Data Sciences Center
Boston University

Project Notification Form

October 1, 2018

submitted to the **Boston Planning & Development Agency**

submitted by **Trustees of Boston University**

prepared by **Fort Point Associates, Inc.**

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BOSTON UNIVERSITY

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

Chapter 1

PROJECT SUMMARY

CHAPTER 1: PROJECT SUMMARY

1.1 PROJECT IDENTIFICATION

Project Name: Boston University Data Sciences Center

Project Proponent: Trustees of Boston University

Address/Location: 665 Commonwealth Avenue, Boston Massachusetts 02215

Assessor's Parcels: 0504089001 and 0504100000

1.2 INTRODUCTION

Trustees of Boston University (the "Proponent") proposes to construct the Data Sciences Center (the "Project") at 665 Commonwealth Avenue on two parcels comprised of approximately 42,000 square feet (0.96 acres) which define the "Site."

This Project Notification Form (PNF) is being submitted to the Boston Planning and Development Agency (BPDA) by the Proponent in accordance with Article 80B of the Boston Zoning Code. The Project is located in the Boston University Charles River Campus and lies within the boundaries of the Boston University Charles River 2013 - 2023 Institutional Master Plan (IMP). The fifth amendment to the IMP has been initiated with the submittal by the Proponent of an Institutional Master Plan Notification Form (IMPNF) to the BPDA concurrent with this PNF under the provisions of Article 80D of the Boston Zoning Code.

1.3 PROJECT SITE

The Site, located approximately 0.3 miles from Kenmore Square, is in the geographic core of the Charles River Campus. Within two blocks is a wide range of the University's programs in allied health, management, earth sciences, humanities, engineering, and communications. To the east and the west, the Site is flanked by academic and research buildings. To the north, a block of multistory brick townhouses serves as residences for students of the University. Across Commonwealth Avenue to the south is a major complex of buildings that supports instruction and research. These buildings include the recently constructed Rajen Kilachand Center for Life Sciences and Engineering. Boston University Grounds South and Warren Towers, an 18-story undergraduate residence hall, complete the block.

Presently the Site is occupied by a paved, at-grade public parking lot, which is accessed via Commonwealth Avenue.

See Figure 1-1, Locus Map; Figure 1-2, Aerial View; and Figure 1-3, Project Site Plan.

1.4 PROJECT DESCRIPTION

Boston University is globally recognized as a leader in interdisciplinary research and is among the top institutions for education and research in the data sciences.

Data science is the interdisciplinary field that collects large groupings of information and, using scientific methods, processes, algorithms and systems, produces knowledge to drive strategic decision making. The application of data science can be seen throughout our everyday lives, from the way healthcare is delivered to our strategies for sustaining cities, supply chains, and how we think and learn.

The Data Sciences Center will become a hub of this interdisciplinary activity at Boston University, anchored by the departments of Computer Science and Mathematics & Statistics and the Rafik B. Hariri Institute for Computing and Computational Science & Engineering (the "Hariri Institute"). Collectively, the data sciences permeate all aspects of contemporary academic life, as advances within them open doors to progress in many other disciplines. This new, iconic building will provide a centralized location for existing departments to come together in a truly collaborative and innovative structure.

The departments of Computer Science and Mathematics & Statistics are the 'home base' for students' academic endeavors as they follow the curriculum requirements in their specialized areas of study. Classrooms and computer labs in the lower floors of the building will provide an innovative learning environment that serves their courses. These instruction spaces and the adjacent areas for collaboration will promote innovation in teaching in the most contemporary of settings and access to services. Faculty research will be supported by a floorplan that is designed to provide a maximum of collaborative spaces. The Hariri Institute, which is an incubator supporting a community of scholars, students, and practitioners in the application of data driven techniques, will be located on the building's top floors.

1.5 PROJECT PROGRAM

Under the umbrella of Data Sciences, two departments and a research institute will be co-located in the new Data Sciences Center. Computer Science and Mathematics & Statistics, as well as the Hariri Institute, will move to the building from five different locations. These programs will be consolidated and thus afforded much needed additional space for expansion and growth. The Project also includes general classrooms and teaching space.

The Data Sciences Center will be comprised of approximately 305,000 square feet (sf) of Gross Floor Area (GFA). For a detailed description of the Project program, see Chapter 2: Project Description.

1.6 PROPOSED INSTITUTIONAL PROJECT – WARREN TOWERS DIGITAL SIGNAGE

Consistent signage helps identify Boston University as a unified urban campus within the City of Boston. The University welcomes and guides pedestrians with clear, streamlined signage throughout the Charles River Campus, and has a comprehensive strategic signage program that includes both exterior on-building signage and interior directories.

Decades ago, poster cases were installed at Warren Towers for student and faculty groups to promote events and programming to the Boston University community and the public. Over time, the cases have required various repairs due to weather damage. The University proposes to replace each of the existing 12 poster cases with digital screens that match the dimensions of the existing poster cases at 6′ high and 4′- 6″ wide. These screens will be installed in the same locations across the Commonwealth Avenue façade. Digital screens will be powered on-site and managed by the University through a software program.

1.7 CONSISTENCY WITH INSTITUTIONAL MASTER PLAN

The Project was included in the IMP as a Proposed Institutional Project (PIP) on Site CC. The development of the Site was described as providing new academic space either as a single-phased or multi-phased project. The Project is consistent with the PIP as described in the IMP with the exception that the proposed maximum height (15 stories, 225 feet) will be exceeded. The height of the Data Sciences Center will be 19 stories and 305 feet. The development of the Site for academic uses remains unchanged, as does the Proponent's intention to fully develop Site CC in the future. Parking is no longer being considered for the Site.

The Project as proposed will be the subject of the fifth amendment to the IMP due to its exceedance of the approved stories and height. The Warren Towers Digital Signage work will also be subject to Project Review under Article 80 and is described as a second PIP in the IMPNF.

1.8 PUBLIC REVIEW PROCESS

Concurrent with the submission of this PNF and the IMPNF to BPDA, the Proponent will meet with BPDA staff to present the Project to the Boston University Charles River Campus Task Force (the "Task Force"). The Proponent looks forward to working with the BPDA, the community, and the City of Boston on this Project.

1.8.1 ARTICLE 80 REVIEW PROCESS

As described in Section 1.2, this document is submitted to the BPDA pursuant to Article 80B, Large Project Review, of the Boston Zoning Code. A scoping session and

a community meeting are expected to occur during the public comment period and prior to the issuance of a Scoping Determination.

Following submission of this PNF to the BPDA, the Proponent will meet with City agencies and present the Project at a combined community and Task Force meeting.

1.8.2 BOSTON CIVIC DESIGN COMMISSION

As required by Article 28 of the Boston Zoning Code, the Proponent and the Project Team will meet with the Boston Civic Design Commission (BCDC) to review and discuss the design of the Project. The Proponent will seek a recommendation from the BCDC in advance of BPDA Board approval.

1.8.3 BAY STATE ROAD BACK BAY WEST LANDMARK DISTRICT REVIEW

The Site is located adjacent to the Bay State Road Back Bay West Architectural Conservation District (the "District"). Upper stories of the building will slightly cantilever into the District, and some proposed off-site improvements to the Proponent's surrounding property, as well as to Granby Street, are located within the District. Because of this, the Project is subject to review and approval by the Bay State Road Back Bay West Architectural Conservation District Commission (BSRACDC). The Proponent will consult with the BSRACDC and, following the submittal of a Design Approval Application, will file a request for a Certificate of Appropriateness for review and approval at a public meeting. See Chapter 6: Environmental for a detailed description of historic resources near the Project.

1.8.4 BOSTON PUBLIC IMPROVEMENT COMMISSION

The Project will require the review and approval of the Boston Public Improvement Commission (PIC) for proposed public realm improvements. These improvements will include repairs and upgrades to the surrounding sidewalks as well as proposed improvements to Granby Street. At the appropriate stage in the design process. the Proponent will submit plans to the PIC to receive approval through a public hearing process for off-site improvements that the Proponent may propose within the public right-of-way. These improvements are further described in Chapter 2: Project Description and Chapter 5: Transportation.

1.8.5 BOSTON UNIVERSITY CHARLES RIVER CAMPUS TASK FORCE

The Task Force is comprised of 14 representatives from areas surrounding the Charles River Campus. Since 1986, the Task Force has reviewed all of the University's master plans and development projects. Members of the Task Force include the following individuals:

- Pamela Beale (Chair)
- Paul Berkeley
- Jennifer Carter
- Paul Creighton
- Dan Cuddy
- Anabel Gomes
- James Hynes
- Yvette Lancaster
- Archie Mazmanian
- Terri North
- Richard Ong
- Shlomo Pinkas
- Christopher Strang
- Victor Themo

The Proponent will schedule Task Force meetings that are open to the public during the course of the Article 80B review. The University held a pre-filing meeting with the Task Force on September 26, 2018. Additional Task Force Meetings will be scheduled in late 2018 and in 2019.

1.9 PUBLIC AND COMMUNITY BENEFITS

Since its founding, the University has been committed to, and is an integral part of, the growth and development of the City of Boston. The University continues to make a significant effort to coordinate its goals and objectives with those of the City and is committed to maintaining and improving all property it acquires and to serving the residents of the City by making educational programs of the highest quality available and accessible. The University is proud to be a steward of many historically significant and important buildings on the Charles River Campus. Ongoing and extensive programs to preserve, maintain, and restore these buildings are at the core of the University's commitment to provide excellent facilities to students, faculty, and the public.

Through direct and indirect spending of the University, its employees, students, and their visitors, the University's economic impact on the Commonwealth of Massachusetts totaled nearly $2.8 billion in FY 2015 with $1.05 billion spent in the City of Boston. From an

employment perspective, the University accounted for a total of 17,890 jobs in the Commonwealth, 14,132 of which were located in Boston. This total includes 8,724 individuals who were directly employed by the University and an additional 5,408 jobs that resulted from University spending.

The University makes significant annual contributions to local communities through a combination of direct payments and services, which include real estate taxes, payments in lieu of taxes, linkage payments, scholarships, fees and permits, police services, rubbish removal and street cleaning, and donated use of athletic and recreation facilities. Between FY2007 and FY2017, the University has paid approximately $48 million in real estate property taxes and linkage payments and $59 million to the City of Boston for voluntary payments in lieu of taxes. Combined payments to the City have totaled approximately $107 million.

The University has also contributed more than $6.6 million between FY2007 and FY2017 to the Commonwealth Avenue Improvement and Beautification Project in collaboration with city, state, and federal agencies.

In addition to direct and indirect economic benefits to the City's economy, the University has long committed to providing opportunity and access to higher education through numerous scholarships that benefit residents of Boston.

The University's signature program, the Thomas M. Menino Scholarship Program, is the longest-running and largest scholarship program of its kind. Each year, 25 exceptional Boston Public High School Seniors are awarded four-year, full-tuition merit scholarships to Boston University. This year the program is expected to enroll 29 new recipients. Since the program's inception in 1973, nearly 2,000 Boston Public School (BPS) students have been awarded more than $170 million in full-tuition scholarships from Boston University.

In 2009, to further expand scholarship opportunities for local students, the University committed to meeting the full financial need (without loans) of any BPS graduate admitted to Boston University through the creation of the Community Service Scholarship. Since the program's inception in 2009, 466 Boston Public School students have received over $59 million in Community Service Scholarship funding.

In December 2017, Boston University and Mayor Walsh announced the expansion of the Community Service Scholarship program, which had previously been limited to incoming freshman, to include incoming transfer students who are graduates of Boston Public Schools. So far, 46 students have received approximately $2.2 million in funding. This expansion builds on Mayor Walsh's commitment to expanding the educational opportunities for all BPS graduates.

The University also actively seeks ways to reduce demand on city services. Through its own Police Department, the University brings additional security to the entire campus area, 24

hours per day, seven days per week, responding to calls both inside and outside campus boundaries. It also oversees the daily maintenance of the local MBTA stations and City sidewalks and streets around campus, provides snow removal during winter months, plants and repairs street trees, and conducts pest control.

The Project will provide substantial benefits to the City and its residents, including the following:

- Transformation of a surface parking lot into a high-quality state-of-the-art academic center for the study of data sciences;
- Maintenance of the position of the University and the region on the cutting edge of data sciences: mathematics, statistics, and computer sciences teaching and research opportunities;
- Consolidation of three major related University research activities into one building with new facilities for state-of-the-art research activities;
- Generation of approximately $10 million/year in grant activity;
- Creation of a state of the art, energy efficient, and environmentally friendly building;
- Improvement and rejuvenation of the streetscape of Commonwealth Avenue with increased pedestrian activity within the academic campus;
- Enhancement of open space and public amenities that contribute to ground floor activation and improve pedestrian accessibility in the neighborhood;
- Substantial improvements to Granby Street including bicycle lanes and street trees;
- Creation of approximately 1,040 direct construction jobs, 554 indirect construction jobs[1], and 414 permanent jobs[2] as a result of the Project; and
- Linkage benefits that will include Development Impact Payments (DIP) of $2,754,150.00 for Housing Linkage and $542,900.00 for Jobs linkage.

[1] Construction jobs based on Regional Economic Models, Inc. (REMI), PI+ Massachusetts Regions, v1.6.6. Boston Planning & Development Agency (BPDA).
[2] Bartley, D. (2005). Connection: The Journal of the New England Board of Higher Education; City of Boston Assessing Department, 2009.

1.10 SUMMARY OF REQUIRED PERMITS AND APPROVALS

Table 1-1 provides a list of approvals that may be required for the Project.

Table 1-1: Anticipated Project Approvals

Agency	Approval
Local	
Boston Planning and Development Agency (BPDA)	• Article 80B Large Project Review • Article 80D Institutional Master Plan Amendment • Schematic Design Approval • Design Development Approval • Construction Document Approval • Boston Residents Construction Employment Plan • Certification of Compliance with Article 80B • Certification of Consistency with Article 80D • Development Impact Project Agreement
Boston Civic Design Commission	• Recommendation to the BPDA Board
Bay State Road Back Bay West Architectural Conservation District Commission	• Certificate of Design Approval
Boston Zoning Commission	• Institutional Master Plan Amendment
Boston Transportation Department	• Transportation Access Plan Agreement • Construction Management Plan
Boston Water and Sewer Commission	• Site Plan Approval • Groundwater Conservation District Approval
Public Improvement Commission	• Specific Repair Plan Approval
Inspectional Services Department	• Building Permit • Certificate of Occupancy • Flammable Storage and Garage Permit
Boston Zoning Board of Appeals	• Building Code Variances (if needed)
State	
Department of Environmental Protection	• Notification Prior to Construction or Demolition • Source Registration for Emergency Generator • Elevator Permit • UIC Registration for Geothermal Wells
Federal	
Environmental Protection Agency	• NPDES Construction/Stormwater General Permit

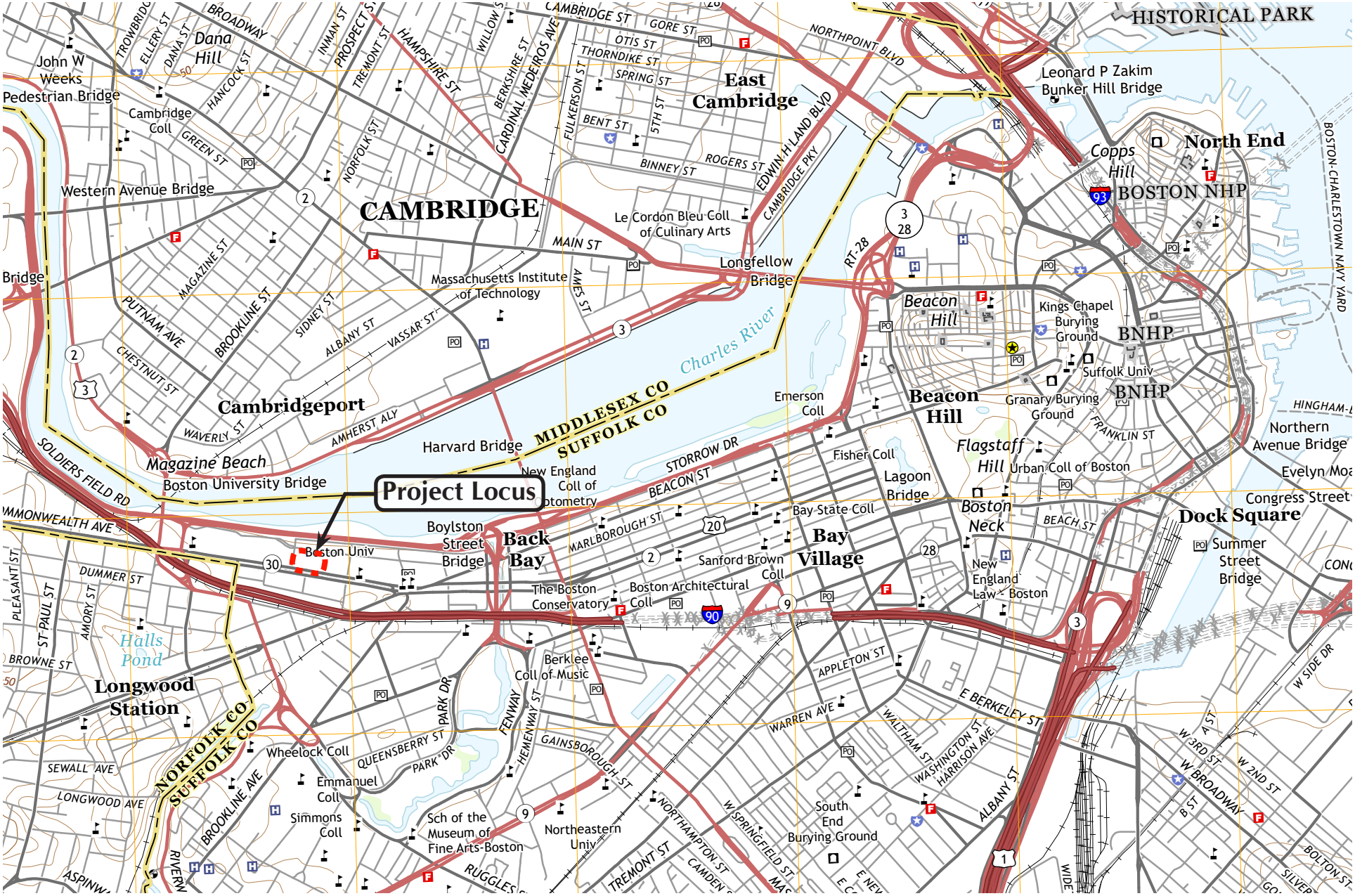
1.11 PROJECT TEAM

The primary contacts from the Project team can be found below:

Proponent	Trustees of Boston University One Silber Way Boston, MA 02215 Contacts: Gary W. Nicksa, Senior Vice President for Operations nicksa@bu.edu Phone: 617-353-6500 Michael Donovan, Vice President for Campus Planning and Operations donovanm@bu.edu Phone: 617-353-4468
Planning and Permitting	Fort Point Associates, Inc. 31 State Street, 3rd Floor Boston, MA 02109 Contact: Judith T. Kohn, Vice President jkohn@fpa-inc.com Phone: 617-357-7044 x211
Architect	KPMB Architects 322 King Street West, Third Floor Toronto, Ontario M5V 1J2 Contact: Luigi LaRocca, Principal llarocca@kpmbarchitects.com Phone: 416-977-5104 x232
Landscape Architect	Richard Burck Associates, Inc. 7 Davis Square Somerville, MA 02144 Contact: Richard Burck skip@richardburck.com Phone: 617-623-2300

MEP	Bard, Rao + Athanas Consulting Engineers LLC 10 Guest Street Boston, MA 02135 Contact: Cris Copley crc@brplusa.com Phone: 617-925-8316
Sustainability/LEED	The Green Engineer 23 Bradford Street, 1st Floor Concord, MA 01742 Chris Schaffner chris@greenengineer.com Phone: 978-369-8978
Legal	Rubin and Rudman, LLP 50 Rowes Wharf Boston, MA 02110 Contact: James H. Greene, Partner jgreene@RubinRudman.com Phone: 617-330-7000
Transportation	AECOM 1 Federal Street, 8th Floor Boston, MA 02110 Contact: James A Doyle, AICP Jay.doyle@aecom.com Phone: 978-905-2188
Civil Engineering	Nitsch Engineering, Inc. 2 Center Plaza #430 Boston, MA 02108 Contact: Chelsea Christenson, Project Manager cchristenson@nitscheng.com Phone: 617-206-8737

Geotechnical and Geothermal	Haley and Aldrich 70 Blanchard Road, Suite 204 Burlington, MA 01803 Contact: Bryan Sweeney, Senior Vice President bsweeney@haleyaldrich.com Phone: 617-908-2715
Wind	RWDI, Inc. 600 Southgate Drive Guelph, ON N1G 4P6 Contact: Dan Bacon Dan.bacon@RWDI.com Phone: 519-823-1311
Pre-Construction Services	Suffolk Construction Co., Inc. 65 Allerton Street Boston, MA 02119 Contact: Frank Craemer Project Executive fcraemer@suffolk.com Phone: 617-517-5236



Boston, Massachusetts

Figure 1-1
Locus Map
Source: USGS, 2015

Boston, Massachusetts

Figure 1-2
Aerial View
Source: Google Earth, 2018

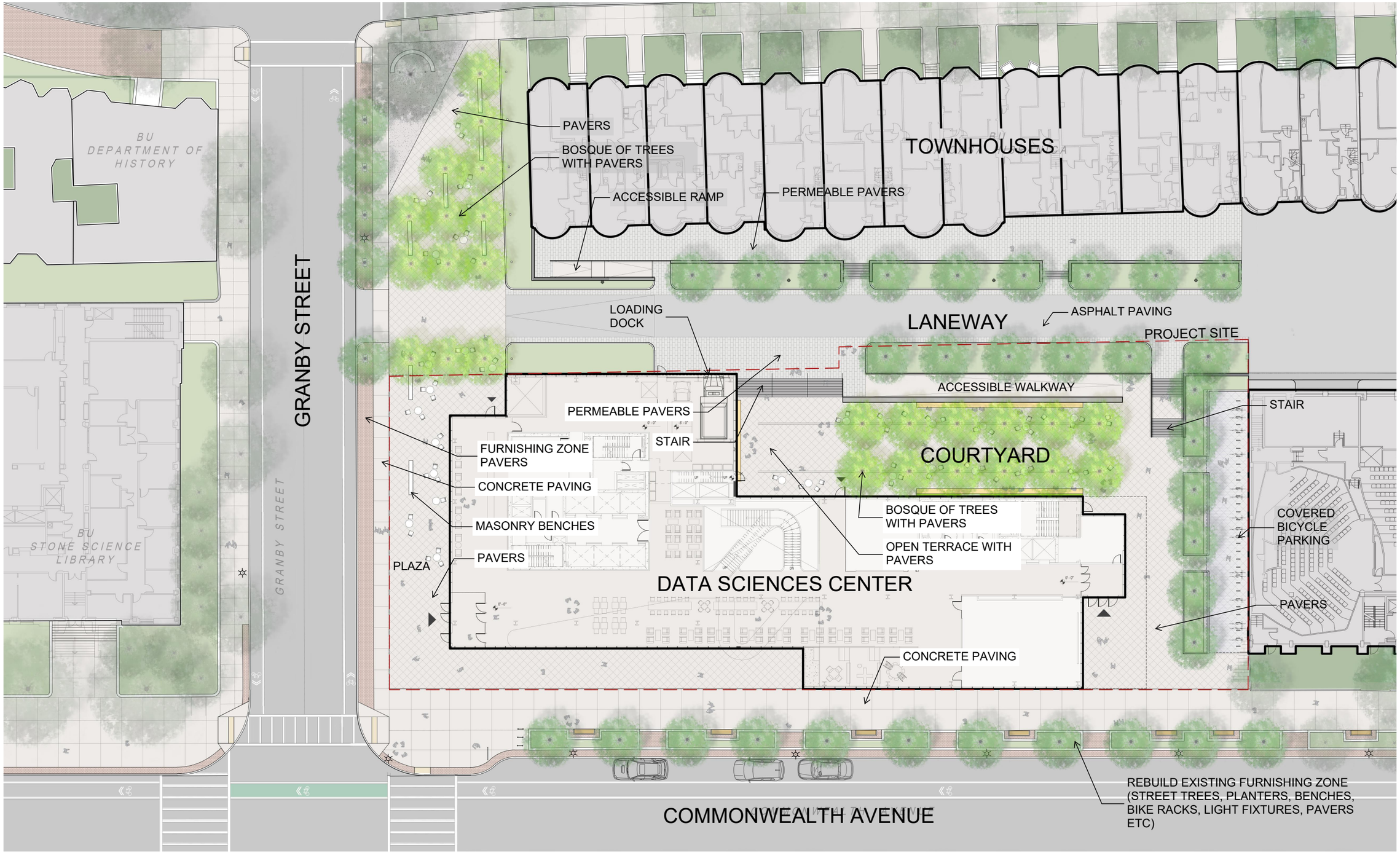


Figure 1-3
Project Site Plan
Source: Richard Burck Associates, Inc., 2018

Chapter 2

PROJECT DESCRIPTION

CHAPTER 2: PROJECT DESCRIPTION

2.1 PROJECT SITE AND PUBLIC REALM

The Proponent owns and controls most of the buildings along Commonwealth Avenue from Kenmore Square to the Boston University Bridge. To the east of the Site is the Boston University College of Health and Rehabilitation Sciences: Sargent College (Sargent College), while the recently constructed Rajen Kilachand Center for Life Sciences and Engineering and Warren Towers, a student residence hall, are each located to the south. Granby Street and the Department of Archaeology and Center for Environmental Studies are to the west of the Site. University-owned multistory brick townhouses face the Site to the north, across a 16-foot-wide paved private passageway that functions as a service alley between the backs of Boston University buildings and the brick townhouses. Together with Warren Towers, the townhouses host over 2,200 Boston University students. These residences front on Bay State Road, which directly abuts Storrow Drive and the Charles River Esplanade.

