grade parking spaces.

9. *Orchard Homeownership Initiative* This project contains 20 wood-framed single family residential units and 40 parking spaces.

10. *Parcel 25* This PDA-approved mixed use development program includes 305,750 sf to be developed over three phases. Under full-build, this program includes 98,000sf of residential (88 units), 10,000 sf of retail, 1,250 sf of community space, and up to 196,500 sf of office. Surface and below grade parking will provide the development with 201 parking spaces.

11. ***44-64 Terrace Street*** This Project contains a four-story building, with 21-units of housing, 3 of which are affordable, and 20 off-street parking spaces.

12. ***The Parker and Terrace Street Development*** This project contemplates 44 residential units and 30 parking spaces in the Project Notification Form.

13. ***Bartlett Place Phase 1*** The Expanded Project Notification Form presents an innovative mixed use residential, retail, commercial development totaling 233,490 sf in Phase 1. Phase 1 includes 60 affordable residential units, 42 market rate units and 72 residential parking spaces. Forty-two additional parking spaces will be provided to the commercial/retail users under Phase 1.

3.3.3 2020 No-Build Traffic Volumes

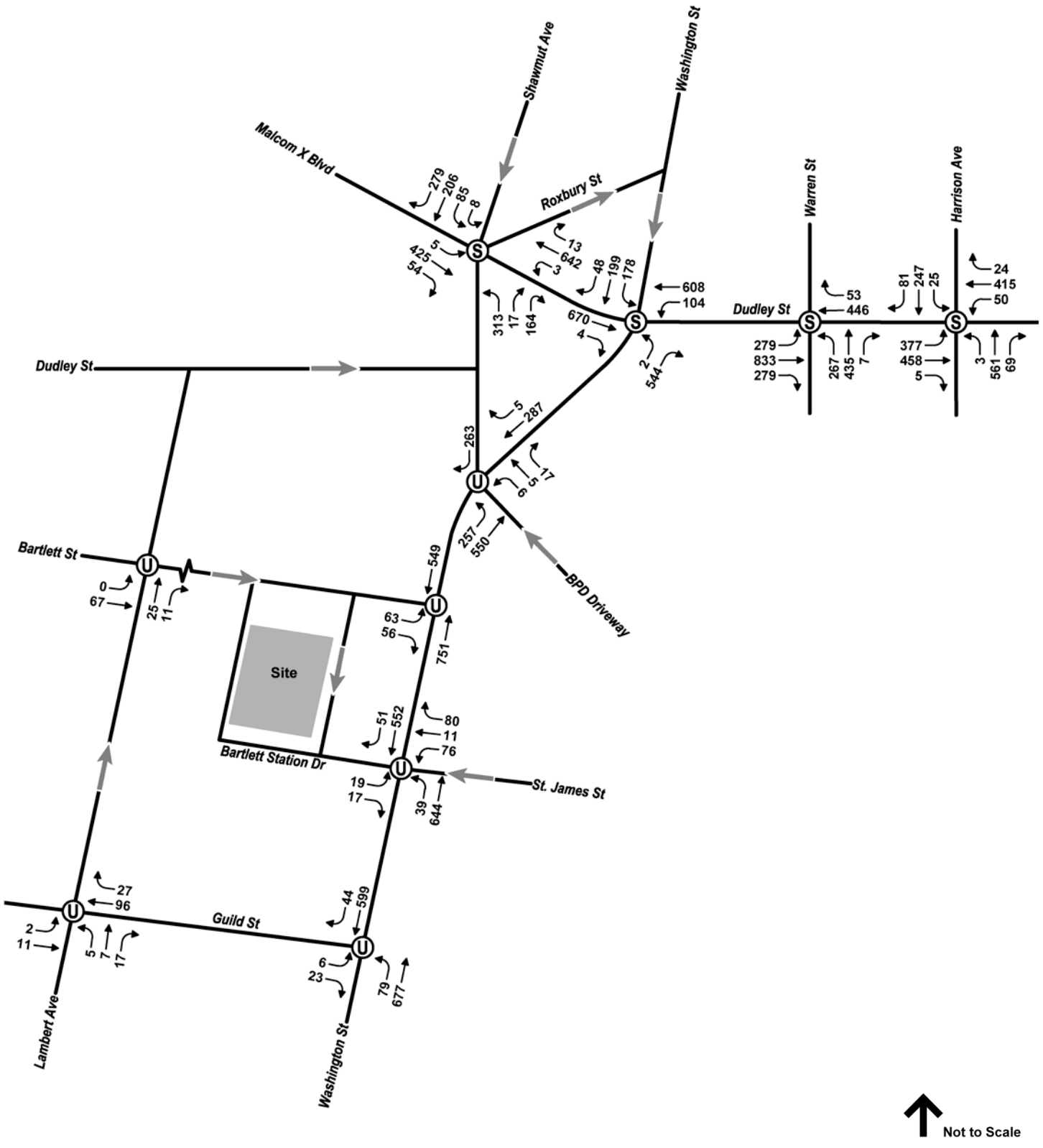
The 2015 Existing Condition volumes were adjusted to 2020 with a growth rate of 0.5 percent per year. The applicable projects that are either planned, approved and/or under construction were then added to these adjusted volumes to create the 2020 No Build Condition Weekday Morning and Evening peak hour traffic volumes. The 2020 No-Build traffic volumes are consistent with what was submitted as the 2020 Phase 1 Build condition in the Bartlett Place analysis. Figure 3-9 and Figure 3-10 present the 2020 No-Build Condition traffic volume networks for the weekday morning and evening peak hours, respectively.

3.4 2020 Build Condition

The 2020 Build Condition traffic volumes for study area roadways were developed by estimating Project-generated traffic volumes, distributing these volumes, and assigning them to the study area roadways. The traffic volumes expected to be generated by the Project were added to the 2020 No-Build Condition traffic volumes to create the year 2020 Build Condition traffic volume networks. The following sections describe the procedures used to develop the adjusted No-Build Conditions and Build Condition traffic volume networks.

3.4.1 Trip Generation

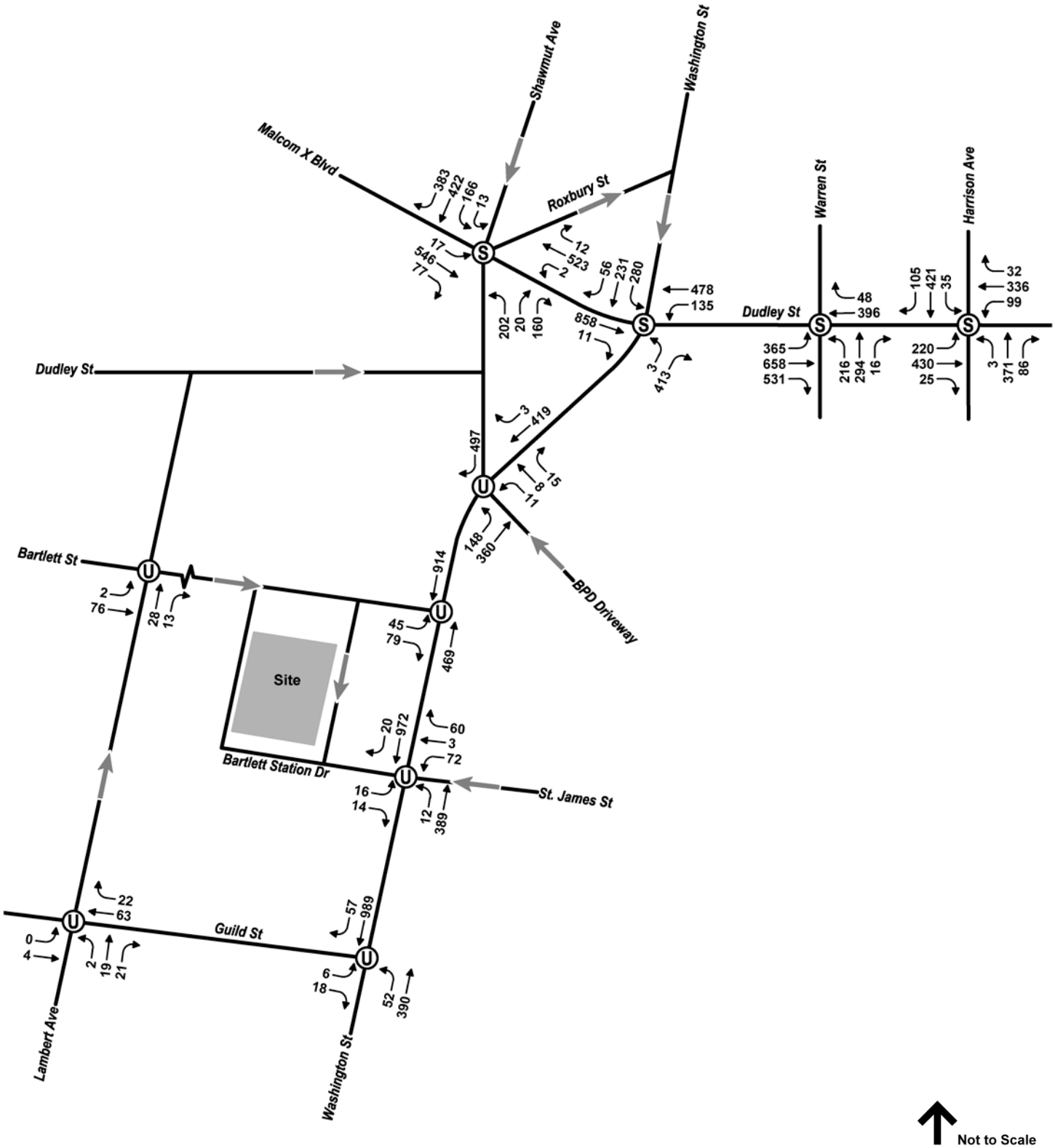
To determine future 2020 Build Condition Project trip generation, existing vehicle trip generation was first quantified based on the existing travel characteristics of the students and faculty/staff in conjunction with the understanding of similar school operations. Operations at other comparable charter schools in Boston were studied to support this effort, including the Boston Renaissance Public Charter School (Hyde Park) and the Match Community Day Charter Public School (under construction in Hyde Park). Existing trends were then applied to the projected student and faculty/staff populations with completion of the Project. For the purposes of this study, it is assumed that the school will be fully occupied and at capacity by 2020.



Conservatory Lab Charter School Boston, Massachusetts

Figure 3-9

2020 No-Build Condition, Morning Peak Hour Traffic Volumes



Conservatory Lab Charter School Boston, Massachusetts

Figure 3-10

2020 No-Build Condition, Evening Peak Hour Traffic Volumes

The use of Institute of Transportation Engineer's (ITE) trip generation was investigated for the Project. However, the resulting trip estimates based on ITE rates were not consistent with the existing trends at the school and therefore were not used for this analysis.

Future peak hour vehicle trips, broken down by parent drop-off/pick-up, school bus, and faculty/staff, were calculated using the total volume of students and faculty/staff and applying the mode share found at the existing School and other area charter schools.

Based on the student population of 456 students at full capacity, future peak hour vehicle trips were estimated using the School's existing mode shares and a vehicle occupancy rate (VOR) of 1.2 students/parent vehicle. It is anticipated that at least ten percent of the student population, or about 45 students, will participate in after school activities. After school activities typically last at least 90 minutes after dismissal and are therefore not included in the evening peak hour volumes. All of these students are assumed to be picked-up by their parents, walk, or use public transportation.

Though faculty/staff typically arrive and depart off-peak, to be conservative, it was assumed that nearly half (of those staff that drive) would arrive during the morning peak hour and depart during the evening peak hour. These employees arriving/departing during the peak hour were assumed to park on-site. To be conservative, it was assumed that staff vehicles have a vehicle occupancy rate of 1.0 persons/vehicle.

Estimated Project-generated vehicle trips for the 2020 Build Condition are shown below in Table 3-3.

Table 3-3 Estimated Project Trip Generated Vehicle Trips

	Morning Peak Hour			Evening Peak Hour		
	Student	Staff/ Faculty	Total	Student	Staff/ Faculty	Total
Arriving						
School Buses	12	0	12	12	0	12
Vehicle Trips	76	16	92	68	0	68
Total Entering	88	16	104	80	0	80
Departing						
School Buses	12	0	12	12	0	12
Vehicle Trips	76	0	76	68	16	84
Total Exiting	88	0	88	80	16	96

The Project will generate 104 new inbound vehicle trips during the morning peak hour and 96 new outbound vehicle trips during the evening peak hour. The majority of the trips are parents that will be traveling to the School to drop-off and pick-up their children.

3.4.1.1 Trip Distribution

Project trips for the 2020 Build Condition were distributed through the Study Area intersections. Trip assignments for the vehicles traveling to the site were determined using trip distribution data from other nearby charter schools representing student and faculty/staff population residences.

During the peak drop-off and pick-up time periods, Bartlett Station Drive will essentially operate in a one-way direction from Washington Street to Bartlett Street. All traffic exiting the site towards the north will be required to take a right-turn onto Bartlett Street which will provide them access to Washington Street.

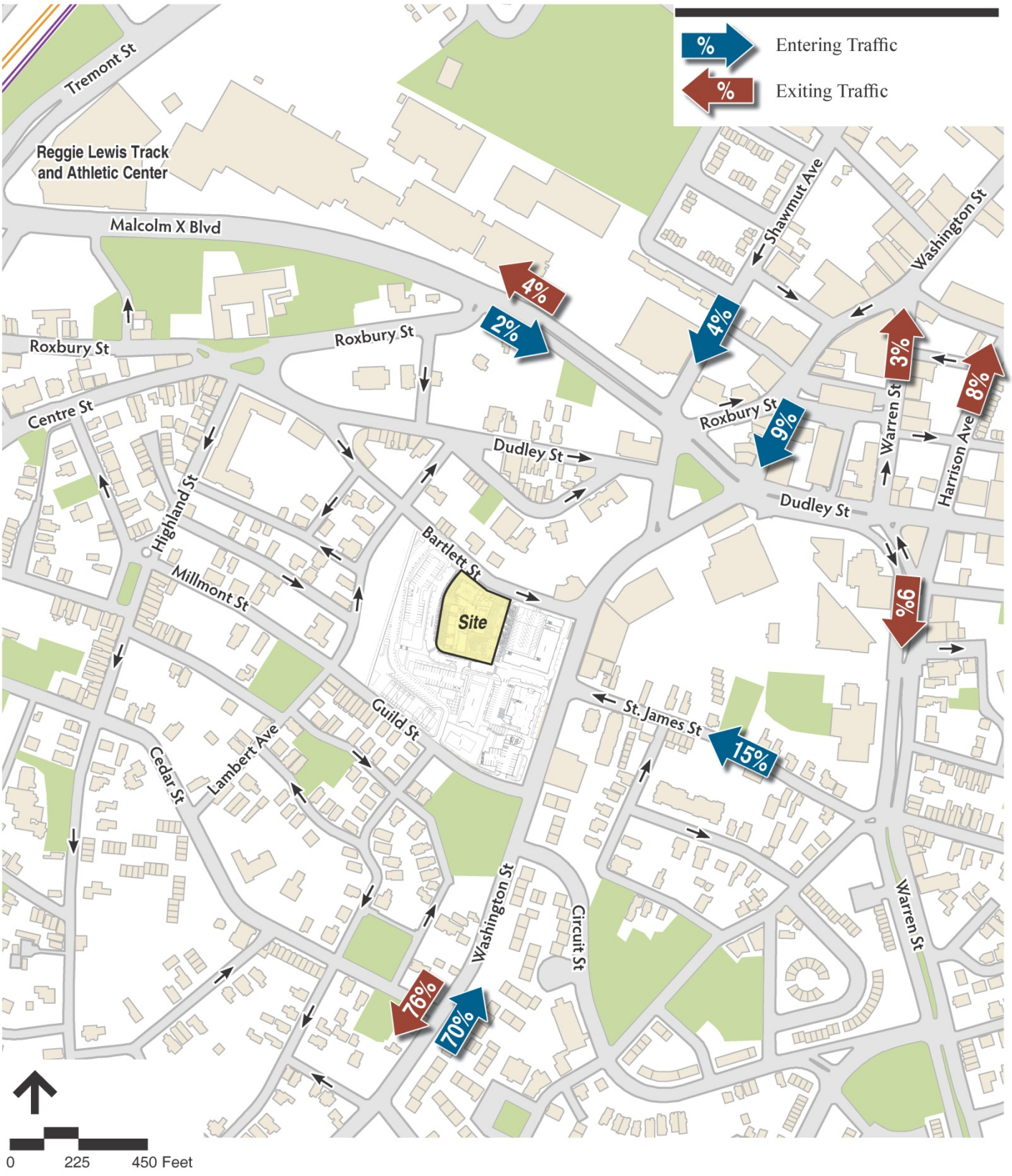
The Project trip distribution is depicted in Figure 3-11. The Project generated vehicle trips, presented previously in Table 3-3, have been assigned to the roadway network using the trip distribution and the resulting 2020 Project generated trips. Morning peak hour trips are presented in Figure 3-12 and evening peak hour trips are presented in Figure 3-13.

3.4.1.2 2020 Build Traffic Volumes

The Project generated trips were added to the 2020 No-Build volumes to develop the 2020 Build Condition peak hour traffic volumes. These volumes are shown in Figure 3-14 and Figure 3-15 for the morning and evening peak hours, respectively.

3.4.1.3 Student Pick-Up/Drop-Off

The proposed site plan provides a continuous curb edge along Bartlett Station Drive that will be used by parents for drop-off/pick-up adjacent to the school. Access to the site will be provided by Bartlett Station Drive, an internal roadway that will connect Washington Street (southeast of the site) to Bartlett Street (northwest of the site). The parent pick-up/drop-off area will be located to the west of the school along the east side of Bartlett Station Drive. A dedicated raised bus lane will also be provided for buses to pick-up/drop-off students on the east side of the school which will be accessed via Bartlett Street. Figures 3-16 and 3-17 present the bus turning radii and they enter and exit the existing and proposed roadways. Parent pick-up/drop-off will egress onto Bartlett Street and school bus pick-up/drop-off will egress onto Bartlett Station Drive. A crosswalk, monitored by a faculty/staff member, will provide a safe crossing area for students to access the proposed public plaza during recess. Faculty/staff members will help students find, load, and unload from school buses and parent vehicles and ensure an efficient drop-off/pick-up operation.



Conservatory Lab Charter School Boston, Massachusetts

Figure 3-11
Project Trip Distribution

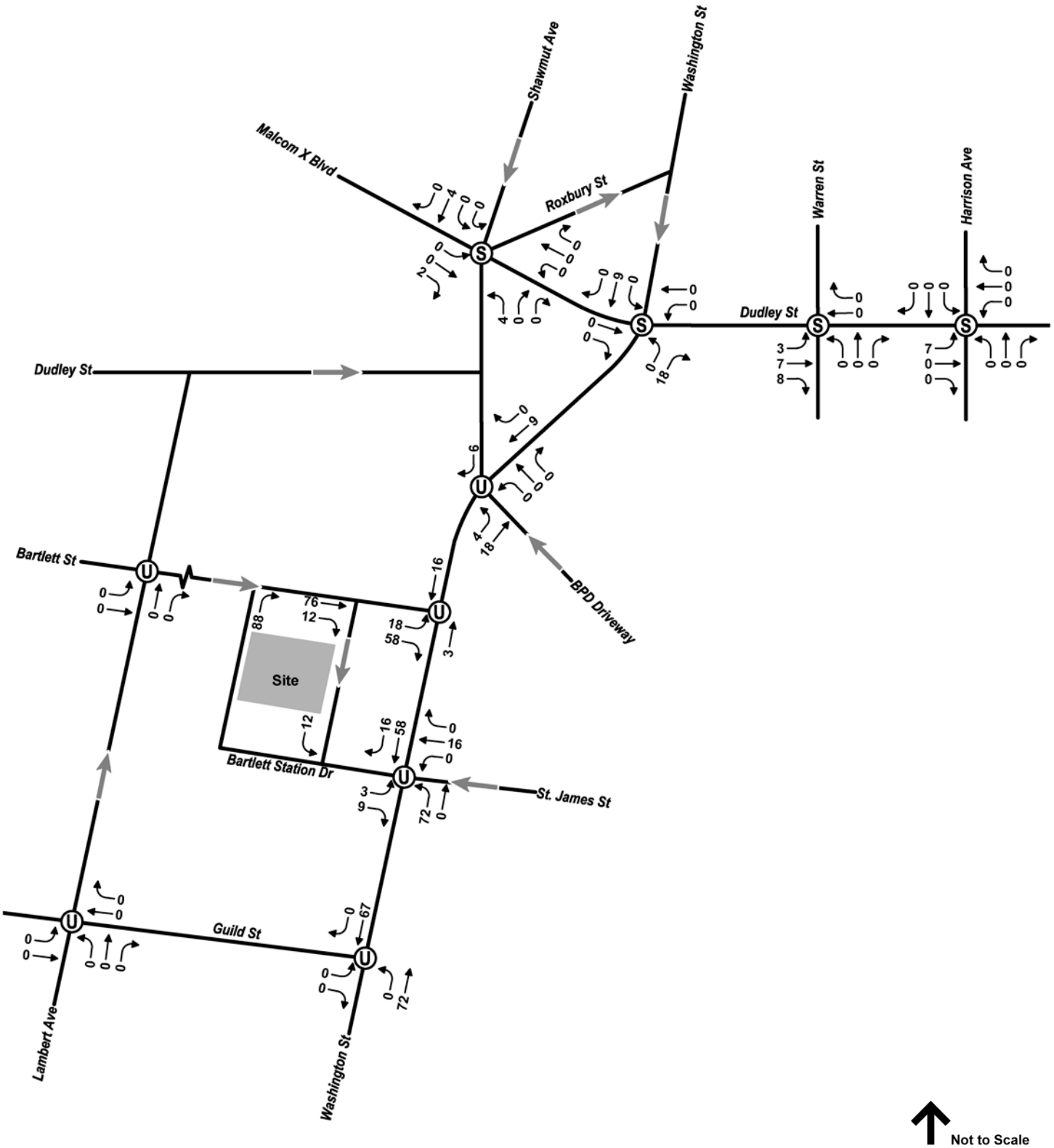


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Figure 3-12
Project Generated Trips, Morning Peak Hour

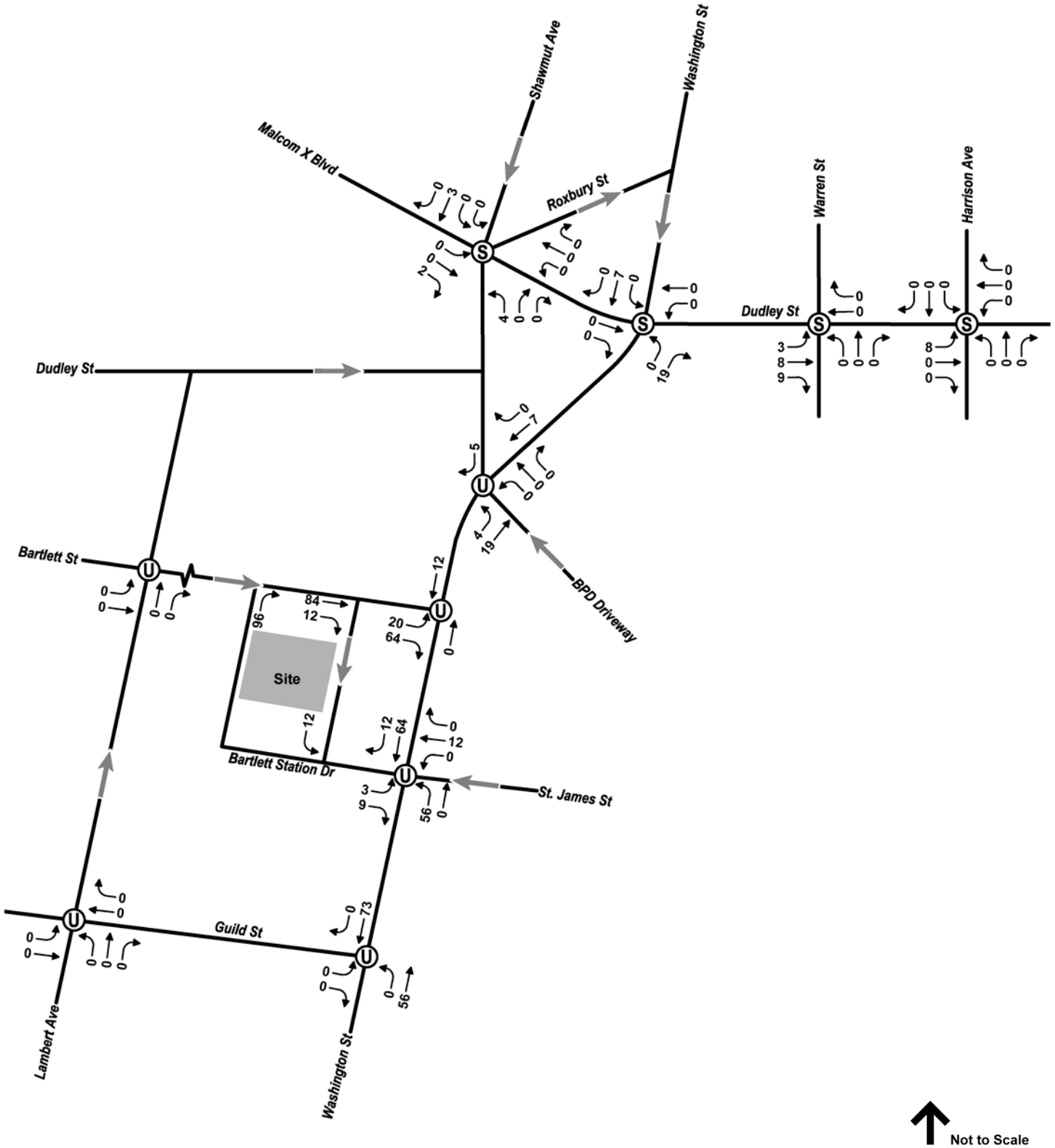

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Figure 3-13
Project Generated Trips, Evening Peak Hour

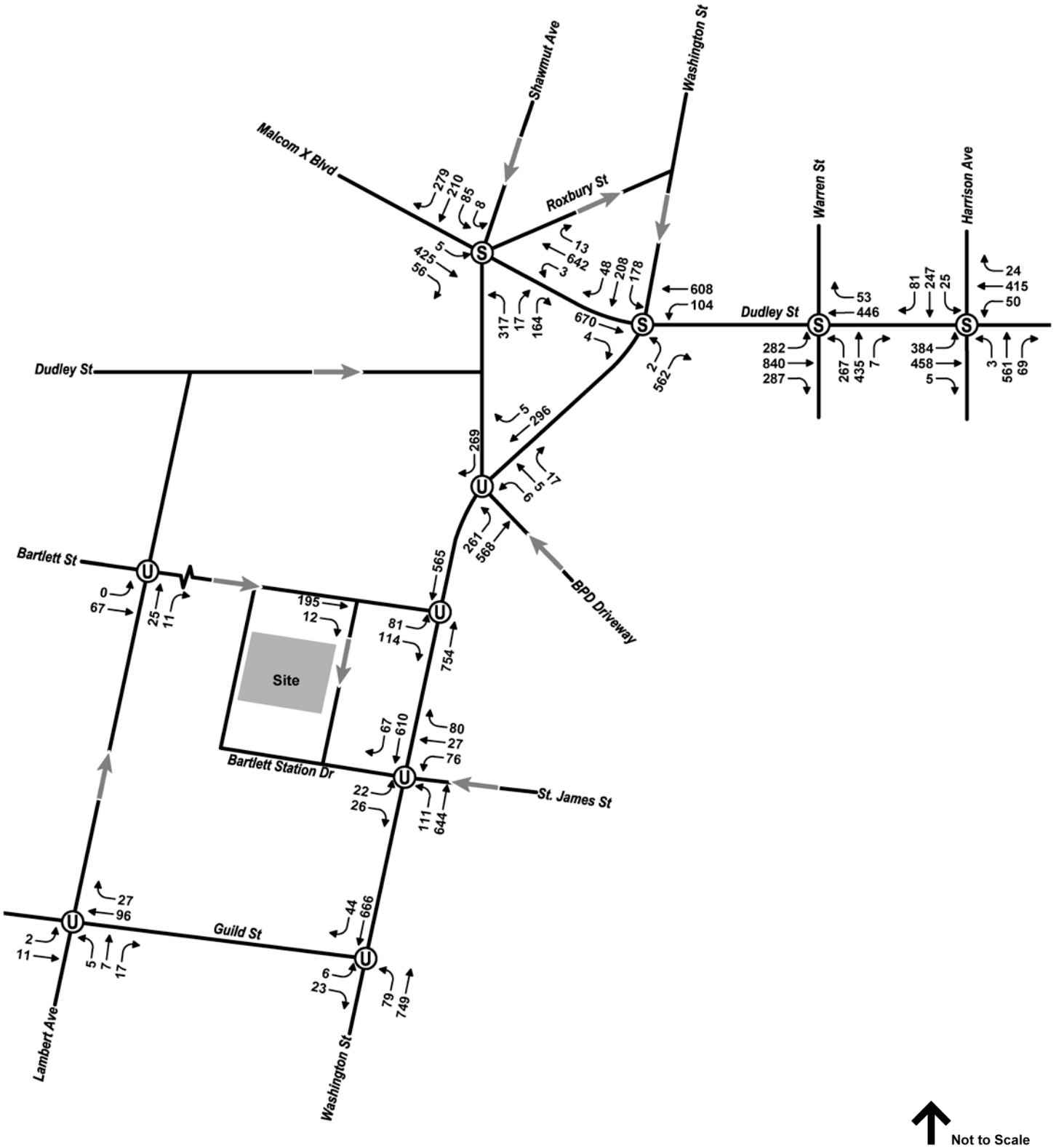

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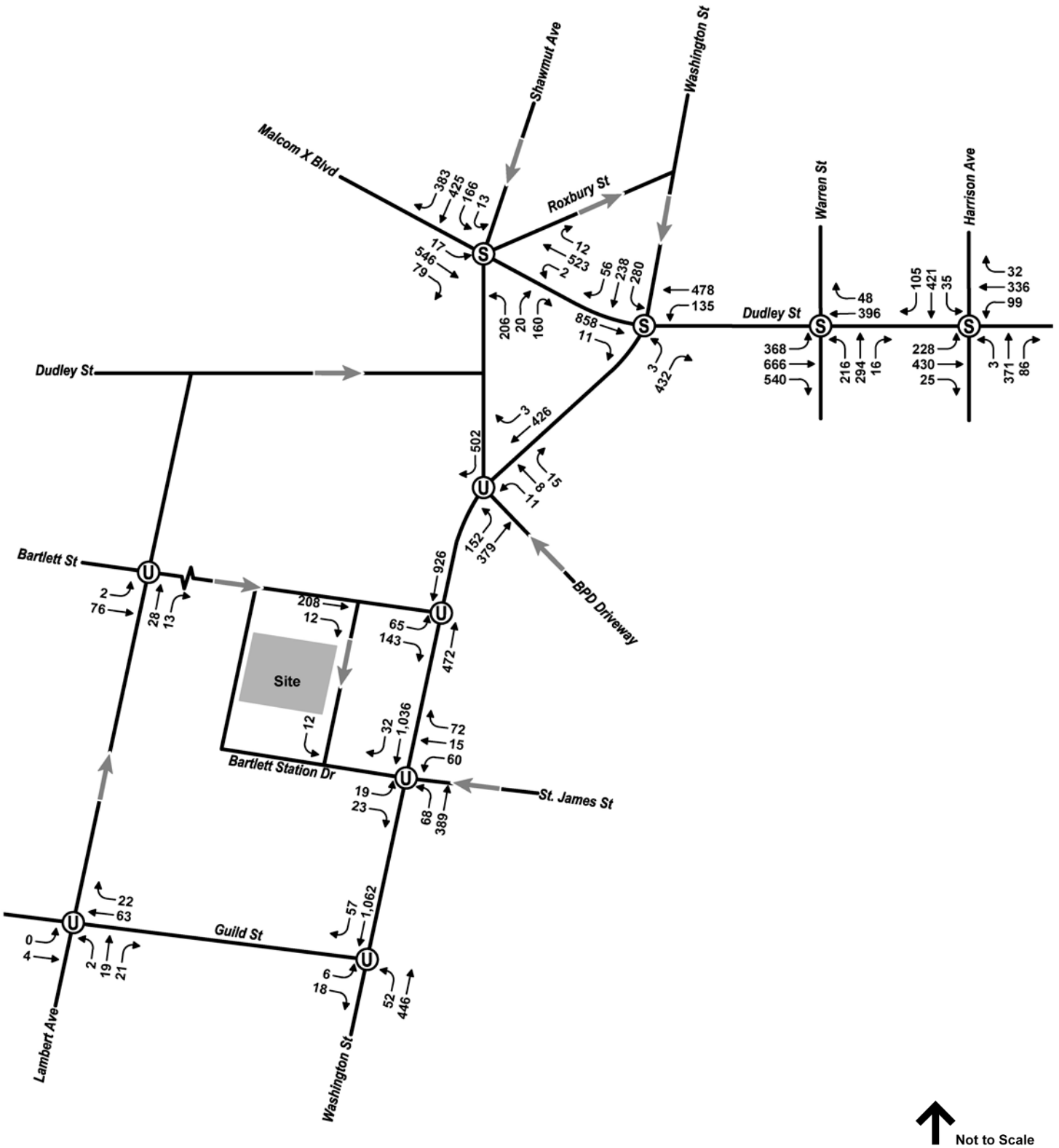
Figure 3-14