The Site consists of an existing surface parking lot with 126 parking spaces and a small area of paved open space with benches. Prior to its acquisition by the Proponent, the Site was utilized for commercial uses. The surface parking lot is bordered by three curb cuts on Commonwealth Avenue and three on Granby Street.

Development of the Project will require removal of the existing parking lot and closing of the curb cuts on Commonwealth Avenue as well as two curb cuts on Granby Street. The removal of the curb cuts will create an uninterrupted sidewalk along Commonwealth Avenue between Silber Way and Granby Street.

Proposed off-site improvements to Granby Street will include a change from a two-lane, one-way configuration to a two-way orientation with exclusive bicycle lanes on either side and new street trees. The Boston University-owned open space area at the corner of Granby Street and Bay State Road will be reconstructed and improved with new plantings, paving, and site amenities. The existing curb cut to access the service alley from Granby Street will be reconstructed and repaved with a combination of pervious pavers and concrete and bituminous concrete pavement. New trees and plantings will line the service alley passageway behind the building, which will transform it into a pedestrian-friendly laneway. These features will allow for improved vehicular, pedestrian, and bicycle circulation as well as direct vehicular connections to the Project's service areas.

Commonwealth Avenue will be animated by the Project's activities and transparency, its open visible accessible entrances at both the east and west ends of the Site, and a new outdoor landscaped pedestrian connection to the laneway between the Sargent College building and the Data Sciences Center. For a more detailed description of Public Realm improvements, see Chapter 3 Urban Design. See Figure 2-1, Oblique View of Project Site; Figure 2-2, Existing

Conditions Plan; Figure 2-3, Existing Conditions Photographs Key; and Figures 2-4 and 2-5, Existing Conditions Photographs.

2.2 PROPOSED PROJECT

2.2.1 PROGRAM DESIGN GOALS

Critical program design goals for the Project have been identified to:

- Provide the data sciences disciplines with a visible presence and home in the center of the Charles River Campus;
- Provide a learning and research environment that is open and collaborative;
- Reduce the stock of surface parking lots owned by the University and replace the Granby Street lot with a cornerstone urban design feature;
- Continue to expand the number of sustainable and resilient buildings on Boston University's campus;
- Animate and improve the public realm at the corner of Commonwealth Avenue and Granby Street; and
- Develop and improve pedestrian connections through and around the block to Bay State Road, University properties, and the Riverfront.

2.2.2 PROJECT PROGRAM

The Project will bring together closely allied disciplines, providing a new platform for collaboration and innovation in the data sciences. The academic, office, and research and training space will serve the College of Arts and Sciences departments of Mathematics & Statistics and Computer Science as well as the Hariri Institute. The Project will allow these academic and research entities to consolidate from five different locations across the campus to one building, which is a critical factor for units that are highly collaborative in their field. The Project will generate some increase in the number of faculty and graduate students who conduct research in these areas as well as providing "hoteling" space for faculty or staff from other departments or institutions needing temporary office space. Descriptions of the academic and research entities, as well as their interaction in the Data Sciences Center, are found in the sections below.

The lower floors of the Data Sciences Center will support a major teaching center that will affirm the University's strong commitment to excellence in teaching of both undergraduate and graduate students. These instruction spaces and the adjacent areas

for collaboration will promote innovation in teaching in the most contemporary of settings and services. The teaching center will be co-located with general classrooms and teaching spaces that serve the University community.

The Project will specifically include dedicated computer science and mathematics computing laboratory and workspaces, general classrooms and department teaching spaces, seminar rooms, focused and informal collaboration spaces, faculty and graduate/post-doctoral offices, and administration spaces, as well as seminar rooms, conference and meeting rooms, and typical building support areas including restrooms, utility rooms, mechanical rooms, and common areas.

As described in Table 2-1, the Project is consistent with the proposed IMP Amendment height, massing, and other dimensional controls. The total building footprint is approximately 20,500 sf, covering 49 percent of the Site. The total GFA of the building as calculated under Boston's zoning code is approximately 305,000 sf, and the Project's Floor Area Ratio (FAR) is 7.26. The 19-story building has an integrated five-story podium to create an appropriately-scaled street face on Commonwealth Avenue and Granby Street. The 19 stories will be located above grade and include two levels of mechanical penthouse. Two levels will be constructed below grade.

Table 2-1: Project Program

Project Component	Dimensions/Count
Total Project Site	42,000 sf
Building Footprint Area	20,500 sf
Gross Floor Area (Per Zoning)	305,000 sf
Floor Area Ratio (Per Zoning)	7.26
Stories	19 stories with 2 levels below grade
Bicycle Parking	65-70 bicycles in exterior covered space
Height	305 feet
Building Area[1]	
Sub-basement	~4,000 sf
Ground Floor	~17,300 sf
Typical Floor – Level 2-5	~24,472 sf
Typical Floor – Level 6-17	~14,000 sf
Penthouse Level 18	2,440 sf
Penthouse Level 19	~1,530 sf

[1] Gross Floor Area per Zoning

Project Component	Dimensions/Count
Program Overview	
Hariri Institute	51,549 NASF[2]
Computer Science	40,653 NASF
Mathematics & Statistics	32,485 NASF
Registrar Classrooms / Teaching Space	19,276 NASF
Total:	143,963 NASF

2.2.3 BELOW-GRADE USES

The basement, which is the first level below grade, includes four classroom and teaching spaces, building operations offices, showers and changing rooms for bike users, and mechanical and electrical equipment space. The sub-basement, which is two levels below grade, is a service level with no academic space and includes areas for mechanical and electrical equipment as well as some general building storage space. See Figure 2-6, Lower Sub-Basement Plan; and Figure 2-7, Basement Plan.

2.2.4 PODIUM LEVELS - GROUND FLOOR AND SECOND FLOOR USES

The ground floor is highly transparent and emphasizes porosity with multiple entrances into the building. The large atrium on the ground floor has a butterfly stair at the center of the plan, which provides for movement to teaching spaces from the basement through the fifth floor. The interconnectivity created by the atrium and atrium stair offers opportunities for collaboration and interaction while providing a view through to the laneway and a true window into the collaborative open spaces on the ground and second floors. Collaboration spaces are profiled along Commonwealth Avenue.

The first two floors of the building house the more "public" academic program spaces. Twenty-one percent of the floor space is devoted to open informal collaborative spaces for students. These collaboration spaces are for the most part positioned on the glass walls open to Commonwealth Avenue. These floors also house six general classrooms that will provide a flexible environment for teaching in today's and tomorrow's environment that values connectivity. Several classrooms will have flexible wall dividers. All classrooms will be equipped with technology for connectivity and flexible movable furniture systems.

The ground floor is accessible from the west and at mid-block on the north to engage the Project's open space features.

[2] Net Assignable Square Feet

See Figure 2-8, Ground Floor Plan; and Figure 2-9, Second Floor Plan.

2.2.5 PODIUM LEVELS - FLOORS THREE TO FIVE – MATHEMATICS & STATISTICS

The upper three floors of the podium of the building contain several general classroom spaces in addition to teaching and computing lab space for the departments of Computer Science and Mathematics & Statistics. The academic spaces, offices, research spaces, and open collaboration spaces for Mathematics & Statistics take up most of the Net Assignable Square Feet (NASF) on these floors.

On the fifth floor, a pavilion located at the east end of the building will provide a common gathering space. This space will serve as an informal lunch area for all disciplines in the building as well as an event space for use by the larger Boston University community.

See Figure 2-10, Third Floor Plan; Figure 2-11, Fourth Floor Plan; and Figure 2-12, Fifth Floor Plan.

2.2.6 BUILDING TOWER - FLOORS SIX THROUGH TEN – COMPUTER SCIENCE

Floors six through ten will contain the department academic space for Computer Science, in which students and faculty study and teach the possibilities, limitations, and applications of computing as well as advancement of the field through academic research.

The tower floors are organized as an academic vertical campus community with each department inhabiting a "neighborhood." Each tower floor provides open and enclosed work spaces that are grouped in flexible configurations to support research clusters in each department. Each research cluster includes space for faculty offices, shared offices for post doctorates and graduate students, open informal and formal collaboration spaces, meeting room spaces, and computing research spaces. The variety of open and closed spaces will encourage collaboration and innovation not only within a research cluster, but also amongst other research clusters in the department and the other departments housed in the Data Sciences Center.

The atrium stair in the center of the building terminates on the fifth floor, and a smaller, open stairway is located slightly to the west to connect through floor seventeen. This connection will supplement the two fire stairs in the building core, providing a more collaborative link between each level.

See Figure 2-13, Sixth Floor Plan; Figure 2-14, Seventh Floor Plan; Figure 2-15, Eighth Floor Plan; Figure 2-16, Ninth Floor Plan; and Figure 2-17, Tenth Floor Plan.

2.2.7 BUILDING TOWER - FLOORS ELEVEN THROUGH SEVENTEEN – HARIRI INSTITUTE FOR COMPUTING AND COMPUTATIONAL SCIENCES AND ENGINEERING

An incubator in a University setting, the Hariri Institute propels collaborative, interdisciplinary research and training initiatives by 1) promoting discovery and innovation through the use of computational and data driven approaches, and 2) advancing computing sciences inspired by challenges in engineering, social, health and management sciences, and the arts. The Hariri Institute includes centers, initiatives, and labs that work in collaboration to support a portfolio of ambitious research projects.

The Hariri Institute closely intersects with both the departments of Computer Science and Mathematics & Statistics. The co-location of these disciplines in one building and the development of the vertical campus enhances the opportunities for the Hariri Institute to develop and grow world class research at Boston University. The seven floors of the Institute include academic and research space similar to the academic departments in the building but with a more flexible and open working environment.

On the top floor, a 100+ seat multipurpose room will serve the Hariri Institute as an everyday colloquium room. The space will also be available to the larger Boston University community for specific events.

See Figure 2-18, Eleventh Floor Plan; Figure 2-19, Twelfth Floor Plan; Figure 2-20, Thirteenth Floor Plan; Figure 2-21, Fourteenth Floor Plan; Figure 2-22, Fifteenth Floor Plan; Figure 2-23, Sixteenth Floor Plan; and Figure 2-24, Seventeenth Floor Plan.

2.2.8 BUILDING ROOF AND MECHANICAL PENTHOUSE

The eighteenth and nineteenth floors will be devoted to mechanical equipment.

A portion of the northeastern corner of the eighteenth and nineteenth floors will be open to both the seventeenth floor and the sky above, creating an open-air terrace below.

See Figure 2-25, Eighteenth Floor Plan – Mechanical Penthouse; Figure 2-26, Nineteenth Floor Plan – Mechanical Penthouse; and Figure 2-27, Roof Plan.

2.3 SITE REQUIREMENTS

2.3.1 SITE CIRCULATION

The podium, which occupies approximately half of the Site area, is designed to provide street frontage on both Commonwealth Avenue and Granby Street. The

configuration of the ground and second floors is such that the width of the sidewalk area on Granby Street and on roughly half of the Commonwealth Avenue building frontage is increased at street level. The enhanced pedestrian environment features a significantly wider walking area, much of which has overhead protection from the elements. The building footprint does not extend to the easternmost edge of the Site, and thus creates a 4,500 sf pedestrian space that will be open to the sky between the Data Sciences Center and the Sargent College building. This connection will create a new north-south link to a courtyard on the north side of the building as well as the laneway and University-owned townhouses on Bay State Road. Pedestrians will be able to enter the building from both the corner of Granby Street and Commonwealth Avenue and midblock from the new pedestrian open space connection beside the Sargent College building. See Figure 2-28, Circulation and Access Plan.

2.3.2 VEHICULAR CIRCULATION

As a result of the Project, three curb openings along Commonwealth Avenue will be closed. The Site will provide no new curb cuts for vehicular access along Commonwealth Avenue. Two existing curb cuts on Granby Street will be removed, and one will be maintained and reconstructed.

In addition to on-site improvements, the alley between Commonwealth Avenue and Bay State Road will be reconstructed from Granby Street to the eastern boundary of the Site. Access for loading, deliveries, and trash pick-up will be provided on the north side of the Site via the new pedestrian-friendly laneway curb cut on Granby Street and by the current access at Silber Way. Granby Street is proposed to be converted to a two-way, two-lane roadway with dedicated bicycle lanes. The Project will not provide any designated drop-off area for private vehicles, but metered parking spaces along Commonwealth Avenue will be retained or replaced.

The Granby Street Lot currently provides five handicap-accessible parking spaces, three of which are located on the eastern side closer to the Sargent College building. To mitigate the loss of these parking spaces, the Project will provide two handicap-accessible on-street spaces along Commonwealth Avenue in close proximity to the Project's eastern accessible entrance and the Sargent College building.

2.3.3 LOADING AND SERVICE

Trucks and deliveries will be accommodated at a loading dock at the north side of the building, which will be accessed from the laneway. Vehicles will access the laneway using routes similar to the existing truck and delivery routes to University-owned buildings located in the block. The loading dock will provide two ports. One port will receive general deliveries, while the second will house an internal trash compactor. Recycling bins will be housed in the interior of the loading dock for

regular pickup. An existing trash compactor currently situated in the alley serves the Sargent College building. The existing trash compactor will be relocated to continue to serve the University's facilities.

2.3.4 PEDESTRIAN/BICYCLE CIRCULATION

Pedestrians will enter the Data Sciences Center from two main accessible entrances provided at the western corner of the building at Granby Street and Commonwealth Avenue and at the eastern corner near the Sargent College building. Pedestrians will also access the building midblock from the north via the new pedestrian courtyard. The ground floor of the Project is set back from the Sargent College building, allowing for a north-south pedestrian connection between Commonwealth Avenue and the laneway. Additionally, the configuration of the ground floor and the second floor provides a wide building frontage and sidewalk plaza area for pedestrians along the length of Granby Street and approximately half of the length along Commonwealth Avenue.

As part of the Project, the Proponent proposes to introduce design changes on Granby Street. These changes include reconfiguring Granby Street from a two-lane, one-way southbound street to a two-way street to reduce traffic on Bay State Road. Dedicated bicycle lanes on both sides of the street will connect to the existing network on Commonwealth Avenue. The Project will provide bicycle storage on-site at the eastern end near the Sargent College building. Bicycle racks are also currently available at several locations in the neighborhood.

2.3.5 ACCESSIBILITY

All of the Project's main entrances will be located at ground level and will be universally accessible. The Project's interior treatments will facilitate universally accessible connections on every floor.

2.3.6 PARKING AND ACCESS

The Site includes an existing surface parking lot, also known as Lot N or Granby Lot, which contains 126 parking spaces. This parking lot will be removed, and no new parking will be required to accommodate the Project program and uses. Parking and access is described in detail in Chapter 5 Transportation.

2.4 OPEN SPACE AND LANDSCAPE

The Proponent proposes to make landscape and open space improvements both within the Site boundaries and to off-site areas abutting the Site. Development of the Project will require removal of parking in the surface lot as well as behind the University-owned townhouses in the abutting alley, which will create a more pedestrian-friendly landscaped environment

while maintaining service and delivery functions on the improved laneway. The improvements to the laneway will include a new Americans with Disabilities Act (ADA) accessible route to the townhouses.

To the north, between the laneway and the Data Sciences Center, there is a new courtyard space and another building entrance that leads to the central atrium and connected spiraling open stair. This large courtyard space will be set at the elevation of the building's ground floor and will be fully accessible directly from the central atrium. Offering outdoor seating for groups and individuals, the space will be planted with shade trees and paved with large stone or concrete pavers. From the exterior of the building, visitors can access the area via Commonwealth Avenue or the laneway. Because the courtyard is elevated above the laneway, it will provide views of the surrounding architecture and skyline.

The Project will provide new street trees along Granby Street and improvements to an open space area at the corner of Granby Street and Bay State Road, and will replace existing street trees and planters along Commonwealth Ave. A new open space connection to the laneway and Bay State Road area will be created between the building and the six-story Sargent College to the east, which will be softened with a line of canopy trees.

See Figure 2-29, Project Site Plan; and Figure 2-30, Landscape Plan.

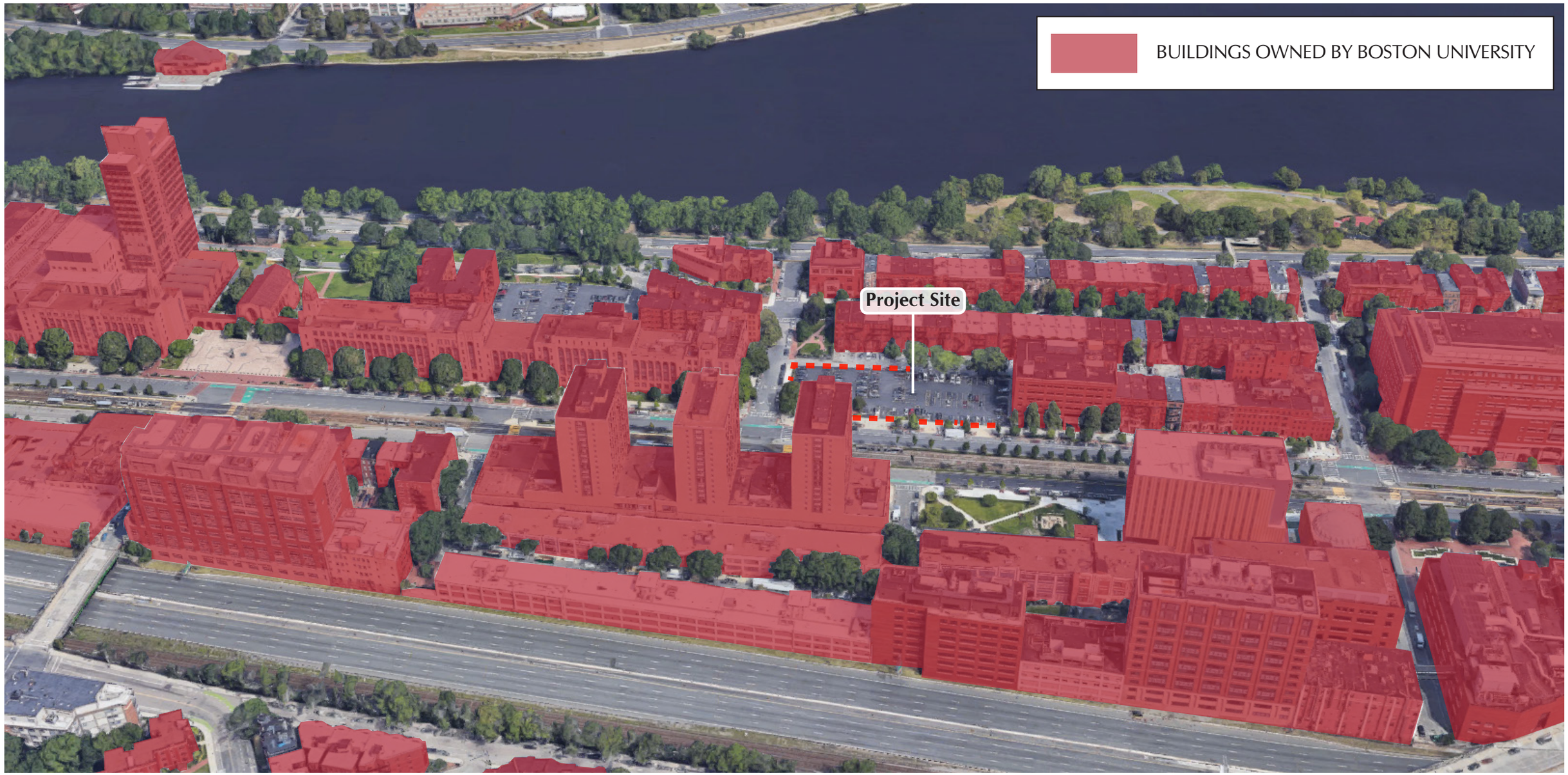


Figure 2-1
Oblique View of Project Site
Source: Google Maps & Fort Point Associates, Inc., 2018

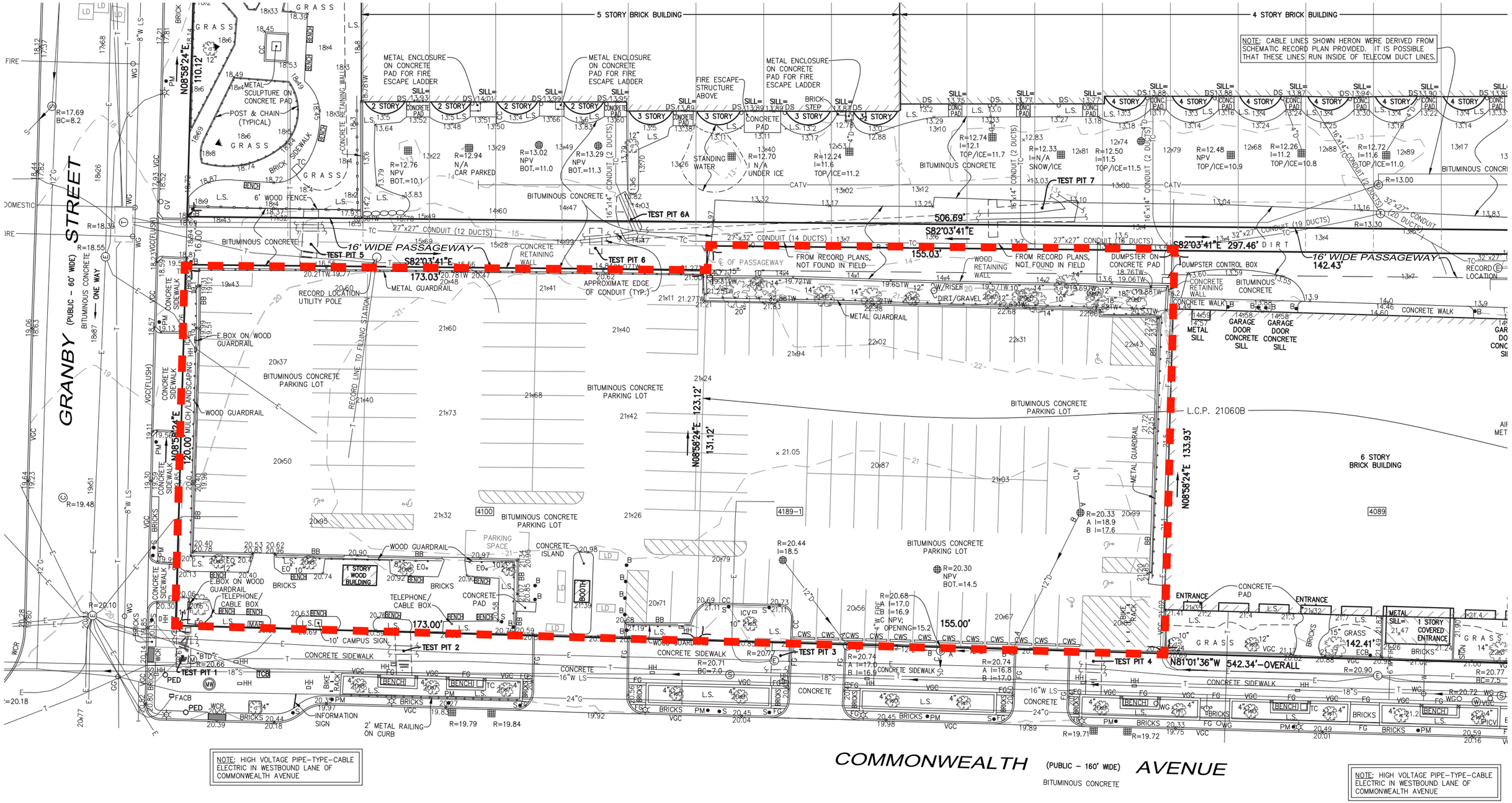
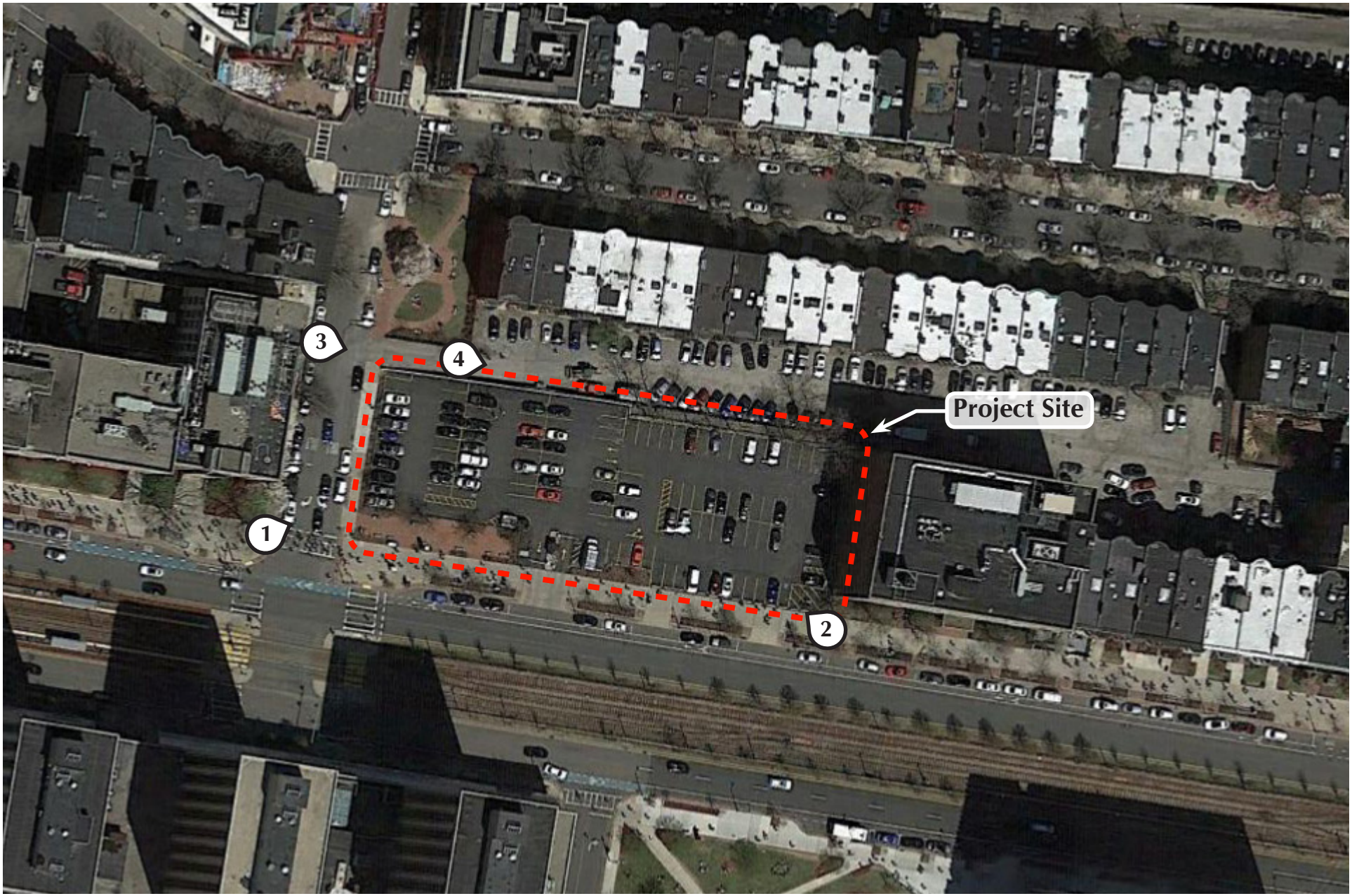


Figure 2-2
Existing Conditions Plan
Source: Nitsch Engineering, Inc., 2018



Boston, Massachusetts

Figure 2-3
Existing Conditions Photographs Key
Source: Fort Point Associates, Inc., 2018