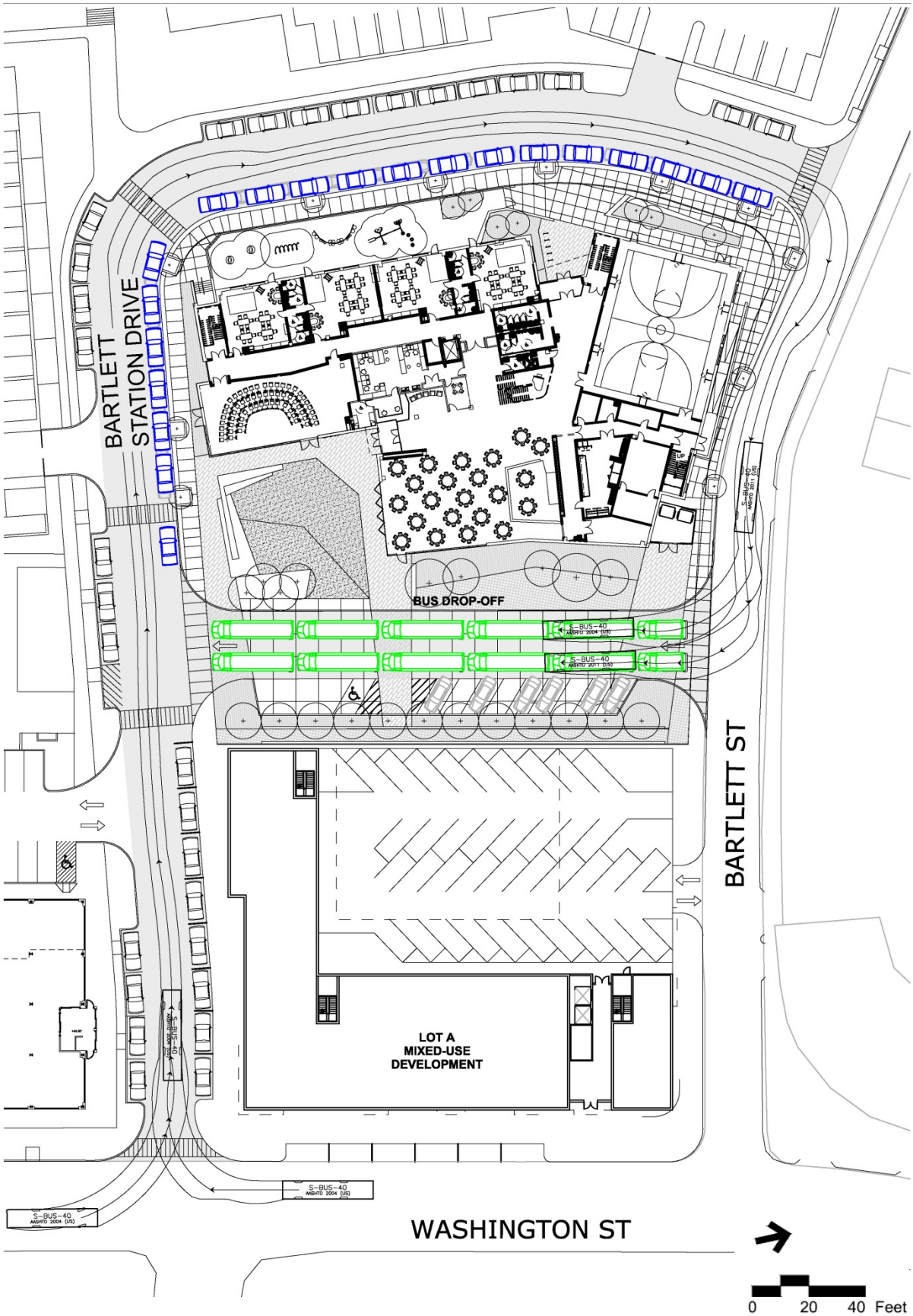
2020 Build Condition, Morning Peak Hour Traffic Volumes



Conservatory Lab Charter School Boston, Massachusetts

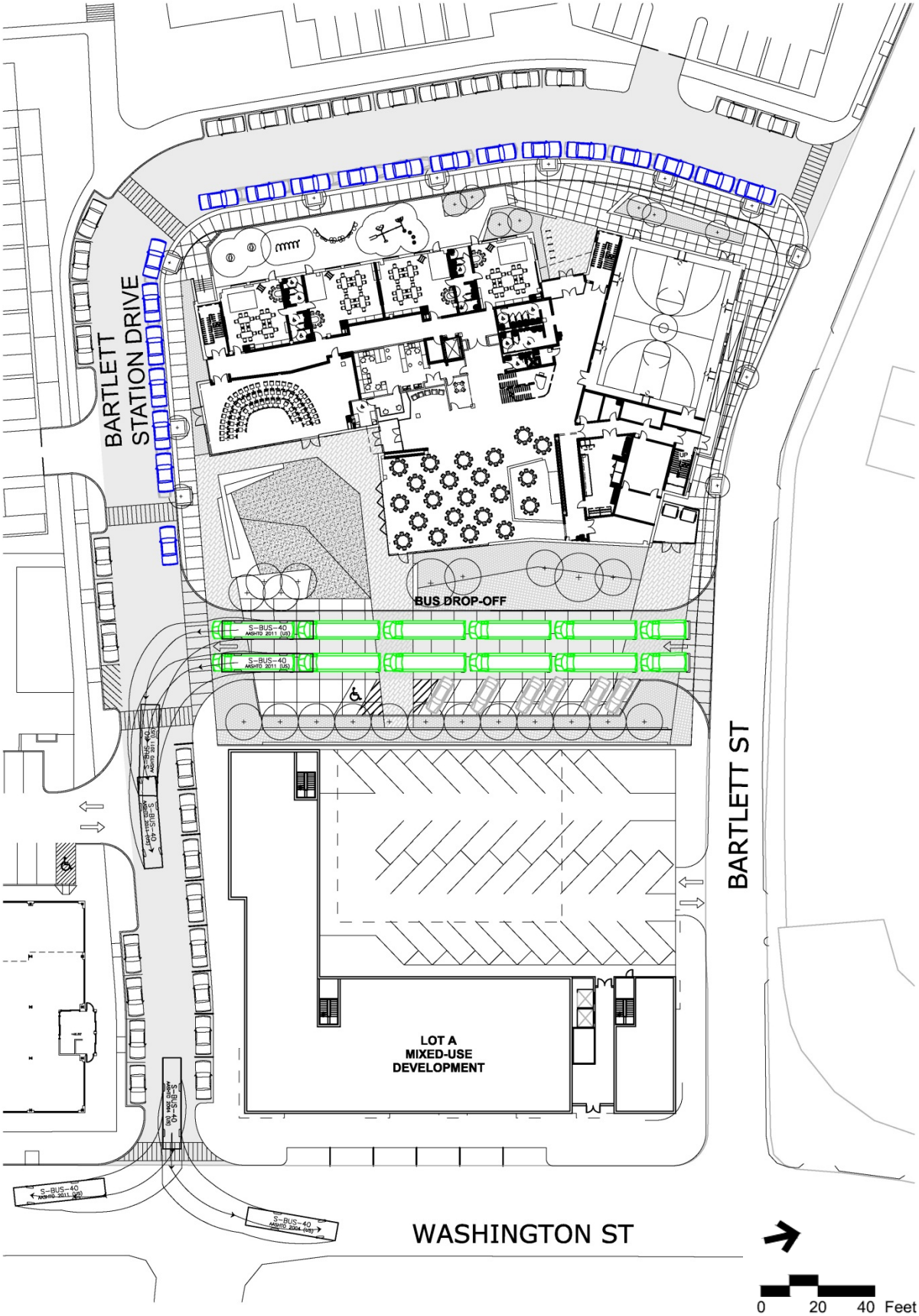
Figure 3-15

2020 Build Condition, Evening Peak Hour Traffic Volumes



Conservatory Lab Charter School Boston, Massachusetts

Figure 3-16
School Bus Turns Entering School



Conservatory Lab Charter School Boston, Massachusetts

Figure 3-17
School Bus Turns Exiting School

The Proponent expects students to begin arriving at the school half an hour before the start of the school day (which is expected to commence at 7:15 AM). As previously shown in Figure 3-1, school buses will unload in the bus lane on the east side of the school building and parents will drop-off their children in the designated area along Bartlett Station Drive to the west of the school building.

The School plans to stagger the dismissal of students in the afternoon. Students that take the school bus, walk, or take the MBTA will be dismissed together. The site has been designed to have the ability to load all 12 school buses at once using the designated raised shared plaza adjacent to the school. Parent vehicles will be allowed on-site in the designated parent pick-up/drop-off area on Bartlett Station Drive. Students that are picked-up by their parents will be dismissed 15 minutes later. Parents will be able to use visitor parking spaces and the curb along Bartlett Station Drive.

3.4.1.4 Parking

The Project will contain approximately 37 parking spaces including 10 spaces along the bus lane and 27 dedicated spaces in a parking lot to the west of the school designated for faculty/staff parking throughout the school day. In addition to these on-site parking spaces, any additional parking needs of the faculty/staff will be met by unregulated, unused on-street parking in the adjacent roadways. For an initial period of time, on-site staff parking will be provided in a temporary parking lot within Bartlett Place and will include up to 27 parking spaces.

3.4.1.5 Delivery and Emergency Vehicle Access

Delivery and service functions for the school will be accommodated within the bus lane. The School will work will vendors to ensure deliveries occur off-peak in order to minimize any impacts to the neighborhood roadway network and school drop-off/pick-up operations. Minimal deliveries are expected and will be made mostly by delivery vans and not larger, tractor-trailer trucks. A single dumpster/compactor will be provided at the exterior, adjacent to the warming kitchen. This dumpster will be emptied or removed/replaced weekly.

Bartlett Station Drive and the raised bus lane to the east of the site have been designed to accommodate emergency vehicle access to the site.

3.4.1.6 Pedestrians

With students walking and taking the MBTA to school daily, the Proponent intends to create a safe pedestrian connection between the site and the rest of the Bartlett Place development to provide a connection to Washington Street and Bartlett Street. Accessible sidewalks around the entire site will be provided. On the Project site, the Proponent intends to provide ample sidewalk space and crosswalks to ensure the safety of the students, faculty/staff, and visitors. The Proponent will provide accessible ramps, crosswalks, and sidewalks throughout the Project site.

3.5 Traffic Operations Analysis

Capacity analyses were conducted for the 2015 Existing Condition, 2020 No-Build Condition, and 2020 Build Condition to determine how well the roadway facilities serve the existing and future traffic demands. These roadway operating conditions are classified by quantified levels of service.

3.5.1 Level-of-Service Criteria

Level-of-service (LOS) is a qualitative measure of control delay at an intersection providing an index to the operational qualities of a roadway or intersection. Level-of-service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. For signalized intersections, the analysis considers the operation of each lane or lane group entering the intersection. The LOS designation is for overall conditions at the intersection.

The evaluation criteria used for the LOS analysis are based on the 2000 Highway Capacity Manual (HCM). Table 3-4 below presents the level of service delay threshold criteria as defined in the HCM.

Table 3-4 Level of Service Criteria

Level-of-Service	Un-signalized Intersection Control Delay (sec/veh)	Signalized Intersection Control Delay (sec/veh)
LOS A	0-10	≤ 10
LOS B	> 10-15	> 10-20
LOS C	> 15-25	> 20-35
LOS D	> 25-35	> 35-55
LOS E	> 35-50	> 55-80
LOS F	> 50	> 80

Source: 2000 HCM

Synchro 8.0 software was used to model LOS operations at the study area intersections. Intersection operations summary reports are presented in Appendix A.

3.5.2 Intersection Capacity Analysis

The study area contains four signalized and six unsignalized intersections in the 2015 Existing, 2020 No-Build Condition, and 2020 Build Condition. In addition, the site driveways are analyzed under the 2020 Build Condition. Capacity analyses were conducted for these signalized intersections. A summary of the signalized intersection capacity analysis is presented in Table 3-5.

Table 3-5 Intersection Capacity Analysis Summary

		2015 Existing Condition			2020 No-Build Condition			2020 Build Condition		
Intersection Location	Analysis Period	V/C[1]	Delay[2]	LOS[3]	V/C[1]	Delay[2]	LOS[3]	V/C[1]	Delay[2]	LOS[3]
1) Roxbury Street/Malcolm X Boulevard/Shawmut Avenue (signalized)	AM Peak Hour	0.70	20.5	C	0.75	23.3	C	0.76	23.8	C
	PM Peak Hour	0.70	37.1	D	0.84	>80.0	F	0.85	206.2	F
2) Malcolm X Boulevard/Dudley Street/Washington Street (signalized)	AM Peak Hour	0.96	80.0	E	1.13	278.0	F	1.13	311.8	F
	PM Peak Hour	0.95	92.7	F	1.05	127.1	F	1.07	134.6	F
3) Dudley Street/Warren Street (signalized)	AM Peak Hour	0.83	171.3	F	0.90	207.0	F	0.91	208.0	F
	PM Peak Hour	0.80	84.5	F	0.89	110.9	F	0.90	111.3	F
4) Dudley Street/Harrison Avenue (signalized)	AM Peak Hour	0.95	48.4	D	1.05	57.1	E	1.06	57.5	E
	PM Peak Hour	0.83	32.4	C	0.91	39.0	D	0.91	39.1	D
5) Shawmut Avenue/Washington Street (unsignalized)	AM Peak Hour	0.43	14.6	B	0.54	17.5	C	0.56	18.2	C
	PM Peak Hour	0.93	46.9	E	1.14	110.4	F	1.16	118.5	F
6) Bartlett Street/Washington Street (unsignalized)	AM Peak Hour	0.38	24.2	C	0.78	59.8	F	1.25	117.8	F
	PM Peak Hour	0.48	35.3	E	1.00	128.4	F	1.74	407.3	F
7) St. James Street/Washington Street (unsignalized)	AM Peak Hour	0.88	76.4	F	1.68	395.7	F	2.76	900.4	F
	PM Peak Hour	0.71	52.9	F	1.57	372.6	F	2.24	679.8	F
8) Guild Street/Washington Street (unsignalized)	AM Peak Hour	0.21	25.0	D	0.26	30.1	D	0.31	37.2	E
	PM Peak Hour	0.18	30.3	D	0.23	39.2	E	0.28	47.4	E
9) Millmont Street/Guild Street/Lambert Avenue (unsignalized)	AM Peak Hour	0.18	7.8	A	0.18	7.8	A	0.18	7.8	A
	PM Peak Hour	0.11	7.4	A	0.12	7.4	A	0.12	7.4	A
10) Bartlett Street/Lambert Avenue (unsignalized)	AM Peak Hour	0.12	7.7	A	0.12	7.7	A	0.12	7.7	A
	PM Peak Hour	0.10	7.6	A	0.11	7.7	A	0.11	7.7	A

1 V/C = volume to capacity ratio
2. Delay = Average delay in seconds per vehicle
3. LOS = Level of Service

Under 2015 Existing Condition, study area intersections range from LOS A to LOS F during both morning and evening peak hours. Two intersections operate at a LOS F; Dudley Street at Warren Street and St. James Street at Washington Street during both peak hours. Malcolm X Boulevard at Dudley Street operates at LOS F during the evening peak hour.

Under 2020 No-Build Condition, several intersections will experience a degradation in LOS due to the background growth and specific projects. Roxbury Street/Malcolm X Boulevard/Shawmut Avenue decreases from LOS D to LOS F during the evening peak hour due to increased volume eastbound and westbound. Malcolm X Boulevard/Dudley Street/Washington Street experiences a decrease from LOS E to LOS F during morning peak hour due to increased volume eastbound and westbound. Dudley Street/Harrison Avenue decreases from LOS D to LOS E during the morning peak hour due to increased volume for the eastbound left turn movement; the intersection also decreases from LOS C to LOS D

during the evening peak hour mainly due to increased volume westbound. Shawmut Avenue at Washington Street experiences a degradation in LOS from a LOS B to C and E to F during the morning and evening peak hours, respectively. Bartlett Street/Washington Street decreases from LOS C to LOS F during the morning peak hour and decreases from LOS E to LOS F during the evening peak hour due to increased volume for the eastbound left turn movement. Guild Street/Washington Street decreases from LOS D to LOS E during the evening peak hour due to increased conflicting northbound and southbound free flow volumes. All other intersections and analysis periods operate at the same LOS as in the 2015 Existing Condition.

Under 2020 Build Condition (i.e. with the Project in place), only one intersection will experience a change from the 2020 No-Build Condition. Guild Street/Washington Street will decrease from LOS D to LOS E during the morning peak hour due to a longer delay (increase of 7 seconds) caused by increased conflicting northbound and southbound free flow volumes. All other intersections are expected to operate at the same LOS as during the 2020 No-Build Condition.

3.5.3 Transportation Improvements

This section delineates the transportation improvement plan developed by the Proponent in connection with the Project. In addition to physical improvements, the Proponent proposes to minimize reliance on travel by automobile through implementation of a Traffic Demand Management (TDM) plan. Generally, TDM strategies are most effective with commuter travel where most trips are made by employees (e.g. in an office development). However, there are a number of measures that will be implemented in an effort to reduce faculty/staff auto trips.

3.5.4 Area Improvements

The Proponent is proposing minimal improvements to the surrounding area due to the limited Project impact and overall good condition of area roadways and sidewalks. Improvements the Proponent is committed to include reconstructing the sidewalk along Bartlett Street and the site, and providing accessible connections from the Project site to the public plaza and the rest of the Bartlett Place Development.

Massworks funding will support the work to build the roadway system, utilities and all the sidewalks and on-street parking surrounding the site along Washington Street, Bartlett Street, Guild Street, and the new interior street including on-street parking and sidewalks (yet to be named). The infrastructure work will help leverage future development on the site, a 12,000 sf grocery Store, 60 units of mixed income housing 120,000 SF (32 units of affordable housing, 28 units moderate to market rate), and a brand new charter school by facilitating the construction of Building B and Building A (comprising Phase 1), followed by

the construction of Phase 2, Phase 3, and Phase 4. The public infrastructure will serve all four of these phases. Completion of the public infrastructure will also greatly enhance the marketability of the housing and retail developed in the initial construction projects. These improvements are shown previously in Figure 3-1.

3.5.5 Transportation Demand Management

The goal of the Transportation Demand Management (TDM) plan is to reduce the Project's overall traffic impact through the implementation of TDM measures that are geared toward affecting the demand side of the transportation equation, rather than the supply side. By their very nature, TDM programs attempt to change people's behavior, and, to be successful, they must rely on incentives or disincentives to make these shifts in behavior attractive to the commuter.

TDM programs are designed to maximize the people-moving capability of the existing transportation infrastructure by increasing the number of persons in a vehicle, providing alternate modes of travel, or influencing the time of, or need to, travel.

TDM measures are most often directed at commuter travel, characterized by the day-to-day regularity of this type of trip. Conditions at the workplace, in terms of employer practices such as on-site services, bicycle storage, shower facilities and shuttle services, impact faculty and staff commuter choices, and makes this market the most suitable for identifying alternatives.

The term TDM encompasses both alternatives to driving alone and the techniques or supporting strategies that encourage the use of these alternatives. TDM alternatives to driving alone include carpools and vanpools, public and private transit, and non-motorized travel including bicycling and walking.

TDM strategies are the supporting measures that encourage the use of alternatives to driving alone. TDM strategies include financial incentives, time incentives, provision of new or enhanced commuter services, dissemination of information, and marketing alternative services. TDM strategies include all the incentives and disincentives that increase the likelihood for people to change their existing travel behavior.

3.5.5.1 Transportation Demand Management Plan

To implement a TDM program for the Project, the Proponent will consider a number of measures that will contribute toward the reduction of vehicular traffic to and from the Project site. The following measures could comprise the proposed TDM package:

Ridesharing The Proponent will promote ridesharing for its faculty and staff by carpooling. The Proponent will provide information regarding carpooling and its benefits to faculty and staff. The School will consider providing ridesharing vehicles with preferential parking spaces in the parking lots as a rideshare incentive.

Transportation Coordinator A transportation coordinator will be identified to ensure that the complete rideshare program, including ride matching, promotion, incentives and a guaranteed ride home, is consistently promoted and provided.

Guaranteed Ride Home In the event of an emergency or a request to stay late at work, the guaranteed ride home would allow faculty and staff to receive transportation service home, usually in the form of a taxi. This program helps to alleviate commuter's worries about being stuck on-campus when using alternative modes in case of various family emergencies.

Transit Incentives To encourage the use of transit by faculty and staff to commute to work, the School will provide local bus schedule and route information in the faculty/staff areas. In addition, the school may subsidize MBTA passes for faculty/staff to promote the use of public transportation.

Bicycle and Pedestrian Measures Bicycling to the site will likely be attractive to some faculty/staff due to the proximity of many residential communities. To encourage and facilitate use of bicycles by faculty/staff, both secure/covered and outdoor bicycle storage racks will be provided at the new school.

Due to the close proximity of residential areas and transit stops to the site, walking will be attractive to some students and faculty/staff. The Proponent is committed to maintaining sidewalks on and around the site. Safe on-site pedestrian circulation will be promoted through clearly delineated crosswalks/walkways on-site. All constructed pedestrian facilities will be ADA compliant.

3.5.6 Construction Management

Following the Article 80 review process, a detailed Construction Management Plan (CMP) will be developed and submitted to the BTD for its approval in connection with the Project. The CMP will provide a detailed evaluation of potential short-term construction related transportation impacts during the course of the Project's construction. The CMP will include truck routing, construction staging on-campus, and pedestrian circulation around the campus.

Construction vehicles will be necessary to move construction materials to and from the Project site. The Proponent recognizes that construction traffic is a concern to area residents. No roadway closures are anticipated with the construction of the Project. The need for street occupancy (i.e. temporary removal of parking or single lane closures) along roadways adjacent to the Project site is possible during certain periods of construction.

Contractors will be required to devise access plans for their personnel that de-emphasizes auto use (such as seeking off-site parking, provide transit subsidies, etc.). The following are some of the elements that are anticipated to be included in a forthcoming CMP to support the Project:

- The vehicular access to the Project site during the construction period will be from Washington Street.
- The construction site will be maintained on private property and will likely not require long-term roadway and/or sidewalk occupancies (other than for utilities connections, the reconstruction of sidewalks, etc.).
- Staging areas for construction are anticipated to be located directly on the Project site.

Chapter 4.0

Environmental Review Component

4.0 ENVIRONMENTAL REVIEW COMPONENT

4.1 Pedestrian Level Winds

Rowan Williams Davies & Irwin Inc. (RWDI) has reviewed the potential pedestrian wind conditions around the proposed Conservatory Lab Charter School at Bartlett Place. This section summarizes their findings, based on the current design drawings and past experience with wind-tunnel testing for buildings in the Boston area.

4.1.1 Site Information

The proposed school building is located on the south side of Bartlett Street between Lambert Avenue to the west and Washington Street to the east, as shown in Figure 4.1-1. A new street (Marcia Street) will be created along the west and south sides of the proposed building (see Figures 4.1-2 and 4.1-3). Currently, the block is covered by low buildings and open spaces, surrounded by low buildings and trees. Further away from the site are also dense low-rise buildings in all directions. There are some small grade changes in the area, with the site at a basin, lower than most surrounding areas except to the northeast.

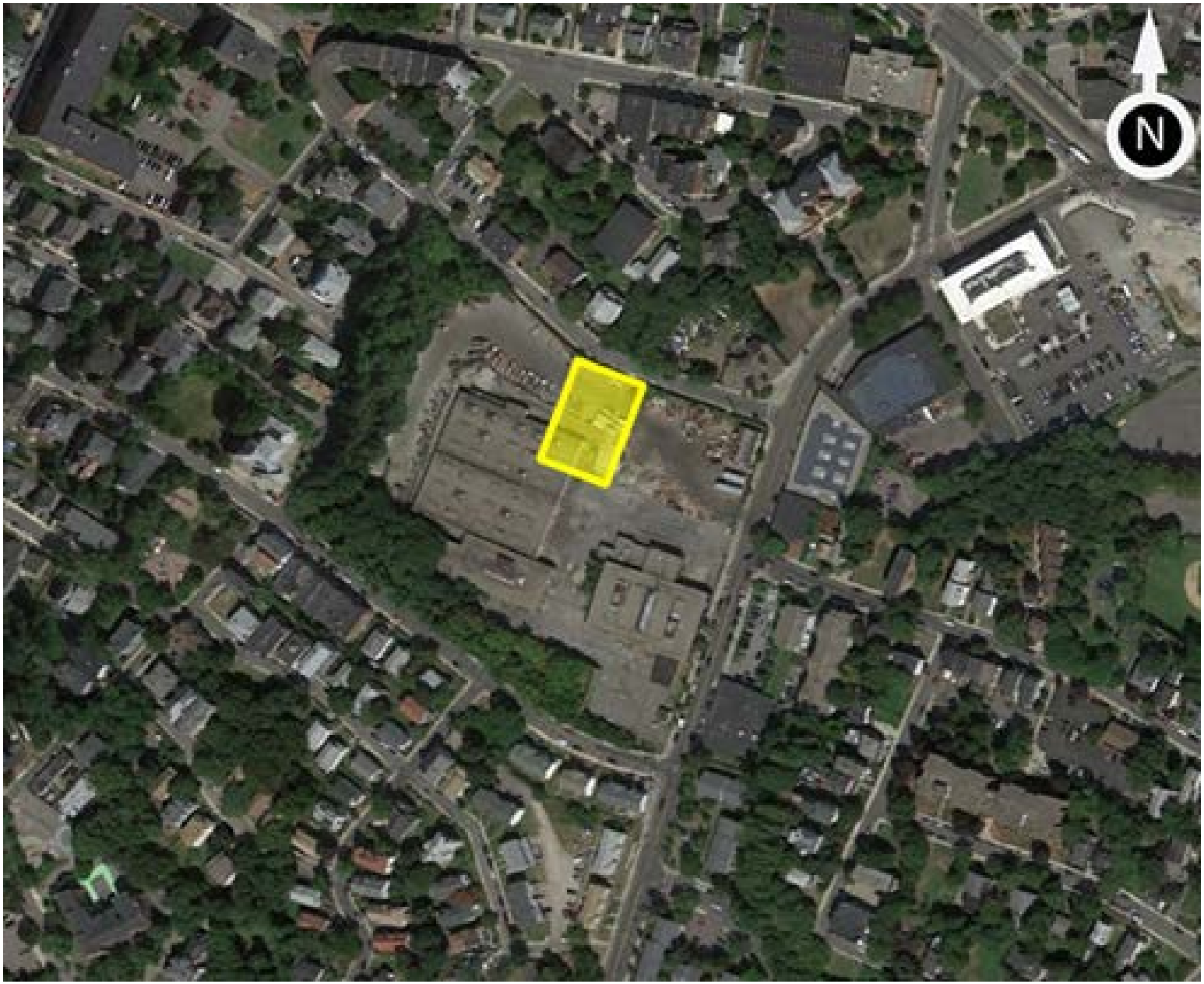
The proposed school development includes a four-story building with a two-story podium on the east side. It is surrounded by parking lots, green areas and buildings planned as part of the Bartlett Place development. Figures 4.1-4 and 4.1-5 present the northeast and west views of the proposed building, respectively. Pedestrian areas on and around the development include building entrances, sidewalks, and a performance courtyard.

An analysis of the long-term wind data in the Boston area indicates that, on an annual basis, the most common wind directions are those between southwest and northwest. Winds from the east and east-southeast are also relatively common. In the case of strong winds, west-northwest and northeast are the dominant wind directions. Typically, winds are stronger in the winter and spring than those in the summer and fall.

4.1.2 Pedestrian Wind Assessment

In order to provide an opinion on the overall wind conditions expected around the proposed development, RWDI reviewed meteorological data for the area, as described above. Drawings of the proposed development were also reviewed, as well as information regarding the surroundings. Using this data, in conjunction with past experience in the area and engineering judgement, the expected wind conditions are summarized as follows:

- Due to its limited height, the proposed school building will not cause any significant wind impact on or around the development. As a result, wind conditions on sidewalks along adjacent streets, green areas and parking lots will be similar to those that currently exist and are considered to be suitable for their intended uses throughout the year.