Existing Photograph 1: View Looking Northeast Toward Project Site

Existing Photograph 2: View Looking Northwest Toward Project Site

Figure 2-4
Existing Conditions Photographs
Source: KPMB Architects, 2018

Existing Photograph 3: View Looking East Toward Alley

Existing Photograph 4: View Looking East in Alley

Figure 2-5
Existing Conditions Photographs
Source: KPMB Architects, 2018

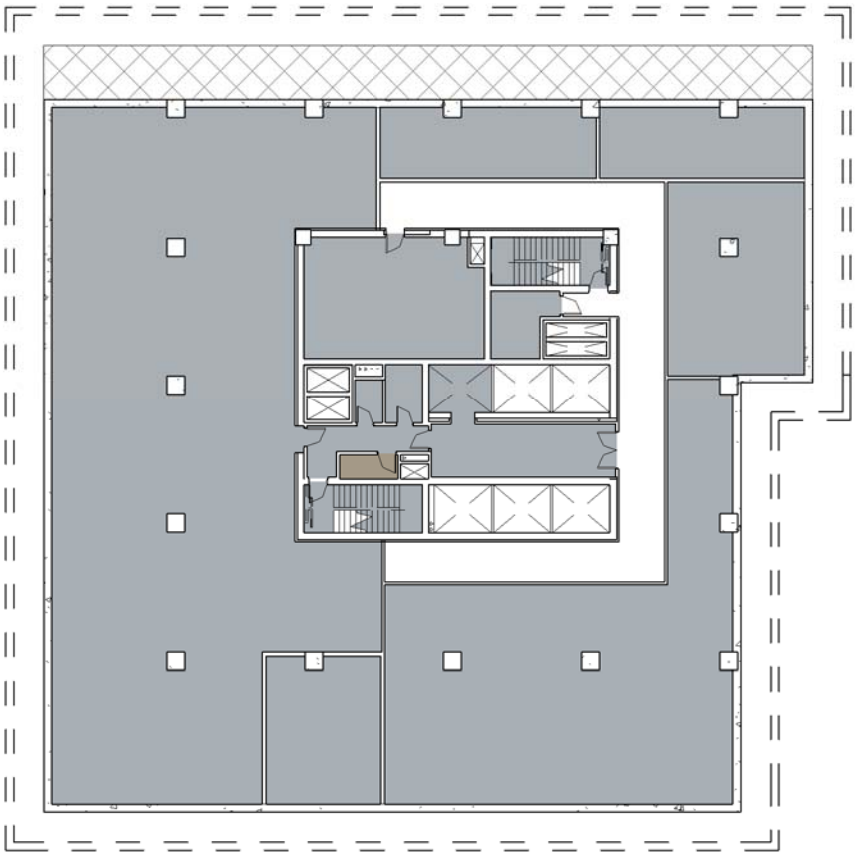


Figure 2-6
Lower Sub-Basement Plan
Source: KPMB Architects, 2018

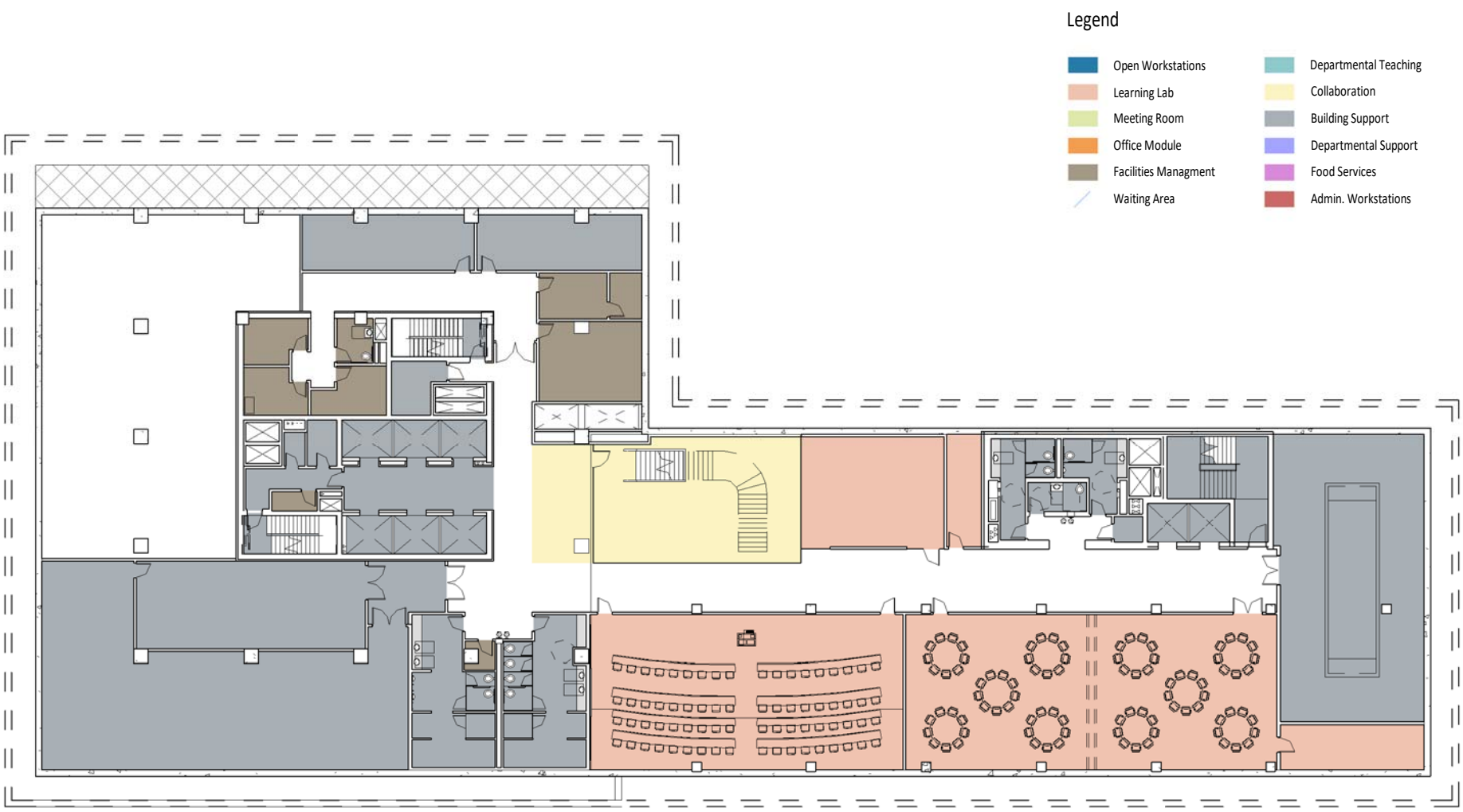


Figure 2-7
Basement Plan
Source: KPMB Architects, 2018

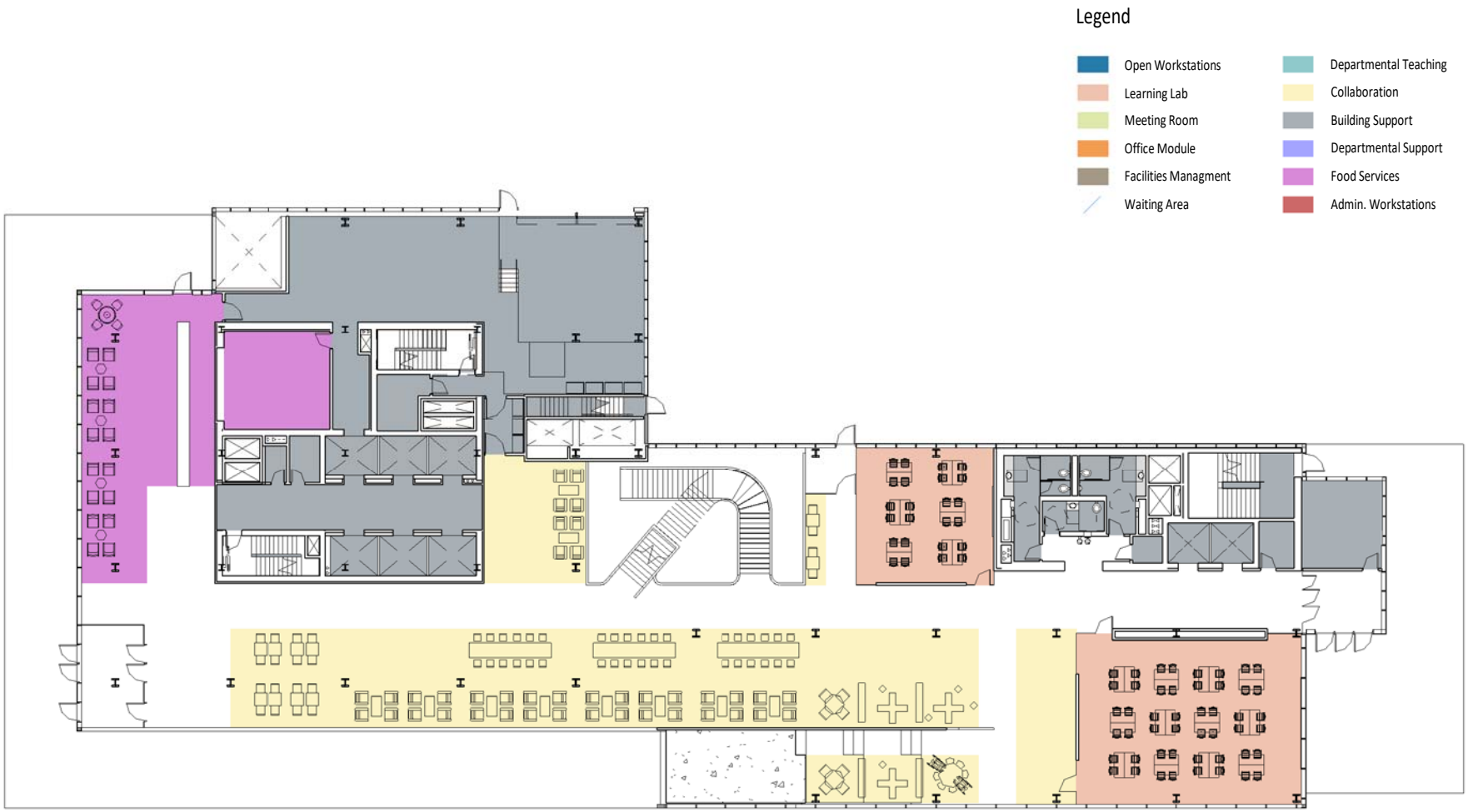


Figure 2-8
Ground Floor Plan
Source: KPMB Architects, 2018

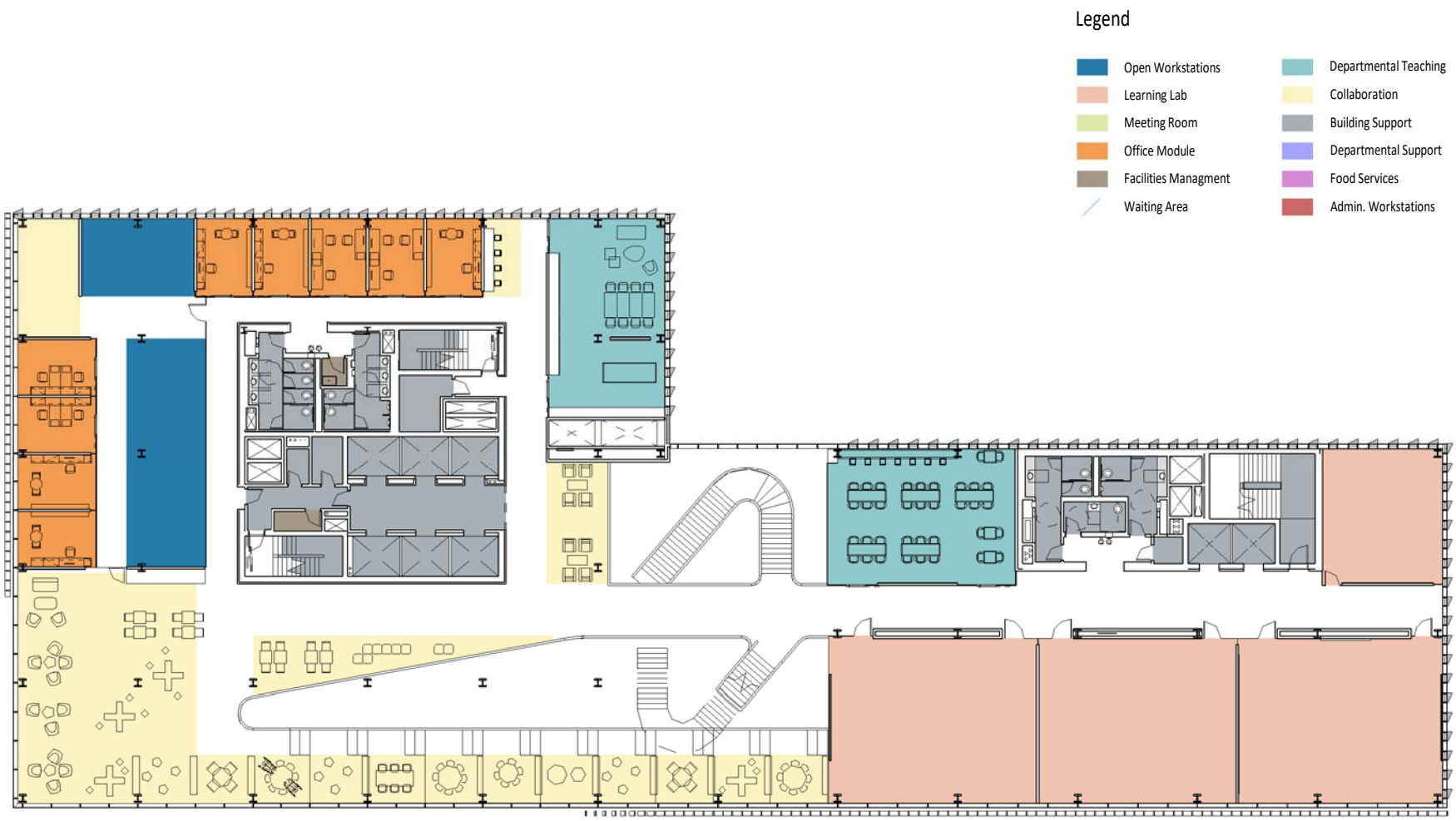


Figure 2-9
Second Floor Plan
Source: KPMB Architects, 2018

Figure 2-10
Third Floor Plan
Source: KPMB Architects, 2018

Figure 2-11
Fourth Floor Plan
Source: KPMB Architects, 2018

Figure 2-12
Fifth Floor Plan
Source: KPMB Architects, 2018

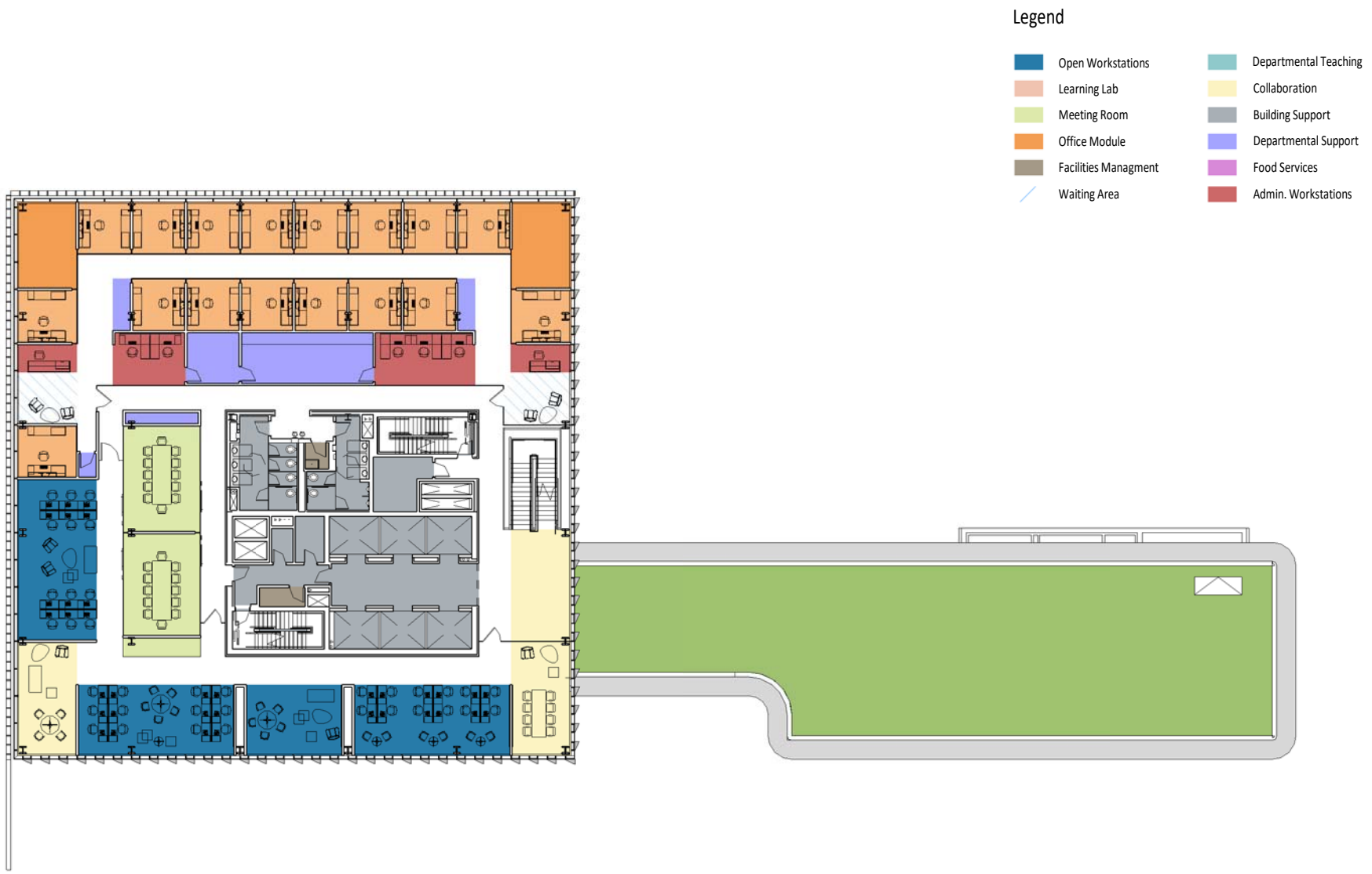
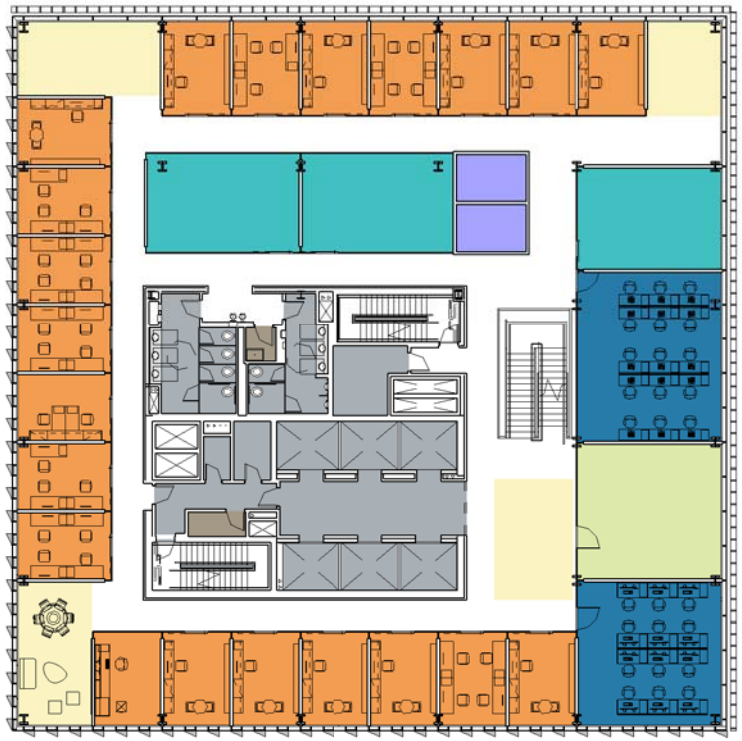


Figure 2-13
Sixth Floor Plan
Source: KPMB Architects, 2018

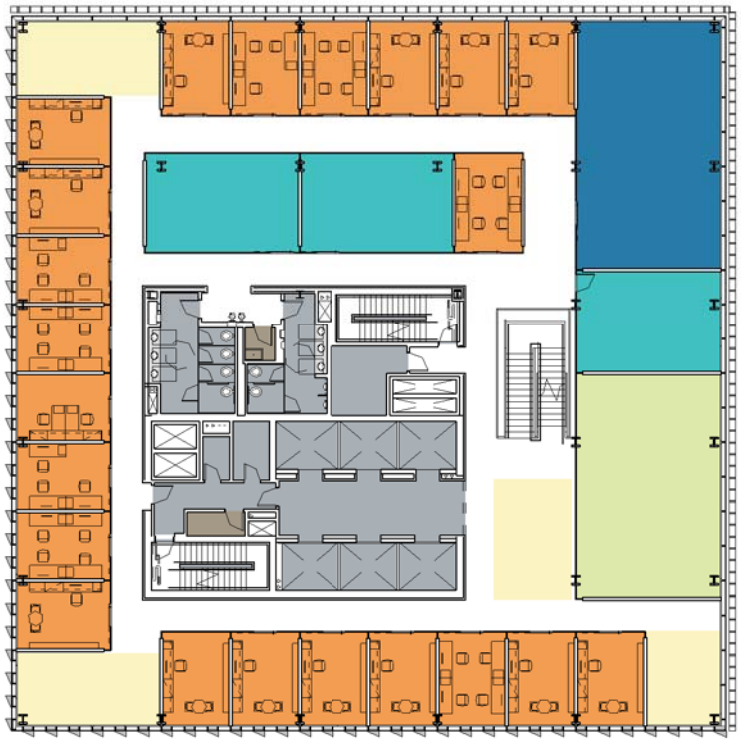
Figure 2-14
Seventh Floor Plan
Source: KPMB Architects, 2018



Legend

- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
- Departmental Teaching
- Collaboration
- Building Support
- Departmental Support
- Food Services
- Admin. Workstations

Figure 2-15
Eighth Floor Plan
Source: KPMB Architects, 2018



Legend

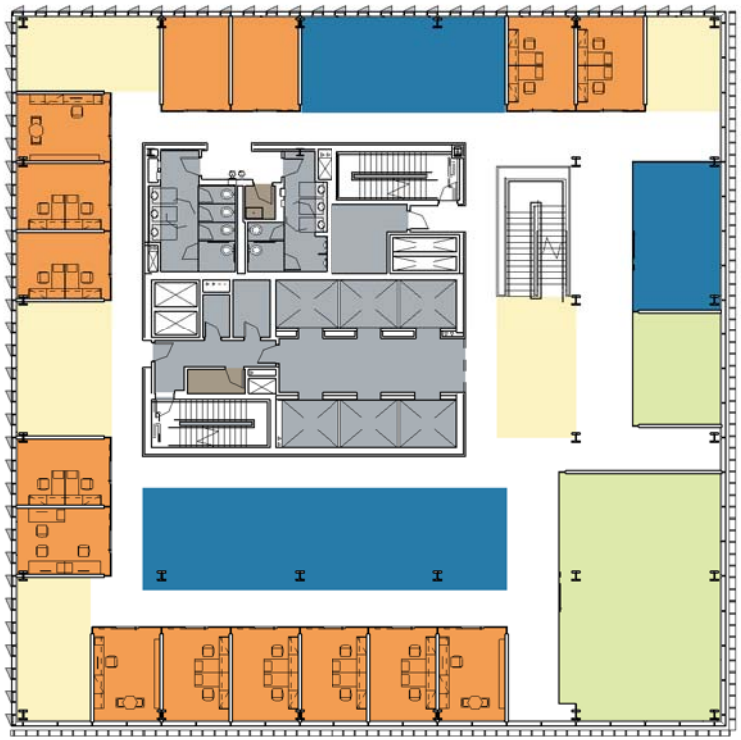
- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
- Departmental Teaching
- Collaboration
- Building Support
- Departmental Support
- Food Services
- Admin. Workstations

Figure 2-16
Ninth Floor Plan
Source: KPMB Architects, 2018

Legend

- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
- Departmental Teaching
- Collaboration
- Building Support
- Departmental Support
- Food Services
- Admin. Workstations

Figure 2-17
Tenth Floor Plan
Source: KPMB Architects, 2018



Legend

- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
- Departmental Teaching
- Collaboration
- Building Support
- Departmental Support
- Food Services
- Admin. Workstations

Figure 2-18
Eleventh Floor Plan
Source: KPMB Architects, 2018

Legend

- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
- Departmental Teaching
- Collaboration
- Building Support
- Departmental Support
- Food Services
- Admin. Workstations

Figure 2-19
Twelfth Floor Plan
Source: KPMB Architects, 2018

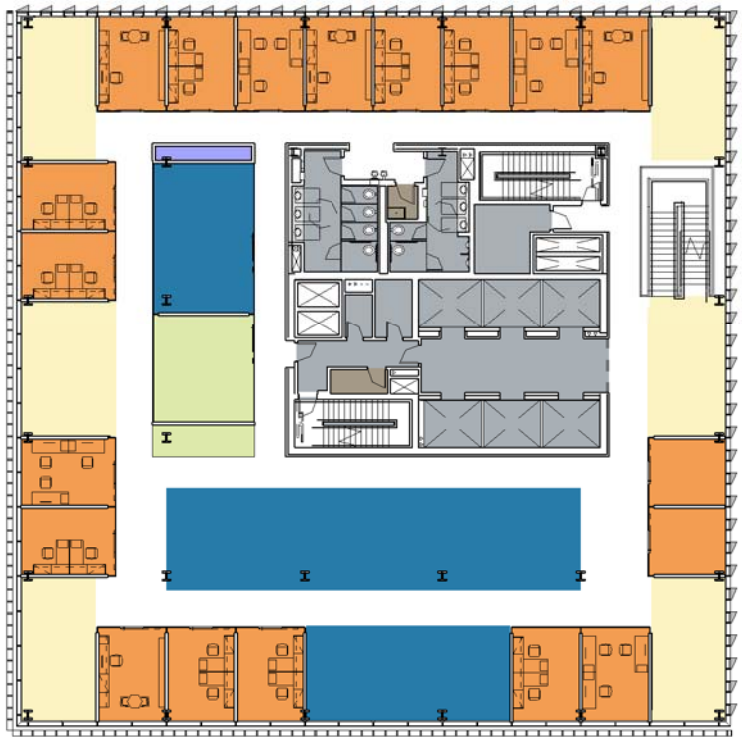
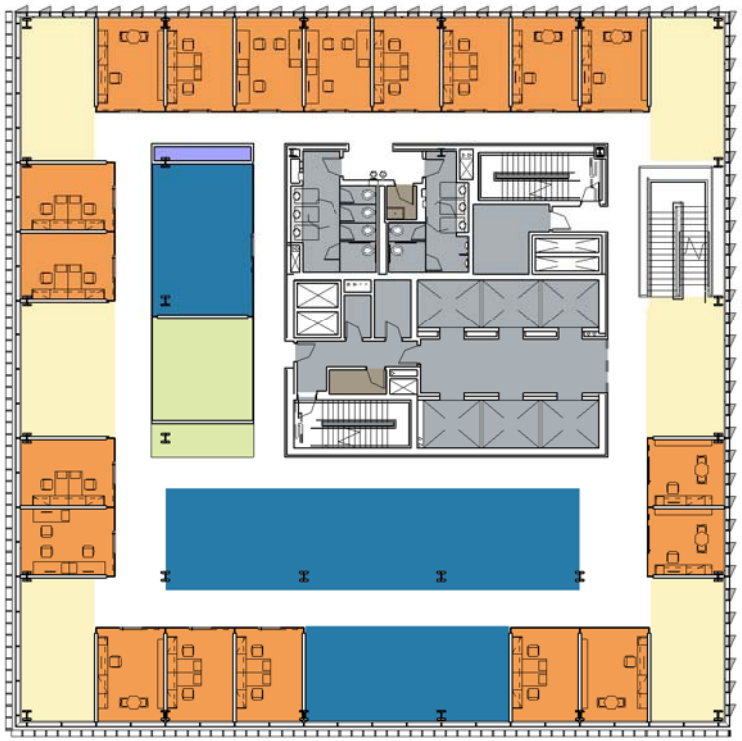


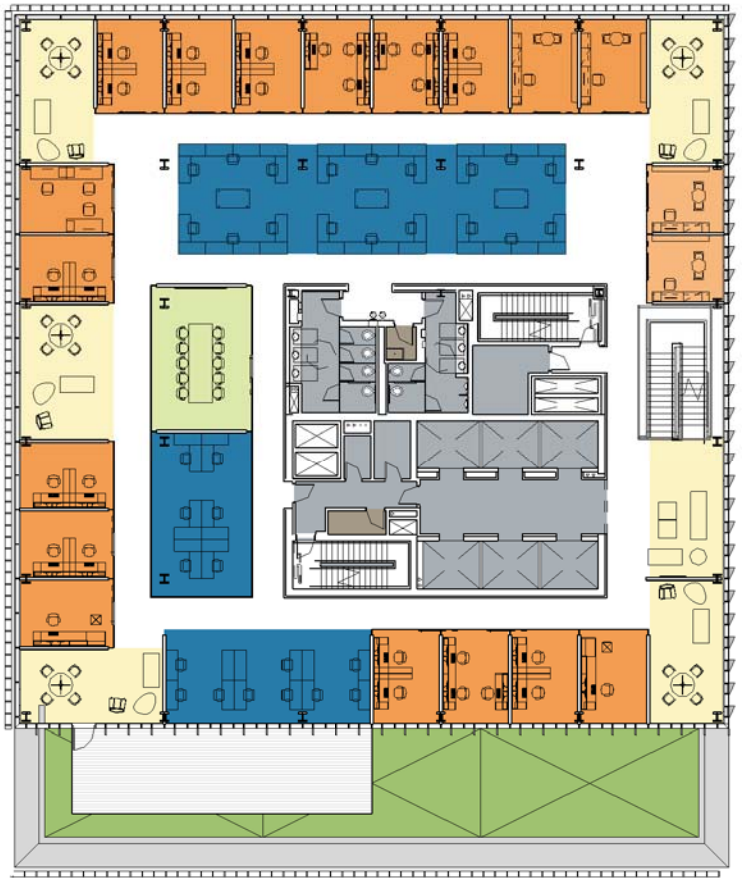
Figure 2-20
Thirteenth Floor Plan
Source: KPMB Architects, 2018



Legend

- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
- Departmental Teaching
- Collaboration
- Building Support
- Departmental Support
- Food Services
- Admin. Workstations

Figure 2-21
Fourteenth Floor Plan
Source: KPMB Architects, 2018



Legend

- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
- Departmental Teaching
- Collaboration
- Building Support
- Departmental Support
- Food Services
- Admin. Workstations

Figure 2-22
Fifteenth Floor Plan
Source: KPMB Architects, 2018

Legend

- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
- Departmental Teaching
- Collaboration
- Building Support
- Departmental Support
- Food Services
- Admin. Workstations

Figure 2-23
Sixteenth Floor Plan
Source: KPMB Architects, 2018

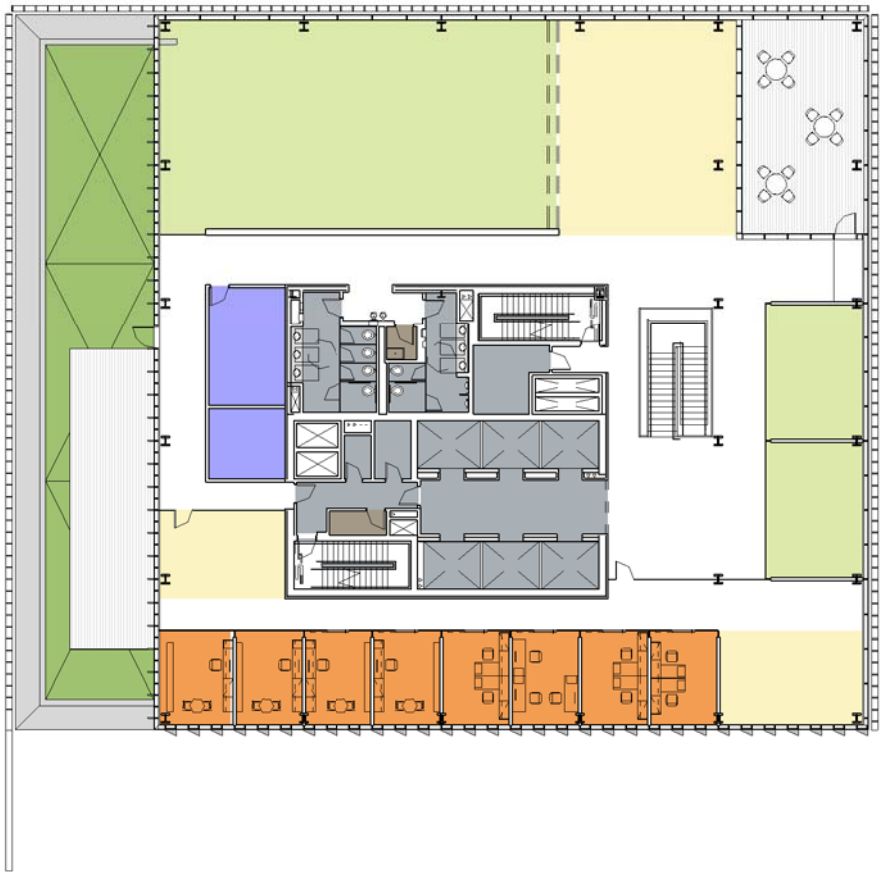
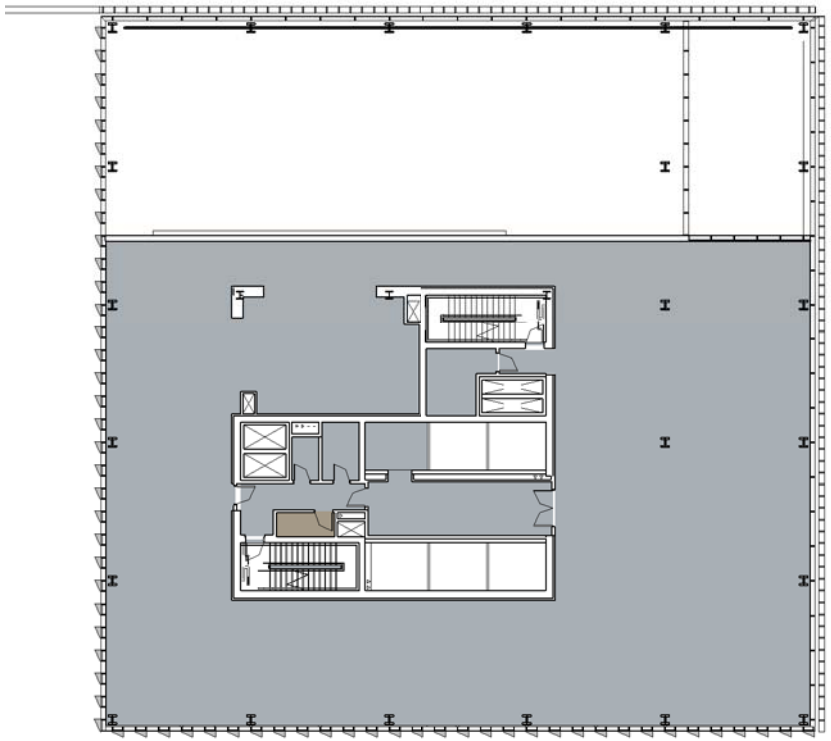


Figure 2-24
Seventeenth Floor Plan
Source: KPMB Architects, 2018



Legend

- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
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- Collaboration
- Building Support
- Departmental Support
- Food Services
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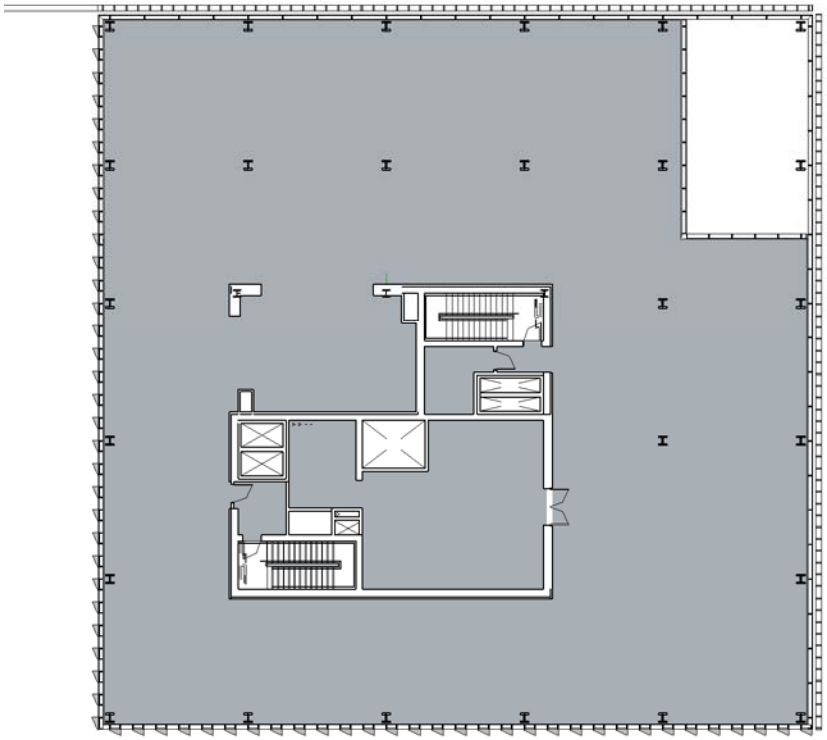
Figure 2-25
Eighteenth Floor Plan - Mechanical Penthouse
Source: KPMB Architects, 2018



Legend

- Open Workstations
- Learning Lab
- Meeting Room
- Office Module
- Facilities Managment
- Waiting Area
- Departmental Teaching
- Collaboration
- Building Support
- Departmental Support
- Food Services
- Admin. Workstations

Figure 2-26
Nineteenth Floor Plan - Mechanical Penthouse
Source: KPMB Architects, 2018

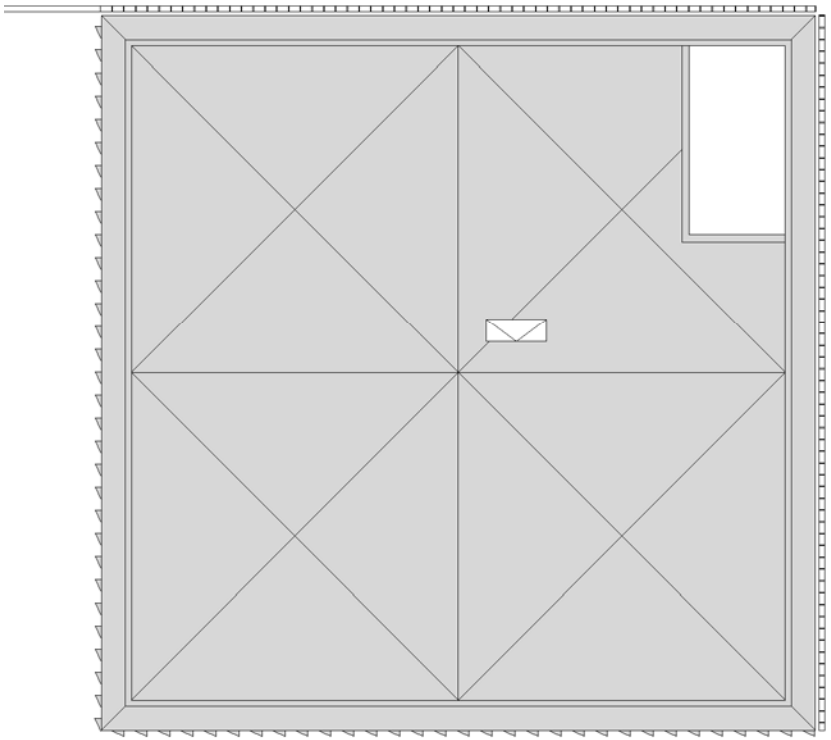


Figure 2-27
Roof Plan
Source: KPMB Architects, 2018

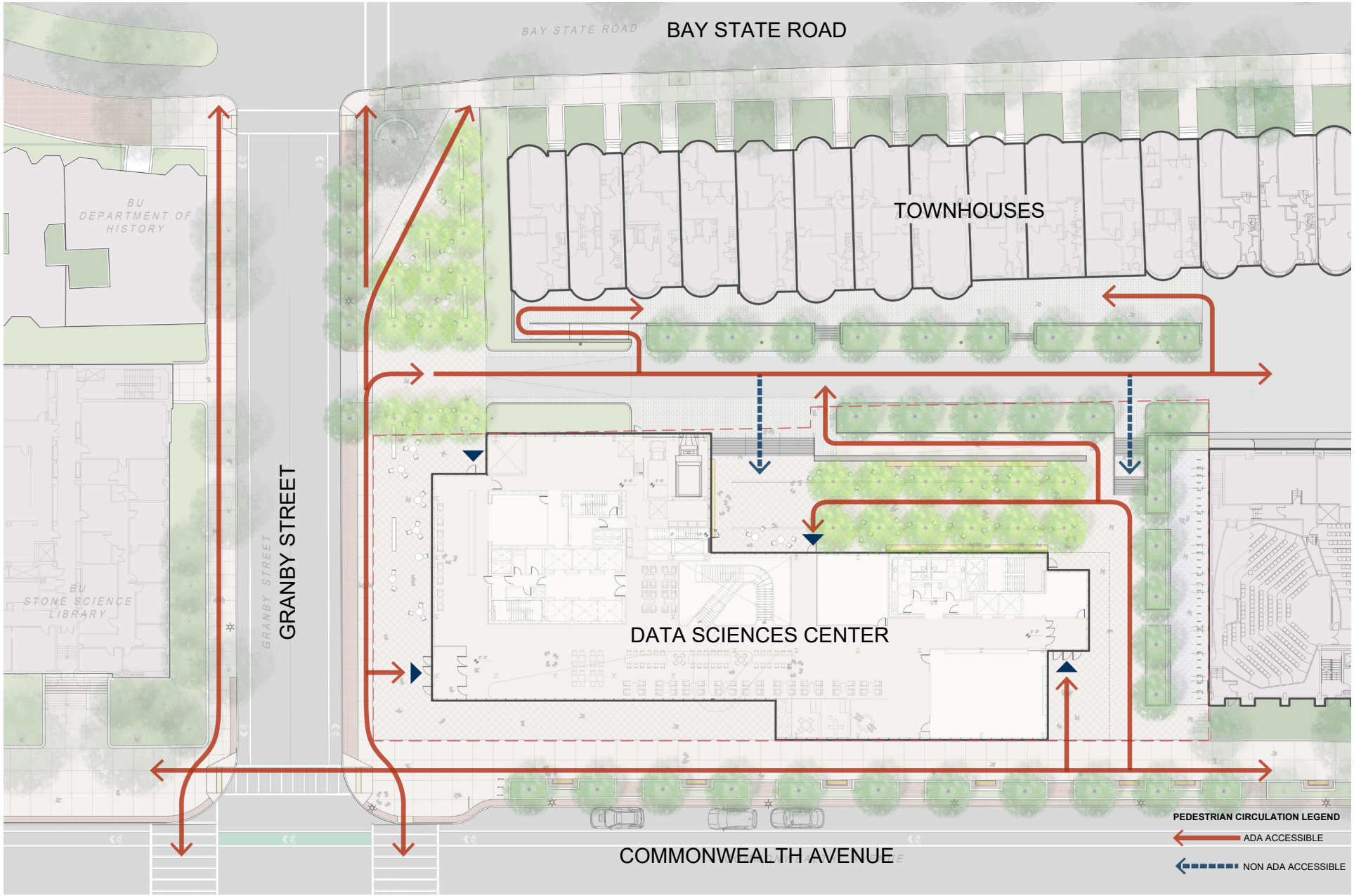


Figure 2-28
Circulation and Access Plan
Source: Richard Burck Associates, Inc., 2018

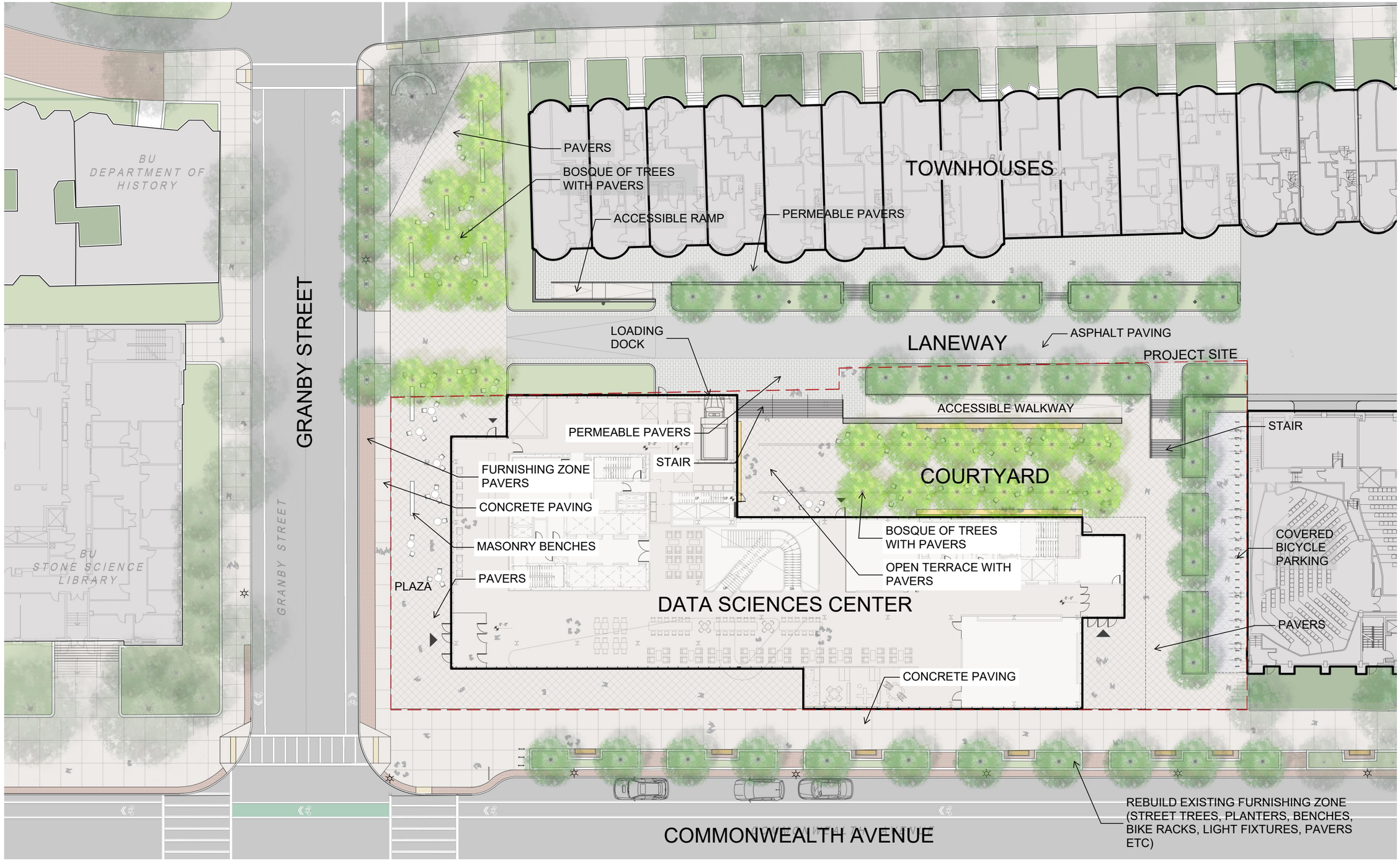


Figure 2-29
Project Site Plan
Source: Richard Burck Associates, Inc., 2018

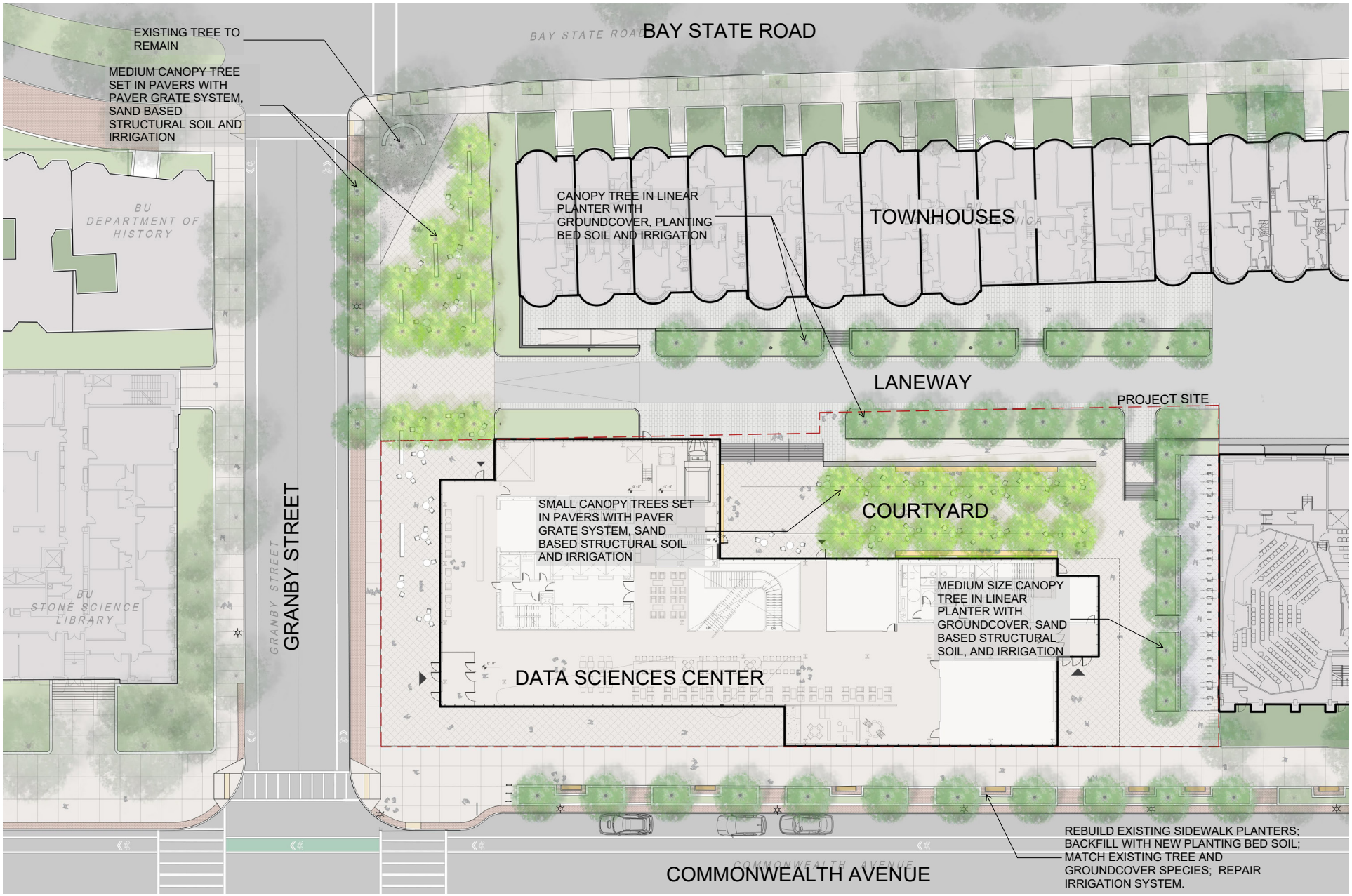


Figure 2-30
Landscape Plan
Source: Richard Burck Associates, Inc., 2018

Chapter 3

URBAN DESIGN

CHAPTER 3: URBAN DESIGN

3.1 INTRODUCTION

The Project will address an urgent need for the University to construct a visionary building that will allow for the consolidation of academic, office, and research space for the University's Mathematics & Statistics and Computer Science departments and the interdisciplinary Hariri Institute. The Project is consistent with key elements of the Boston University Charles River Campus 2013 – 2023 Institutional Master Plan and the Boston University Charles River Campus 2013 – 2023 Institutional Master Plan Urban Design Supplement.

As described in Chapter 1: Introduction and Chapter 2: Project Description, the Project replaces an existing surface parking lot with a new signature building on the corner of Granby Street and Commonwealth Avenue. When the Project is completed, it will support the Proponent's long-term vision to strengthen the University's Science and Research Campus, improve the public realm, and activate ground floor uses and the streetscape along Commonwealth Avenue.

The Data Sciences Center will be a truly bold architectural statement along the central spine of the Charles River Campus, adding another distinctive landmark to Boston University's extensive campus. Combining a pedestrian and precinct -scaled base with a dramatic tower that will reach 19 stories into the sky, the building will be visible and recognizable from both banks of the Charles River. The Data Sciences Center will underscore the University's central place at the heart of – and on the skyline of – a great American City and will celebrate its role as one of the nation's outstanding private research communities.

3.2 NEIGHBORHOOD CONTEXT

Boston University has developed its campus vision in consideration of its mission, riverfront location, proximity to historic neighborhoods, and the insertion of major transportation infrastructure within the heart of its campus. Boston University is now surrounded by well established, distinctive neighborhoods that provide a context for its ongoing development. This section illustrates the distinctive character of each area. See Figure 3-1, Neighborhood Context.

3.2.1 COMMONWEALTH AVENUE

Extending approximately 1.5 miles from Kenmore Square to Packard's Corner, the physical identity of the Charles River Campus is strongly influenced by Commonwealth Avenue. This thoroughfare serves as both a major transportation spine and the heart of the campus.

The historic Marsh Chapel Plaza anchors Boston University's first constructed buildings on the Charles River Campus as designed by architects Cram and Ferguson in the mid-1940's. Adjacent and further west on Commonwealth Avenue is the George Sherman Union (GSU) Plaza, an important public space on the northern edge of Commonwealth Avenue. The Plaza acts as an entry point to John Luis Sert's congregation of mid-century modern structures that comprise the Boston University School of Law and serve the students of the University who utilize the GSU and Mugar Memorial Library. The architectural character and urban form of this section of Commonwealth Avenue is very distinct from the monumental Back Bay section with its uniform building scale and continuous "street wall" with median open space.

Throughout the length of the Boston University Campus, the median of Commonwealth Avenue is occupied by the Green Line trolley, and the urban form is defined by street wall punctuated by a series of well scaled and well-used open spaces such as the Marsh Plaza.

The activity of student life along this boulevard makes this section of Commonwealth Avenue unique. In addition to the Green Line trolley, the pedestrian traffic of over 2,000 people/hour during peak hours makes Commonwealth Avenue one of the most vibrant and heavily-travelled streets in the City of Boston. Recognizing the importance of Commonwealth Avenue, a highly successful public-private partnership was initiated by Boston University, the City of Boston's Department of Public Works and Transportation Department, and the state's Executive Office of Transportation that resulted in a significant investment by the University in major safety, aesthetic, and transportation improvements to the portion of Commonwealth Avenue from Kenmore Square to the BU Bridge. These improvements were accomplished through the installation of wider sidewalks, tree plantings on both sides of the Avenue and median, period appropriate streetlights, and articulated crosswalks. The removal of an unnecessary third travel lane allowed for the installation of the first bike lanes in the City of Boston and effectively improved safety conditions for pedestrians and cyclists. Boston University contributed funds toward the design and construction of this phase of improvements and provides ongoing maintenance of the plantings along this segment of the Commonwealth Avenue corridor. The same planning and treatment is now being planned by the University in conjunction with the same stakeholders noted above to the area from BU Bridge to Packard's Corner.

3.2.2 BAY STATE ROAD

Bay State Road weaves together historic brownstones and a mix of newer institutional buildings. The elegant, attractive, and charming brownstones overlook a tree-lined street and the Charles River; these University-owned as well as privately-owned properties have been restored and upgraded over the years using historically appropriate methods and materials. In 1994, the Boston Preservation Alliance

awarded Boston University its preservation award "for the outstanding restoration and stewardship of the many historic properties of Bay State Road." A BPA Preservation Achievement Award in 2015 acknowledged the University's work on The Alan and Sherry Leventhal Center at 225 Bay State Road. The Yawkey Center for Student Services at 100 Bay State Road was designed to respect the urban design of the street with appropriately scaled setbacks and bay sizes.

3.2.3 CHARLES RIVER

The Charles River, while not a neighborhood, serves as a strong geographic element in the identities of Boston University and the City of Boston. The Charles River is an actively used recreational area, with sailing, rowing, and boating activities underway on an almost year-round basis. The Boston and Cambridge shorelines are also popular sightseeing spots. The open space along the southern bank of the Charles River abuts the University's campus, and there are pedestrian overpasses providing connections to the riverside parkland. The Charles River Basin is listed in the National Register of Historic Places and is managed by the state's Department of Conservation and Recreation (DCR). The Charles River Esplanade was designated as a Local Landmark in Boston in 2009.

3.3 MASSING

The Project is located in a part of the University's Charles River Campus characterized by a range of buildings that vary substantially in height, age, and style (see Figure 2-1, Oblique View of Project Site). Bay State Road and Commonwealth Avenue, which were historically built-up by mid-rise townhouses, have been interspersed over time with punctuating buildings of new height and modern design. In its history as a landowner in this architecturally sensitive neighborhood, Boston University has invested considerable resources in the acquisition, restoration, and protection of historic buildings and, when appropriate, has introduced diversity in massing and scale to the neighborhood that is dominated by the University and its academic buildings.

The height and massing of Boston University's School of Law, Warren Towers, the Center for Integrated Life Sciences, and the Photonics Center each contribute to a visually diverse skyline and streetscape along Commonwealth Avenue. The Data Sciences Center, reaching a height of 305 feet, is approximately 70 feet higher than the School of Law. A number of Projects in the Kenmore Square and the Fenway area, which are in various stages of permitting or construction, are being undertaken by other developers and envision similar or taller buildings.

The massing and siting of the Data Sciences Center is intended to enhance the public realm through scale, animation in the program of the ground floor and podium floors, transparency, and accessibility. The height of the five-story podium relates directly to the height and massing

of the red brick masonry Sargent College building to the east and the limestone clad Stone Science building to the west. The tower levels are set back from the podium to mitigate impact on the street, and the massing is carefully developed to establish alignments of height with the buildings along Commonwealth Avenue. The design balances opacity and transparency to simultaneously respond to, and act as a counterpoint to, the solidity of frontages along Commonwealth Avenue.

At Granby Street, the ground floor is set back from the property line by approximately 23 feet, significantly increasing the pedestrian circulation areas beyond the public sidewalks and framing views to the Charles River. The podium levels above extend to the property line, providing weather protection for the west entrance to the building and for pedestrian movement north to Bay State Road.

On the fifth floor, where the tower levels become articulated, a glass pavilion is set back from the south and east façades of the podium. The pavilion is surrounded by roof gardens and accessible outdoor terraces. The footprint of the tower levels is relatively small at 120 feet by 120 feet and approximately 14,000 sf. At six different levels, the floor plan is shifted horizontally in one direction to create a dynamic, complex form. This cantilevering of various floor plates creates five terraces at levels 7, 10, 12, 15, and 17. The terraces will combine green roof space with hard surface space for people, which will further animate the building on the skyline.

See Figure 3-2, Project Site Plan; Figure 3-3, Elevated Perspective; Figures 3-4 through 3-6, Perspective Views; Figure 3-7, Building Section; and Figures 3-8 through 3-11, Elevations.

3.4 CHARACTER AND MATERIALS

The podium and tower levels will be unified in the singular use of a unitized glass curtain wall system. Approximately one half of the façades will be screened by steeply sloped vertical shading fins made of prefinished aluminum. The fins will have a terra cotta color that complements the adjacent building materials of red brick and limestone.