Conservatory Lab Charter School Boston, Massachusetts

Figure 4.1-1
Aerial Photograph

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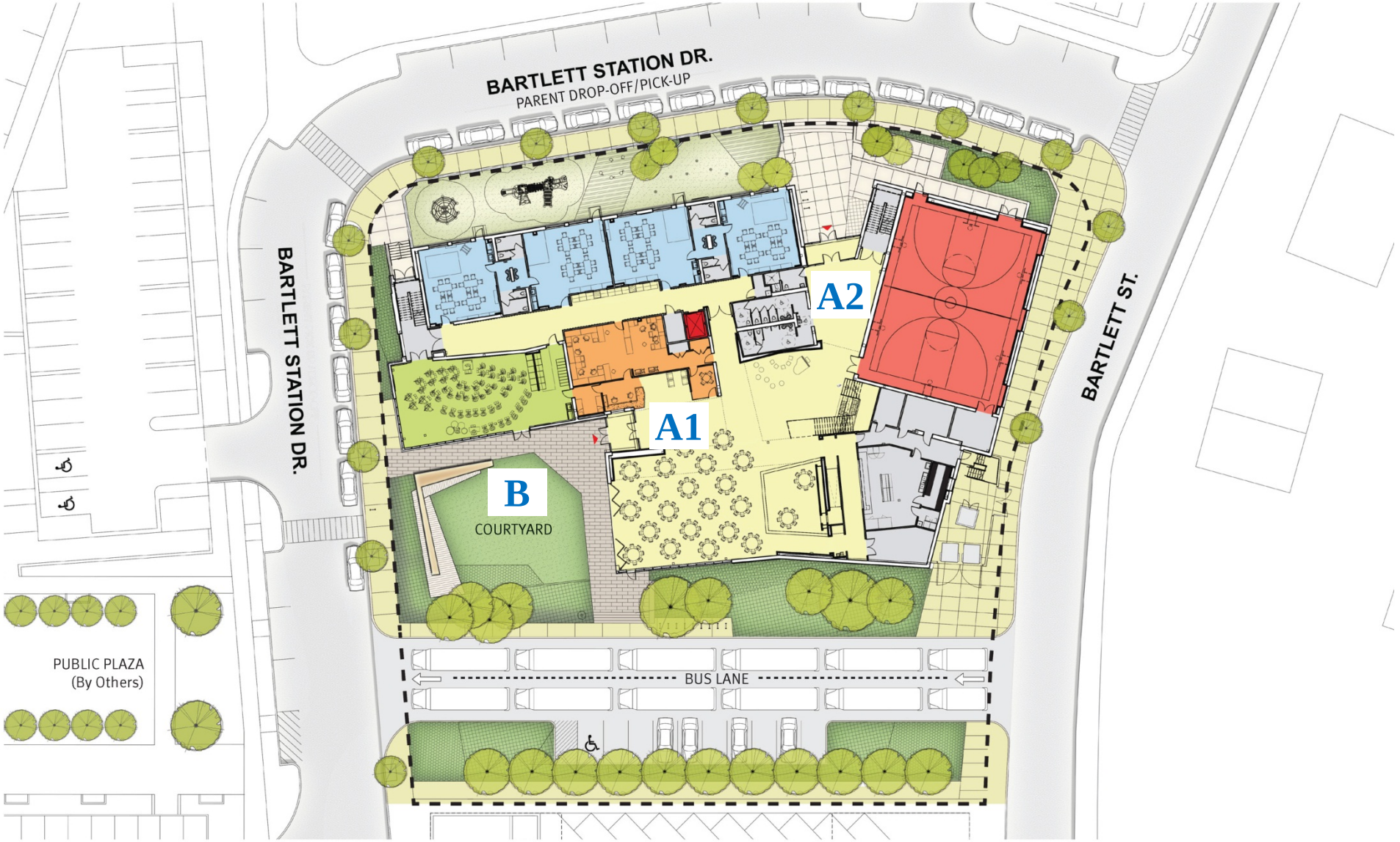
Figure 4.1-2

Bartlett Place Site Plan



Conservatory Lab Charter School Boston, Massachusetts

Figure 4.1-3

Level 1 Plan

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Figure 4.1-4

View from the Northeast

Conservatory Lab Charter School Boston, Massachusetts

Figure 4.1-5

View from the West

- The south entrance (A1 in Figure 4.1-3) is located in an inner building corner, sheltered from all prevailing winds. The west entrance (A2) is significantly recessed from the west façade. Both entrances are designed with vestibules. These are positive design features and, hence, suitable wind conditions are expected in these areas.

- The courtyard (area B in Figure 4.1-3) is located on the southeast side of the building and protected by the proposed building from the prevailing west and northwest winds. However, winds from the southwest and northeast directions may flow around the exposed building corners, causing increased wind in the open area. The resultant wind conditions are expected to be comfortable for standing and walking.

4.2 Shadow Impacts

4.2.1 Introduction and Methodology

A shadow impact analysis was conducted to assess potential shadow impacts from the Project. The study looked at the following four times of the year:

1. Spring Equinox (March 21) at 9:00 a.m., 12:00 noon, and 3:00 p.m.
2. Summer Solstice (June 21) at 9:00 a.m., 12:00 noon, 3:00 p.m. and 6:00 p.m.
3. Autumnal Equinox (September 21) at 9:00 a.m., 12:00 noon, 3:00 p.m. and 6:00 p.m.
4. Winter Solstice at 9:00 a.m., 12:00 noon, and 3:00 p.m.

The shadow analysis presents the existing shadow and new shadow that would be created by the Proposed Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, sidewalks and bus stops adjacent to and in the vicinity of the Project site. It should be noted that the model used for the analysis does not include trees, which can block new shadow from the proposed buildings during much of the year during certain time periods. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 4.2-1 to 4.2-14 at the end of this section.

4.2.2 Vernal Equinox (March 21)

At 9:00 a.m. new shadow will be cast to the northwest onto Marcia Street and its sidewalks. No new shadow will be cast onto bus stops or public open spaces.

At 12:00 p.m., new shadow will be cast to the north onto Bartlett Street and its sidewalks, onto a portion of Marcia Street and its eastern sidewalk and onto the School's tot lot. No new shadow will be cast onto bus stops or public open spaces.

At 3:00 p.m., new shadow will be cast to the northeast onto Bartlett Street and its sidewalks. No new shadow will be cast onto bus stops or public open spaces.

4.2.3 Summer Solstice (June 21)

At 9:00 a.m. new shadow will be cast to the west onto Marcia Street and its sidewalks and onto the School's tot lot. No new shadow will be cast onto bus stops or public open spaces.

At 12:00 p.m., new shadow will be cast to the northwest onto a portion of Marcia Street and the School's tot lot, and onto a small portion of Bartlett Street and its southern sidewalk. No new shadow will be cast onto bus stops or public open spaces.

At 3:00 p.m., new shadow will be cast to the northeast onto a portion of Bartlett Street and its sidewalks, and a small portion of the courtyard/bus lane. No new shadow will be cast onto bus stops or public open spaces.

At 6:00 p.m., new shadow will be cast to the east onto Bartlett Street and its sidewalks, and onto the courtyard/bus lane. No new shadow will be cast onto bus stops or public open spaces.

4.2.4 Autumnal Equinox (September 21)

At 9:00 a.m new shadow will be cast to the west onto Marcia Street and its sidewalks, and onto the School's tot lot. No new shadow will be cast onto bus stops or public open spaces.

At 12:00 p.m., new shadow will be cast to the northwest onto Bartlett Street and its sidewalks, and onto a portion of Marcia Street and the School's tot lot. No new shadow will be cast onto bus stops or public open spaces.

At 3:00 p.m., new shadow will be cast to the northeast onto Bartlett Street and its sidewalks, and onto a portion of the courtyard/bus lane. No new shadow will be cast onto bus stops or public open spaces.

At 6:00 p.m., most of the area is under existing shadow. New shadow will be cast to the east onto the portion of the courtyard/bus lane not under existing shadow, onto a small portion of Bartlett Street and its sidewalks, and onto portions of St. James Street and its sidewalks. No new shadow will be cast onto bus stops or public open spaces.

4.2.5 Winter Solstice (December 21)

The winter solstice creates the least favorable conditions for sunlight in New England. The sun angle during the winter is lower than in any other season, causing the shadows in urban areas to elongate and be cast onto large portions of the surrounding area.

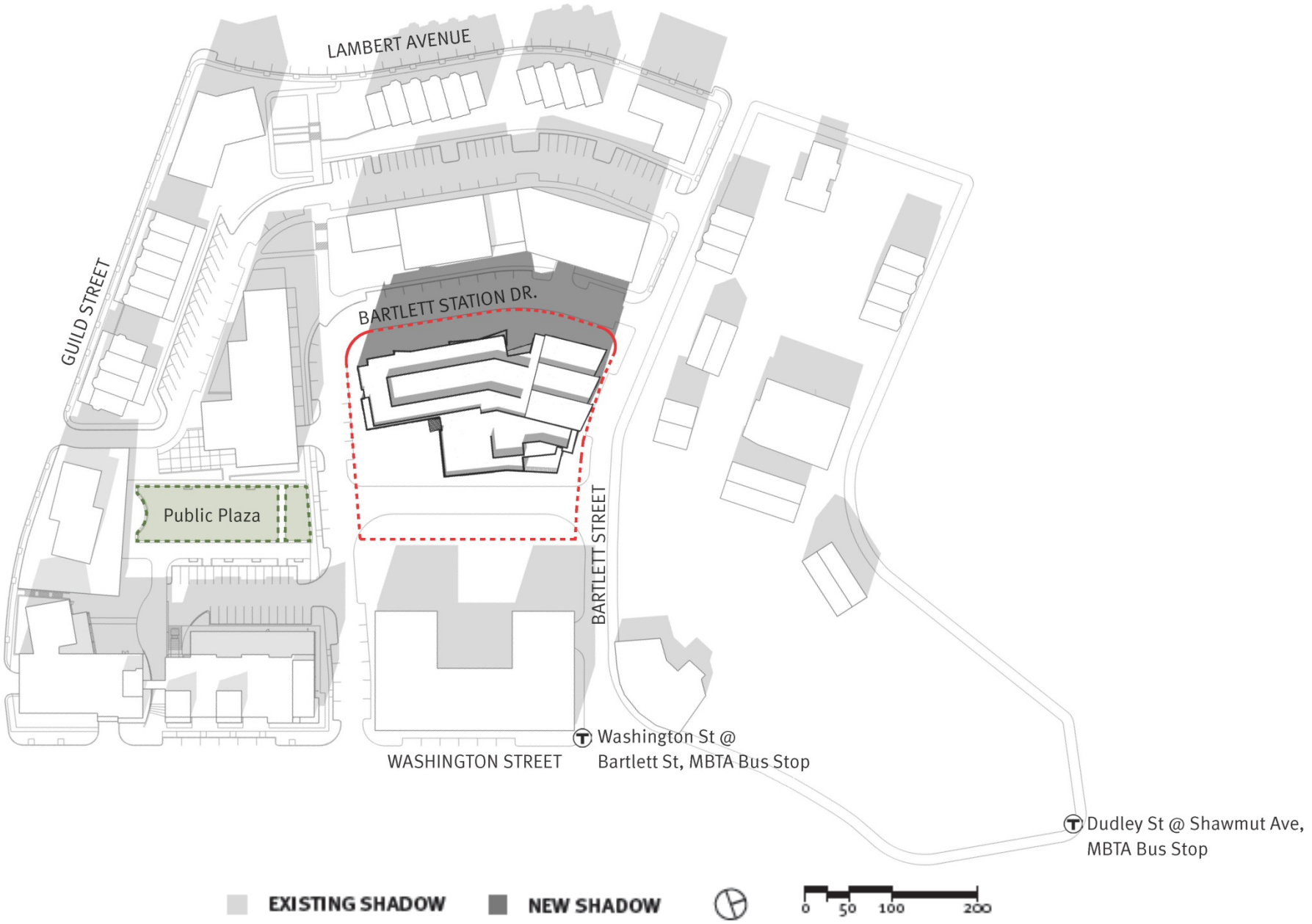
At 9:00 a.m., new shadow from the Project will be cast to the northwest onto Marcia Street and its sidewalks, the School's tot lot, and onto Bartlett Street and its sidewalks. No new shadow will be cast onto bus stops or public open spaces.

At 12:00 p.m., new shadow will be cast to the north onto a portion of Marcia Street and onto Bartlett Street and its sidewalks. No new shadow will be cast onto bus stops or public open spaces.

At 3:00 p.m., new shadow will be cast to the northeast onto Bartlett Street and its sidewalks.

4.2.6 Conclusions

The shadow impact analysis looked at net new shadow created by the Project during fourteen time periods. New shadow will generally be limited to the area immediately surrounding the School and the nearby streets and sidewalks. No new shadow will be cast onto nearby bus stops or public open spaces.



Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 4.2-1

Shadow Study: March 21, 9 a.m.

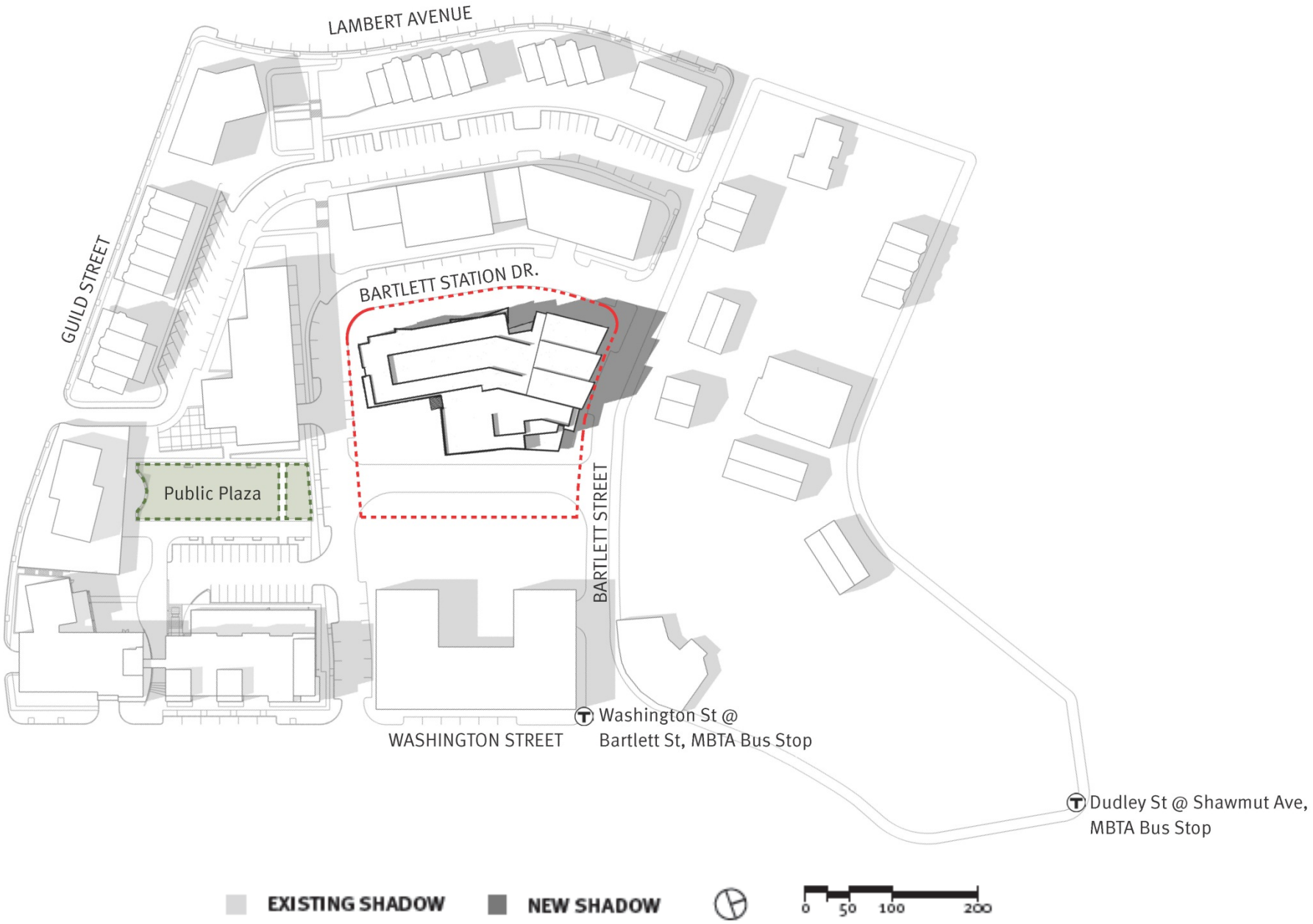


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Figure 4.2-2

Shadow Study: March 21, 12 p.m.

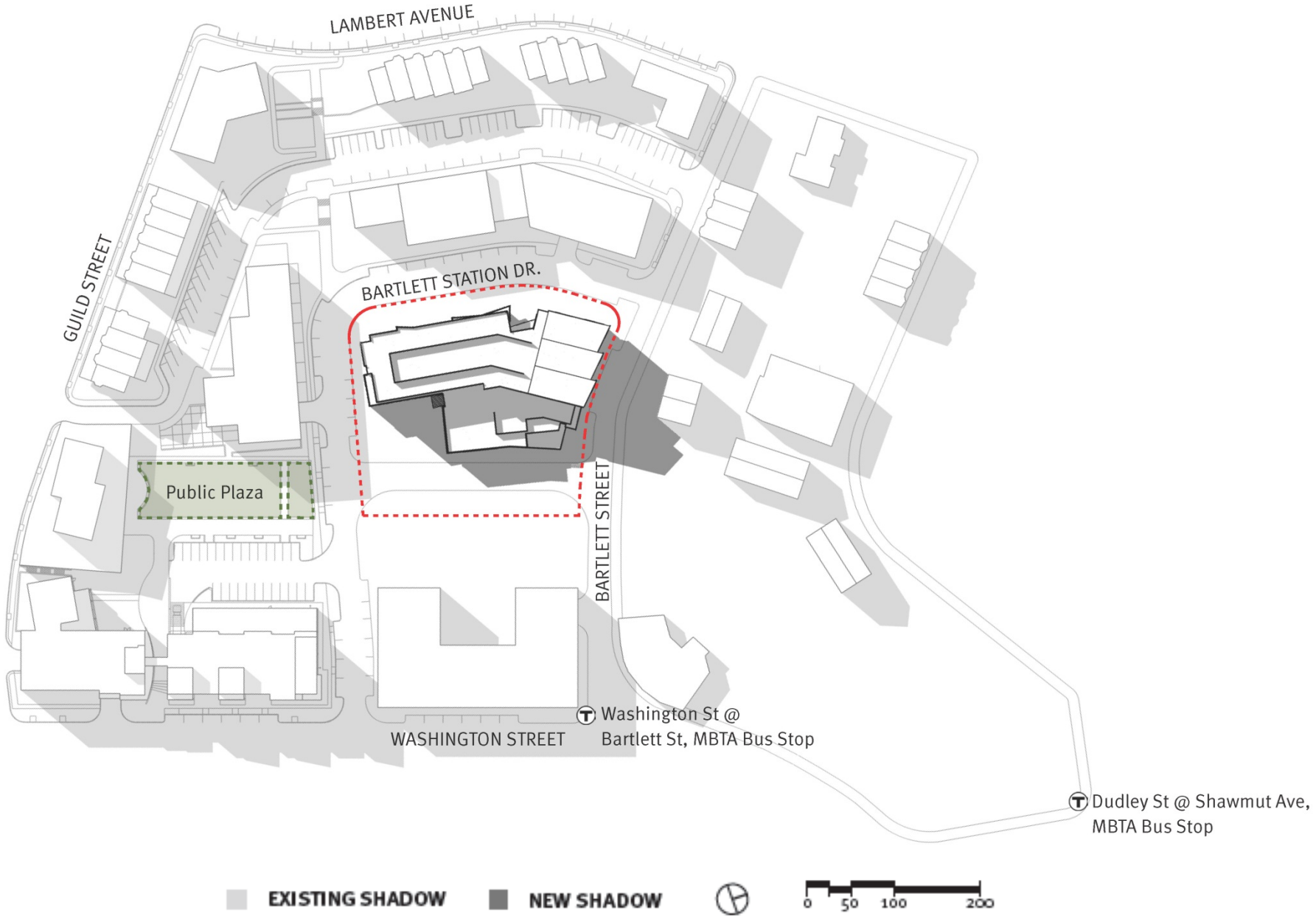

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Figure 4.2-3

Shadow Study: March 21, 3 p.m.

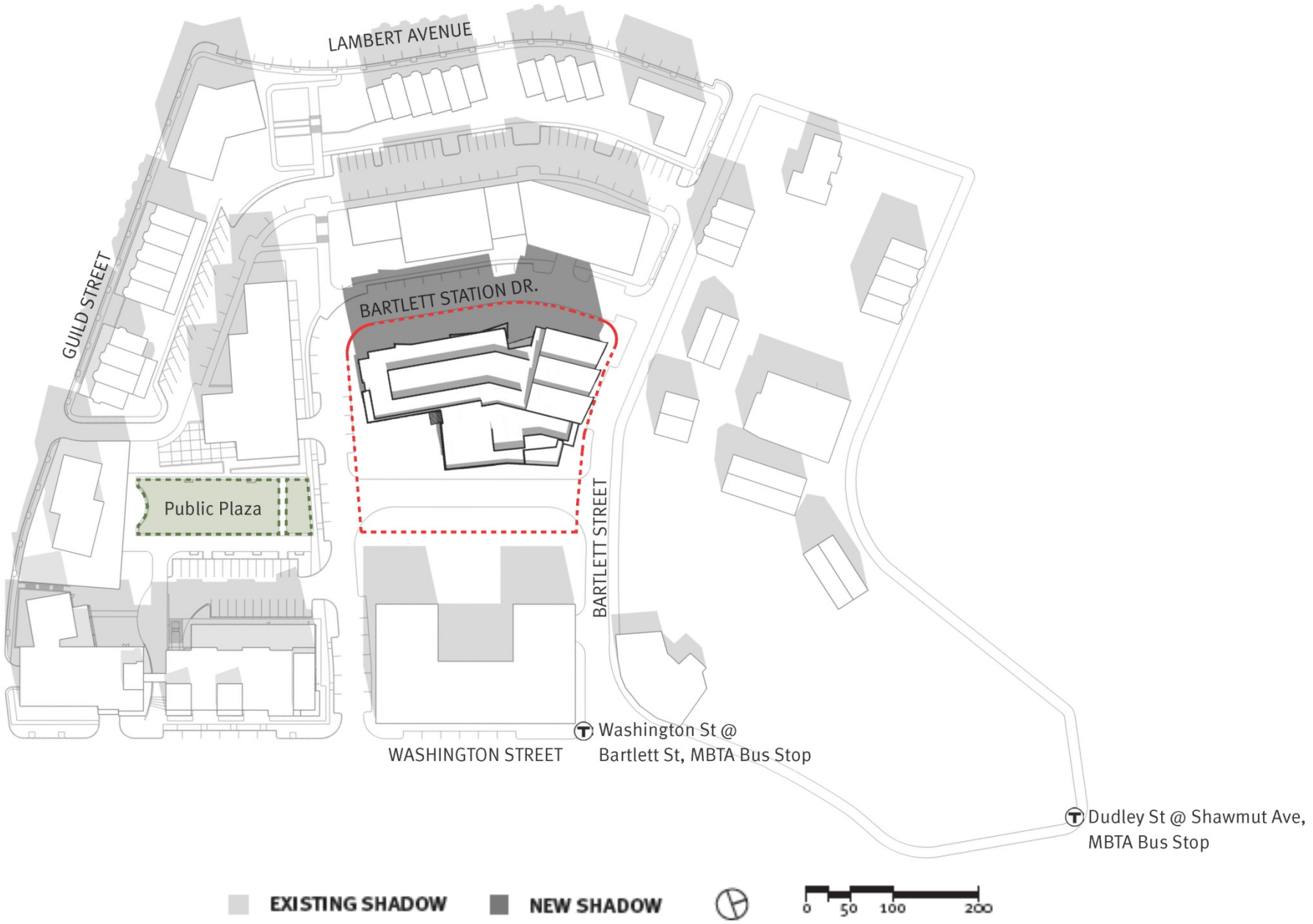

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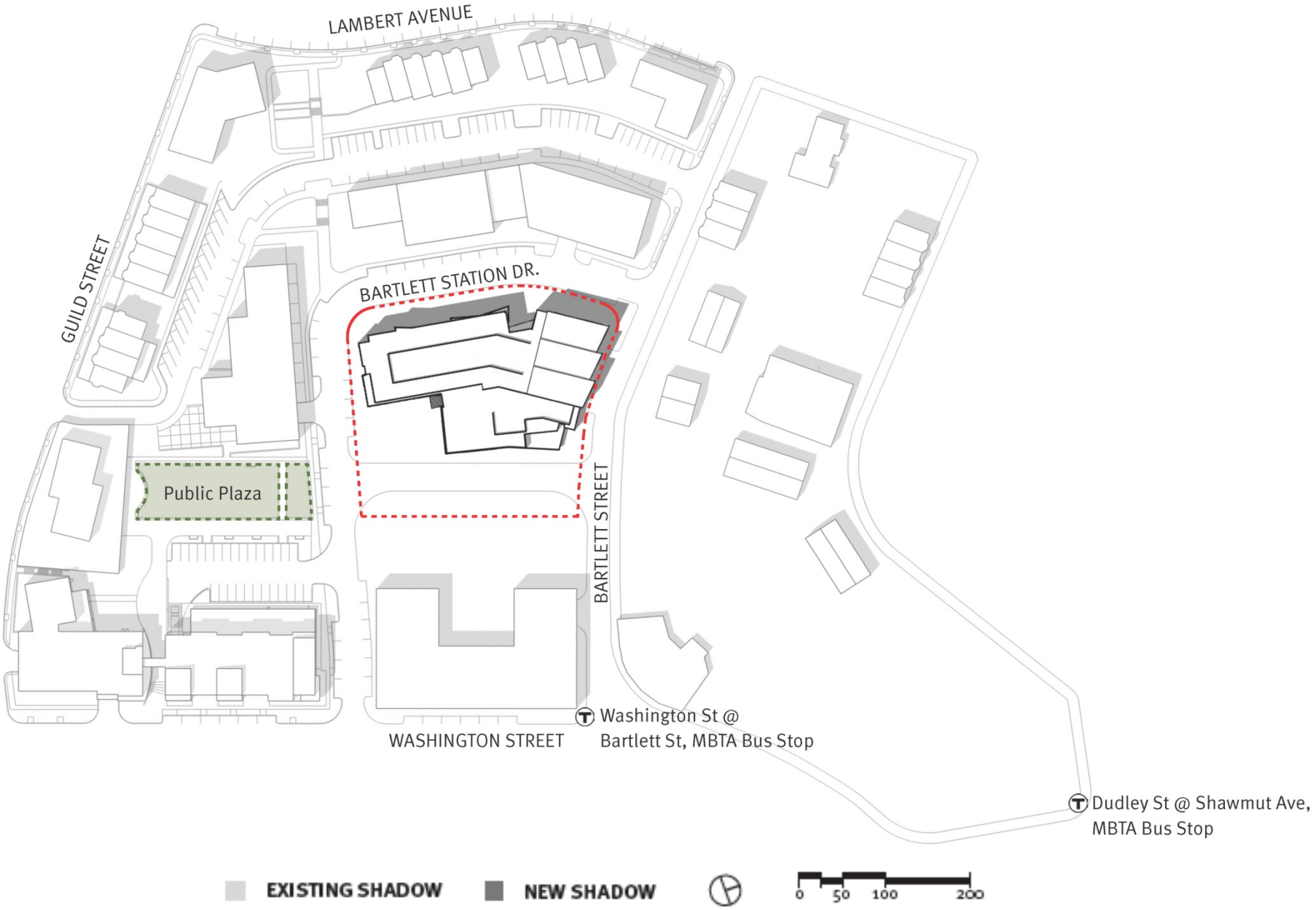
Figure 4.2-4

Shadow Study: June 21, 9 a.m.



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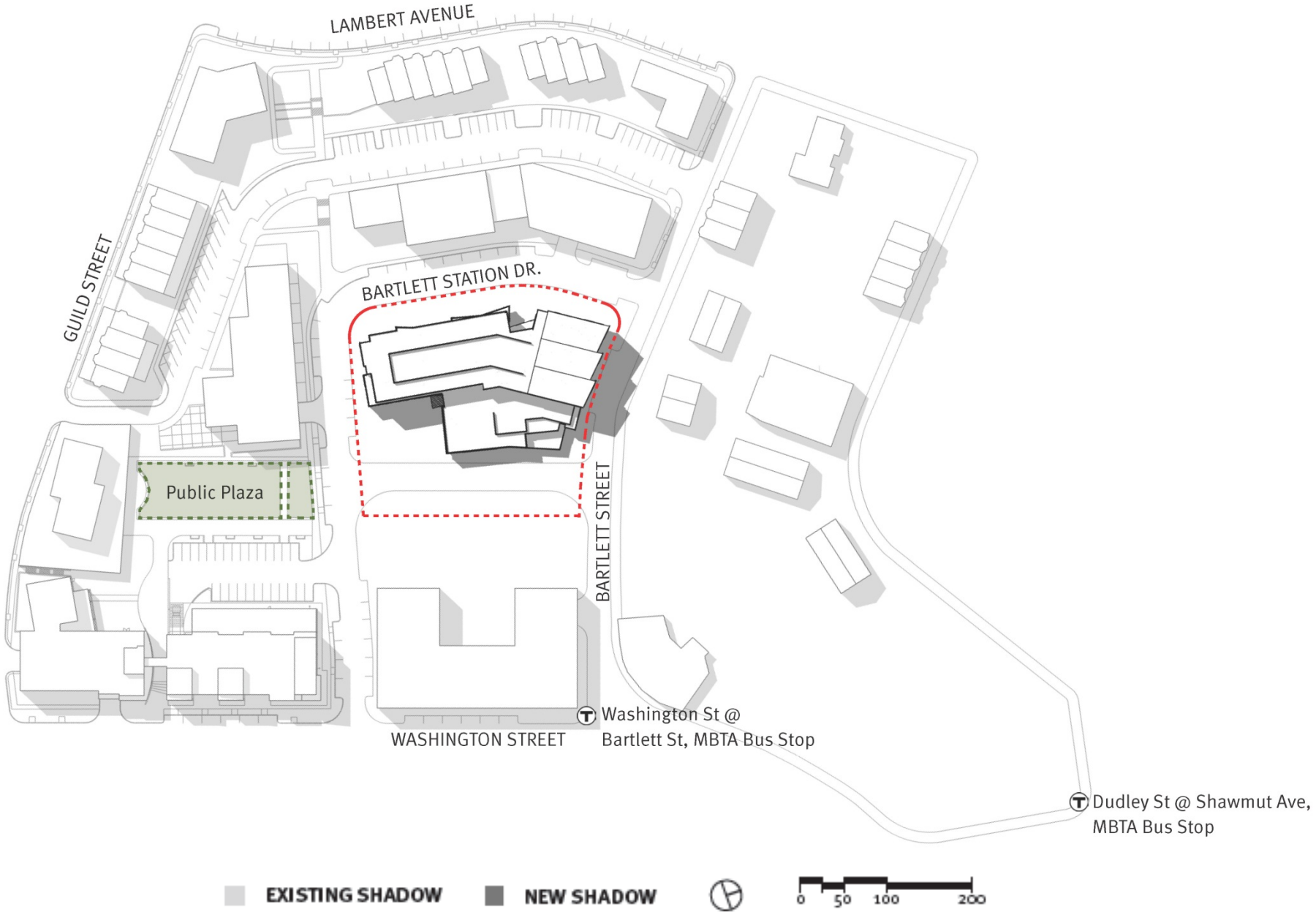
CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 4.2-5

Shadow Study: June 21, 12 p.m.