The remainder of the façades will be clad in an alternating pattern of vertical full-height panels of open vision glass and vertical full-height panels of shaped prefinished metal. The color of the prefinished metal panels will be light and silver-toned to have an affinity to the color and partial reflectivity of the vision glass panels. The overall impression of the glass will be light and transparent with some reflectivity due to the protective coatings on the glass.

3.5 VIEWS

3.5.1 PODIUM LEVELS

Along Commonwealth Avenue, the southern façade of the Data Sciences Center will serve as the gateway to the building. The five-story podium will have terra cotta-colored shading fins along Commonwealth Avenue and will complement and challenge the existing street wall, giving more traditional, Bostonian architectural forms a striking, contemporary update. The north, east, and west elevations of the podium will be generally screened from distant views by surrounding buildings. The west façade, which fronts on the corner of Granby Street and Commonwealth Avenue, will also be clad in the shading fins. The east and north façade will consist of glass curtain, most visible to residents of the homes on Bay State Road. The abutting Sargent College does not have windows facing the building.

3.5.2 TOWER LEVELS

The tower, which rises 14 stories above the podium, will be viewed most prominently from Commonwealth Avenue, Bay State Road, and Storrow Drive. Rising above the surrounding neighborhood, the tower will punctuate the skyline and serve as an iconic landmark of the University. The Charles River Esplanade and Charles River will afford some of the stateliest views of the Project from both banks of the River, with the geometric tower levels rising unobstructed above the brownstones situated along Storrow Drive and Bay State Road. Approximately 70 feet taller than the next highest building in the immediate vicinity, the cantilevers and material changes will create a dynamic form that engages with the skyline, integrating the Project into the existing urban fabric.

3.6 OPEN SPACE AND LANDSCAPE MATERIALS

In accordance with provisions in the IMP, the Project is designed to reinforce the University's linear campus and create a variety of open spaces that enrich the streetscape by supporting different scales, levels of intimacy, and interaction. These spaces will be designed both within the Site's boundaries and in abutting areas owned by Boston University. See Figure 3-12, Landscape Plan.

3.6.1 COMMONWEALTH AVENUE STREETSCAPE

The existing Commonwealth Avenue streetscape consists of a fifteen-foot-wide concrete sidewalk as well as a ten-foot-wide furnishing zone of granite tree planters, flush granite bands, brick paver accents and street lights, benches, and bike racks. Both the sidewalk and the furnishing zone will be demolished during construction. These features will be rebuilt to match the existing design intent, with the exception

of the three curb cuts being closed along Commonwealth Avenue to allow longer tree planters that will infill these spaces. The signature furnishing zone along the street edge defines a buffer zone between the sidewalk and the street traffic.

3.6.2 PLAZA

The building's deep overhang and broad setback from Granby Street and Commonwealth Avenue will provide considerable protected street-level space for café seating and special events adjacent to the sidewalk. The plaza will be surfaced with durable concrete or granite pavers and will be activated by the high volume of pedestrians that enter the building and travel along Granby Street and Commonwealth Avenue.

3.6.3 COURTYARD

The courtyard on the north side of the building is removed from the active sidewalks on Commonwealth Avenue and provides a quiet outdoor setting for studying and socializing. The courtyard is conceived as an extension of the building atrium's floor material and pattern and will be accessible from the interior of the building by a door at the atrium stair. From outside the Data Sciences Center, the courtyard can be accessed via Commonwealth Avenue or the laneway off Granby Street. Shade trees will create a ceiling, while seat walls and movable furnishings will create a welcoming outdoor space.

3.6.4 OPEN SPACE CONNECTION

A new pedestrian connection between the Data Sciences Center and the six-story Sargent College building to the east will be softened with a line of canopy trees.

3.6.5 OFF-SITE IMPROVEMENTS

The Project will provide new street trees along Granby Street and improvements to an open space area at the corner of Granby Street and Bay State Road, and will replace existing street trees, pavement, and planters along Commonwealth Ave. The new laneway, adjacent to the site on the north, will include shade trees and plantings as well as accessible ramps to the University-owned townhouses.

3.7 PEDESTRIAN ENVIRONMENT

The ground floor of the podium is shaped by the interior collaboration spaces and deliberate cutouts that shelter the entrances at both the west end on Granby Street and the east end at the passage between the Project and the Sargent College building. The podium is distanced from Sargent College by approximately 45 feet at the ground floor, where a mid-block pedestrian open space will connect Commonwealth Avenue to the laneway north of the Site.

This area will improve the movement through and around the Site, leading to the landscaped courtyard fronting the laneway that will humanize the space and provide a green landscape and pleasant view to the occupants of the Bay State townhouses. Pedestrian access will be improved on the laneway and in the rear entry areas of the University-owned townhouses on Bay State Road. New paving and landscape materials will enhance the pedestrian experience on the Site and in the off-site areas surrounding the Project.

See Figure 3-13, Circulation and Access Plan.

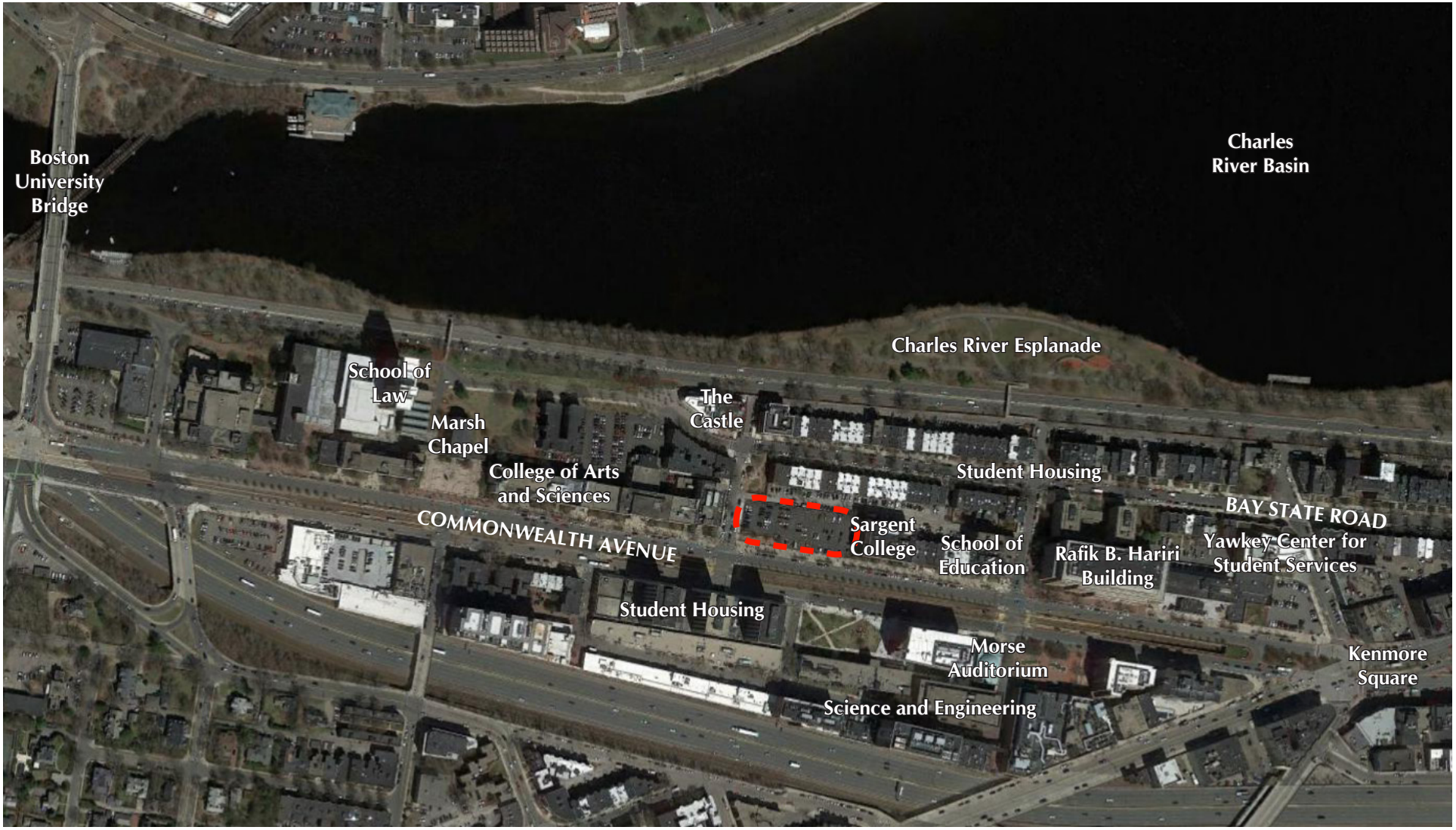


Figure 3-1
Neighborhood Context
Source: Google Earth, 2018

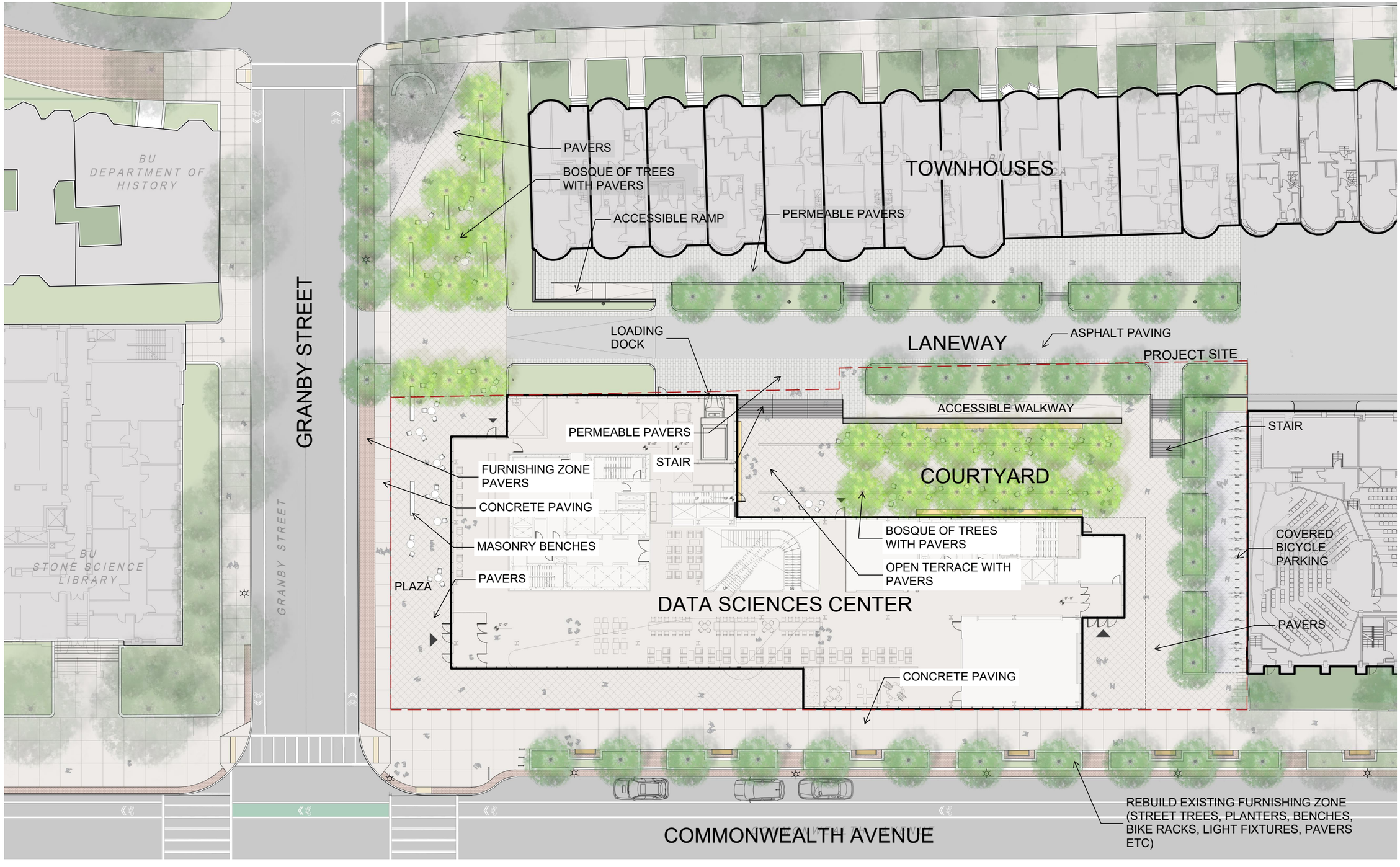


Figure 3-2
Project Site Plan
Source: Richard Burck Associates, Inc., 2018

Boston, Massachusetts

Figure 3-3
Elevated Perspective
Source: KPMB Architects, 2018

Boston, Massachusetts

Figure 3-4
Perspective Looking East
Source: KPMB Architects, 2018

Figure 3-5
Perspective Looking Southwest
Source: KPMB Architects, 2018

Figure 3-6
Perspective Looking West
Source: KPMB Architects, 2018

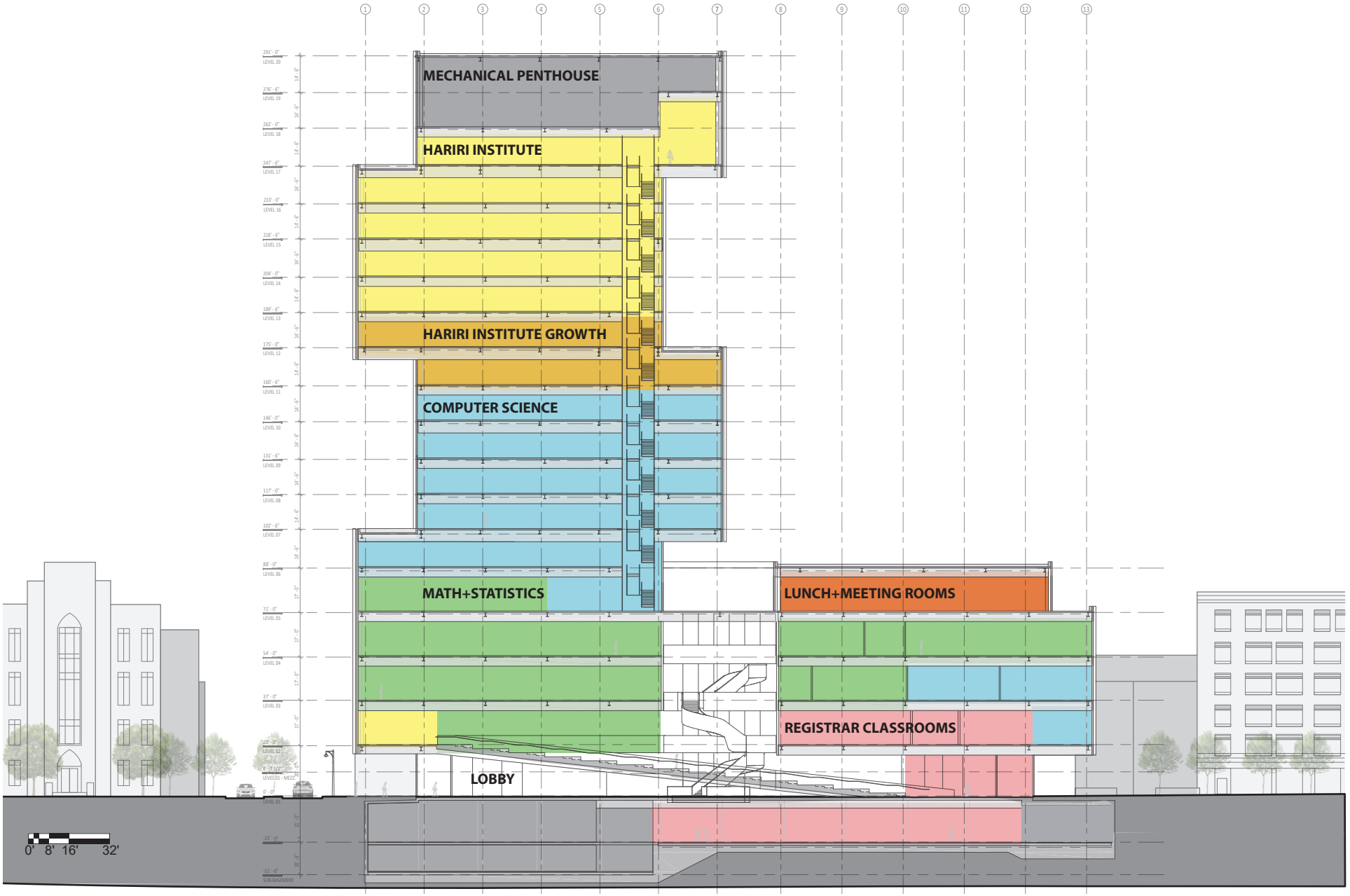


Figure 3-7
Building Section
Source: KPMB Architects, 2018

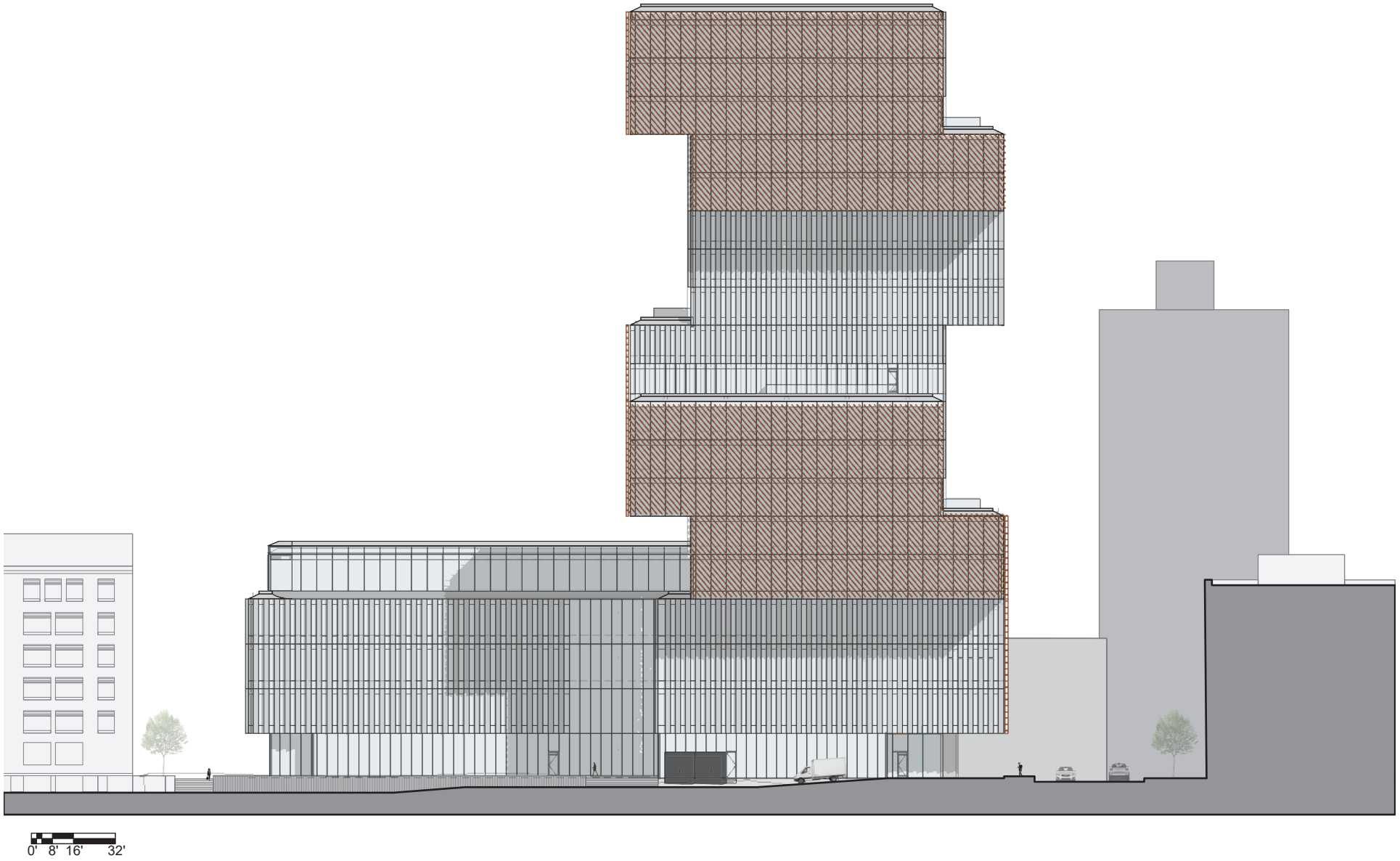


Figure 3-8
North Elevation
Source: KPMB Architects, 2018

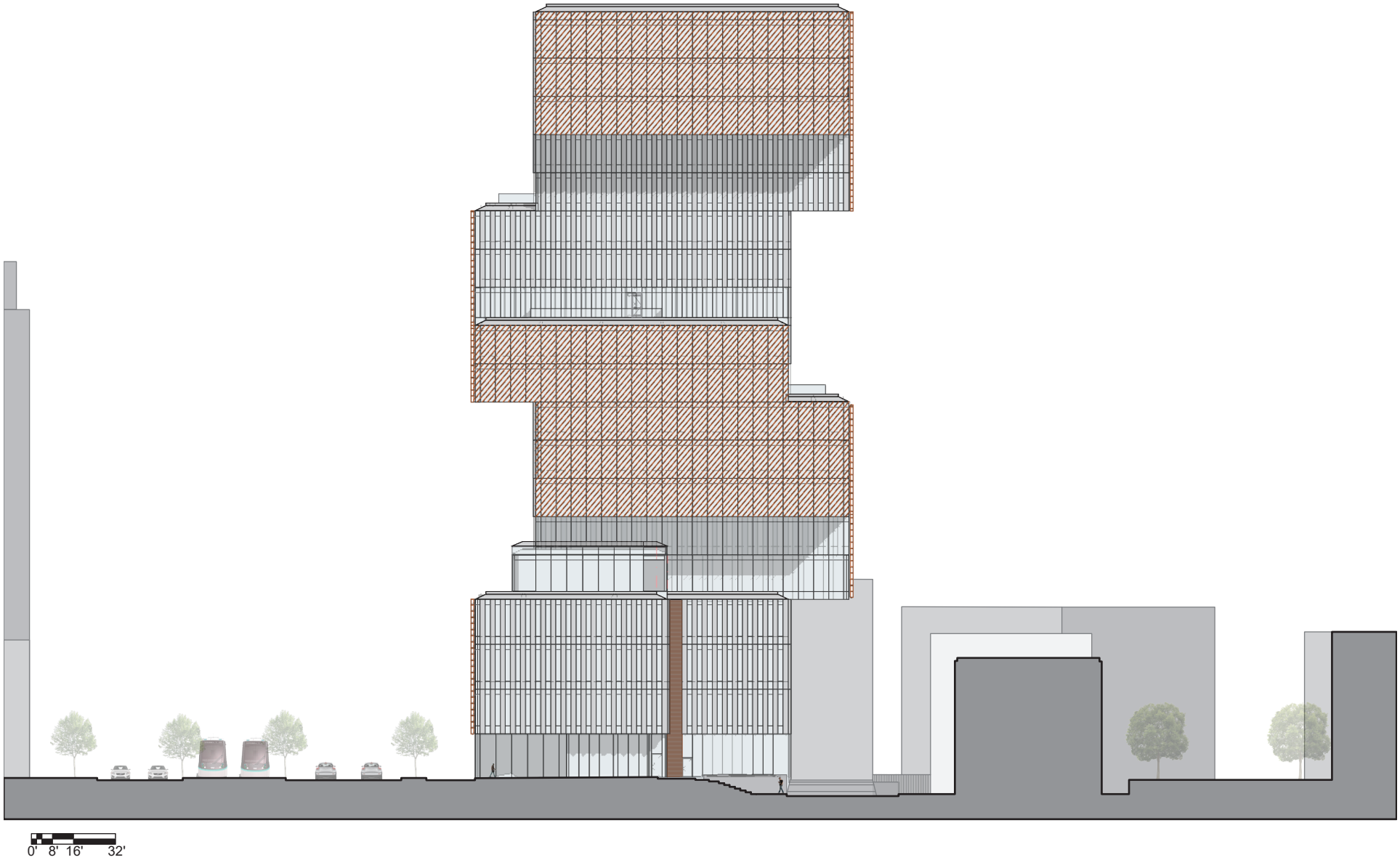


Figure 3-9
East Elevation
Source: KPMB Architects, 2018

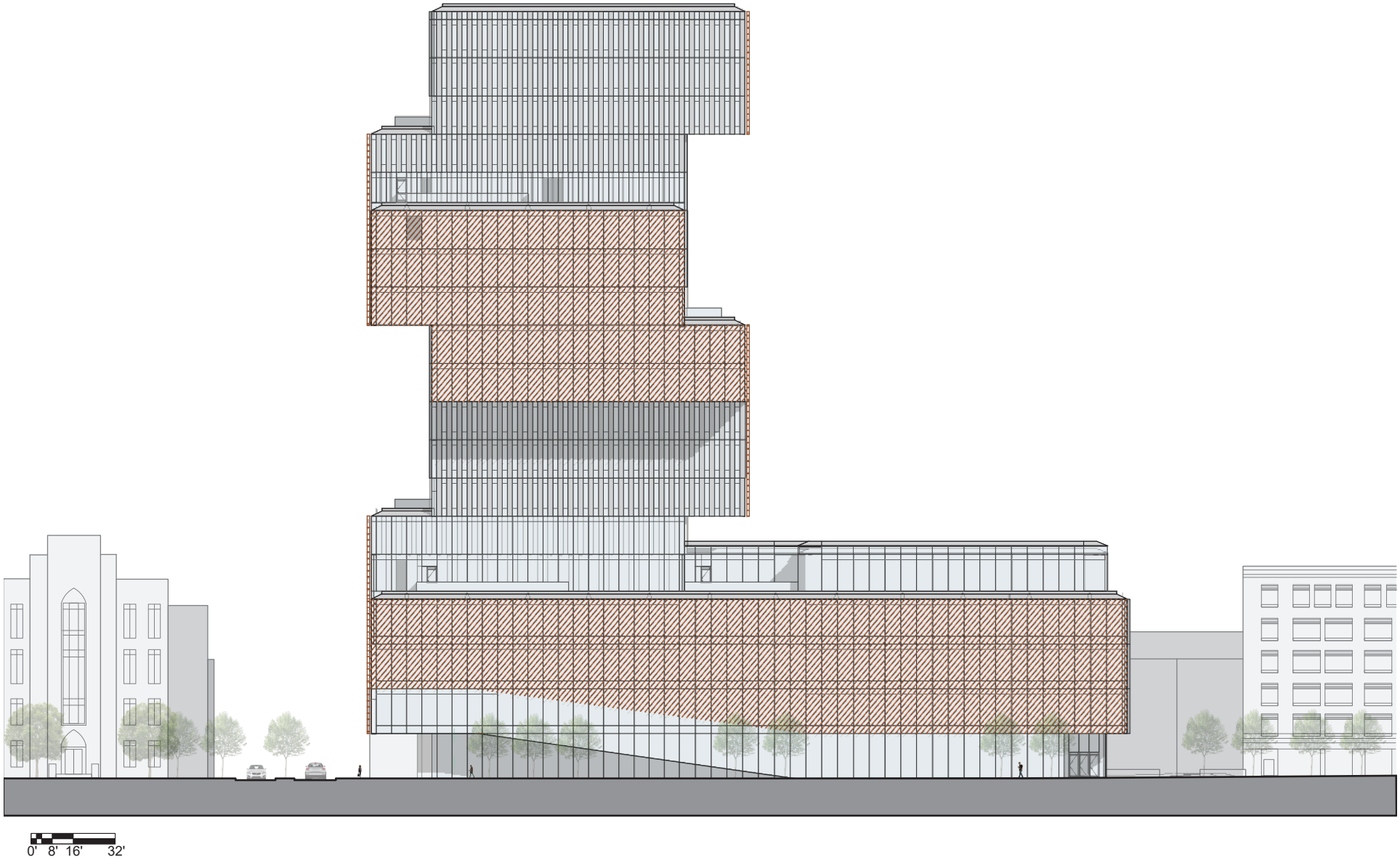


Figure 3-10
South Elevation
Source: KPMB Architects, 2018

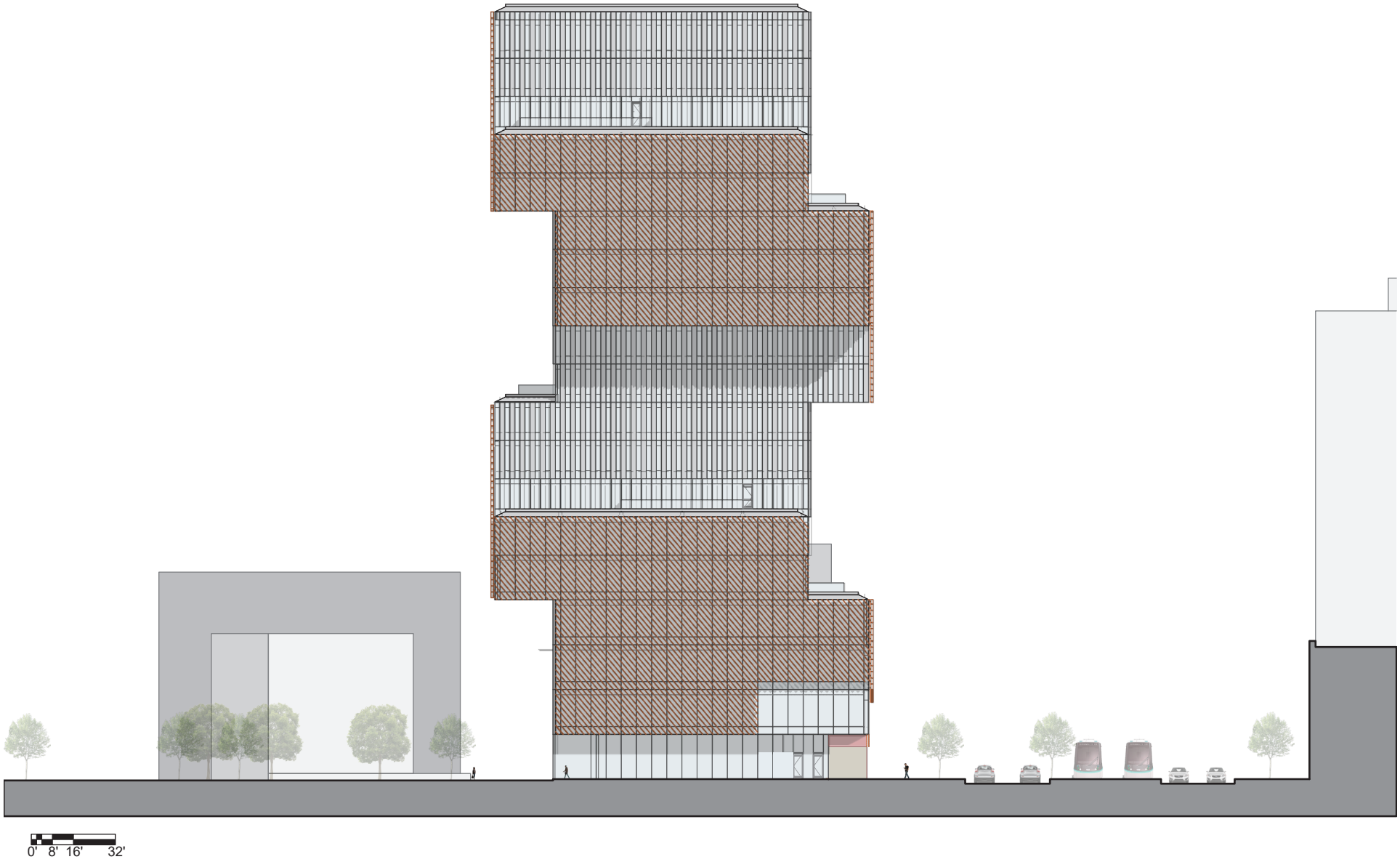


Figure 3-11
West Elevation
Source: KPMB Architects, 2018

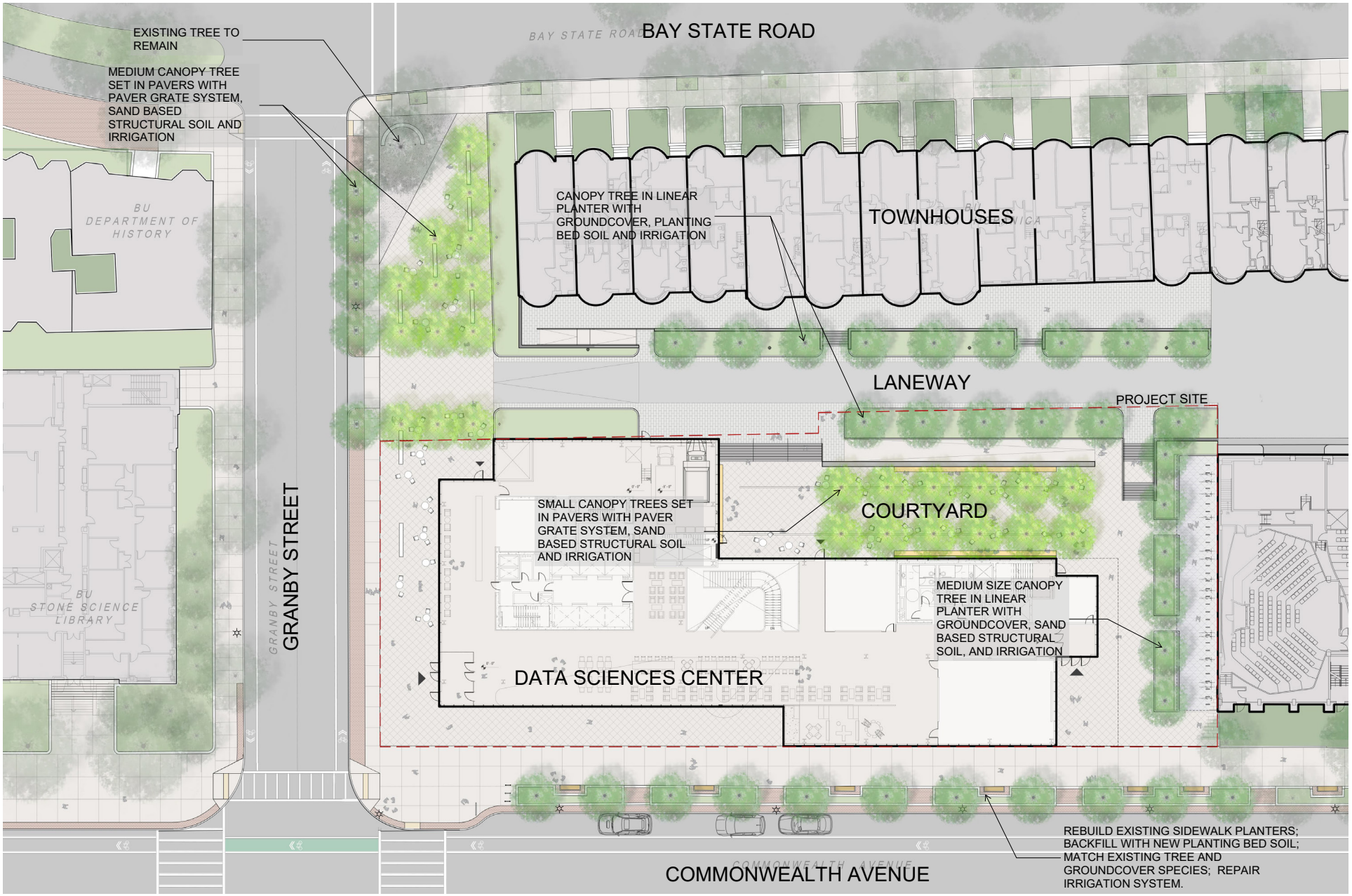


Figure 3-12
Landscape Plan
Source: Richard Burck Associates, Inc., 2018

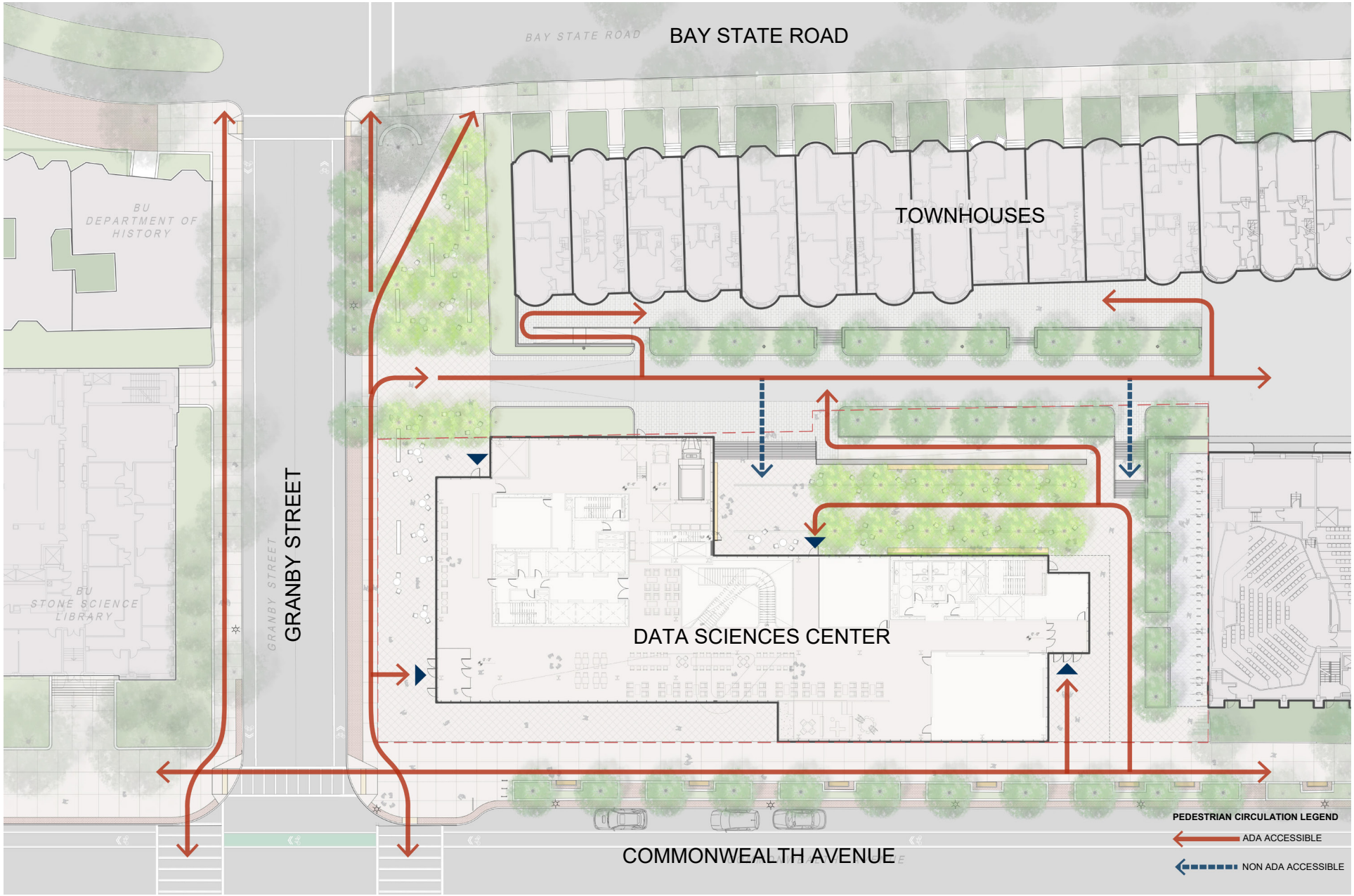


Figure 3-13
Circulation and Access Plan
Source: Richard Burck Associates, Inc., 2018

Chapter 4

SUSTAINABILITY

CHAPTER 4: SUSTAINABILITY

4.1 SUSTAINABLE DESIGN

In 2017, the University adopted a bold Climate Action Plan with five major points:

1. Prepare the campuses for the effects from climate change.
2. Net zero emissions from operations by 2040.
3. Act on indirect emissions from transportation, purchasing, and waste.
4. Integrate climate change into undergraduate education and support for research.
5. Integrate the Climate Action Plan into the University's Strategic Plan.

The Project will use the Leadership in Energy and Environmental Design (LEED) rating system as a framework to measure the various sustainable features of the Project. This system is divided into the following categories: Integrative Process, Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation, and Regional Priority Credits. A variety of sustainable design strategies in each category will be pursued to target a minimum of Gold Certification, as provided in the University's Climate Action Plan for new buildings of this size.

The Project will comply with the requirements of the City of Boston to address the current LEED Version 4 (v4). The Proponent has used a LEED v4 Building Design + Construction: New Construction Checklist to illustrate that the Project is currently tracking 65 LEED points. See Figure 4-1 and 4-2, LEED Checklist.

The Project will comply with Article 37 of the Boston Zoning Code, Boston's Green Building Regulations. The purpose of Article 37 is to ensure that major building projects are planned, designed, constructed, and managed to minimize adverse environmental impacts, conserve natural resources, prepare for climate change, promote a more sustainable city, and enhance the quality of life in Boston. The narrative below demonstrates that the Project is planned to be in compliance with Article 37. A completed Climate Change Preparedness and Resiliency Questionnaire can be found in Appendix B. As the Project is in the early stages of the design process, some of these strategies are expected to evolve with the design of the building.

4.2 ARTICLE 37/LEED COMPLIANCE

4.2.1 INTEGRATIVE PROCESS

IP Credit 1 Integrative Process **1 point**

The Project team meets regularly to ensure team members from the various disciplines involved are all known to each other and collectively communicating. Sustainable design-focused workshops were held early in the design process to assist the team in establishing shared sustainable design and energy efficiency goals for the Project. This includes evaluations of both energy and water-related systems, load reduction strategies, potential system downsizing opportunities, opportunities for non-potable water use, and any influenced adjustments to the Owner's Project Requirements and/or the Basis of Design for the Project.

As the Project progresses, there will be regular design meetings to ensure the entire team is engaged throughout the design and construction processes.

4.2.2 LOCATION AND TRANSPORTATION

The Project is located in the Fenway/Kenmore neighborhood of Boston, where it has ample access to public transportation, including the MBTA Green Line via the B branch at the Boston University East station, MBTA Bus route 54, Boston University Bus operating on the Charles River Campus and connecting the Charles River Campus to the medical campus, and the MBTA Commuter Rail via the Framingham line at Yawkey station. Exterior long and short-term bicycle storage is planned to encourage occupants to bike to the Project. The local neighborhood provides a variety of services with pedestrian and cyclist access.

The Project earns points for Sensitive Land Protection, High Priority Site, Surrounding Density and Diverse Uses, Access to Quality Transit, Bicycle Facilities, and Reduced Parking Footprint.

LT Credit 2 Sensitive Land Protection **1 point**

The Project is located on a previously developed/graded site at the corner of Commonwealth Avenue and Granby Street on Boston University's campus.

LT Credit 3 High Priority Site **1 point**

The Project is located within a U.S. Department of Housing and Urban Development Qualified Census Tract (QCT). A QCT is an area in which 50 percent of households have incomes below 60 percent of the Area Median Gross Income and/or there is a poverty rate of 25 percent or more.

LT Credit 4 Surrounding Density and Diverse Uses **5 points**

The Site is located on a dense urban college campus, with a surrounding community that includes many local amenities within a .5-mile walking distance.

LT Credit 5 Access to Quality Transit **5 points**

There is direct access within a .25-mile walking distance to the MBTA Green Line light rail via the Boston University East station (B branch of the Green Line), MBTA Bus route 54, and within .5-miles of the MBTA Framingham line of the Commuter Rail at Yawkey station.

LT Credit 6 Bicycle Facilities **1 point**

The Project will provide long and short-term bicycle storage on-site as well as showers for regular building occupants. The Project is located on a bike network in Boston where all streets have ≤ 25 MPH speed limits, many with designated bike lanes.

LT Credit 7 Reduced Parking Footprint **1 point**

The Project is located on the site of an existing campus parking lot (Lot N) and will not be replacing the off-street spaces that were previously existing. By removing these spaces, the University intends to reduce its overall parking capacity by up to 6%. The remaining on-street parking capacity meets the LEED requirements for providing at least 40% less parking than baseline values as recommended by the Institute of Transportation Engineers' Transportation Planning Handbook.

4.2.3 SUSTAINABLE SITES

The Site is a previously developed parcel located at the corner of Commonwealth Avenue and Granby Street. It is currently being used as a parking lot.

Prior to its design and ongoing throughout the application process, the Project has carefully considered the features of the Site and the surrounding context to create a building that is sustainable and environmentally sensitive. At this stage in the Project development, the Proponent is committed to reducing the heat island effect through light colored surfaces and ample vegetation. Light pollution will also be mitigated by installing exterior light features that comply with LEED requirements regarding uplight and trespass. Additional measures to protect and improve habitat, open space, and rainwater management are still being considered.

SS Prerequisite 1 Construction Activity Pollution Prevention **REQUIRED**

The Project construction manager will submit and implement an Erosion and Sedimentation Control (ESC) Plan for construction activities related to the demolition of existing conditions and the construction of the new building specific

to this project. The ESC Plan shall conform to the erosion and sedimentation requirements of the 2012 EPA Construction General Permit in order to comply with this LEED prerequisite.