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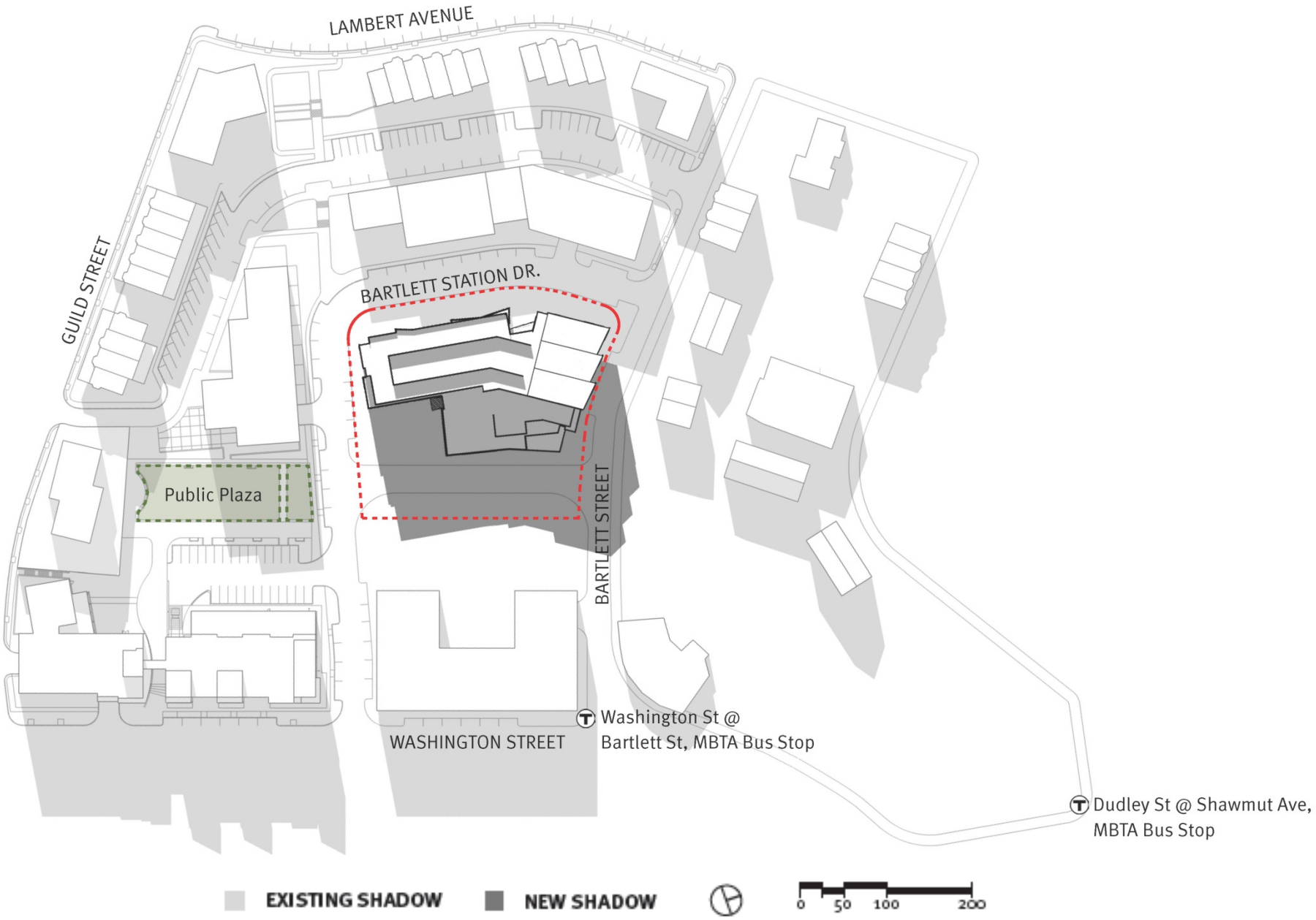
CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 4.2-6

Shadow Study: June 21, 3 p.m.



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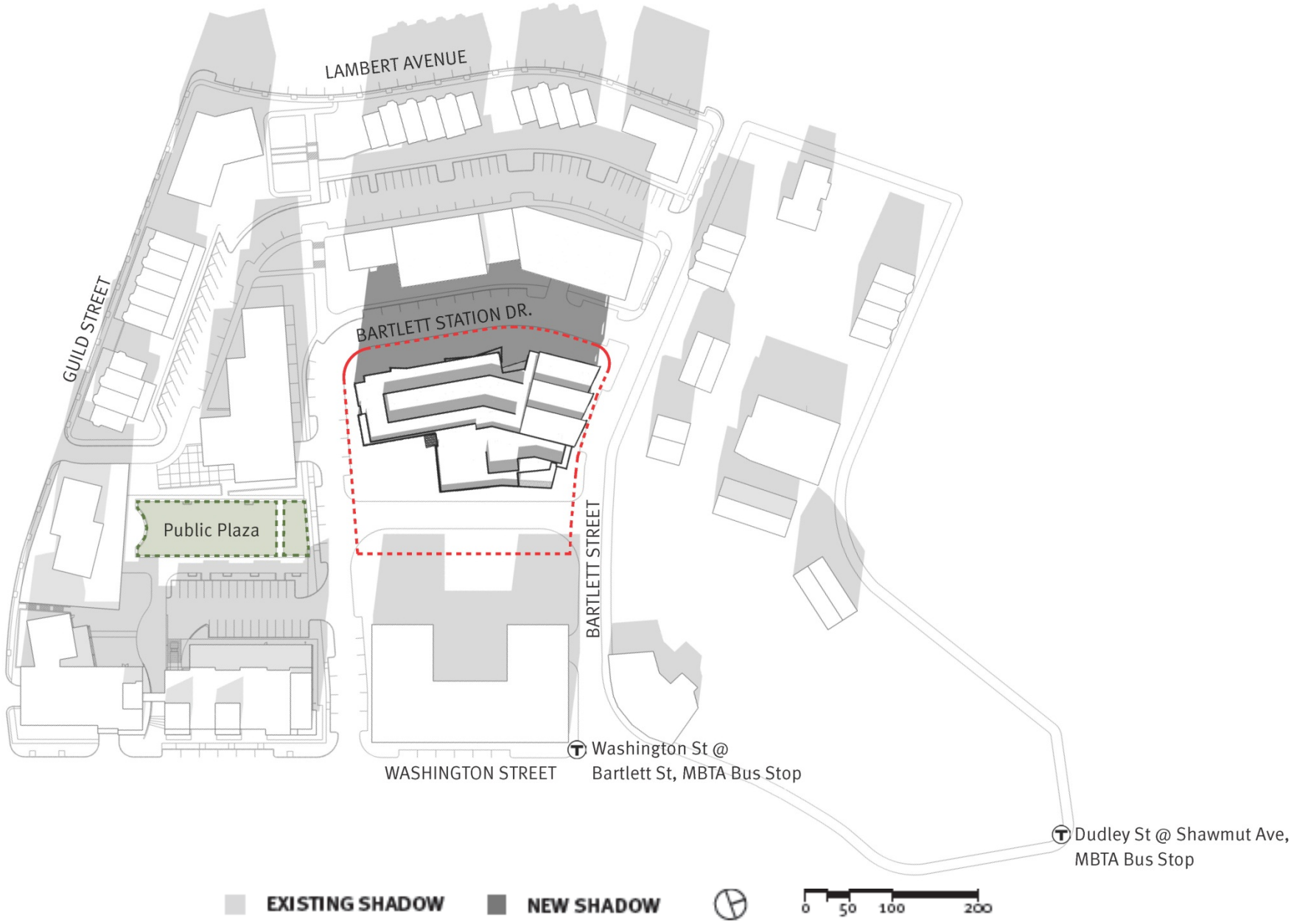
CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 4.2-7

Shadow Study: June 21, 6 p.m.

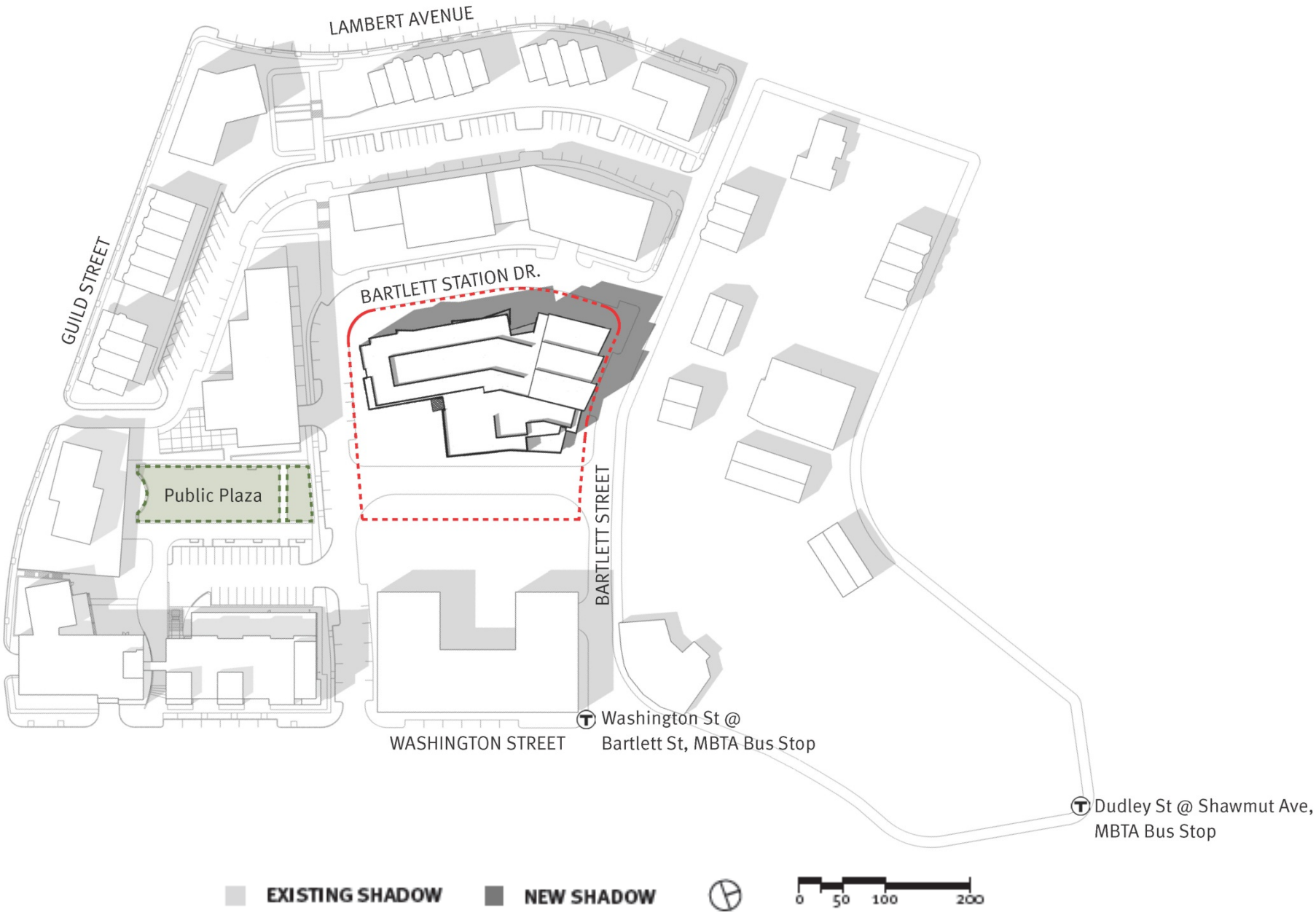


Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 4.2-8

Shadow Study: September 21, 9 a.m.

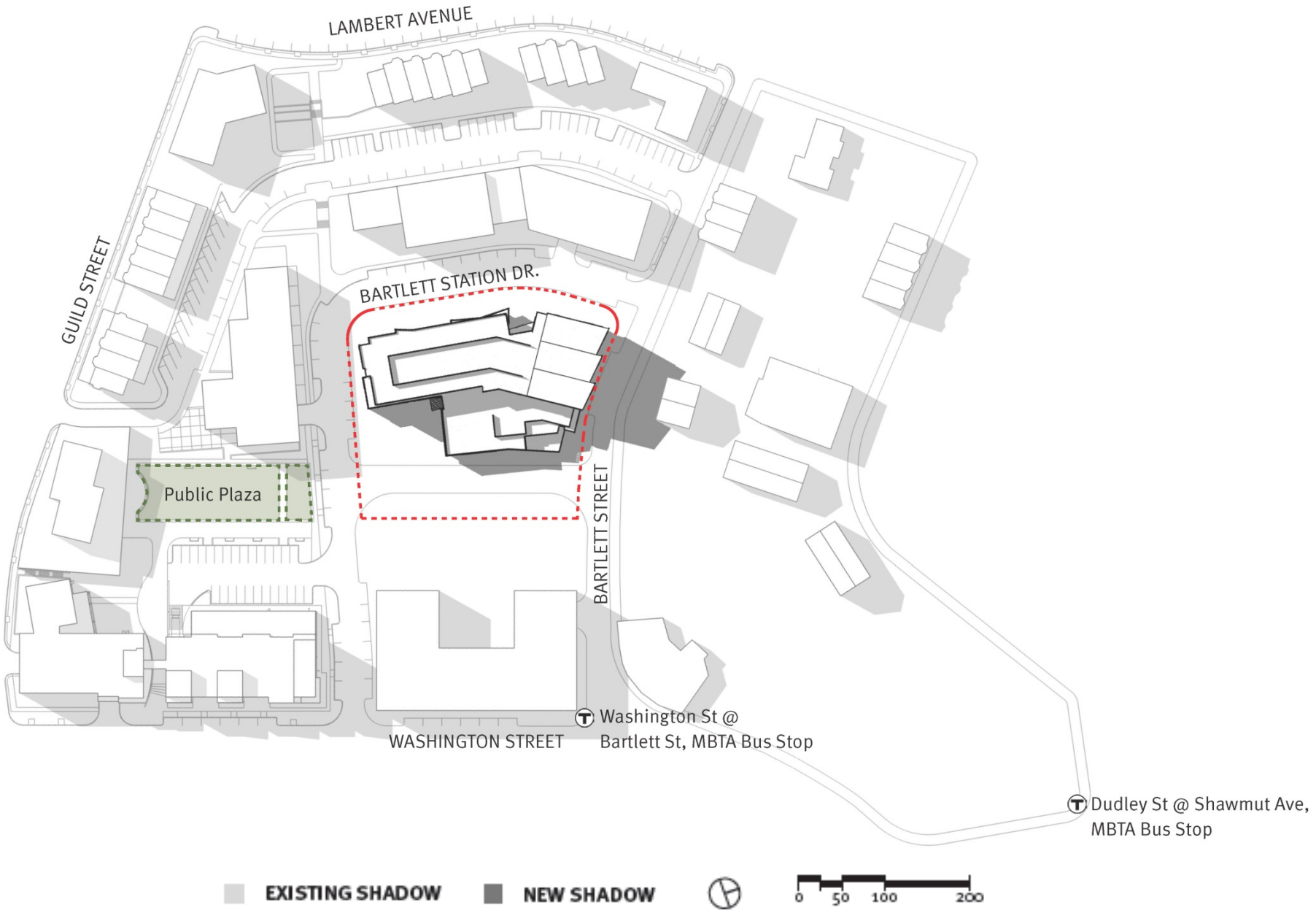


Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 4.2-9

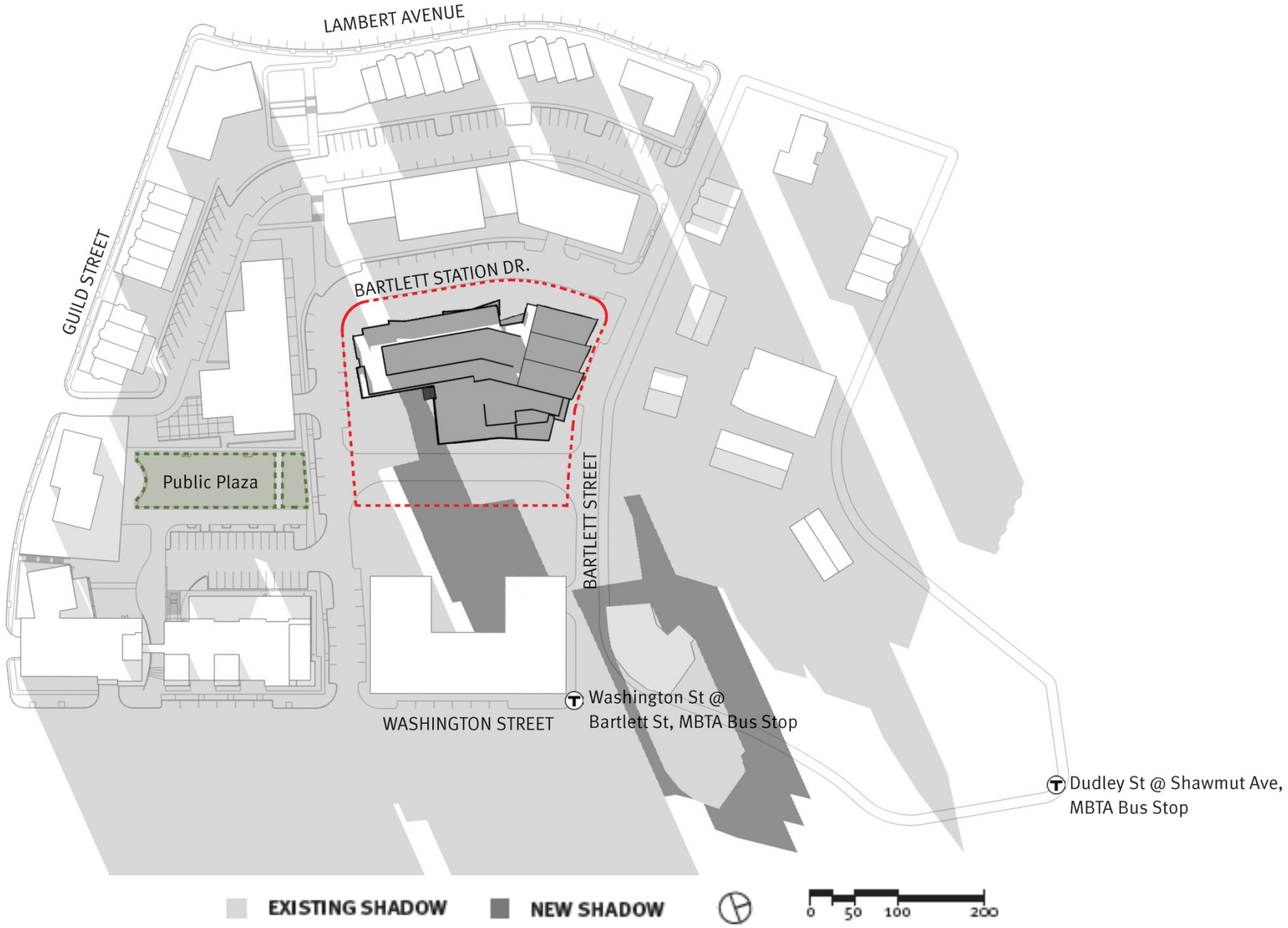
Shadow Study: September 21, 12 p.m.



Conservatory Lab Charter School Boston, Massachusetts

Figure 4.2-10

Shadow Study: September 21, 3 p.m.

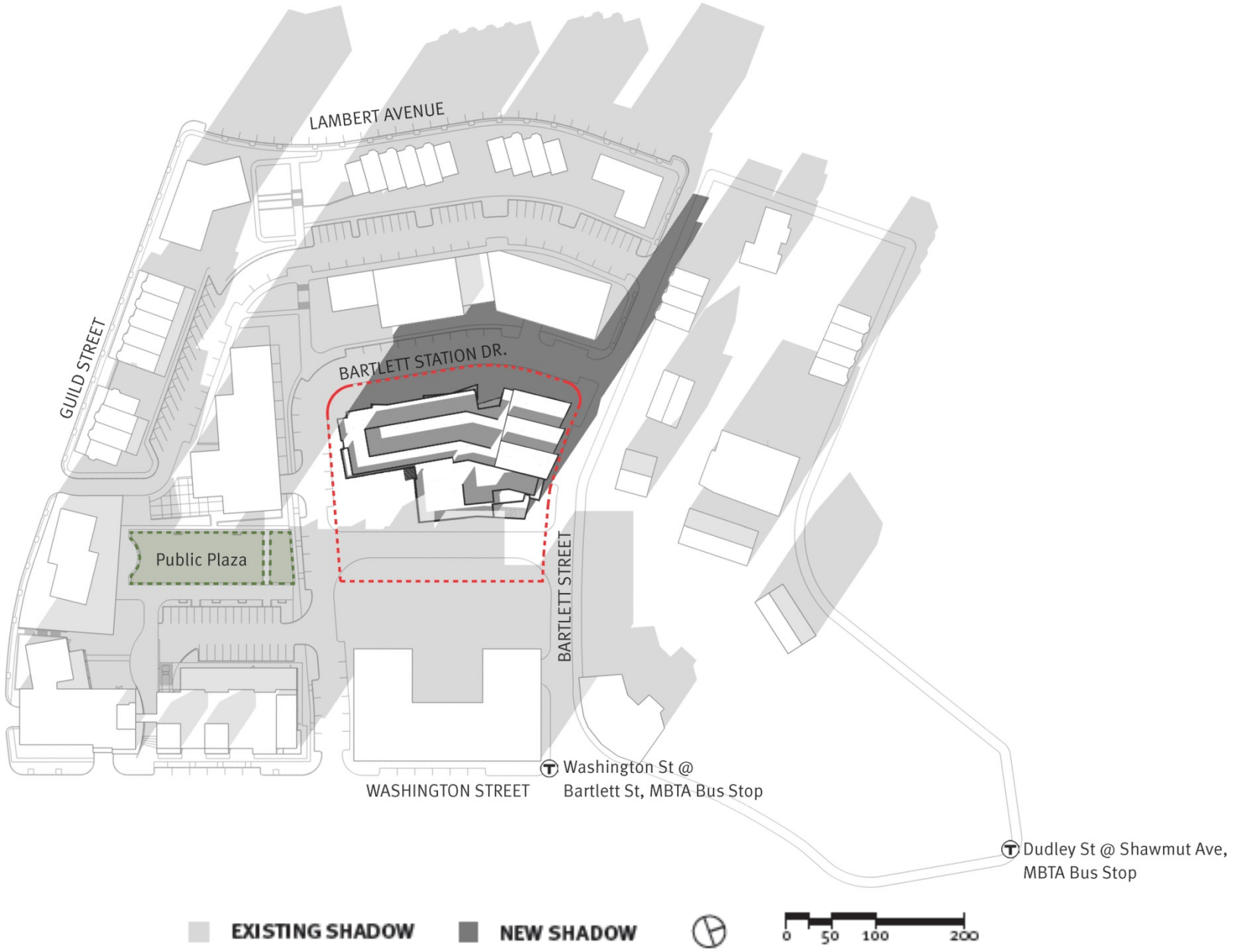


Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 4.2-11

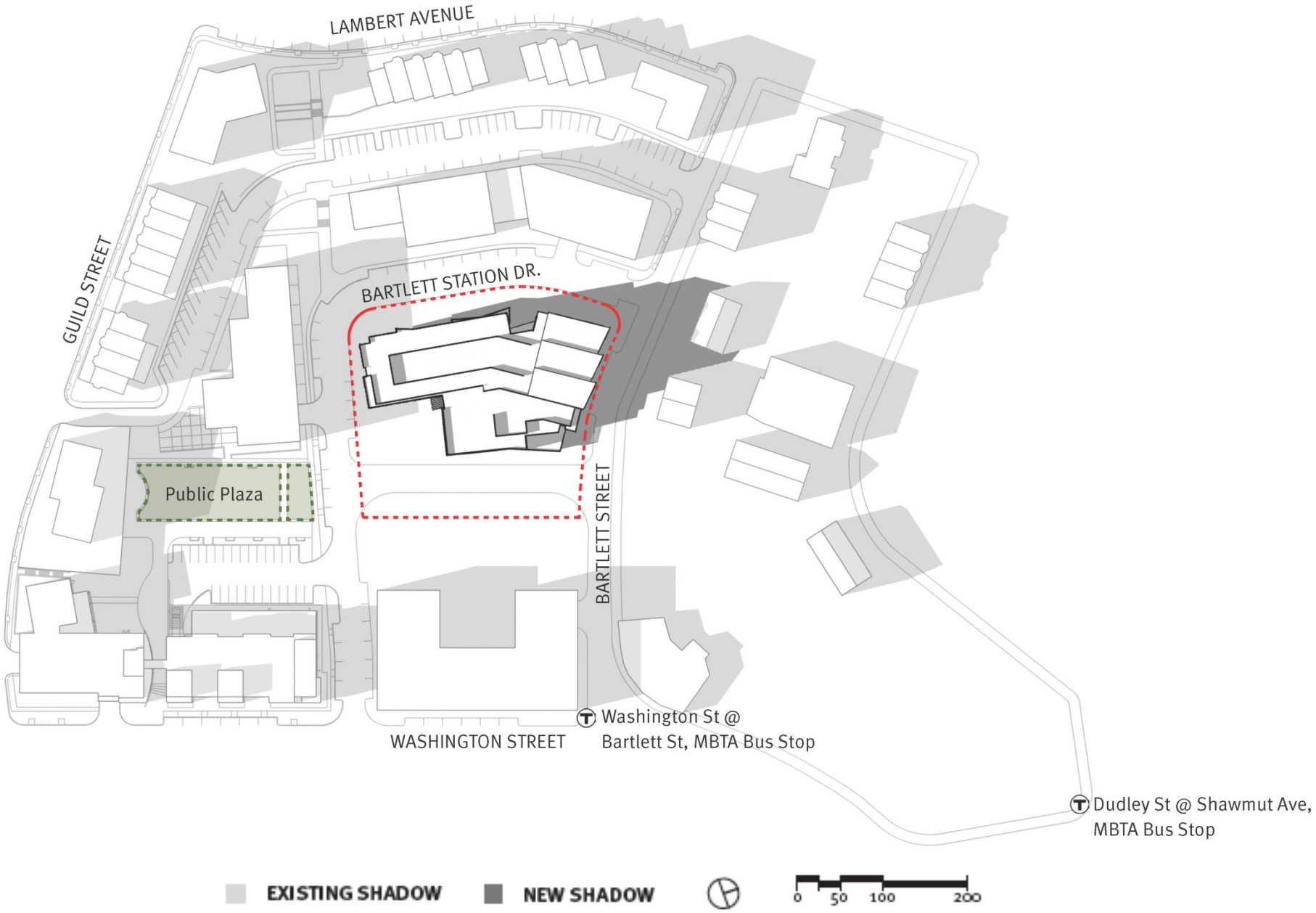
Shadow Study: September 21, 6 p.m.



Conservatory Lab Charter School Boston, Massachusetts

Figure 4.2-12

Shadow Study: December 21, 9 a.m.

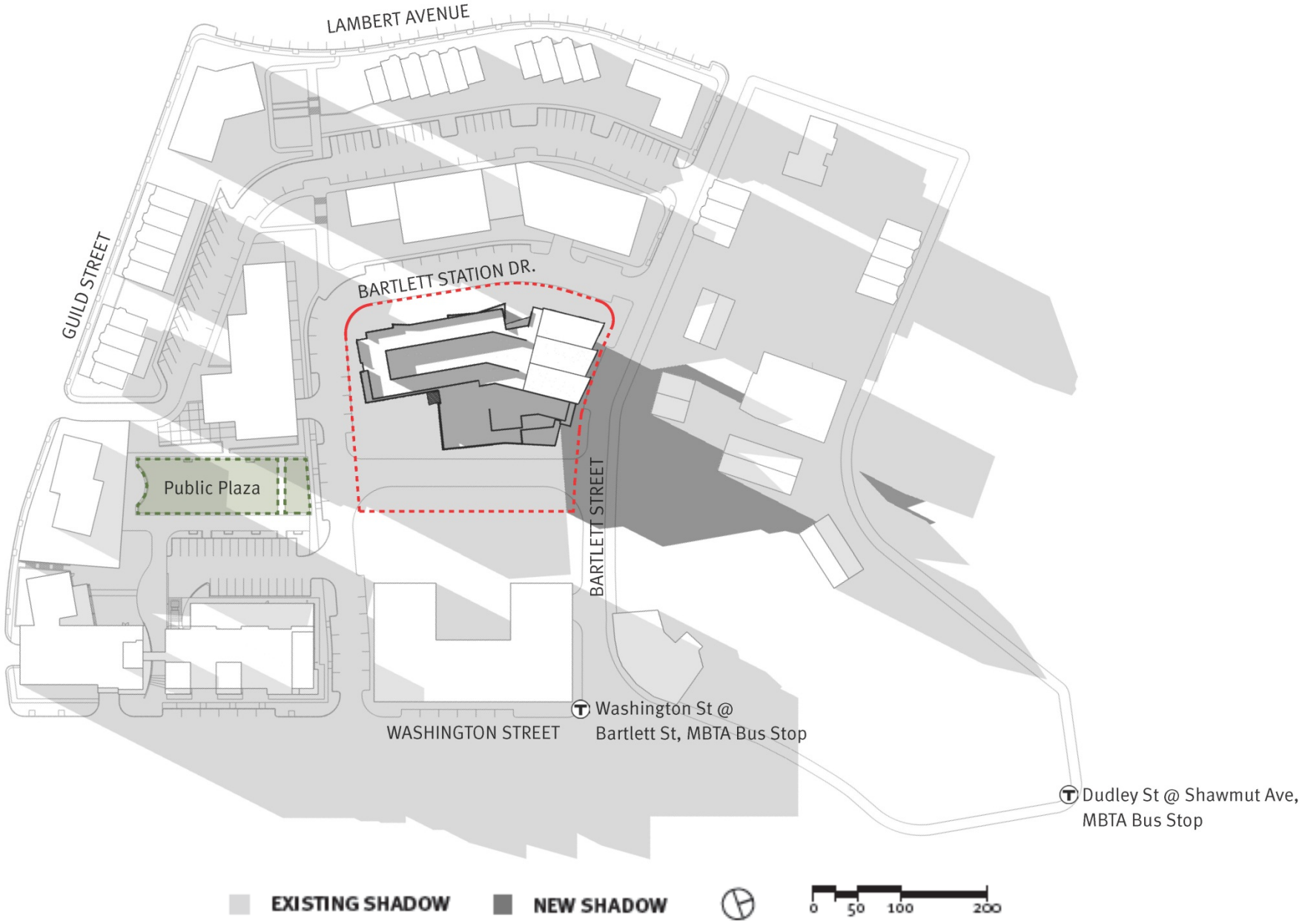


Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 4.2-13

Shadow Study: December 21, 12 p.m.



Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 4.2-14

Shadow Study: December 21, 3 p.m.

4.3 Daylight Analysis

4.3.1 Introduction

The purpose of the daylight analysis is to estimate the extent to which a proposed project will affect the amount of daylight reaching the streets and the sidewalks in the immediate vicinity of a project site. A daylight analysis for the proposed Project considers the existing and proposed conditions, as well as daylight obstruction values of the surrounding area.

The proposed Project will be taller than the existing low-rise buildings on the site (which will be razed prior to construction); therefore, the proposed Project will increase daylight obstruction. The resulting conditions, however, will be typical of the area, and daylight obstruction will not be significant.

4.3.2 Methodology

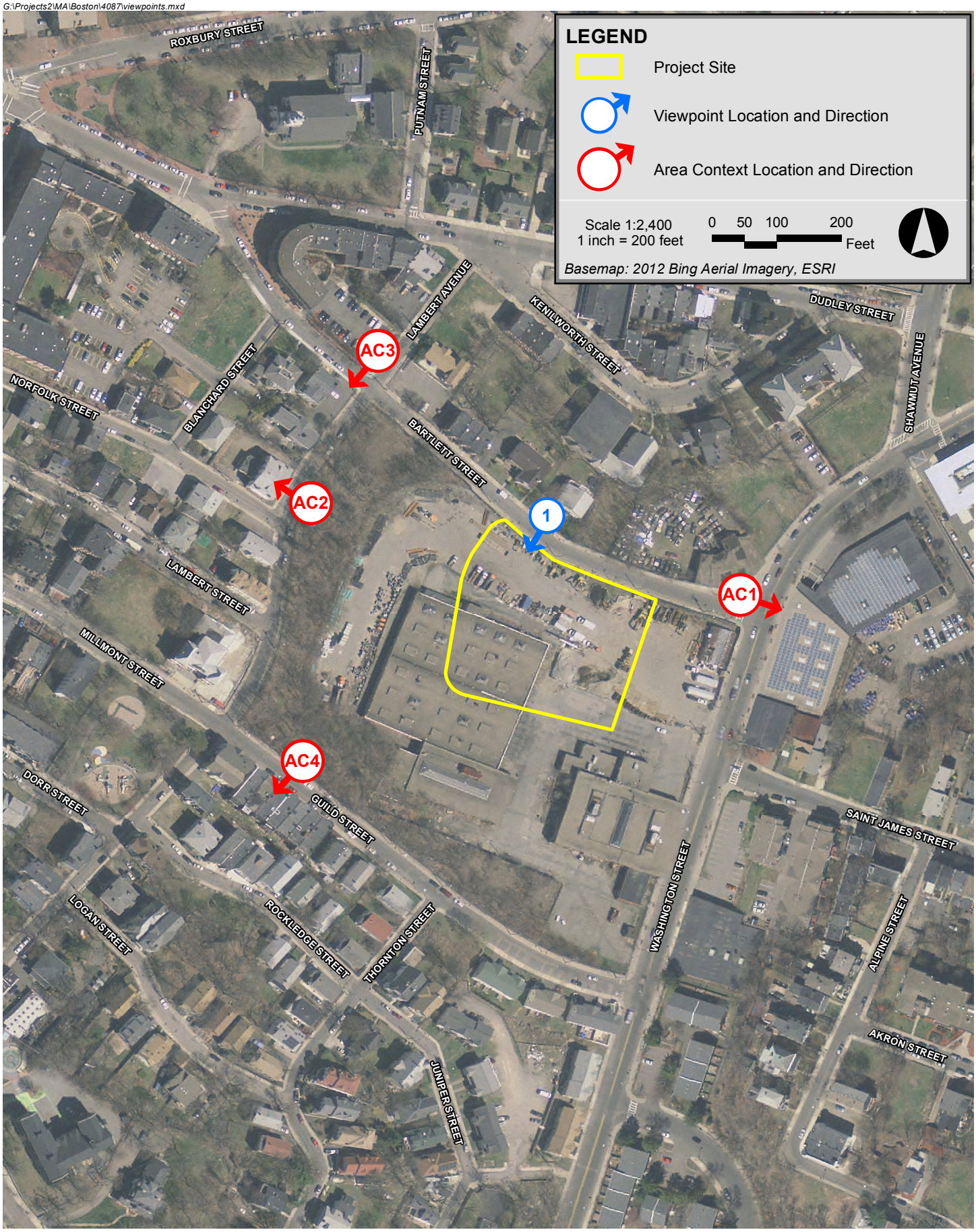
The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[1]. This program measures the percentage of sky-dome that is obstructed by a project and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways centered on the proposed building. The façade of the building facing the viewpoint, including heights, setbacks, corners and other features, is plotted onto a base map using lateral and elevation angles. The two-dimensional base map generated by BRADA represents a figure of the building in the "sky dome" from the viewpoint chosen. The BRADA program calculates the percentage of daylight that will be obstructed on a scale of 0 to 100 percent based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

The analysis compares three conditions: Existing Conditions; Proposed Conditions; and Area Context. A viewpoint along Bartlett Street was chosen to evaluate daylight obstruction for the proposed and existing conditions. Four area context points were considered in order to provide a basis of comparison to existing conditions in the surrounding area. The viewpoints and area context viewpoints were taken in the following locations and are shown on Figure 4.3-1:

- **Viewpoint 1 –** View from Bartlett Street facing south at the Project site.

[1] Method developed by Harvey Bryan and Susan Stuebing, computer program developed by Ronald Fergle, Massachusetts Institute of Technology, Cambridge, MA, September 1984.



Conservatory Lab Charter School Boston, Massachusetts

Figure 4.3-1
Viewpoint and Area Context Locations

- **Area Context Viewpoint 1 (AC1) –** View from Washington Street looking east at 2500 Washington Street.
- **Area Context Viewpoint 2 (AC2)** – View from Lambert Avenue looking northwest at 15-17 Lambert Avenue.
- **Area Context Viewpoint 3 (AC3)** – View from Bartlett Street looking south at 58-60 Bartlett Street.
- **Area Context Viewpoint 4 (AC4)** – View from Guild Street looking south at 40-52 Guild Street.

4.3.3 Results

The results for each viewpoint under each alternative condition are shown in Table 4.3-1. Figures 4.3-2 and 4.3-3a and 4.3-3b present the BRADA results.

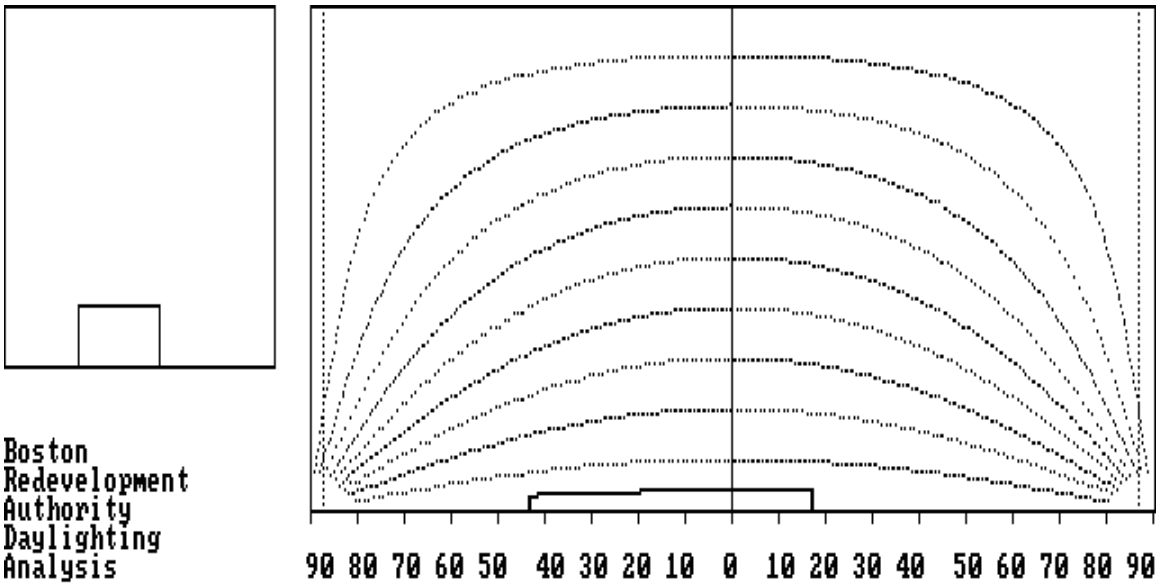
Table 4.3-1 Daylight Obstruction Values

Viewpoint Locations		Existing Conditions	Proposed Conditions
Viewpoint 1	Bartlett Street looking south at the Project Site	1.5%	51.4%
Area Context Points			
AC1	Washington Street looking east at 2500 Washington Street	23.1%	N/A
AC2	Lambert Avenue looking northwest at 15-17 Lambert Avenue	32.9%	N/A
AC3	Bartlett Street looking south at 58-60 Bartlett Street	31.6%	N/A
AC4	Guild Street looking south at 40-52 Guild Street	67.2%	N/A

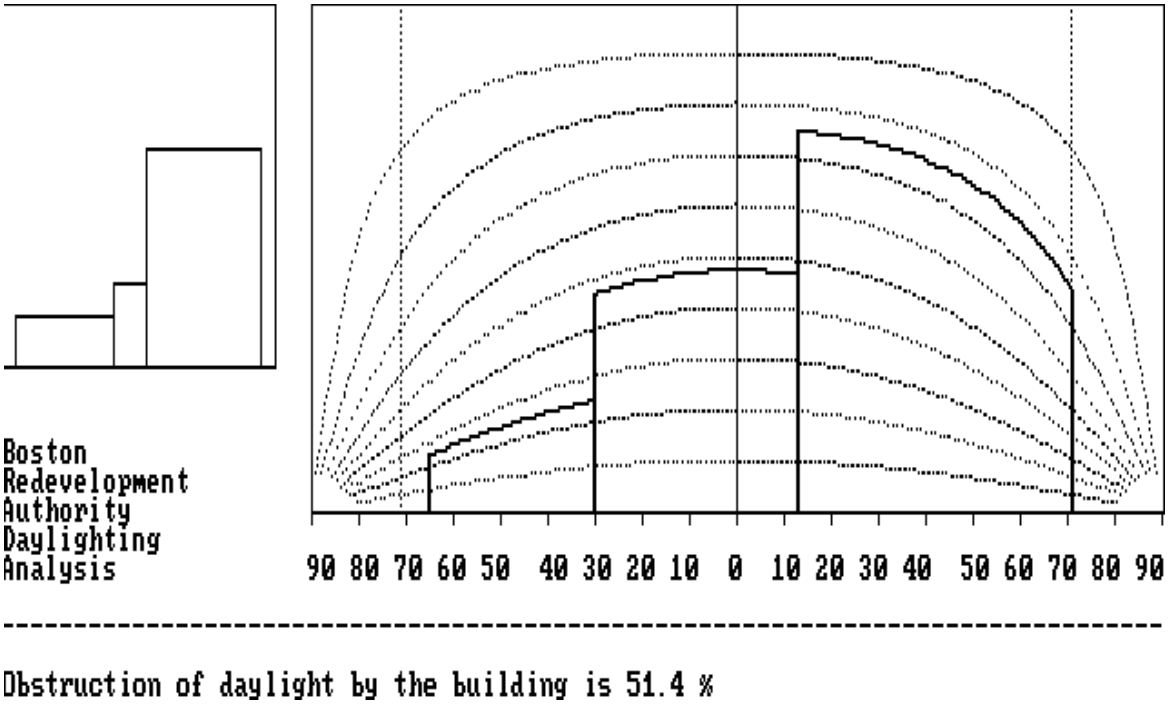
Bartlett Street – Viewpoint 1

Viewpoint 1 was taken from the center of Bartlett Street, looking south at the Project Site. From this perspective the existing buildings on the Project Site are far from the street edge leading to an existing daylight obstruction value of 1.5 percent. The development of the Project will increase daylight obstruction values to 51.4 percent. While this is an increase over existing conditions, the daylight obstruction value for the Project is typical for an urban location.

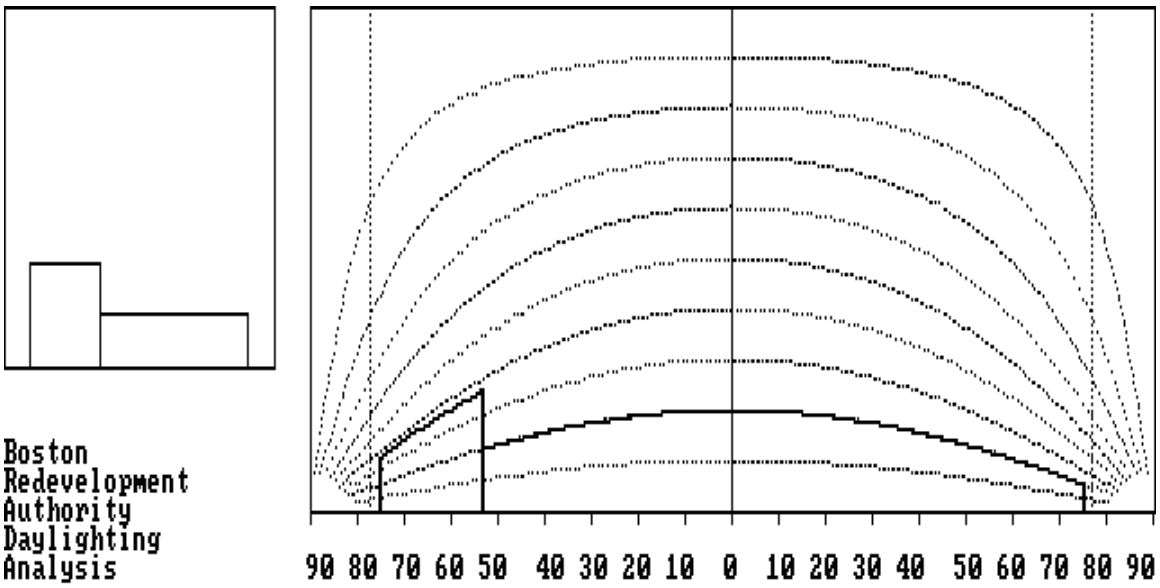
Existing Conditions: View from Washington Street facing west toward the Project Site.



Proposed Conditions: View from Bartlett Street facing south toward the Project Site.

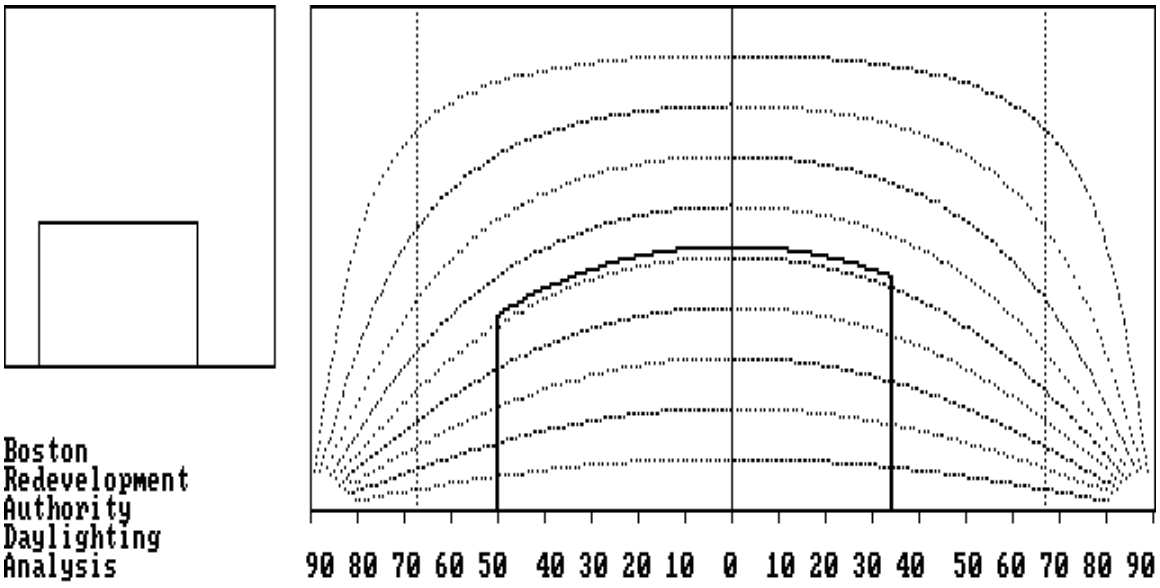


View from Washington Street looking east at 2500 Washington Street.



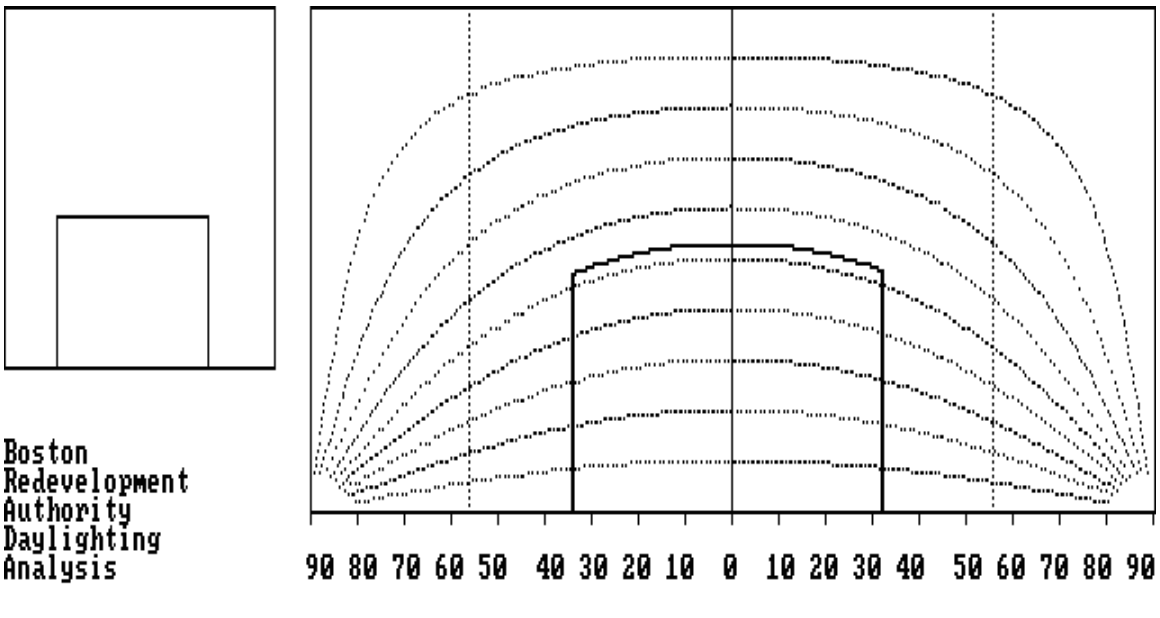
Obstruction of daylight by the building is 23.1 %
Press any key to continue ...

View from Lambert Avenue looking northwest at 15-17 Lambert Avenue.



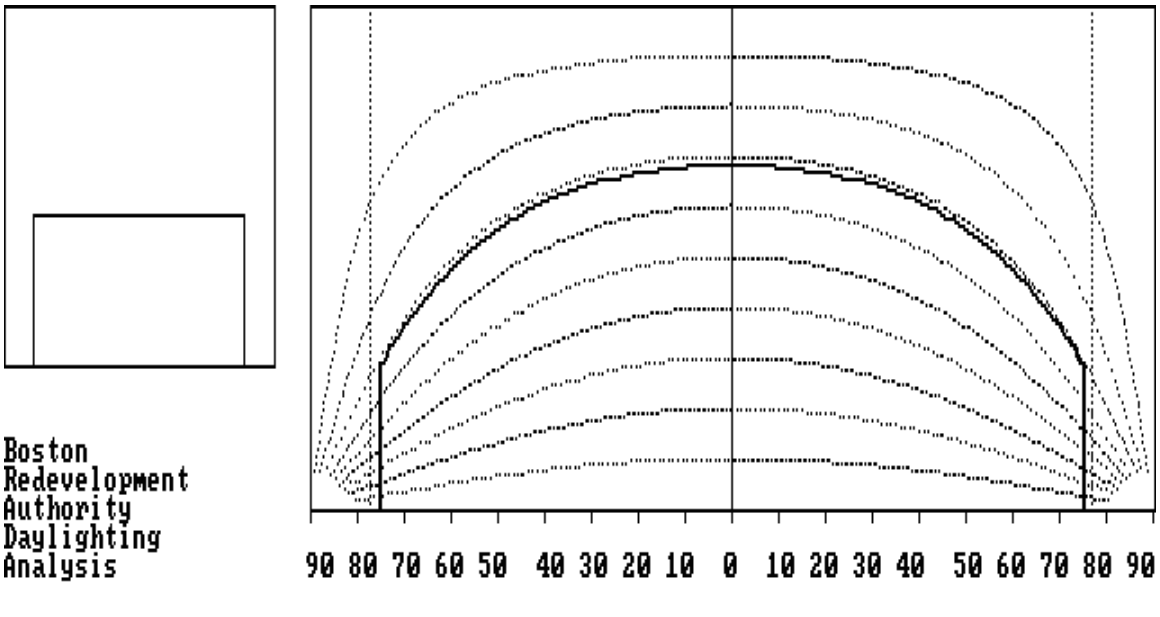
Obstruction of daylight by the building is 32.9 %
Press any key to continue ...

View from Bartlett Street looking south at 58-60 Bartlett Street.



Obstruction of daylight by the building is 31.6 %
Press any key to continue ...

View from Guild Street looking south at 40-52 Guild Street.



Obstruction of daylight by the building is 67.2 %
Press any key to continue ...

Area Context Views

The Project area is primarily characterized by industrial and residential uses. The buildings in the Project vicinity are predominantly low-rise, ranging between one and 4 stories. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the two Area Context Points described above and shown on Figure 4.3-1.

The daylight obstruction values ranged from 67.2 percent on Guild Street (AC4) to 23.1 percent on Washington Street (AC1). Daylight obstruction values for the Project are consistent with the Area Context values and are typical for urban areas.

4.3.4 Conclusions

The daylight analysis conducted for the Project describes existing and proposed daylight obstruction conditions at the Project site and in the surrounding area. The results of the BRADA analysis indicate that while the development of the Project will result in increased daylight obstruction over existing conditions, the resulting conditions will be similar to the daylight obstruction values within the surrounding area and typical of densely built urban areas.

4.4 Solar Glare

The Project materials are still being studied and glazing of the windows will be determined as the design progresses. The Proponent does not expect to use reflective glazing or other mirror finish materials, therefore, solar glare impacts are not anticipated.

4.5 Air Quality Analysis

4.5.1 Introduction

An air quality assessment was conducted to determine the impact of pollutant emissions from combustion and mobile source emissions generated by the Conservatory Lab Charter School Project.

National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the U.S. Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, EPA promulgated National Ambient Air Quality Standards (NAAQS) for these criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM10 and PM2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table 4.5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS. However, since the NAAQS are not incorporated into the MAAQS by reference, there can be differences if EPA promulgates new standards and there is delay for Massachusetts to incorporate them into 310 CMR 6.04.

NAAQS specify concentration levels for various averaging times and include both "primary" and "secondary" standards. Primary standards are intended to protect human health, whereas secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation. The more stringent of the primary or secondary standards were applied when comparing to the modeling results for the Projects.

A one-hour NO_2 standard was promulgated on January 22, 2010 to protect public health, including the health of sensitive populations (e.g., people with asthma, children, and the elderly). The final rule for the new hourly NO_2 NAAQS was published in the Federal Register on February 9, 2010 and became effective on April 12, 2010. The form of this standard is the three-year average of the 98th percentile of the daily maximum one-hour concentrations.

Similarly, a one-hour SO_2 standard was promulgated on June 2, 2010 to protect public health, including the health of sensitive populations (e.g., people with asthma, children, and the elderly). The final rule for the new hourly SO_2 NAAQS was published in the Federal Register on June 22, 2010 and became effective on August 23, 2010. The form of this standard is the three-year average of the 99th percentile of the daily maximum one-hour concentrations.

The NAAQS also reflect various durations of exposure. The short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

The inhalable particulate (PM10) NAAQS were promulgated on July 1, 1987 at the federal level with the intent of replacing the existing standards limiting ambient levels of Total Suspended Particulate (TSP). EPA also promulgated a Fine Particulate (PM2.5) NAAQS, effective December 2006, with an annual standard of 15 micrograms per cubic meter (μg/m3) and the 24-hour standard of 35 μg/m3. This standard has since been strengthened to 12 μg/m3.

Table 4.5-1 National Ambient Air Quality Standards

Pollutant	Averaging Period	National Ambient Air Quality Standards and Massachusetts Ambient Air Quality Standards (micrograms per cubic meter)	
		Primary	Secondary
NO_2	Annual [1]	100 (53 ppb)	Same
	1-hour [7]	188 (100 ppb)	None
SO_2	Annual [1]	80 (0.03 ppm)	None
	24-hour [2]	365 (0.14 ppm)	None
	3-hour [2]	None	1,300 (0.5 ppm)
	1-hour [7]	196 (75 ppb)	None
PM10 [6]	Annual	50	Same
	24-hour [3]	150	Same
PM2.5	Annual [4]	12	15
	24-hour [5]	35	Same
CO	8-hour [2]	10,000 (9 ppm)	Same
	1-hour [2]	40,000 (35 ppm)	Same
Ozone	8-hour [3]	147 (0.075 ppm)	Same
Pb	3-month [1]	1.5	Same

Notes:
[1] Not to be exceeded
[2] Not to be exceeded more than once per year.
[3] Not to be exceeded more than an average of one day per year over three years.
[4] Not to be exceeded by the arithmetic average of the annual arithmetic averages from 3 successive years.
[5] Not to be exceeded based on the 98th percentile of data collection.
[6] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM10 standard in 2006 (effective December 17, 2006). However, the annual standard remains codified in 310 CMR 6.00
[7] Not to be exceeded. Based on the 3-yr average of the 98th (NO2) or 99th (SO2) percentile of the daily maximum 1-hour concentrations.
Source: 40 CFR 50 and 310 CMR 6.00

Background Concentrations

To estimate background pollutant levels representative of the area, the most recent air quality monitor data reported by the MassDEP in their Annual Air Quality Reports was obtained for 2011 to 2013. MassDEP guidance specifies the use of the latest three years of available monitoring data from within 10 km of the project site.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM-10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM-2.5 standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$. For annual PM-2.5 averages, the average of the highest yearly

observations was used as the background concentration. A new 1-hr NO_2 standard was recently promulgated. To attain this standard, the 3-year average of the 98th percentile of the maximum daily 1-hour concentrations must not exceed 188 $\mu g/m^3$.

Background concentrations were determined from the closest available monitoring stations to the proposed development. The closest monitor is located at the corner of Harrison Avenue and Ziegler Street, in Boston. Air quality is generally good in the area with all concentrations below applicable standards.

A summary of the background air quality concentrations are presented in Table 4.5-2.

Table 4.5-2 Observed Ambient Air Quality Concentrations and Background Levels

POLL	AVG TIME	Form	2011	2012	2013	Back-ground Conc. ($\mu g/m^3$)	Std ($\mu g/m^3$)	Location
SO_2 [1][7][8]	1-Hr	99th %	62.4	31.7	28.8	62.4	196	Harrison Ave, Boston
	3-Hr	H2H	60.0	30.9	25.4	60.0	1300	Harrison Ave, Boston
	24-Hr	H2H	23.1	13.1	13.1	23.1	365	Harrison Ave, Boston
	Ann.	H	3.3	2.9	2.6	3.3	80	Harrison Ave, Boston
PM-10	24-Hr	H2H	41.0	32.0	34.0	41.0	150	Harrison Ave, Boston
	Ann.	H	14.8	14.1	15.0	15.0	50	Harrison Ave, Boston
PM-2.5	24-Hr [4]	98th %	20.9	20.6	16.0	19.2	35	Harrison Ave, Boston
	Ann. [5]	H	8.5	8.3	7.4	8.1	12	Harrison Ave, Boston
NO_2 [3]	1-Hr [6]	98th %	97.8	82.7	94.0	91.5	188	Harrison Ave, Boston
	Ann.	H	34.8	29.7	32.8	34.8	100	Harrison Ave, Boston
CO [2]	1-Hr	H2H	2451.0	2508.0	2131.8	2508.0	40000	Harrison Ave, Boston
	8-Hr	H2H	1596.0	1824.0	1254.0	1824.0	10000	Harrison Ave, Boston
O_3	8-Hr [9]	H4H	117.8	153.1	115.8	128.904	147	Harrison Ave, Boston
Pb	3-Mo	H	0.017	0.014	0.007	0.017	0.15	Harrison Ave, Boston

From 2011-2013 MassDEP Annual Data Summaries

[1] SO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppb = 2.62 $\mu g/m^3$.

[2] CO reported in ppm or ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1140 $\mu g/m^3$.

[3] NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppb = 1.88 $\mu g/m^3$.

[4] Background level for 24-hour PM-2.5 is the average concentration of the 98th percentile for three years.

[5] Background level for annual PM-2.5 is the average for three years.

[6] Background level for 1-hour NO2 is the average of the 98th percentile of the daily maximum 1-hour values a over three years.

[7] The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

[8] The 2011 - 2013 SO_2 3-hr values and 2013 SO2 24-hr value are no longer reported by MassDEP. Obtained from EPA AirData website.

[9] Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years

4.5.2 Microscale Analysis

The BRA typically requests an analysis of the effect on air quality of the increase in traffic generated by projects subject to Large Project Review. This "microscale" analysis is typically required for any intersection (including garage entrances/exits) where 1) Project traffic would impact intersections or roadway links currently operating at LOS D, E, or F or would cause LOS to decline to D, E, or F; 2) Project traffic would increase traffic volumes on nearby roadways by ten percent or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the Project will generate 3,000 or more new average daily trips on roadways providing access to a single location. The microscale analysis involves modeling of carbon monoxide (CO) emissions from vehicles idling at and traveling through signaled intersections. Predicted ambient concentrations of CO for the Build and No Build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards.

A microscale analysis was previously performed for the entire Bartlett Place development project.[2] This analysis included traffic impacts from all facets of the development, including the prior use of Lot C, where the charter school is now planned. Analysis years included 2012, 2017, and 2022 and focused on the intersection of Malcolm X Boulevard, Dudley Street, Washington Street, Roxbury Street, and Shawmut Avenue and the intersection of Dudley Street, Harrison Avenue, and Warren Street, as these were the intersections that met the BRA criteria for a microscale analysis. That analysis, including the cumulative effect of the entire project's traffic impacts to air quality, showed that all predicted CO concentrations are well below 1-hour and 8-hour NAAQS.

Although the change in proposed use of Lot C will result in increased traffic at the analyzed intersections, it is expected that Project-related afternoon traffic will fall earlier than the general PM peak traffic hours, during the mid-afternoon school release. Therefore, it is expected that air quality impacts during the PM peak hours will be relatively unchanged.

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[2] Expanded Project Notification Form, Submitted Pursuant to Article 80 of the Boston Zoning Code, Bartlett Place, March 1, 2013

Increased Project-related morning traffic could potentially occur during the AM peak period. Comparisons of traffic volumes at the two intersections between the 2013 Bartlett Place PNF and this Project are presented in Table 4.5.3.

Table 4.5-3 Total Vehicle Volumes at Worst-Case Intersections

	2013 Bartlett Yards PNF 2022 Build		2020 Build	
	AM	PM	AM	PM
Malcolm X Boulevard, Roxbury Street, and Shawmut Avenue	2073	2543	2224	2552
	Difference		151	9
	% Difference		7%	0%
Washington Street and Dudley Street	2220	2391	2384	2491
	Difference		164	100
	% Difference		7%	4%
Dudley Street and Warren Street	2458	2547	2618	2544
	Difference		160	-3
	% Difference		7%	0%
Dudley Street and Harrison Avenue	2193	2157	2323	2171
	Difference		130	14
	% Difference		6%	1%

As expected, there is little to no increase in PM peak traffic at the critical intersections. Although there is an increase in AM peak traffic volumes, the relative increase is rather small, at six to seven percent Also, according to Section 3.1.3, with the charter school Project, these intersections would remain to operate at the same level of service as the future No-Build conditions. Finally, the difference between the predicted CO concentrations presented in the 2013 Bartlett Place PNF and the applicable NAAQS are relatively large, with the maximum 1-hour predicted 2022 Build CO concentration only 13 percent of the NAAQS (4.7 ppm vs. 35 ppm) and the maximum 8-hour predicted CO concentration only 38 percent of the NAAQS (3.4 ppm vs. 9 ppm). Even with a seven percent increases in traffic, it would be expected that predicted concentrations would not increase to levels approaching the applicable NAAQS.

Therefore, it can be concluded that there are no adverse air quality impacts resulting from increased traffic in the area.

4.5.3 Diesel Emissions

Pollutant emissions from diesel engines have been of increasing concern. Diesel emissions have been shown to lead to serious health conditions like asthma and allergies, and to worsen heart and lung diseases, especially in those already afflicted or the elderly. Additionally, diesel engines emit particulate matter, as well as precursors to ground-level smog, and acid rain. These pollutants also cause damage to crops and property.

Curbside vehicle idling is limited to 5 minutes. Massachusetts, state laws (M.G.L. Chapter 90, Section 16A and M.G.L. Chapter 90, Section 16B) and MassDEP regulations [310 CMR 7.11(1)(b)] limit vehicle idling to no more than five minutes in most cases. A vehicle may idle longer only if absolutely necessary. There are exceptions for vehicles being serviced, vehicles making deliveries that need to keep their engines running (to power refrigerators, for example), and vehicles that need to run their engines to operate accessories (such as power lifts). MassDEP provides tools for both facilities and fleets to use to discourage curbside idling. Diesel school buses must also comply with this law.

The City of Boston has also proposed an ordinance that requires all pre-2007 vehicles owned or leased by the City or used by its contractors to have been retrofit with more effective emission-reduction equipment. Through a combination of federal and state grants and City funds, most of the City's diesel school buses are already later model years with built-in pollution-reduction equipment or model-year 2006 or earlier retrofit with the highest level of pollution reduction equipment feasible.[3]

4.6 Solid and Hazardous Waste

4.6.1 Hazardous Waste

Based on the results of subsurface explorations completed at the site, soil and groundwater at the site are impacted by a historic release of petroleum and lead gasoline. Contamination is generally confined to soils at depths of about 4 to 11 feet below existing surface grade and in groundwater.

The Project will involve the excavation of petroleum and/or metals from contaminated soils which may generate odors. During excavation of the petroleum-impacted soils, odor control will be performed to minimize the impacts to the surrounding areas. Also, air monitoring will be performed during excavation to confirm that airborne contamination is below levels that might pose a health and safety concern to the general public.

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[3] City of Boston. Press Release: Mayor Walsh Announces Ordinance to Reduce Diesel Emissions. April 7, 2015.

4.6.1.1 Site History and Compliance with the Massachusetts Contingency Plan

A Phase I Environmental Site Assessment (ESA) was prepared for the Project site by McPhail Associates, LLC. The Project site is the location of five Massachusetts Contingency Plan (MCP) disposal sites referenced as Release Tracking Numbers (RTN) 3-27845, 3-29936, 3-2860, 3-11907 and 3-17636 at 2565 Washington Street. It is understood that petroleum releases to soil and groundwater occurred as a result of overfilling a 1,000 gallon waste oil underground storage tank (UST). Contaminants in site soil and/or groundwater are understood to include petroleum hydrocarbons and total lead.

Various response actions were previously completed at the site to address the releases to site soil and groundwater. An Activity and Use Limitation (AUL) was not recorded for any of these sites; however, response actions culminated in the submittal of a Class A-2 Response Action Outcome (RAO) Statement under RTNs 3-2860, 3-11907 and 3-17636. A Phase IV Remedy Implementation Plan (RIP) has been submitted to Massachusetts Department of Environmental Protection (MassDEP) with regard to RTNs 3-27845 and 3-29936. The Phase IV report indicated that the chosen remedial option for the releases is selective excavation and off-site disposal of "some or all of the most impacted soils" and implementation of an AUL on portions of the site.

Upon completion of site remediation activities, the situation will be reassessed to determine if additional environmental mitigation steps are advisable, such as installing a vapor barrier and passive sub-slab ventilation system to mitigate against the potential for adverse indoor air quality impacts resulting from the soil contamination.

Should excess excavated soil be generated during construction it will be managed in accordance with MassDEP policy and the MCP. Furthermore, excavation of petroleum-impacted soil, if encountered during construction, would be completed under a Release Abatement Measure (RAM) Plan in conjunction with the foundation excavation for the new building as described in Section 4.10 – Geotechnical Impacts. Upon completion of the RAM, a RAM Completion Report and a Permanent Solution Statement (PSS) will be prepared and submitted to MassDEP indicating that a Permanent Solution was achieved and that a Condition of No Significant Risk exists at the site.

4.6.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of a school facilities. Solid waste generated by the Project will be collected, picked up, and disposed of at a suitable off-site location. The school will have a recycling program for paper, cardboard, plastic, and aluminum. Bins will be distributed throughout the school building, and recycled materials will be picked up and emptied twice per week.

4.7 Noise Impacts

The primary set of noise regulations relating to a potential increase in sound levels due to the Project is the City of Boston Zoning District Noise Standards (City of Boston Code – Ordinances: Section 16–26 Unreasonable Noise and City of Boston Air Pollution Control Commission Regulations for the Control of Noise in the City of Boston). Separate regulations within the Standards provide criteria to control different types of noise. Regulation 2 is applicable to the effects of the Project, as completed. Zoning District Standards are presented below in Table 4.7-1.

Table 4.7-1 City of Boston Zoning District Noise Standards, Maximum Allowable Sound Pressure Levels

Octave-band Center	Residential Zoning District		Residential-Industrial Zoning District		Business Zoning District	Industrial Zoning District
Frequency (Hz)	Daytime (dB)	All Other Times (dB)	Daytime (dB)	All Other Times (dB)	Anytime (dB)	Anytime (dB)
32	76	68	79	72	79	83
63	75	67	78	71	78	82
125	69	61	73	65	73	77
250	62	52	68	57	68	73
500	56	46	62	51	62	67
1000	50	40	56	45	56	61
2000	45	33	51	39	51	57
4000	40	28	47	34	47	53
8000	38	26	44	32	44	50
A-Weighted (dBA)	**60**	**50**	**65**	**55**	**65**	**70**

Notes:
Noise standards are extracted from Regulation 2.5, City of Boston Air Pollution Control Commission, "Regulations for the Control of Noise in the City of Boston", adopted December 17, 1976.
All standards apply at the property line of the receiving property.
dB and dBA based on a reference sound pressure of 20 micropascals.
'Daytime' refers to the period between 7:00 am and 6:00 pm daily, excluding Sunday.

Additionally, the MassDEP has the authority to regulate noise under 310 CMR 7.10, which is part of the Commonwealth's air pollution control regulations. According to MassDEP, "unnecessary" noise is considered an air contaminant and thus prohibited by 310 CMR 7.10. The MassDEP administers this regulation through Noise Policy DAQC 90-001 which

limits a source to a 10-dBA increase above the L_{90} ambient sound level measured at the Project property line and at the nearest residences. The MassDEP policy further prohibits "pure tone" conditions where the sound pressure level in one octave-band is 3 dB or more than the sound levels in each of two adjacent bands.

While the details of the mechanical equipment associated with the Project have not yet been precisely determined, steady operational noise from stationary sources will primarily involve a minimal amount heating, cooling, and ventilation equipment, including: small cooling fans, boilers and furnaces located within interior mechanical spaces, and rooftop chillers/air conditioner units. It is assumed that the proposed chillers will be fitted with appropriate sound blankets or acoustical enclosures to control noise emissions, providing at least 10 dBA of attenuation per unit.

No detailed sound level assessment was performed due to the limited size and scope of the mechanical equipment proposed for the Project at this time. However, a screening level evaluation of the equipment considered indicates that the Project would operate without significant impact on the existing acoustical environment.

At this time, the mechanical equipment and noise controls are conceptual in nature and, during the final design phase of the Project, will be specified to meet the applicable City of Boston and MassDEP noise limits. Reasonable efforts will be made, if necessary, to minimize noise impacts from the Project using routinely employed methods of noise control.

In summary, the Project, with appropriate noise control, if necessary, is not expected to result in any adverse noise impacts at nearby sensitive receptors. Short-term, intermittent increases in noise levels will occur during Project construction. However, every reasonable effort will be made to minimize the noise impacts and ensure the project complies with the requirements of the City of Boston noise ordinance.

4.8 Storm Drainage System

Please see Section 8.3 for a discussion of stormwater and water quality.

4.9 Flood Hazard Zones/ Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the site located in the City of Boston - Community Panel Number 25025C0079G indicates the FEMA Flood Zone Designations for the site area. The map for the Project Site shows the Project is located outside of designated flood zones.

The site does not contain wetlands.

4.10 Geotechnical Impacts

4.10.1 Subsurface Soil and Bedrock Conditions

Existing ground surface at the site is generally underlain by a 1- to 11-foot thickness of granular urban fill. The fill is underlain by successive deposits of glacial till and bedrock. Groundwater is generally present at around Elevation +40, which corresponds to a depth of about 8 feet below the ground surface.

4.10.2 Groundwater

The Project site is not located within the Groundwater Conservation Overlay District (GCOD) as outlined in Article 32 of the City of Boston Zoning Code. The proposed building is not planned to contain any occupied below-grade space. Therefore, construction of the proposed development is not expected to have adverse short or long-term impact on groundwater conditions.

4.10.3 Project Impacts and Foundation Considerations

Foundation support for the proposed building will consist of conventional spread footings. The footings will bear directly on the glacial till or bedrock, on soil improved with rammed aggregate piers (RAPs), and/or on compacted structural fill or lean concrete placed directly over the glacial till or bedrock to the bottom of footing.

Geopier®, a Rammed Aggregate Pier® system, (RAP) is a replacement, aggregate pier, ground improvement method used to improve shallow to intermediate, soft clay, loose silt, and loose sand soil for support of shallow foundations. RAP improves soft soil and fill by vibration, compaction, and ramming of thin lifts of crushed rock into a drilled hole. Soft soil is removed from the ground and then very dense, high quality crushed rock is compacted into the drilled hole which expands the hole into the adjacent soil.

RAPs are a ground improvement technique that involves the horizontal displacement of existing soil and the subsequent creation of a column of compacted aggregate stone to reinforce uncontrolled soils. The compaction densifies the aggregate and increases the lateral stress in the soil matrix beneath the proposed building so that conventional foundation support consisting of spread footings can be used.

Ground vibrations will be produced as a result of the RAP installation procedures. Impacts from these vibrations are not anticipated to result in structural damage to existing, adjacent structures. Vibration monitoring with seismographs will be performed during the RAP installation activities.

4.11 Construction Impacts

4.11.1 Introduction

A Construction Management Plan (CMP) in compliance with the City's Construction Management Program will be submitted to the Boston Transportation Department (BTD) once final plans are developed and the construction schedule is fixed. The construction contractor will be required to comply with the details and conditions of the approved CMP.

Proper pre-planning with the City and neighborhood will be essential to the successful construction of the Project. Construction methodologies, which ensure public safety and protect nearby residences and businesses, will be employed. Techniques such as barricades, walkways and signage will be used. The CMP will include routing plans for trucking and deliveries, plans for the protection of existing utilities, and control of noise and dust.

During the construction phase of the Project, the Proponent will provide the name, telephone number and address of a contact person to communicate with on issues related to the construction. The Proponent will work closely with other site developers within the Bartlett Place development to ensure that the safety of students during upcoming construction is a priority and will be consistent with the School's standards.

The Proponent intends to follow the guidelines of the City of Boston and the MassDEP, which direct the evaluation and mitigation of construction impacts.

4.11.2 Construction Methodology/Public Safety

Construction methodologies that ensure public safety and protect nearby tenants will be employed. Techniques such as barricades and signage will be used. Construction management and scheduling will minimize impacts on the surrounding environment and will include plans for construction worker commuting and parking, routing plans for trucking and deliveries, and the control of noise and dust.

As the design of the Project progresses, the Proponent will meet with BTD to discuss the specific location of barricades, the need for lane closures, pedestrian walkways, and truck queuing areas. Secure fencing, signage, and covered walkways may be employed to ensure the safety and efficiency of all pedestrian and vehicular traffic flows. In addition, sidewalk areas and walkways near construction activities will be well marked and lighted to protect pedestrians and ensure their safety. Public safety for pedestrians on abutting sidewalks will also include covered pedestrian walkways when appropriate. If required by BTD and the Boston Police Department, police details will be provided to facilitate traffic flow. These measures will be incorporated into the CMP which will be submitted to BTD for approval prior to the commencement of construction work.

4.11.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in Fall of 2015 and last for approximately 15 months.

Typical construction hours will be from 7:00 am to 6:00 pm, Monday through Friday, with most shifts ordinarily ending at 3:30 pm. No substantial sound-generating activity will occur before 7:00 am. If longer hours, additional shifts, or Saturday work is required, the construction manager will place a work permit request to the Boston Air Pollution Control Commission and BTD in advance. Notification should occur during normal business hours,

Monday through Friday. It is noted that some activities such as finishing activities could run beyond 6:00 pm to ensure the structural integrity of the finished product; certain components must be completed in a single pour, and placement of concrete cannot be interrupted.

4.11.4 Construction Staging/Access

Access to the site and construction staging areas will be indicated in the CMP.

Although specific construction and staging details have not been finalized, the Proponent and its construction management consultant will work to ensure that staging areas will be located to minimize impacts to pedestrian and vehicular flow. Secure fencing and barricades will be used to isolate construction areas from pedestrian traffic adjacent to the site. Construction procedures will be designed to meet all Occupational Safety and Health Administration (OSHA) safety standards for specific site construction activities.

4.11.5 Construction Mitigation

The Proponent will follow City and MassDEP guidelines which will direct the evaluation and mitigation of construction impacts. As part of this process, the Proponent and construction team will evaluate the Commonwealth's Clean Air Construction Initiative.

A CMP will be submitted to BTD for review and approval prior to issuance of a Building Permit. The CMP will include detailed information on specific construction mitigation measures and construction methodologies to minimize impacts to abutters and the local community. The CMP will also define truck routes which will help in minimizing the impact of trucks on City and neighborhood streets.

"Don't Dump - Drains to Charles River" plaques will be installed at storm drains that are replaced or installed as part of the Project.

4.11.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 302 construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 50 percent of the total employee work hours be for Boston residents, at least 25 percent of total employee work hours be for minorities and at least 10 percent of the total employee work hours be for women. The Proponent will enter into jobs agreements with the City of Boston.

To reduce vehicle trips to and from the construction site, minimal construction worker parking will be available at the site and all workers will be strongly encouraged to use public transportation and ridesharing options. The general contractors will work aggressively to ensure that construction workers are well informed of the public transportation options serving the area. Space on-site will be made available for workers' supplies and tools so they do not have to be brought to the site each day.

4.11.7 Construction Truck Routes and Deliveries

Truck traffic will vary throughout the construction period, depending on the activity. The construction team will manage deliveries to the site during morning and afternoon peak hours in a manner that minimizes disruption to traffic flow on adjacent streets. Construction truck routes to and from the site for contractor personnel, supplies, materials, and removal of excavations required for the development will be coordinated with BTD. Traffic logistics and routing will be planned to minimize community impacts. Truck access during construction will be determined by the BTD as part of the CMP. These routes will be mandated as a part of all subcontractors' contracts for the development. The construction team will provide subcontractors and vendors with Construction Vehicle & Delivery Truck Route Brochures in advance of construction activity.

"No Idling" signs will be included at the loading, delivery, pick-up and drop-off areas.

4.11.8 Construction Air Quality

Short-term air quality impacts from fugitive dust may be expected during demolition, excavation and the early phases of construction. Plans for controlling fugitive dust during demolition, excavation and construction include mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of debris by covered trucks. The construction contract will provide for a number of strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts, pursuant to this Article 80 approval. These measures are expected to include:

- Encouraging the contractor to comply with the MassDEP's Clean Diesel Retrofit Program;
- Using wetting agents on areas of exposed soil on a scheduled basis;

- Using covered trucks;
- Minimizing spoils on the construction site;
- Monitoring of actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on the site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

4.11.9 Construction Noise

The Proponent is committed to mitigating noise impacts from the construction of the Project. Increased community sound levels, however, are an inherent consequence of construction activities. Construction work will comply with the requirements of the City of Boston Noise Ordinance. Every reasonable effort will be made to minimize the noise impact of construction activities.

Mitigation measures are expected to include:

- Instituting a proactive program to ensure compliance with the City of Boston noise limitation policy;
- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously running equipment, such as air compressors and welding generators;
- Replacing specific construction operations and techniques by less noisy ones where feasible;
- Selecting the quietest of alternative items of equipment where feasible;
- Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
- Turning off idling equipment; and
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

4.11.10 Construction Vibration

All means and methods for performing work at the site will be evaluated for potential vibration impacts on adjoining property, utilities, and adjacent existing structures. Acceptable vibration criteria will be established prior to construction, and vibration will be monitored, if required, during construction to ensure compliance with the agreed-upon standard.

4.11.11 Construction Waste

The Proponent will take an active role with regard to the reprocessing and recycling of construction waste. The disposal contract will include specific requirements that will ensure that construction procedures allow for the necessary segregation, reprocessing, reuse and recycling of materials when possible. For those materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility, per MassDEP Regulations for Solid Waste Facilities, 310 CMR 16.00. This requirement will be specified in the disposal contract. Construction will be conducted so that materials that may be recycled are segregated from those materials not recyclable to enable disposal at an approved solid waste facility.

4.11.12 Protection of Utilities

Existing public and private infrastructure located within the public right-of-way will be protected during construction. The installation of proposed utilities within the public way will be in accordance with the MWRA, BWSC, Boston Public Works, Dig Safe, and the governing utility company requirements. All necessary permits will be obtained before the commencement of the specific utility installation. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer and drain facilities will be reviewed by BWSC as part of its site plan review process.

4.11.13 Rodent Control

A rodent extermination certificate will be filed with the building permit application for the Project. Rodent inspection monitoring and treatment will be carried out before, during, and at the completion of all construction work for each phase of the Project, in compliance with the City's requirements.

4.11.14 Wildlife Habitat

The Project site is in an established urban neighborhood. There are no wildlife habitats in or adjacent to the Project site.

Chapter 5.0

Sustainable Design and Climate Change Preparedness

5.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

5.1 Sustainable Design

To comply with Article 37 of the Code, the Proponent intends to measure the results of their sustainability initiatives using the framework of the Leadership in Energy and Environmental Design (LEED) rating system. As new construction of a school, the Project will use the LEED for Schools rating system to show compliance with Article 37. The LEED rating system tracks the sustainable features of a project by achieving points in the following categories: Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Innovation in Design.

A LEED checklist is included at the end of this section, and shows the credits the Project anticipates achieving. The checklist will be updated regularly as the design develops and engineering assumptions are substantiated. Presently, 52 points have been targeted, not including any of the potential Boston Zoning Code Article 37 points. Fifty-three points falls within the LEED Silver category. Points that are still being studied and marked as "maybe" on the LEED checklist are italicized below.

Sustainable Sites

Prerequisite 1: Construction Activity Pollution Prevention. The Proponent will comply with the National Pollutant Discharge Elimination System (NPDES) program as established by the EPA.

Prerequisite 2: Environmental Site Assessment. The Project site is known to be contaminated. Remediation work will meet the standard set by the EPA and other agencies, which have jurisdiction over the Project.

Credit 1: Site Selection. The Project site does not include sensitive site elements or restrictive land types. The building will be designed with a minimal footprint for the required program to minimize site disruption.

Credit 2: Development Density and Community Connectivity. The Project will redevelop a previously developed site in a residential neighborhood along Bartlett Street, and will meet the community connectivity option for this credit.

Credit 3: Brownfield Redevelopment. The Project site meets the definition of a brownfield due to the presence of hazardous materials within the existing buildings on site, which will be demolished as part of the site development. All contaminates identified on site will be removed or reduced to a safe level as scheduled in the remediation program for the site. The Project meets the intent of the brownfield redevelopment credit due to complications of additional cost and required regulatory compliance work.

Credit 4.1: Alternative Transportation: Public Transportation Access. The Project site is located within 0.5 miles of two bus stops serviced by five total MBTA bus lines. The Project will also be served by the Boston Public Schools bus system. There will be dedicated walking or bike routes to the transit stops extending from the building to at least the end of the school property, in two or more different directions.

Credit 4.2: Alternative Transportation: Bicycle Use. The Project will provide bicycle storage and changing facilities, as well as shower facilities for 0.5% of Full-Time Equivalent staff.

Credit 4.3: Alternative Transportation: Low-Emitting & Fuel-Efficient Vehicles. Five percent of the parking spaces will be dedicated to preferred parking for Low-Emitting & Fuel-Efficient Vehicles.

Credit 4.4: Alternative Transportation: Parking Capacity. Five percent of the parking spaces will be preferred parking for carpools or vanpools. Zoning parking ordinances are exempt, as the site is a Planned Development Area.

Credit 5.2: Site Development: Maximize Open Space. The Project incorporates sufficient open landscaped areas on the site to meet the credit standard.

Credit 6.2: Stormwater Design: Quality Control. The proposed overall impervious surfaces are being reduced over existing conditions. The design intent is to collect storm water runoff from the impervious area and roof of the Project, and direct it to two subsurface infiltration systems on site, which will overflow to the 12-inch drain line in Marcia Boulevard and then flow to the 72-inch storm drain main in Washington Street. Soil testing will be performed to confirm that this is feasible. The storm water management plan will utilize Best Management Practices to treat runoff and remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

Credit 7.1: Heat Island Effect: Non-Roof. For at least 50% of the site hardscape, the Project will utilize paving materials with a solar reflectance index (SRI) of at least 29, and an open-grid pavement system that is at least 50% pervious.

Credit 7.2: Heat Island Effect: Roof. The new building roofs will feature a white/light color EPDM roof membrane. These roof membranes are highly reflective and reduce solar radiation.

Credit 8: Light Pollution Reduction. Light pollution will be minimized with the use of high-efficiency lighting fixtures that are dark sky compliant. Fixtures for area lighting will be pole-mounted cut-off luminaires in the parking and roadway areas. Building perimeter fixtures will be wall mounted cut-off luminaires over exterior doors. Exterior lighting will be controlled by photocell on and timed off operation.

Credit 9: Site Master Plan. This Project will meet credits for Site Selection, Site Development (Maximize Open Space), Storm Water Design (Quality Control), and Light Pollution Reduction. Additionally, the master plan will be developed in collaboration with the school board, and will include parking, paving and utilities.

Credit 10: Joint Use of Facilities. The cafetorium, gymnasium, "Promenade," kitchen, and Level 1 restrooms will be open to the community after school hours and on weekends for non-school events and functions.

Water Efficiency

Prerequisite 1: Water Use Reduction, 20% Reduction. Water efficiency within the School will be increased to reduce the burden on municipal water supply and wastewater systems through low flow toilets, urinals, and faucets. These strategies will, in aggregate, use at least 20% less water than the water use baseline calculated for the building, which meets the requirements set forth by the International Plumbing Code, Energy Policy Act of 1992, and Energy Policy Act of 2005.

Credit 1.1: Water Efficient Landscaping. Landscape plant materials will be native and drought resistant to achieve the 50% reduction in irrigation water use. Furthermore, the Project will not incorporate any type of irrigation system.

Credit 1.2: Water Use Reduction, 30% Reduction. Low flow toilets, urinals, and faucets will be employed to reduce water usage. Water consumption will be reduced by 30% from a code required system.

Energy and Atmosphere

Prerequisite 1: Fundamental Commissioning of Building Energy Systems. A commissioning agent will be hired as part of the design team to achieve this prerequisite, as well as the additional commissioning credit.

Prerequisite 2: Minimum Energy Performance. The Project is expected to achieve 26.5% over the ASHRAE 90.1-2010 (see EA Credit 1), meeting the minimum energy performance.

Prerequisite 3: Fundamental Refrigerant Management. HVAC systems will not utilize CFC refrigerants and will use HFC only. No ozone depleting refrigerants are used in the cooling systems.

Credit 1: Optimize Energy Performance. The Project is expected to perform 26.5% over the ASHRAE 90.1-2010, meeting the minimum energy performance. Energy efficiency will be achieved by improved building envelope, increased insulation at walls and roof, improved windows at all locations, high efficiency lighting for all spaces, daylight harvesting to reduce lighting energy need, and a high efficiency HVAC system including condensing boilers, heat recovery wheels, and dehumidification ventilation system. HVAC design will

be based on 9 month use for the classroom building to reduce the overall size of the HVAC units and increased operation efficiency. HVAC systems will be monitored and controlled by a building energy management system. Occupancy sensors will be used to reduce energy consumption for lighting systems. High efficiency motors will be incorporated with variable-frequency drives whenever possible. The expected total cost saving will be in the range of 26.5% better than the ASHRAE 90.1-2010.

Credit 2: On-site Renewable Energy. The Proponent is currently searching for a PPA. As part of the base contract scope, the architect will account for the weight of the PV panels in structural frames, and will install conduits between the inverter locations and the main electric room. The Project has contacted potential vendors and determined that available roof area may achieve 3% of the building's total energy use with on-site renewable energy systems.

Credit 3: Enhanced Commissioning. A commissioning agent will be hired to develop a commissioning plan, meeting the requirement of this credit.

Credit 5: Measurement and Verification. The school is committed to documenting whole-building energy and water data through ENERGY STAR Portfolio Manager for a five-year period.

Materials and Resources

Prerequisite 1: Storage and Collection of Recyclables. Recycling bins will be provided in each classroom and office. In addition, a dedicated recycling collection/storage area will be located within the dumpster enclosure to facilitate the recycling program.

Credit 2.1 and 2.2: Construction Waste Management. The construction contractor will be required to implement a waste management plan to divert at least 75% of construction and demolition material to recycling and salvage facilities. It is expected that as much as 95% of the construction waste could be diverted.

Credit 4.1 and 4.2: Recycled Content. The Project team will use material with as much recycled content as possible for the Project. Some of the materials include fly ash in concrete, recycled gypsum boards, structural steel, ceiling tiles, and flooring.

Credit 5.1: Regional Materials: 10%. The Project team will specify building materials that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the Project site.

Credit 7: Certified Wood. The Project is expected to achieve at least 50% of FSC certified wood for all wood-based product used.

Indoor Environmental Quality

Prerequisite 1: Minimum IAQ Performance. The Project will meet the minimum requirements of the Massachusetts Building Code and ASHRAE 62.1-2010 for ventilation and indoor air quality.

Prerequisite 2: Environmental Tobacco Smoke Control. Smoking will be prohibited on school grounds per Massachusetts General Law.

Prerequisite 3: Minimum Acoustical Performance. The HVAC system will be designed to meet the ASHRAE Handbook, Chapter 47, requirement under Option 2. Designs for classrooms and other core learning spaces will be acoustically designed so that they are quiet, allowing teachers to speak to the class without straining their voices and allowing for effective communication. Designs for these spaces will be in compliance with ANSI Standard S12.60-2002.

Credit 3.1: Construction IAQ Management Plan: During Construction. Construction specifications will require the contractor to submit an IAQ plan for the construction period to protect the HVAC system and prevent moisture and contaminants from contact with carpeting, ceiling tiles, and other absorptive surfaces.

Credit 3.2 Construction IAQ Management Plan: Before Occupancy. A flush-out will be performed prior to Project occupancy.

Credits 4.1, 4.2, 4.3 and 4.4: Low-Emitting Materials. Adhesives, sealants, paints, coatings, flooring systems, composite wood, and agrifiber products with low VOC content limits will be specified for use in this Project.

Credit 5: Indoor Chemical & Pollutant Source Control. Entry mat systems will be installed in all entries. Direct ventilation to outside will be provided in all chemical storage areas, including housekeeping spaces. A MERV 13 filter will be specified to meet the standard for this credit.

Credit 6.1: Controllability of Systems – Lighting. Each area will be locally switched and designed for multi-level controls. All regularly occupied spaces will have an occupancy sensor to turn off lights when unoccupied. Daylight sensors will be installed in each room where there is natural light available. The overall lighting control system will be in conformance with the requirements of this credit.

Credit 8.1: Daylight & Views. At least 90% of the classroom spaces within the school will be provided with sufficient daylight to provide the teachers and students with a connection to the outdoors. This will be primarily accomplished through the use of large classroom windows, which will allow ample opportunity for daylight to permeate the classroom

spaces. Vision glazing between 2'6 and 7'6" above finish floor will be provided for occupants in 90% of all occupied areas. In private offices, a minimum of 75% of the area will have a direct line of sight to perimeter vision glazing.

Credit 9: Enhanced Acoustical Performance. The building shell, classroom partitions, and other core learning space partitions will be designed to meet the Sound Transmission Class (STC) requirements of ANSI Standards S12.60-2002. Additionally, background noise levels from HVAC systems in classrooms and other core learning spaces will not exceed 40 dBA.

Innovation in Design

Innovation in Design: Green Cleaning. The Project will develop and implement a Green Housekeeping program. The program will include detailed information regarding staff training, cleaning process and chemicals, and occupant feedback.

Innovation in Design: Integrated Pest Management. The Project will develop and implement an indoor integrated pest management plan. The plan will call for the use of least-toxic chemical pesticides minimum use of chemicals, use only in targeted locations and use only for targeted species.

Innovation in Design: MRC 2.2 Construction Waste Management, 95%. It is expected that as much as 95% of the construction waste may be diverted.

LEED Accredited Professional. The Project design team has at least one LEED AP in each of the major disciplines.

The School as a Teaching Tool. The Project team will closely coordinate with the school administration to develop or revise existing curricula that encourages ongoing relationships between high-performance features of the school and its students.

Regional Priority

Regional Priority Credits, (RPC) are established LEED credits designated by the USGBC to have priority for a particular area of the country. When a Project team achieves one of the designated RPCs, an additional credit is awarded to the Project. RPCs applicable to the site include: SSc3, SSc6.1, SSc7.1, SSc7.2, EAc2(1%) and MRc1.1(75%). This Project anticipates two RPCs for SSc3, Brownfield Redevelopment, and SSc7.2, Heat Island Effect, Roof.

5.2 Energy Conservation and Renewable Energy

The Project will be highly energy efficient due to an improved building envelope, increased insulation at walls and roof, improved windows at all locations, high efficiency lighting for all spaces, and daylight harvesting to reduce lighting energy need. The Project will also include a high efficiency HVAC system including condensing boilers, heat recovery wheels, and a dehumidification ventilation system.

The Proponent is currently searching for a PPA, and the building will be solar-ready. The Project has contacted potential vendors and determined that available roof area may achieve 3% of the building's total energy use with on-site renewable energy systems.

5.3 Climate Change Preparedness

5.3.1 Introduction

The Project team examined two areas of concern related to climate change: drought conditions and increased number of high-heat days. Due to the Project's location, elevation and topography, sea level rise will not impact the Project site, and impacts from heavy rain events are anticipated to be minimal. A copy of the preliminary Climate Change Checklist is included in Appendix B.

5.3.2 Drought Conditions

Under a high emissions scenario that would increase the potential climate change impacts, the occurrence of droughts lasting one to three months could go up by as much as 75% over existing conditions by the end of the century. To minimize the Project's susceptibility to drought conditions, the landscape design is anticipated to incorporate native and adaptive plant materials which require low irrigation and are known for their ability to withstand adverse conditions. Plumbing fixtures will be specified to achieve a reduction in water use through low-flow water-closets, low-flow showers, and low-flow sinks.

5.3.3 High Heat Days

The Intergovernmental Panel on Climate Change (IPCC) has predicted that in Massachusetts the number of days with temperatures greater than 90°F will increase from the current five-to-twenty days annually, to thirty-to-sixty days annually[1]. Energy modeling for the Project has not yet been completed; however, as described in Section 5.2, the Project includes measures to reduce energy use.

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[1] IPCC (Intergovernmental Panel on Climate Change), 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Avery, M. Tignor, and H. L. Miller (eds.)]. Cambridge University Press, Cambridge, UK, and New York, 996 pp.

LEED-**NC**

LEED-SCH 2009 Registered Project Checklist

Yes	?	No			
17	**5**	**2**	**Sustainable Sites**		**24** Points
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
Y			Prereq 2	**Environmental Site Assessment**	Required
1			Credit 1	**Site Selection**	1
4			Credit 2	**Development Density & Community Connectivity**	4
1			Credit 3	**Brownfield Redevelopment**	1
4			Credit 4.1	**Alternative Transportation**, Public Transportation Access	4
1			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
2			Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	2
	2		Credit 4.4	**Alternative Transportation**, Parking Capacity	2
		1	Credit 5.1	**Site Development,** Protect or Restore Habitat	1
1			Credit 5.2	**Site Development,** Maximize Open Space	1
		1	Credit 6.1	**Stormwater Design,** Quantity Control	1
1			Credit 6.2	**Stormwater Design,** Quality Control	1
	1		Credit 7.1	**Heat Island Effect,** Non-Roof	1
1			Credit 7.2	**Heat Island Effect,** Roof	1
1			Credit 8	**Light Pollution Reduction**	1
	1		Credit 9	**Site Master Plan**	1
	1		Credit 10	**Joint Use of Facilities**	1

Yes	?	No			
6	**1**	**4**	**Water Efficiency**		**11** Points
Y			Prereq 1	**Water Use Reduction, 20% Reduction**	Required
2			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	2 to 4
2			Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	2
		2	Credit 2	**Innovative Wastewater Technologies**	2
2	1	1	Credit 3	**Water Use Reduction**	2 to 4
			2	30% Reduction	2
				35% Reduction	3
				40% Reduction	4
		1	Credit 4	**Process Water Use Reduction**	1

Yes	?	No			
11	**5**	**17**	**Energy & Atmosphere**		**33** Points
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance:** 10% New Bldgs or 5% Existing Bldgs Renovations	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
8	3	8	Credit 1	**Optimize Energy Performance**	1 to19
				12% New Buildings or 8% Existing Building Renovations	1
				14% New Buildings or 10% Existing Building Renovations	2
				16% New Buildings or 12% Existing Building Renovations	3
				18% New Buildings or 14% Existing Building Renovations	4
				20% New Buildings or 16% Existing Building Renovations	5
				22% New Buildings or 18% Existing Building Renovations	6
				24% New Buildings or 20% Existing Building Renovations	7
			8	26% New Buildings or 22% Existing Building Renovations	8
				28% New Buildings or 24% Existing Building Renovations	9
				30% New Buildings or 26% Existing Building Renovations	10

	32% New Buildings or 28% Existing Building Renovations	11
	34% New Buildings or 30% Existing Building Renovations	12
	36% New Buildings or 32% Existing Building Renovations	13
	38% New Buildings or 34% Existing Building Renovations	14
	40% New Buildings or 36% Existing Building Renovations	15
	42% New Buildings or 38% Existing Building Renovations	16
	44% New Buildings or 40% Existing Building Renovations	17
	46% New Buildings or 42% Existing Building Renovations	18
	48% New Buildings or 44% Existing Building Renovations	19

Yes	?	No			
	2	5	Credit 2	**On-Site Renewable Energy**	1 to 7
2			Credit 3	**Enhanced Commissioning**	2
		1	Credit 4	**Enhanced Refrigerant Management**	1
1		1	Credit 5	**Measurement & Verification**	2
		2	Credit 6	**Green Power**	2

Yes	?	No		
4	2	7	**Materials & Resources**	**13** Points

Y			Prereq 1	**Storage & Collection of Recyclables**	Required
		2	Credit 1.1	**Building Reuse**, Maintain % of Existing Walls, Floors & Roof	1 to 2
		1	Credit 1.2	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1
1			Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
1			Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
		1	Credit 3.1	**Materials Reuse**, 5%	1
		1	Credit 3.2	**Materials Reuse**, 10%	1
1			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
	1		Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
	1		Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regionally	1
		1	Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regionally	1
		1	Credit 6	**Rapidly Renewable Materials**	1
1			Credit 7	**Certified Wood**	1

Yes	?	No		
10	2	7	**Indoor Environmental Quality**	**19** Points

Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
Y			Prereq 3	**Minimum Acoustical Performance**	Required
		1	Credit 1	**Outdoor Air Delivery Monitoring**	1
		1	Credit 2	**Increased Ventilation**	1
1			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
1			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
1			Credit 4.3	**Low-Emitting Materials**, Flooring Systems	1
1			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
1			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
1			Credit 6.1	**Controllability of Systems**, Lighting	1
		1	Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
		1	Credit 7.1	**Thermal Comfort**, Design	1
		1	Credit 7.2	**Thermal Comfort**, Verification	1
2		1	Credit 8.1	**Daylight & Views,** Daylight	1 to 3
	1		Credit 8.2	**Daylight & Views**, Views	1
	1		Credit 9	**Enhanced Acoustical Performance**	1
		1	Credit 10	**Mold Prevention**	1

Yes	?	No

Yes	?	No			
2	4		**Innovation & Design Process**		**6** Points
	1		Credit 1.1	**Innovation in Design**: Green Cleaning	1
1			Credit 1.2	**Innovation in Design**: Integrated Pest Management	1
	1		Credit 1.3	**Innovation in Design**: Construction Waste Management, Divert 95% from Di	1
	1		Credit 1.4	**Innovation in Design**: TBD	1
1			Credit 2	**LEED® Accredited Professional**	1
	1		Credit 3	**The School as a Teaching Tool**	1
2	2	2	**Regional Priority Credits (select 4 max.)**		**4** Points
		1	Credit 1.1	**Regional Priority Credit:** MRc1.1 Building Reuse: 75%	1
	1		Credit 1.2	**Regional Priority Credit:** EAc2 Renewable Energy - 1%	1
1			Credit 1.3	**Regional Priority Credit:** SSc3 - Brownfield Redevelopment	1
	1		Credit 1.4	**Regional Priority Credit:** SSc6.1 - Stormwater Design, Quantity Control	1
		1	Credit 1.5	**Regional Priority Credit:** SSc7.1 - Heat Island Effect, Non-Roof	1
1			Credit 1.6	**Regional Priority Credit:** SSc7.2 - Heat Island Effect, Roof	1
52	21	39	**LEED Project Total** (pre-certification estimates)		**110** Points
1		3	**APPENDIX A to ARTICLE 37 - Boston Green Building Credits**		
Y			Prereq. 1	**Retrofit Diesel Construction Vehicles**	
Y			Prereq. 2	**Outdoor Construction Management Plan**	
Y			Prereq. 3	**Integrated Pest Management Plan**	
		1	Credit 1.1	**Modern Grid**	
		1	Credit 1.2	**Historic Preservation**	
1			Credit 1.3	**Groundwater Recharge**	
		1	Credit 1.4	**Modern Mobility**	
53	21	42	**Project Totals** (pre-certification estimates)		

Certified 40-49 points **Silver** 50-59 points **Gold** 60-79 points **Platinum** 80+ points

Chapter 6.0

Urban Design

6.0 URBAN DESIGN

6.1 Design Goals and Context

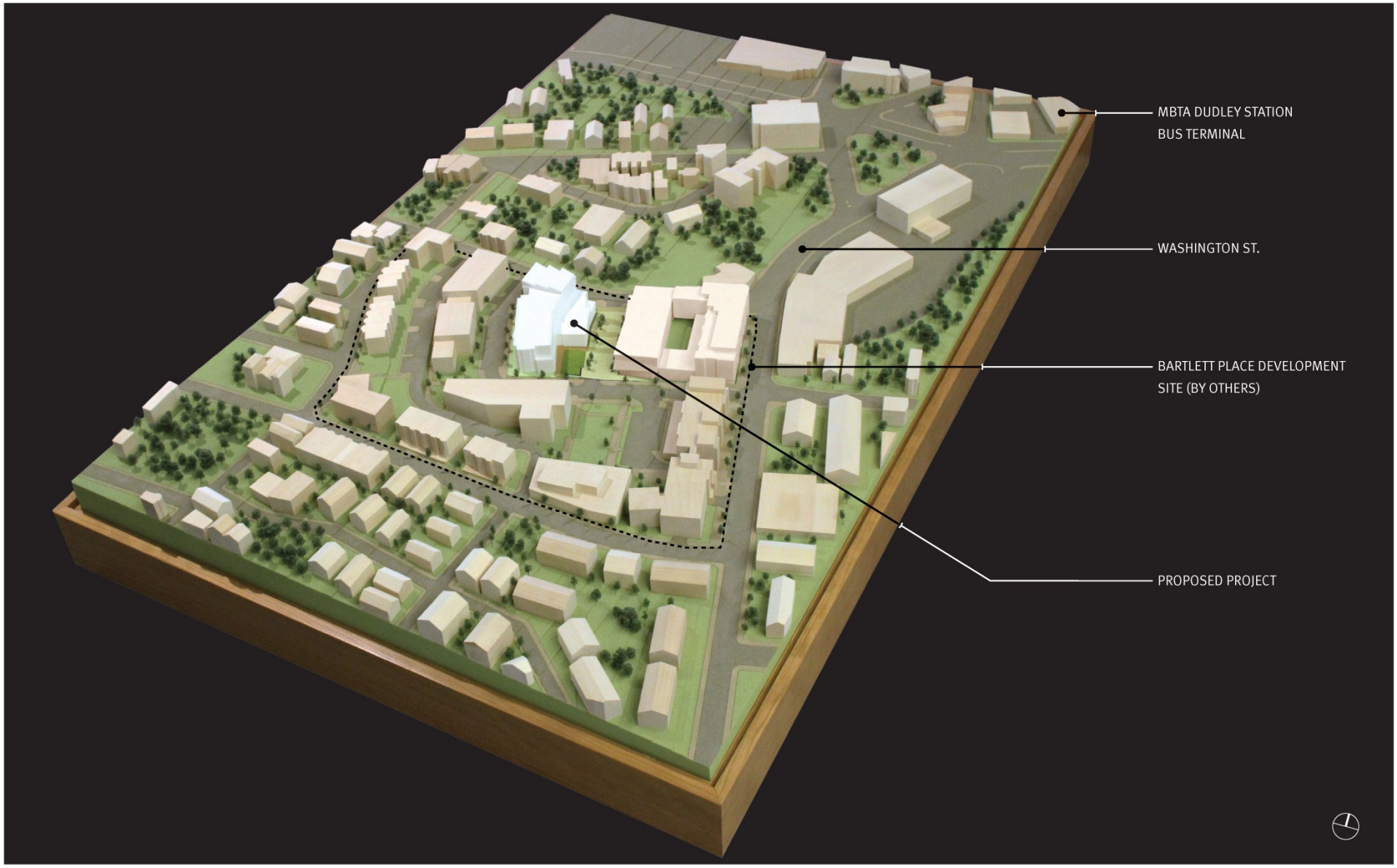
The Project will create a learning environment that generates a vibrant physical and cultural link between the school and the surrounding Dudley Square community. The school's mission to fuse music with learning is supported by the Bartlett Place proposal to create an urban village focused on music and the arts.

The majority of the Bartlett Place development will comprise a mix of market rate, mixed-income, and affordable housing, as well as retail and commercial spaces along Washington Street. The school's positioning near the center of the overall Bartlett Place create a focal point of the entire Bartlett Place site and serve as an asset to the overall development and the Roxbury community.

The Project will provide outdoor recreational space, including a secured tot lot to the west and courtyard space to the east. At pick-up and drop-off times, the courtyard will accommodate two parallel bus lanes. The courtyard is designed as a pedestrian-friendly space, emphasized through its raised condition, flush with adjacent street curbs; and the use of permeable hardscape materials, native landscape plantings, and site furnishings.

The design of the Project considers the perception of the building from the surrounding community to be of prime importance. Each perspective is considered in an effort to best integrate the new development within the existing and proposed urban fabric. See Figure 6-1 for a view of the Project within the larger Dudley Square context. The new facility is designed with a 4-story classroom wing oriented parallel to Marcia Street, occupied by the elementary grades on the lower two floors and the middle school grades on the upper two floors. While separated by floors, both elementary and middle school grades will have access to the school's common resource spaces – which include a cafeteria, gymnasium, media library, and large ensemble space – via stairwells and an elevator, enhancing an internal sense of school community. The Project is also programmed with a series of gathering spaces that activate the pedestrian level. These spaces include a gymnasium, a large ensemble room, and a cafeteria space that opens onto the courtyard for community gatherings.

A central, double-height circulation path known as the "Promenade" will provide dual access from two points along Marcia Street. The main building entry, located toward the south along the courtyard, will function as the primary point of access for students, visitors, and staff throughout the day. The secondary entry, located on the west, will provide school access for parent pick-up and drop-off activities but will be locked during the course of the day. See Figure 6-2 for a rendering of the main building entrance, and Figure 6-3 for a rendering of the entrance along Marcia Street.



Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 6-1
Area Context

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 6-2
Main Entrance

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 6-3

View from Bartlett Station Drive

On the interior, the "Promenade" will foster a sense of school community in providing interconnected views to the cafeteria, second-story bridge and balcony, and media library through a series of double-height spaces. The "Promenade" will also expand to accommodate informal performance spaces.

6.2 Height and Massing

The Project is predominantly aligned along the western edge of the site, while the main building entry and courtyard front a proposed public plaza to south. The main building entry is a two-story space framed by a cafeteria and large ensemble space that activate both the internal promenade and exterior courtyard. The arrangement of these spaces allow the school to engage with the community by providing views into the large ensemble space, and an opportunity for the cafeteria – which hosts informal performances – to expand its performance space out to the courtyard.

The classroom wing, oriented parallel to Marcia Street, will be developed as a 4-story volume to maximize the capacity of the building's footprint for the required program; complement the heights of adjacent residential buildings; and address varying grade elevations. These four floors delineate the elementary and middle school grades within the building, where the elementary grades occupy the lower two floors of the school while the middle school grades occupy the upper two floors of the school.

The upper level ensemble rooms, double-height gymnasium, and media library are designed to break down the building's massing to a pedestrian scale, therefore complementing the residential feel of Bartlett Street's neighborhoods. Figures 6-4 and 6-5 illustrate the proposed elevations for the new school building. The roof lines, overhangs, and shifts in massing have been analyzed with respect to neighborhood compatibility, shadow impact mitigation, and other environmental factors.

6.3 Character and Materials

The character of the school will be both welcoming and inclusive, achieved through the use of transparency and activity at the ground level.

The massing is articulated with a durable brick veneer and warm-toned vertical siding to create a modern look and feel. Both an iron spot brick and warmer brick pattern will create a rich tapestry of color and texture along the façade of the classroom wings. Large classroom windows will characterize the majority of the building elevations, allowing for a high degree of transparency in the building envelope.

EAST ELEVATION

NORTH ELEVATION

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 6-4

East and North Elevations

WEST ELEVATION

SOUTH ELEVATION

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 6-5

West and South Elevations

A warm-toned vertical siding system is used on the façades of the El Sistema music program, learning hubs and cafeteria which will highlight the internal use of the school's unique education model while creating exterior focal points that help breakdown the massing. Transparency between both the large ensemble space and cafeteria fosters connectivity between the school and community.

Given the sustainable mandate for the Project, selected materials will achieve an optimal balance between both first-cost and life-cycle cost considerations.

6.4 Landscaping

The Project will improve the existing edge condition along Bartlett Street by providing both open and enclosed exterior spaces along the site perimeter, as well as a courtyard at the main building entry. See Figure 6-6 for a rendering of the view along Bartlett Street.

Planted areas will be created adjacent to the building along Marcia and Bartlett Streets. A combination of street trees, shrubs, and groundcover will complement the courtyard serving as the entry forecourt to the building. The courtyard will also incorporate permeable pedestrian walking surfaces accentuated by lighting and seating elements. Directly outside of the cafeteria and large ensemble space, the courtyard will be a welcoming space that invites students, parents, and staff into the school.

A secondary entry will be located along the western edge of Marcia Street, providing direct access to the school for students and parents during pick-up and drop-off. A new fenced-in tot lot will be located adjacent to the secondary entry, providing recreation opportunities on play surfaces and structures for the younger students. This play area will at times be shielded from mid-day southern late sun by the mass of the school, and will have great access to sunlight in the mornings and afternoons.

Covered bike storage will be provided on-site to provide a dry and secure location for bike parking, and to encourage students and staff to utilize alternative means of transportation to and from the site.

Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL ARROWSTREET

Figure 6-6

View from Bartlett Street

Chapter 7.0

Historic and Archaeological Resources

7.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

7.1 Historic Resources within the Project Site

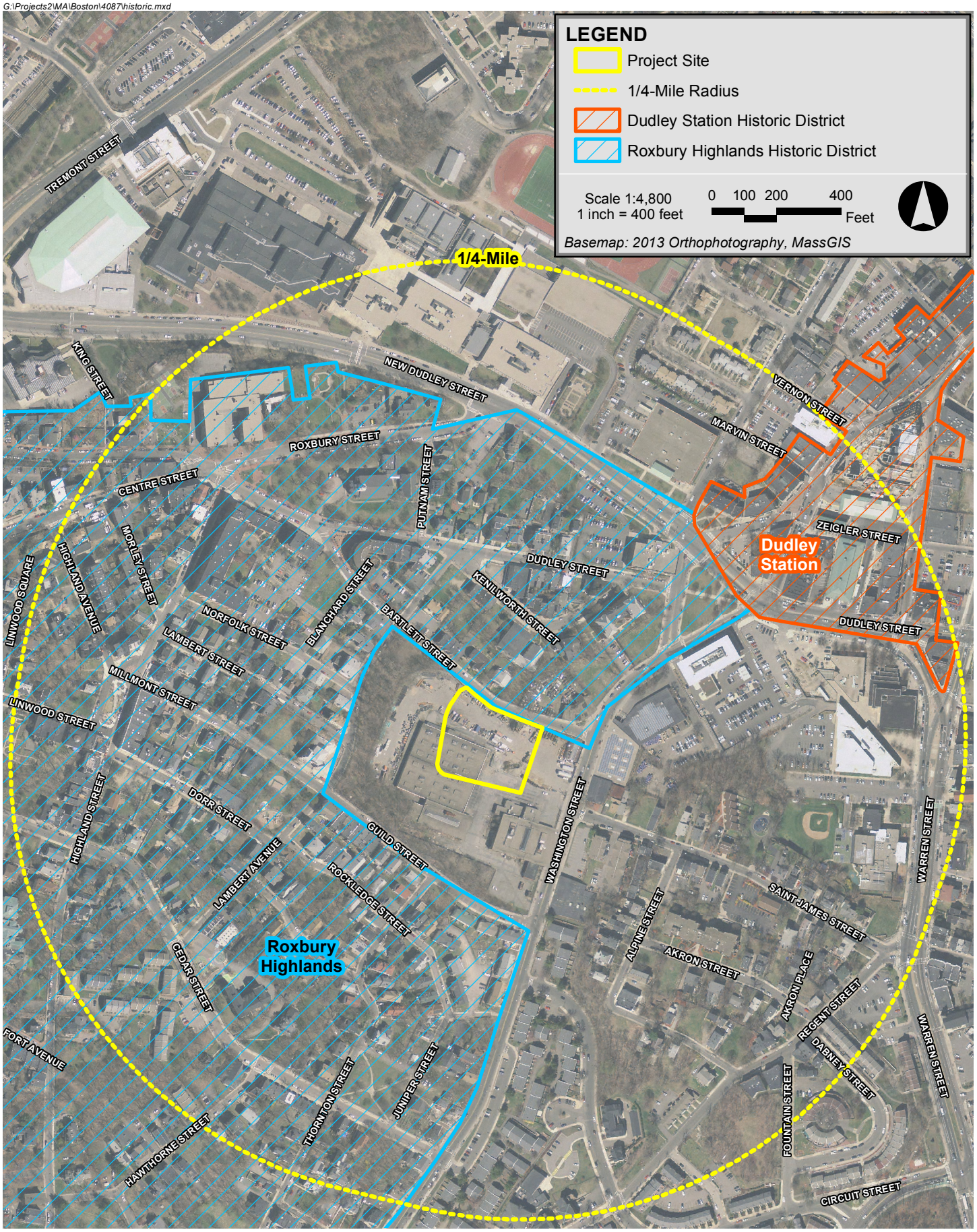
The Project site is an approximately 1.25-acre site located in Lot C of the Bartlett Place Development on Washington Street in Roxbury. The parcel consists of the former Boston Elevated Railway Company Yard, most recently known as the MBTA's Bartlett Street Yard, at 2565 Washington Street. The property had included two large garage buildings (constructed ca. 1930), a foundation of a former elevated railway platform, and a small office building and a small utility shed (both ca. 1970s). The Bartlett Street Yard is included in the Inventory of Historic and Archaeological Assets of the Commonwealth (Inventory) (Inv. Nos. BOS.11451 and BOS.11452), maintained by the Massachusetts Historical Commission (MHC). The buildings and structures are presently in the process of being demolished.

7.2 Historic Resources in the Vicinity of the Project Site

While no historic resources remain within the Project site, the property is immediately adjacent to the Roxbury Highlands Historic District at its south, west, and north property boundaries. Further to the northeast is the Dudley Station Historic District. Both districts are listed on the State and National Registers of Historic Places. The resources are depicted in Figure 7-1.

7.3 Archaeological Resources within the Project Site

There are no known archaeological resources listed in the State and National Registers of Historic Places or included in the Inventory within the Project site. The Project site consists of a previously developed urban site; therefore, it is unlikely that the proposed Project will affect previously unidentified archaeological resources.



Conservatory Lab Charter School Boston, Massachusetts

Figure 7-1
Historic Resources

7.4 Potential Impacts to Historic Resources

7.4.1 Visual Impacts to Historic Resources

The proposed Project is immediately adjacent to the Roxbury Highlands Historic District. The district is largely comprised of residential buildings constructed in the late 19th and early 20th-centuries, two to three stories in height consisting of wood frame and masonry construction. Additionally, within the district are some institutional and civic buildings that are two to five stories in height of masonry construction, such as the former Dillaway School at 6 Kenilworth Street. Numerous buildings within the district have been altered with synthetic siding, replacement windows, and other alterations. In the immediate vicinity of the Project site are masonry commercial buildings along Washington Street and multi-story masonry and wood frame multi-family dwellings along Bartlett Street and Lambert Avenue. Further to the northeast is the Dudley Station Historic District, which largely consists of multi-story masonry commercial buildings, three to five stories in height dating from the late 19th-century.

As described in Section 6, the proposed Project has been designed to be consistent with the height, scale, massing, and materials of buildings found in the neighborhood. The proposed masonry cladding is consistent with brick commonly used in the surrounding architecture. The massing is consistent with other institutional, civic, and commercial/mixed-use buildings. The building is sited with the majority of its height at the rear of the parcel utilizing existing grade changes and with a vegetative buffer and setback from Bartlett Street. The two-story wing has been designed to scale down the building, breaking up its mass to a residential scale. Changes in plane, roof lines and overhangs have also been designed to break up the mass of the building and complement the architecture in the surrounding neighborhood.

The proposed Project will result in no adverse visual impacts to the character of the Roxbury Highlands or the Dudley Station Historic Districts.

7.4.2 Shadow Impacts to Historic Resources

Shadow impacts to the historic resources will be minimal. As illustrated in the shadow study diagrams (Figures 4.2-1 to 4.2-14), during isolated time periods the Project will cast minimal net new shadow on areas of the Roxbury Highlands Historic District.

New shadow on historic resources with the City of Boston is limited to new shadow at 12:00PM and 3:00PM on March 21; 3:00PM and 6:00PM on June 21;12:00PM, 3:00PM and 6:00PM on September 21; and 9:00AM, 12:00PM and 3:00PM on December 21 within the boundaries of the Roxbury Highlands Historic District. New shadow will have minimal impact on nearby historic buildings as the shadow will largely fall on the sidewalks and the travel lanes within Bartlett Street. Five properties within the District will have minimal new shadow: 23-25 Bartlett Street, 31 Bartlett Street, 37-41 Bartlett Street, 2501 Washington

Street and 30 Kenilworth Street. 23-25 Bartlett Street has been substantially altered with replacement siding and windows adversely affecting its historic character; 31 Bartlett Street is a modern non-historic building constructed circa 1990; 37-41 Bartlett Street will be minimally affected by shadow only at 9:00AM on December 21; 2501 Washington Street will be minimally affected by shadow only at 6:00PM on September 21; and 30 Kenilworth Street will be minimally affected by shadow only at 3:00PM on December 21.

In conclusion, net new shadow created by the Project will have no significant impacts to historic resources.

7.5 Consistency with Other Historic Reviews

7.5.1 Article 85

The demolition of the buildings was previously reviewed by the Boston Landmarks Commission under Article 85 of the Boston Zoning Code. The Commission found that the buildings were not significant. Further review is not required.

7.5.2 Massachusetts Historical Commission

The Project was reviewed by MHC for the transfer of land out of MBTA ownership, demolition of the buildings onsite, and the use of state and federal funding in compliance with Section 106 of the National Historic Preservation Act and MGL Chapter 9, Sections 26-27C, as amended by Chapter 254 of the Acts of 1988. An MHC Project Notification Form was submitted in 2010. The MHC concluded that the proposed demolition of the Bartlett Street Yard structures would have an adverse effect on historic properties. The MHC agreed to accept the demolition concluding there are no prudent and feasible alternatives. A draft Memorandum of Agreement (MOA) has been prepared by the MHC, accepting the adverse effect. The MOA will be executed among the MHC, the Department of Housing and Community Development, and Proponent as the project approvals and funding applications move forward.

Chapter 8.0

Infrastructure

8.0 INFRASTRUCTURE

This chapter outlines the existing utilities surrounding the Project site, the proposed connections required to provide service to the new structure, and impacts on the existing utility systems.

8.1 Wastewater

8.1.1 Existing Sewer System

There is an existing Boston Water and Sewer Commission (BWSC) sewer main located in Washington Street and a new sewer main located in Marcia Boulevard. There is a 48x42-inch sewer main flowing north in Washington Street. An 8-inch sewer line in Marcia Boulevard connects to the 48x42-inch sewer main in Washington Street.

8.1.2 Project-Generated Sanitary Sewer Flow

The proposed Project's sewage generation was estimated based on the Massachusetts Division of Water Pollution Control Sewer System Extension and Connection Permit Program at 314 CMR 07.00, which list typical sewage generation values for proposed sources. As listed in the regulations a school with cafeteria, gymnasium and showers will use approximately 20 gallons per day per person. Based on an estimate 526 persons being at the school (staff and students), the expected flow will be 10,520 gallons per day.

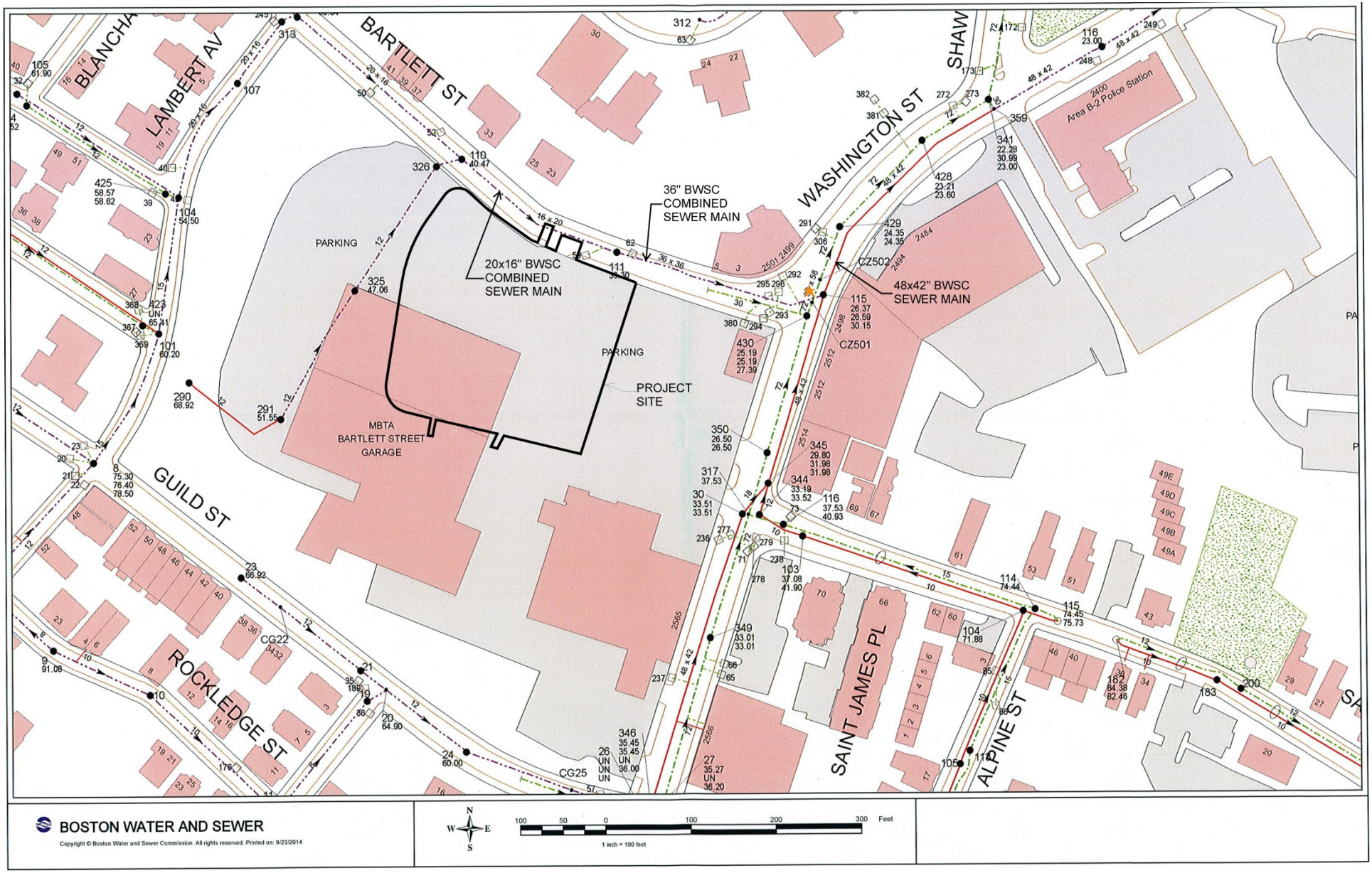
8.1.3 Sanitary Sewer Connection

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the sewer system. The sewer services for the Project will connect to the new sewer line to be built in Marcia Street and flow to the sewer main in Washington Street.

All improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's site plan review process for the 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.

8.1.4 Sewage Capacity

The capacities of the 48x42-inch sewer main in Washington Street and the 8-inch sewer line in Marcia Street are summarized below in Table 8-1. Pipe diameter and inverts used to calculate the capacities are a combination of information obtained from the BWSC wastewater infrastructure system map (Figure 8-1), plans from DeVellis Zrein Inc., and survey information provided by Nitsch Engineering. Flow capacities of the existing sanitary sewers were calculated in cubic feet per second (cfs) and million gallons per day (MGD) using Manning's equation. The Project is not expected to exceed existing sewer capacities.



Conservatory Lab Charter School Boston, Massachusetts

Figure 8-1

Existing Wastewater System

Table 8-1 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)
Marcia Blvd to Washington St								
SMH1 to SMH2	247.5	47.26	38.68	3.5%	8	0.01	2.92	1.89
SMH2 to SMH3	135	38.68	36.88	1.3%	8	0.01	1.81	1.17
SMH3 to 30	33.75	36.88	36.5	1.1%	8	0.01	1.67	1.08
30 to 345	44	33.51	31.98	3.5%	18	0.01	25.46	16.46
345 to 115	468	29.8	26.59	0.7%	48x42	0.01	185.16	119.67
						Minimum Flow Analyzed:	1.67	1.08

Notes:
1. Manhole numbers taken from BWSC Sewer system Map and DeVellis Plans.
2. Flow Calculations based on Manning Equation

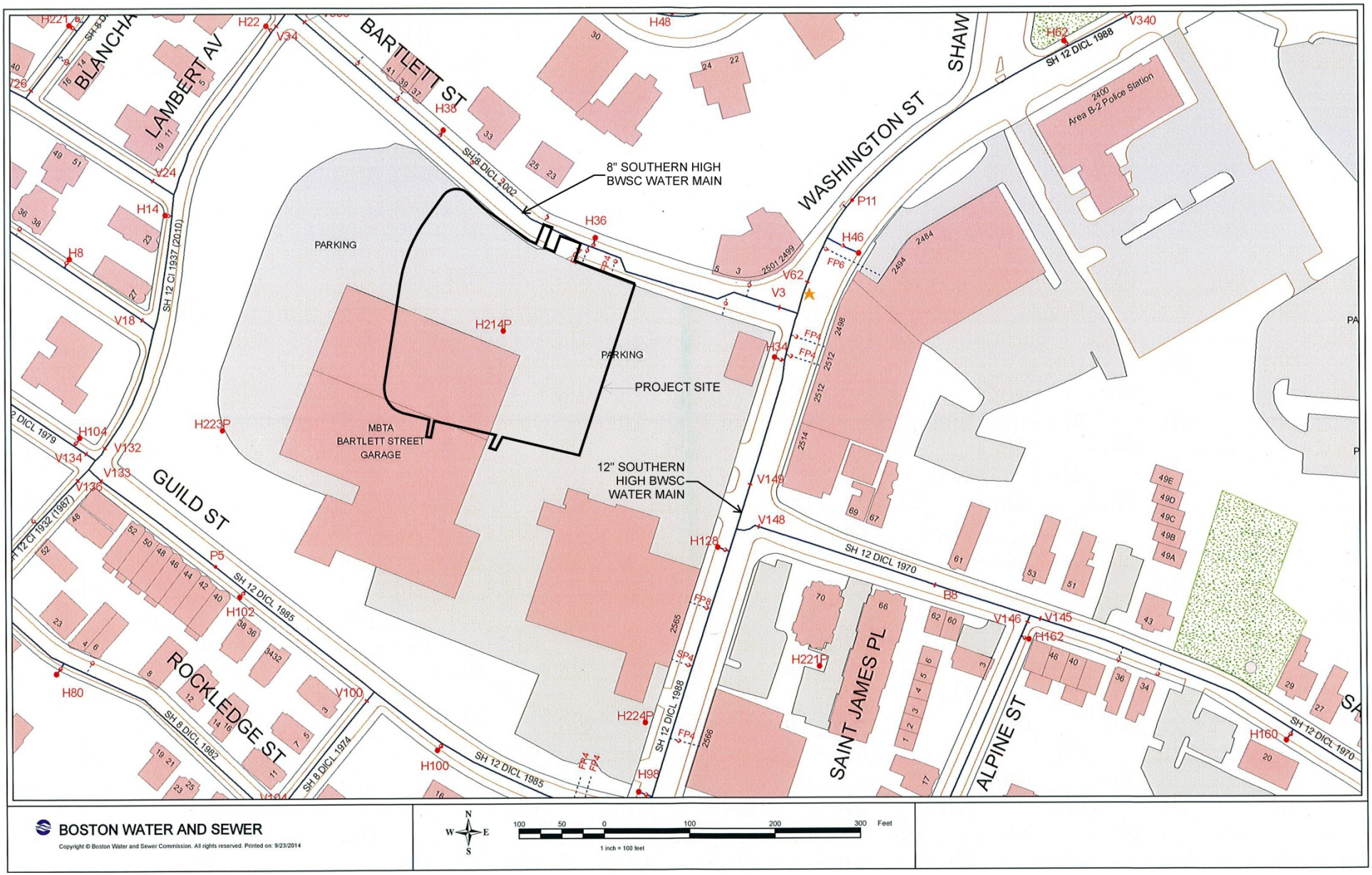
8.2 Water System

8.2.1 Existing Water Service

Water for the 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 (SL, commonly known as low service), southern high (SH, commonly known as high service), southern extra high, northern low, and northern high.

BWSC owns and operates an 8-inch SH ductile iron cement lined water main within Bartlett Street (2002) and a 12-inch SH ductile iron cement lined water main in Washington Street (1988). The existing water system information was obtained from the BWSC water infrastructure system map (See Figure 8-2).

The site is serviced by six fire hydrants; H36 and H38 serviced by the 8-inch main in Bartlett Street, H34 and H128 serviced by the 12-inch main Washington Street, and H214P and H223P.



Conservatory Lab Charter School Boston, Massachusetts

Figure 8-2

Existing Water System

Hydrant flow tests for hydrants H36, H38, H34, H214P, and H223P were requested on September 25, 2014. Flow test results have not yet been received. BWSC conducted a hydrant flow test on July 29, 2013. There appears to be adequate capacity within the vicinity. Hydrant flow data is presented in Table 8-2.

Table 8-2 Existing Hydrant Flow Data

Hydrant #	Static Pressure	Residual Pressure	Total Flow	Flow at 20 psi	Flow at 10 psi
H132	104 psi	98 psi	2,126 gpm	8,840 gpm	9,394 gpm

8.2.2 Anticipated Water Consumption

The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation, described above. A conservative factor of 1.1 (ten percent) 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 increase in domestic water demand is 11,572 gpd (10,520*1.1). The water for the Project will be supplied by the BWSC system within Bartlett Street.

All reasonable efforts to reduce water consumption will be made, including water efficient landscaping. The Project goal is to reduce water consumption by at least 30 percent from code requirements.

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.

8.2.3 Proposed Water Service

The proposed domestic water and fire services will be required to connect to the existing 8-inch water main in Bartlett Street. The domestic water and fire protection water service connections required for the 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.

8.2.4 Water Conservation

The Project will utilize several water conservation measures. Landscape plant materials will be native and drought resistant in order to reduce irrigation water use by 50%. The design plans will also incorporate low flow toilets, urinals and faucets to reduce water use.

8.3 Stormwater

8.3.1 Existing Stormwater System

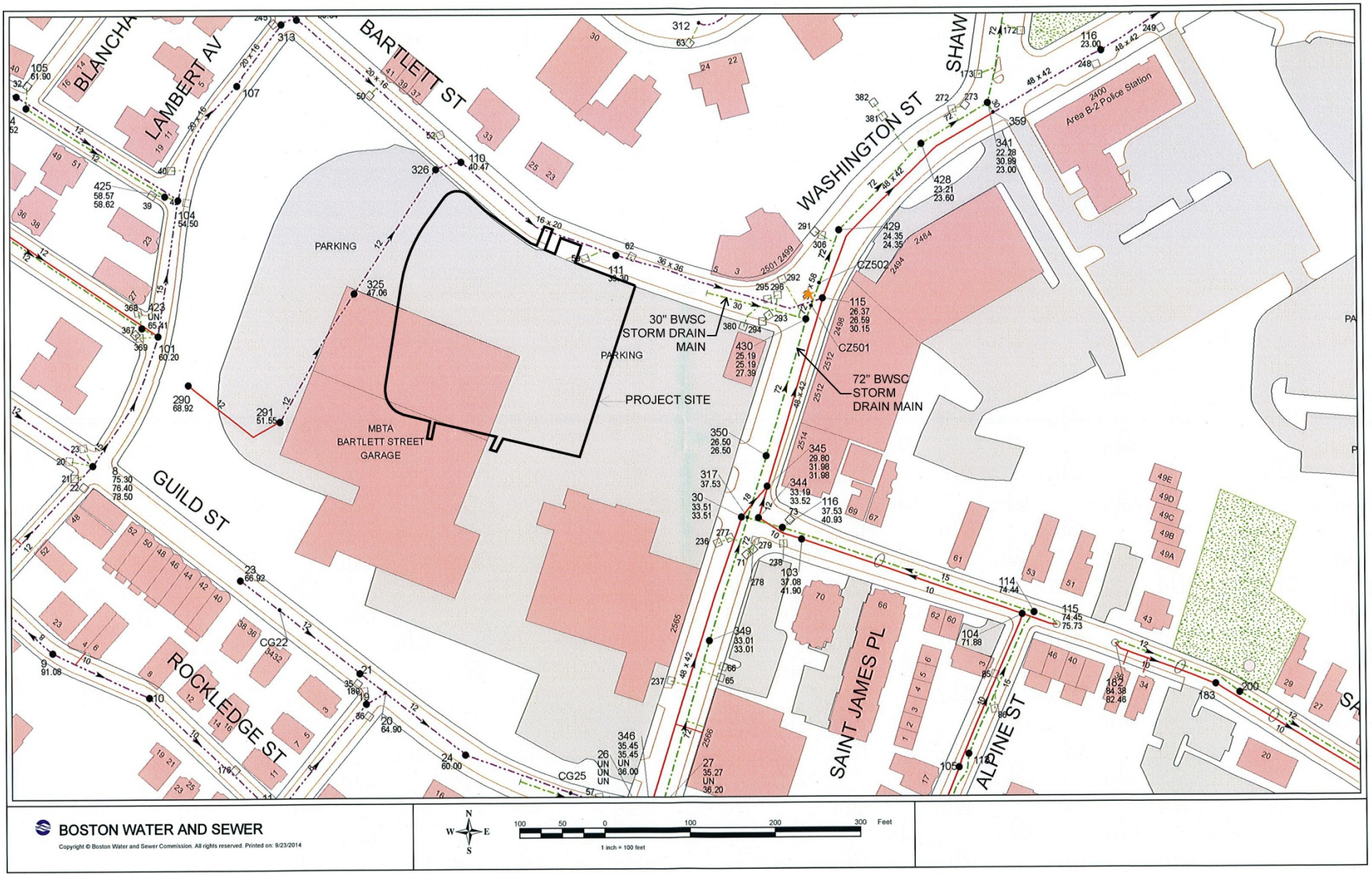
There will be a new 12-inch storm drain line installed in Marcia Street, which will flow east into the 72-inch storm drain in Washington Street which flows north to Shawmut Avenue. The capacities of these lines are summarized below in Table 8-3. Pipe diameter and inverts used to calculate the capacities are a combination of information obtained from the BWSC stormwater infrastructure system map (Figure 8-3), plans from DeVellis Zrein Inc., and survey information provided by Nitsch Engineering.

Flow capacity of existing storm drains were calculated in cubic feet per second (cfs) using Manning's Equation. The Project is not expected to exceed existing storm drain capacities.

Table 8-3 Drain 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)
Marcia Blvd to Washington St								
DMH1 to DMH2	225	43	39.61	1.5%	12	0.012	4.74	3.06
DMH2 to DMH	48.75	39.51	33	13.4%	12	0.012	14.10	9.12
Washington St	220.8	33.01	26.5	2.9%	72	0.012	787.80	509.17
349 to 350	220.8	33.01	26.5	2.9%	72	0.012	787.80	509.17
350 to 430	162.65	26.5	25.19	0.8%	72	0.012	411.75	266.12
430 to 429	107.5	25.19	24.35	0.8%	72	0.012	405.56	262.12
						Minimum Flow Analyzed:	4.74	3.06

Notes:
1. Manhole numbers taken from BWSC Sewer system Map and DeVellis Plans.
2. Flow Calculations based on Manning Equation



Conservatory Lab Charter School Boston, Massachusetts

CONSERVATORY LAB CHARTER SCHOOL

Figure 8-3

Existing Stormwater System

8.3.2 Proposed Storm Drainage System

The amount of impervious surfaces on the Project site will be reduced compared to existing conditions. The design intent is to collect stormwater runoff from the impervious area and roof of the Project and direct it to two subsurface infiltration systems on site which will overflow to the 12-inch drain line in Marcia Street and then flow to the 72-inch storm drain main in Washington Street. Soil testing will be performed to confirm that this is feasible. The Project is committed to treating phosphorus and other TSS prior to discharge into the BWSC storm drain system. 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 stormwater management system will decrease or maintain the flow and volume of stormwater runoff from the site. Stormwater runoff will not be directed towards any abutters.

The proposed stormwater management system will collect all site runoff and recharge one inch over the Project's impervious area in accordance with the BWSC's current stormwater requirements.

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, and compliance with the City of Boston Zoning Code.

8.3.3 Water Quality Impact

The Project will not adversely 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 Project will be in compliance with all local and state stormwater management policies. See below for additional information.

8.3.4 DEP Stormwater Management Policy Standards

In March 1997, Mass DEP adopted a new Stormwater Management Policy to address non-point source pollution. In 1997, Mass DEP 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 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 water of the Commonwealth as a result of stormwater discharges related to the Project.

Standard #2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR.

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 Project.

Standard #3: Loss of annual recharge to groundwater shall be eliminated or 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 type. 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 Project is a Redevelopment, and 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 Project's limit of work, there will be mostly roof, landscape, parking and pedestrian areas. Any paved areas that would contribute unwanted sediments or pollutants to the existing storm drain systems will be collected by deep sump, hooded catch basins and treated 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 design will include source control, pollution prevention and pretreatment practices, as necessary.

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: Not Applicable. The Project site is not within an outstanding resource 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 Project will comply with this standard. The Project complies with the Stormwater Management Standards as applicable to the redevelopment.

Standard #8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

Compliance: The Project will comply with this standard. Sedimentation and erosion controls will be incorporated as part of the design of the Project 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 Project will comply with this standard. An O&M Plan including long-term BMP operation requirements will be prepared for the Project and will assume proper maintenance and functioning of the stormwater management system.

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

Compliance: The Project will comply with this standard. There will be no illicit connections associated with the Project. Temporary construction dewatering will be conducted in accordance with all applicable BWSC and Massachusetts Water Resource Authority (MWRA) requirements, as necessary.

8.4 Electrical Service

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

8.5 Natural Gas

National Grid has gas services in the vicinity of the Project site. The Proponent will work with National Grid to confirm adequate system capacity as design is finalized.

8.6 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.

8.7 Utility Protection During Construction

Existing public and private infrastructure located within nearby public rights-of-way will be protected during Project construction. 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 Project.

Chapter 9.0

Coordination with other Governmental Agencies

9.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

9.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board and will be designated to comply with the standards of the Americans with Disabilities Act. See Appendix C for the Accessibility Checklist.

9.2 Massachusetts Environmental Policy Act (MEPA)

Bartlett Place has undergone Massachusetts Environmental Policy Act (MEPA) review. On June 30, 2014, Bartlett Place Land, Inc. filed an Expanded Environmental Notification Form (ENF) and a Request for Waiver of a Mandatory Environmental Impact Report (EIR). On August 15, 2014, the Secretary of Energy and Environmental Affairs (EEA) issued a Certificate on the Expanded ENF finding that the project did not require a the submission of an EIR, along with a Draft Record of Decision proposing to grant a Waiver from the requirement to prepare the EIR. The Secretary issued a Final Record of Decision granting the Waiver on September 12, 2014.

As the project was reviewed by MEPA, Block C was to include 28 elderly residential housing units and 28 townhouse units, totaling approximately 50,000 gross square feet.

The Proponent for Bartlett Place is coordinating with the MEPA Office to determine if the proposed addition of the school will necessitate any further MEPA review. If so, it would be the responsibility of the Bartlett Place developer to file a Notice of Project Change for its project with the MEPA Office.

9.3 Massachusetts Historical Commission

The Project was reviewed by MHC for the transfer of land out of MBTA ownership, demolition of the buildings onsite, and the use of state and federal funding in compliance with Section 106 of the National Historic Preservation Act and MGL Chapter 9, Sections 26-27C, as amended by Chapter 254 of the Acts of 1988. An MHC Project Notification Form was submitted in 2010. The MHC concluded that the proposed demolition of the Bartlett Street Yard structures would have an adverse effect on historic properties. The MHC agreed to accept the demolition concluding there are no prudent and feasible alternatives. A draft Memorandum of Agreement (MOA) has been prepared by the MHC, accepting the adverse effect. The MOA will be executed among the MHC, the Department of Housing and Community Development, and Proponent as the project approvals and funding applications move forward.

9.4 Boston Civic Design Commission

The Project will comply with the provisions of Article 28 of the Boston Zoning Code. This PNF will be submitted to the Boston Civic Design Commission by the BRA as part of the Article 80 process.

Appendix A

Transportation Appendix

Available Upon Request

Appendix B

Climate Change Preparedness Questionnaire

Climate Change Preparedness and Resiliency Checklist for New Construction

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the Boston Redevelopment Authority adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding project resiliency, preparedness, and to mitigate any identified adverse impacts that might arise under future climate conditions.

For more information about the City of Boston's climate policies and practices, and the 2011 update of the climate action plan, *A Climate of Progress*, please see the City's climate action web pages at http://www.cityofboston.gov/climate

In advance we thank you for your time and assistance in advancing best practices in Boston.

Climate Change Analysis and Information Sources:

1. Northeast Climate Impacts Assessment (www.climatechoices.org/ne/)
2. USGCRP 2009 (http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/)
3. Army Corps of Engineers guidance on sea level rise (http://planning.usace.army.mil/toolbox/library/ECs/EC11652212Nov2011.pdf)
4. Proceeding of the National Academy of Science, "Global sea level rise linked to global temperature", Vermeer and Rahmstorf, 2009 (http://www.pnas.org/content/early/2009/12/04/0907765106.full.pdf)
5. "Hotspot of accelerated sea-level rise on the Atlantic coast of North America", Asbury H. Sallenger Jr*, Kara S. Doran and Peter A. Howd, 2012 (http://www.bostonredevelopmentauthority.org/planning/Hotspot of Accelerated Sea-level Rise 2012.pdf)
6. "Building Resilience in Boston": Best Practices for Climate Change Adaptation and Resilience for Existing Buildings, Linnean Solutions, The Built Environment Coalition, The Resilient Design Institute, 2103 (http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf)

Checklist

Please respond to all of the checklist questions to the fullest extent possible. For projects that respond "Yes" to any of the D.1 – Sea-Level Rise and Storms, Location Description and Classification questions, please respond to all of the remaining Section D questions.

Checklist responses are due at the time of initial project filing or Notice of Project Change and final filings just prior seeking Final BRA Approval. A PDF of your response to the Checklist should be submitted to the Boston Redevelopment Authority via your project manager.

Please Note: When initiating a new project, please visit the BRA web site for the most current Climate Change Preparedness & Resiliency Checklist.

A.1 - Project Information

Project Name:	Conservatory Lab School at Bartlett Place
Project Address Primary:	2525 Washington Street, Roxbury MA, 02119 (Lot C)
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Mr. Lee Keller, Owners Project Manager, KV Associates Inc., hkeller@kvaboston.com, 857-300-6322

A.2 - Team Description

Owner / Developer:	Conservatory Lab Charter School
Architect:	Arrowstreet
Engineer (building systems):	Garcia, Galuska, DeSousa Consulting Engineers, Inc. (GGD)
Sustainability / LEED:	Arrowstreet & GGD
Permitting:	Epsilon
Construction Management:	Commodore Builders
Climate Change Expert:	GGD

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:	K - 8 Charter School
List the First Floor Uses:	Classrooms, cafeteria, gymnasium, music rooms, admin, MEP & building support

What is the principal Construction Type – select most appropriate type?

Wood Frame	Masonry	☑Steel Frame	Concrete

Describe the building?

Site Area:	*Approx. 55,015SF*	Building Area:	*73,000 SF*
Building Height:	*68' Ft.*	Number of Stories:	*4 Flrs.*
First Floor Elevation (reference Boston City Base):	*Elev. 51'*	Are there below grade spaces/levels, if yes how many:	No / *Number of Levels*

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:	*265.0 (kW)*	Heating:	*1.57 (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*46.06 (kbut/SF or kWh/SF)*	Cooling:	*100(Tons/hr)*

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	*0.0 (kW)*	Heating:	*(MMBtu/hr)*
		Cooling:	*(Tons/hr)*

What is nature and source of your back-up / emergency generators?

Electrical Generation:	*0.0 (kW)*		Fuel Source:	
System Type and Number of Units:	Combustion Engine	Gas Turbine	Combine Heat and Power	*(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?

7/ 91 Deg.

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

91 Deg.	*7 Days*	*2 Events / yr.*

What Drought characteristics will be used for project planning – Duration and Frequency?

45 Days	*1 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?

48 Inches / yr.	*7.2 Inches*	*2 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?

105 Peak Wind	*3 second*	*1 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:	*26 %*
How is performance determined:	Computerized energy modeling

What specific measures will the project employ to reduce building energy consumption?

Select all appropriate:	☑High performance building envelope	☑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 = 29.35*	Walls / Curtain Wall Assembly:	*R = 19.92*
Foundation:	*R = 11.08*	Basement / Slab:	*R = 10.86*
Windows:	*U = 0.70*	Doors:	*U = 0.66 & 0.37*

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:	There will be two (2) subsurface infiltration systems			

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 51' Elev.(Ft.)*

Building Proximity to Water:	*+/- 4900 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?

+/- 4800 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:

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:	*Yes / No*	Hardened / Resilient Ground Floor Construction	Temporary shutters and or barricades	Resilient site design, materials and construction

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:	*Yes / No*	Surrounding site elevation can be raised	Building ground floor can be raised	Construction been engineered
Describe additional strategies:				

Has the building been planned and designed to accommodate future resiliency enhancements?

Select appropriate:	*Yes / No*	Solar PV	Solar Thermal	Clean Energy / CHP System(s)
		Potable water storage	Wastewater storage	Back up energy systems & fuel
Describe any specific or additional strategies:				

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

Appendix C

Accessibility Checklist

Accessibility Checklist

(to be added to the BRA Development Review Guidelines)

In 2009, a nine-member Advisory Board was appointed to the Commission for Persons with Disabilities in an effort to reduce architectural, procedural, attitudinal, and communication barriers affecting persons with disabilities in the City of Boston. These efforts were instituted to work toward creating universal access in the built environment.

In line with these priorities, the Accessibility Checklist aims to support the inclusion of people with disabilities. In order to complete the Checklist, you must provide specific detail, including descriptions, diagrams and data, of the universal access elements that will ensure all individuals have an equal experience that includes full participation in the built environment throughout the proposed buildings and open space.

In conformance with this directive, all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding the following:

- improvements for pedestrian and vehicular circulation and access;
- encourage new buildings and public spaces to be designed to enhance and preserve Boston's system of parks, squares, walkways, and active shopping streets;
- ensure that persons with disabilities have full access to buildings open to the public;
- afford such persons the educational, employment, and recreational opportunities available to all citizens; and
- preserve and increase the supply of living space accessible to persons with disabilities.

We would like to thank you in advance for your time and effort in advancing best practices and progressive approaches to expand accessibility throughout Boston's built environment.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
    a. http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
    a. http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Boston Complete Street Guidelines
    a. http://bostoncompletestreets.org/
4. City of Boston Mayors Commission for Persons with Disabilities Advisory Board
    a. http://www.cityofboston.gov/Disability
5. City of Boston – Public Works Sidewalk Reconstruction Policy
    a. http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
6. Massachusetts Office On Disability Accessible Parking Requirements
    a. www.mass.gov/anf/docs/mod/hp-parking-regulations-mod.doc
7. MBTA Fixed Route Accessible Transit Stations
    a. http://www.mbta.com/about_the_mbta/accessibility/

Article 80 | ACCESSIBILTY CHECKLIST

Project Information

Project Name:	Conservatory Lab School at Bartlett Place
Project Address Primary:	2525 Washington Street, Roxbury MA, 02119 (Lot C)
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Mr. Lee Keller, Owners Project Manager, KV Associates Inc., hkeller@kvaboston.com, 857-300-6322

Team Description

Owner / Developer:	Conservatory Lab Charter School
Architect:	Arrowstreet
Engineer (building systems):	Garcia, Galuska, DeSousa Consulting Engineers, Inc. (GGD)
Sustainability / LEED:	Arrowstreet/ GGD
Permitting:	Epsilon
Construction Management:	Commodore Builders

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:

Article 80 | ACCESSIBILTY CHECKLIST

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)	Classrooms, cafeteria, gymnasium, music rooms, admin, MEP & building support			

What is the Construction Type – select most appropriate type?

	Wood Frame	Masonry	☑Steel Frame	Concrete

Describe the building?

Site Area:	51,015 *SF*	Building Area:	*73,000 SF*
Building Height:	*68 Ft.*	Number of Stories:	*4 Flrs.*
First Floor Elevation:	*Elev. 51'*	Are there below grade spaces:	*Yes / No*

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.	The Project site is located within the larger PDA Bartlett Place development in the Dudley Square neighborhood of Roxbury. There are currently a mix of new and existing municipal buildings to the northeast of the site and single to multi-familiy residences along the south and west quadrants.
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	Dudley Station: <0.25 mile (Local Bus and Silverline) Roxbury Crossing: 0.7 miles (Local Bus and Transit) Ruggles Station: 1 mile (Local Bus, Commuter Rail and Transit)

List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	Marcus Garvey Gardens, Orchard Park Housing Projects Dudley Street Neighborhood Charter School, James P. Timilty Middle School, Madison Park Tech. Voc. H.S., John D. O'Bryant School of Math & Science, Nathan Hale School Boston Medical Center Hospital, Roxbury Community College
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.	No. Reggie Lewis Track & Athletic Center, Yawkey Boys & Girls Club Bruce C. Bolling Municipal Building, District B-2 Police Station, Dudley Branch Library

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?	There are existing sidewalks along Bartlett Street at the North edge of the site. Additional sidewalks have been proposed as part of the overall PDA Master Plan surrounding the site.
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	Existing concrete sidewalk along Bartlett is in unfavorable condition and an inconsistent width. Tree pit openings are filled with asphalt. Curb cuts at pedestrian crossings are not compliant with accessibility codes.
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.	No existing pedestrian ramps are to remain within our project limits.
Is the development site within a historic district? **If yes,** please identify.	No

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, proposed sidewalks will be consistent with the Boston Complete Street Guidelines.
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.	Frontage Zone: Varies 5'-20' Pedestrian Zone: Varies 5'-20' Furnishing Zone: Varies 2'-5'
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?	Concrete Pavement & Unit Pavers. (walkway ownership limits to be determined)
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?	Walkway ownership limits to be determined
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	Bike racks in some locations
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	5' minimum clearance

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?	10 on-site surface spaces, with another 27 off-site spaces located nearby.
What is the total number of accessible spaces provided at the development site?	1 per 521 CMR
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?	No.
Where is accessible visitor parking located?	On-site
Has a drop-off area been identified? **If yes,** will it be accessible?	Yes and yes.
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 diagram.

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.	See attached diagram.
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	1. Main Entrance from Courtyard: Flush condition 2. Secondary Entrance off Marcia St. stairs and ramp 3. Tot Lot Access: Flush condition
Are the accessible entrance and the standard entrance integrated?	Yes
If no above, what is the reason?	NA
Will there be a roof deck or outdoor courtyard space? If yes, include diagram of the accessible route.	There will be an outdoor pedestrian oriented courtyard that will double as a bus lane during pick-up and drop-off hours.
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	No.

Accessible Units: (If applicable) N/A

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.

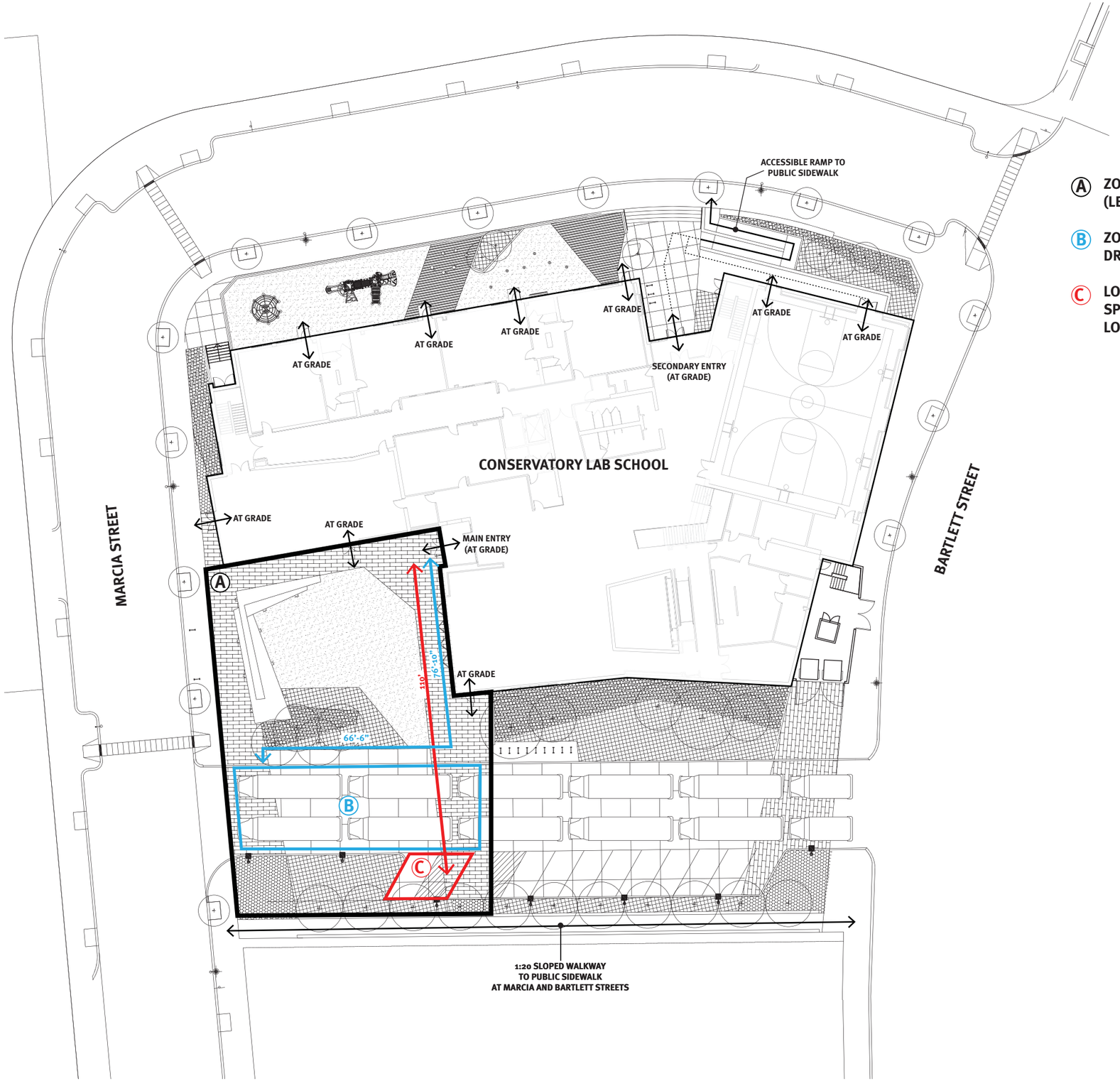
What is the total number of proposed units for the development?	NA

How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	NA
How many accessible units are being proposed?	NA
Please provide plan and diagram of the accessible units.	NA
How many accessible units will also be affordable? If none, please describe reason.	NA
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at entry or step to balcony. If yes, please provide reason.	NA.
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	NA
Did the Advisory Board vote to support this project? If no, what recommendations did the Advisory Board give to make this project more accessible?	NA

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



Ⓐ ZONE OF ACCESSIBLE COURTYARD (LESS THAN 2% GRADE CHANGE)

Ⓑ ZONE OF ACCESSIBLE ON-SITE BUS DROP-OFF AND PICKUP

Ⓒ LOCATION OF 1 ACCESSIBLE PARKING SPACE ON-SITE WITH ADJACENT LOADING ZONE