SS Credit 1 Site Assessment **1 point**

The Project team will complete a Site survey that includes the Site topography and soil conditions, human use, and hydrology.

SS Credit 3 Open Space **1 point**

The Project Site design includes ample pedestrian-oriented hardscape areas as well as ground level vegetation and trees, providing a large amount of accessible and usable open space for building occupants.

SS Credit 5 Heat Island Reduction **2 points**

The Project's hardscape and roofing materials will be selected with compliant SRI values in order to lower the Project's impact on the heat island effect.

SS Credit 6 Light Pollution Reduction **1 point**

Exterior light fixtures will comply with LEED requirements to reduce uplight and trespass, thereby lowering the Project's light pollution.

4.2.4 WATER EFFICIENCY

In order to improve on-site water efficiency and reduce the burden on municipal water supply and wastewater systems, the Project will reduce potable water use for both sewage conveyance and irrigation needs. Both whole-building and end-use water metering will be installed in the Project, and low flow and high efficiency plumbing fixtures will be used to reduce the amount of potable water used throughout the building. Exterior vegetation will be comprised of regionally appropriate, drought tolerant, indigenous plants.

The Project earns points for Outdoor Water Use Reduction, Indoor Water Use Reduction, and Water Metering.

WE Prerequisite 1 / Credit 1: Outdoor Water Use Reduction REQUIRED / 2 points

Through the selection of native and adaptive plants for landscaping, the Project will have no permanent irrigation system in place beyond a two-year establishment period.

WE Prerequisite 2 / Credit 2: Indoor Water Use Reduction REQUIRED / 4 points

Through the specification of low flow and high efficiency plumbing fixtures, the Project shall implement water use reduction strategies that use, at a minimum, 20

percent less potable water than the water use baseline calculated for the building after meeting Energy Policy Act of 1992 fixture performance requirements. The Project shall target an overall potable water use savings of 40 percent from the calculated baseline use. A higher goal of 45 percent will be considered depending on the final fixture selection for Water Use Reduction by the Project team.

WE Prerequisite 3 / Credit 4 Water Metering **REQUIRED / 1 point**

The Project will include building-level water meters, the data from which will be shared with the U. S. Green Building Council (USGBC) for a minimum of five years. Additionally, water meters will be installed for at least two subsystems in the Project. These may include meters for the boiler, indoor plumbing fixtures and fittings, or domestic hot water.

4.2.5 ENERGY AND ATMOSPHERE

The building systems shall be designed to optimize energy performance and reduce energy consumption through high efficiency building systems. The Project team will engage a building commissioning agent to ensure the proper installation and operation of systems. No chlorofluorocarbon (CFC) based refrigerants will be used in order to avoid ozone depletion in the atmosphere. The Project team will explore the feasibility of onsite alternative energy technologies, including geothermal wells for ground source heat pumps.

The Project has established a preliminary Site EUI target of 36. Methods under study to achieve this target include: triple glazing coupled with a high-performing building envelope, a hybrid geothermal system for heating and cooling, and a highly-efficient LED lighting system with occupancy and daylight controls. The Project is striving for a fossil-fuel free building operation with a 90 percent reduction in overall carbon emissions.

The HVAC design options include air handling units, heat recovery chillers, air-cooled chillers, condensing boilers, pumps, chilled beams, terminal units, and other miscellaneous systems.

Ventilation will be provided by dual wheel dedicated outdoor air units serving minimum ventilation to fan powered boxes, fan coil units, and active chilled beams. Perimeter heat will be provided in spaces with greater than 15 feet of glass height.

The Proponent shall engage a Commissioning Agent during the design phase to review the proposed design and ultimately confirm the building systems are installed and function as intended and desired.

The Project earns points for Enhanced Commissioning, Optimize Energy Performance, Advanced Energy Metering, and Green Power and Carbon Offsets.

EA Prerequisite 1 / Credit 1 **REQUIRED / 6 points**
Fundamental/Enhanced Commissioning and Verification

A Commissioning Agent (CxA) will be engaged by the Proponent for purposes of providing full commissioning services for the building energy related systems including building envelope, HVAC&R, lighting, and domestic hot water systems. The CxA will verify that the building systems are installed, calibrated, and perform to the Project requirements and basis of design. Additionally, the CxA will perform Commissioning activities for mechanical, electrical, plumbing, and renewable energy systems. The Project will be designed to support monitoring-based commissioning efforts after occupancy of the building, to be performed by the CxA.

EA Prerequisite 2 / Credit 2 Energy Performance **REQUIRED / 10 points**

The Project's energy performance shall meet the minimum requirements of EAp2. For EAc2, project teams may use a pilot alternative compliance path (EApc95) for documenting savings under the EA Optimize Energy Performance Credit. The intent of this ACP is to allow project teams to use performance metrics other than cost for documenting performance improvement. The ACP requires project teams to calculate and report a metric from each of the required categories: Site Energy Cost, Source Energy, Greenhouse Gas Emissions, and Time Dependent Valuation (TDV) Energy (if available).

The average percent savings of the two highest-performing metrics, using equal weighting, is then used to determine percentage energy savings for the Project. Source energy reduction and greenhouse gas emission reduction metrics will be used to document savings under LEED.

Based on early energy analysis, the average percent savings for energy use reduction is estimated at 25 percent, which equates to 10 LEED points. The Project team shall develop a whole building energy model to demonstrate the expected performance rating of the designed building systems.

EA Prerequisite 3 Building-Level Energy Metering **REQUIRED**

The Project will include building-level energy meters, the data from which will be shared with the USGBC for a minimum of five years.

EA Prerequisite 4 Fundamental Refrigerant Management **REQUIRED**

The specifications for refrigerants used in the Project HVAC & R systems shall NOT permit the use of CFC based refrigerants. The proposed design of the HVAC systems will achieve the prerequisite.

EA Credit 3 Advanced Energy Metering **1 point**

The Project will include meters for all end uses that represent 10 percent or more of the total building energy use.

EA Credit 7 Green Power and Carbon Offsets **2 points**

The University has negotiated a contract to purchase 100% of the electricity used on all campuses from a planned wind farm scheduled to come online in early 2020. The electricity demand for the Project will be included within this contracted amount. The contract is for a minimum of 15 years, and all RECs attained through this process will be Green-e Certified, as required.

4.2.6 MATERIALS AND RESOURCES

A demolition and construction waste management plan will be implemented during the construction of the Project to divert at least 75 percent of waste material from at least four separate waste streams from entering landfills. Building materials will be selected that contain recycled and regional content to reduce use of virgin materials and energy use associated with transportation while supporting local economies. Additionally, materials that disclose environmental and health information will be specified. Building-occupant waste recycling will be supported throughout the building and managed through the University's recycling program.

The Project earns points for Construction and Demolition Waste Management and Building Product Disclosure and Optimization Environmental Product Declarations, Sourcing of Raw Materials, and Material Ingredients.

MR Prerequisite 1 Storage and Collection of Recyclables **REQUIRED**

The storage of collected recyclables shall be accommodated within the Project design, including options for hazardous material disposal (i.e. batteries and electronic waste). Occupants shall have dedicated areas located on each floor to bring their recyclables for storage and collection. The University's contracted waste management company shall collect recyclables on a regular basis.

MR Prerequisite 2 / Credit 5 **REQUIRED / 2 points**
Construction and Demolition Waste Management (Planning)

The specification shall require that prior to the start of construction, the Construction Management team shall prepare and submit a Construction Waste Management plan that shall be implemented on the Site. The Project cconstruction manager shall endeavor to divert as much demolition debris and construction waste from area landfills as possible with a goal to achieve at minimum 75 percent diversion of four waste streams.

MR Credit 2 BPDO Environmental Product Declarations **1 point**

The Architect will work with the specifications writer and the construction manager to specify 20 products from five manufacturers with compliant Environmental Product Declarations.

MR Credit 3 BPDO Sourcing of Raw Materials **1 point**

The architect will work with the specifications writer and the construction manager to specify products worth 25 percent of the total materials cost with positive Leadership and Extraction Practices. These include regional, recycled, FSC wood, and rapidly renewable materials.

MR Credit 4 BPDO Material Ingredients **1 point**

The architect will work with the specifications writer and the construction manager to specify 20 products from five manufacturers with compliant Health Product Declarations or similar.

4.2.7 INDOOR ENVIRONMENTAL QUALITY

The comfort and well-being of the building occupants will be paramount in regard to air quality, access to light, and thermal comfort. An indoor air quality management plan will be implemented during construction to enhance the well-being of construction workers and to promote a better indoor environment for building occupants. Low-emitting materials will be employed throughout the building to reduce the quantity of indoor air contaminants and promote the comfort and well-being of installers and building occupants.

The Project earns points for Enhanced Indoor Air Quality Strategies, Low Emitting Materials, Construction Indoor Air Quality Management Plan, Thermal Comfort, and Interior Lighting.

IEQ Prerequisite 1 Minimum IAQ Performance **REQUIRED**

The building mechanical systems shall be designed to meet or exceed the requirements of ASHRAE Standard 62.1-2010 sections 4 through 7. Any naturally ventilated spaces shall comply with the applicable portions of ASHRAE 62.1.

IEQ Prerequisite 2 Environmental Tobacco Smoke (ETS) Control **REQUIRED**

The Project shall be non-smoking. Additionally, smoking shall be prohibited within 25 feet of all building openings and air intakes. Signage will be located within 10 feet of all entrances to inform building occupants.

IEQ Credit 1 Enhanced Indoor Air Quality Strategies **2 points**

The Project will pursue both options for this credit. The following considerations will be made: Entryway Systems, Interior Cross-Contamination Prevention, Filtration, and Carbon Dioxide Monitoring.

IEQ Credit 2 Low-Emitting Materials **1 point**

The specifications shall include requirements for at least two of the following categories to meet low emitting and VOC criteria: adhesives and sealants, paints and coatings, flooring, furniture, and composite wood. The Project cconstruction mmanager will be required to track all products used to ensure compliance.

IEQ Credit 3 Construction IAQ Management Plan **1 point**

The specifications shall require the Project construction manager to develop an Indoor Air Quality Management Plan for the construction and pre-occupancy phases of the Project to meet/exceed the recommended Control Measures of the SMACNA IAQ Guidelines for Occupied Buildings Under Construction 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).

IEQ Credit 5 Thermal Comfort **1 point**

The Project will meet ASHRAE 55-2010 standards for thermal comfort and will be designed to provide thermal controls to occupants within all multi-occupant common spaces, as well as individual controls to comfortably surpass the minimum of 50 percent of occupants with control access.

IEQ Credit 6 Interior Lighting **1 point**

The Project will be designed to provide three-level lighting controls to occupants within all multi-occupant common spaces, as well as provide individual, multi-level lighting controls to a minimum of 90 percent of occupants within individually occupied spaces.

4.2.8 INNOVATION

ID Credit 1 O+M Starter Kit **1 point**
Green Cleaning and Integrated Pest Management Plan

The Proponent shall implement a campus standard Green Cleaning Policy that covers green cleaning procedures, materials, and services that are within the building and site management's control and includes the organization responsible for cleaning the building and building site. Additionally, the Proponent will institute an Integrated Pest Management Program that includes measures for investigation, evaluation, and low-risk, alternative methods for pest management before moving to consider higher risk methods. In the event that high-risk methods of pest control are

necessary, the Program will ensure notification of all building occupants prior to utilization.

ID Credit 2 Green Building Education **1 point**

The Project shall develop and implement educational programs and resources for building occupants and the University community as a whole to learn about the sustainable features of the building. This will be done using brochures for occupants and a web-based information portal displayed on a building dashboard to be installed in the main lobby as well as within the University's sustainability website. Building tours that include sustainability as a focus of the script will also be provided.

ID Credit 3 Sustainable Purchasing, Lamps **1 point**

The Project shall design the lighting to reduce the average mercury content of purchased lamps below 35 picograms per lumen hour or eliminate the use of mercury-containing lamps altogether. The credit requires that the Project demonstrate a reduction of mercury content in mercury-containing lamps to 35 picograms per lumen hour or less.

ID Credit 4 PBT Source Reduction **1 point**

The Project shall specify substitutes for building materials manufactured with lead, cadmium, and copper per requirements of this credit, with the intent to reduce the release of PBTs (Persistent Bio accumulative and Toxic) chemicals into the environment and exposure to occupants and facilities and maintenance staff.

ID Credit 5 Pilot Credit Integrative Analysis of Building Materials **1 point**

The Project shall specify and install at least three permanently installed products within the building that have a documented qualitative analysis of the potential health, safety, and environmental impacts of the product in five stages of the product's life cycle. Qualitative analysis will meet requirements of this Pilot Credit.

ID Credit 6 LEED Accredited Professional **1 point**

A LEED AP shall provide administrative services to oversee the LEED credit documentation process.

4.2.9 REGIONAL PRIORITY

Regional Priority Credits (RPCs) 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 for up to four total points. RPCs applicable to the Project's location include: LTc3 High Priority Site (2 point threshold), SSc4 Rainwater Management (98% threshold),

WEc2 Indoor Water Use Reduction (40% threshold), EAc2 Optimize Energy Performance (20% threshold), and EAc5 Renewable Energy Production (5% threshold). This Project currently holds two RPCs as "Yes," as described in the sections above.

WE Credit 2 Indoor Water Use Reduction	**1 point**
EA Credit 2 Optimize Energy Performance	**1 point**

4.2.10 BOSTON GREEN BUILDING CREDITS

The Boston Green Building Credits were established in Appendix A to Article 37 as Boston-specific credits that can contribute a point toward a project's LEED "Certifiable" point total. One point may be awarded for each of the following four categories: Modern Grid, Historic Preservation, Groundwater Recharge, and Modern Mobility. The Project will meet the three required prerequisites and is exploring pursuit of the following credits:

Historic Preservation

The Project is not eligible for this credit since it is a new construction project.

Groundwater Recharge

The Project team will explore whether or not the Project can provide 50 percent greater recharge than required under Article 32-6.

Modern Mobility

The Project team will explore Transportation Demand Management options available and appropriate for the Project.

4.3 SUSTAINABLE PRACTICES

A number of innovative measures have been incorporated into the Project to address sea level rise and climate change.

4.3.1 SEA LEVEL RISE

The Project team has established a design flood elevation of 20 feet, consistent with Boston University guidelines (20 feet) and exceeding the City of Boston guidelines (16.1 feet). Measures will be implemented on the Project to prevent flood water from entering the building and subsequently minimize damage should water enter the building during a flood event. These measures may include:

- Locate the ground floor elevation at 21, which is above the design flood elevation;

- Design the foundation of the Project to resist additional hydrostatic pressure;
- Provide temporary flood barriers at ground floor doors; and
- Waterproof and dam around the lower elevation loading dock area.

If water should enter the building:

- Manage drainage of below-grade openings; and
- Provide waterproof electrical vault and electrical rooms.

4.3.2 CLIMATE CHANGE

Additional measures will be implemented on the Project to address various conditions brought on by climate change. These include bolstering the stormwater retention and management system to account for increased precipitation and flooding; designing a triple-glazed, high-performance envelope to mitigate solar heat gain and optimize heating and cooling load conditions; and using passive and alternative energy building system strategies to reduce the overall energy consumption of the Project.

4.4 CLEAN AND RENEWABLE ENERGY PRACTICES

The Proponent and Project team have evaluated multiple potential clean and/or renewable strategies for the Project, as described in the sections below.

4.4.1 COMBINED HEAT AND POWER

Combined Heat and Power (CHP) has received increased interest and application. Given that the University's goal outlined in the Climate Action Plan is to be net carbon neutral for its operations by 2040, the Project is striving for a fossil-fuel free building, and the fact that the anticipated thermal demand for domestic hot water within this Project does not support it, CHP is not considered an appropriate nor economical option to implement in this Project.

4.4.2 SOLAR PHOTOVOLTAIC PANELS

Early feasibility analysis of both building-integrated (BIPV) and rooftop-mounted photovoltaic (PV) panels has been performed. The Project team is still evaluating these strategies to determine the most appropriate application for this Project.

4.4.3 GROUND SOURCE HEAT PUMPS

The Project team is evaluating the two ground-source heat pump systems summarized below, and will continue to evaluate these options to determine the most effective and appropriate application for the Project:

Hybrid ground-source heat pump system with air-cooled chillers and condensing boilers for peak load

This option includes three heat recovery chillers, two air-cooled chillers, and three condensing boilers in the plant, with chilled water and hot water distributed to the building. The ground-loop heat exchanger is a vertical closed-loop system maximized based on Site constraints.

Full-sized central ground-source heat pump system with condensing boilers for emergency backup.

This option would significantly increase the sizing of the geothermal wells to extend below the building footprint in order to maximize the reliance on the ground-source heat pump system for the Project. This option would reduce the need for peak loads to be covered by supplemental chillers and boilers.

4.5 ENERGY EFFICIENCY ASSISTANCE

The University has Memoranda of Understanding with National Grid and Eversource to reduce natural gas and electricity consumption over three years. The Project team has had preliminary discussions with Eversource regarding incentive programs and will be meeting again to discuss potential Energy Conservation Measures for the Project.

LEED v4 for New Construction
Project Scorecard

Project Name: **BU Data Sciences Building**
Address: Commonwealth Ave, Boston MA
Date of Issue: 9/7/2018

Yes	Maybe	No			
1	0	0		**Integrative Process**	1
1			Credit 1	**Integrative Process**	1

Yes	Maybe	No			
14	1	1		**Location and Transportation**	16
		N	Credit 1	**LEED for Neighborhood Development Location**	16
1			Credit 2	**Sensitive Land Protection**	1
1		1	Credit 3	**High Priority Site**	2
5			Credit 4	**Surounding Density and Diverse Uses**	5
5			Credit 5	**Access to Quality Transit**	5
1			Credit 6	**Bicycle Facilities**	1
1			Credit 7	**Reduced Parking Footprint**	1
	1		Credit 8	**Green Vehicles**	1

Yes	Maybe	No			
5	2	3		**Sustainable Sites**	11
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
1			Credit 1	**Site Assessment**	1
	1	1	Credit 2	**Site Development; Protect or Restore Habitat**	2
1			Credit 3	**Open Space**	1
	1	2	Credit 4	**Rainwater Management**	3
2			Credit 5	**Heat Island Reduction**	2
1			Credit 6	**Light Pollution Reduction**	1

Yes	Maybe	No			
7	1	3		**Water Efficiency**	11
Y			Prereq 1	**Outdoor Water Use Reduction**	Required
Y			Prereq 2	**Indoor Water Use Reduction**	Required
Y			Prereq 3	**Building-level Water Metering**	Required
2			Credit 1	**Outdoor Water Use Reduction**	2
4	1	1	Credit 2	**Indoor Water Use Reduction**	6
		2	Credit 3	**Cooling Tower Water Use**	2
1			Credit 4	**Water Metering**	1

Yes	Maybe	No			
19	7	7		**Energy and Atmosphere**	33
Y			Prereq 1	**Fundamental Commissioning and Verification**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Building-level Energy Metering**	Required
Y			Prereq 4	**Fundamental Refrigerant Management**	Required
6			Credit 1	**Enhanced Commissioning**	6
10	4	4	Credit 2	**Optimize Energy Performance**	18
1			Credit 3	**Advanced Energy Metering**	1
	2		Credit 4	**Demand Response**	2
		3	Credit 5	**Renewable Energy Production**	3

Figure 4-1
LEED Checklist Part I
Source: The Green Engineer, 2018

	1		Credit 6	**Enhanced Refrigerant Management**	1
2			Credit 7	**Green Power and Carbon Offsets**	2

Yes	Maybe	No			
5	6	2		**Materials and Resources**	13
Y			Prereq 1	**Storage & Collection of Recyclables**	Required
Y			Prereq 2	**Construction and Demolition Waste Management Planning**	Required
	5		Credit 1	**Building Life-Cycle Impact Reduction**	5
1		1	Credit 2	**Building Product Disclosure and Optimization**-Environmental Product Declarations	2
1	1		Credit 3	**Building Product Disclosure and Optimization**-Sourcing of Raw Materials	2
1		1	Credit 4	**Building Product Disclosure and Optimization**-Material Ingredients	2
2			Credit 5	**Construction and Demolition Waste Management**	2

Yes	Maybe	No			
6	9	1		**Indoor Environmental Quality**	15
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
2			Credit 1	**Enhanced IAQ Strategies**	2
1	1	1	Credit 2	**Low-Emitting Materials**	3
1			Credit 3	**Construction IAQ Management Plan**	1
	2		Credit 4	**IAQ Assessment**	2
1			Credit 5	**Thermal Comfort**	1
1	1		Credit 6	**Interior Lighting**	2
	3		Credit 7	**Daylight**	3
	1		Credit 8	**Quality Views**	1
	1		Credit 9	**Acoustical Performance**	1

Yes	Maybe	No			
6	0	0		**Innovation**	6
1			Credit 1	**Innovation: O+M Starter Kit: Green Cleaning +Integrated Pest Mgmt**	1
1			Credit 2	**Innovation: Green Building Education**	1
1			Credit 3	**Innovation: Sustainable Purchasing, Lamps**	1
1			Credit 4	**Innovation: PBT Source Reduction**	1
1			Credit 5	**Pilot Credit: Integrative Analysis of Materials**	1
1			Credit 6	**LEED Accredited Professional**	1

Yes	Maybe	No			
2	0	2		**Regional Priority**	4
		1	Credit 1	**Renewable Energy Production**	1
1			Credit 2	**Optimize Energy Performance**	1
		1	Credit 3	**High Priority Site, Rainwater Management, Bldg Life Cycle Assess.**	1
1			Credit 4	**Indoor Water Use Reduction**	1

Yes	Maybe	No	
65	26	19	110

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

Figure 4-2
LEED Checklist Part II
Source: The Green Engineer, 2018

Chapter 5

TRANSPORTATION

CHAPTER 5: TRANSPORTATION

5.1 INTRODUCTION

Potential transportation impacts resulting from the Project were evaluated. This chapter summarizes the existing and proposed transportation conditions, analyzes transportation operations, and identifies potential Project impacts, transportation demand management (TDM) strategies, and transportation mitigation measures. The study was developed in conformance with the Boston Transportation Department's (BTD) Transportation Access Plan Guidelines and the Boston Planning and Development Agency's Article 80 Large Project Review process.

5.1.1 SUMMARY OF FINDINGS

The net new vehicle trips generated by the Project represent a small portion of existing traffic along the Study Area roadway network. As shown in the analyses to follow, the additional traffic generated by the Project is not expected to result in significant impacts to the surrounding transportation network. Parking impacts resulting from the loss of on-street and off-street parking spaces are expected to be mitigated by available parking capacities at adjacent University-owned facilities and through reductions in campus-wide parking demand currently being achieved through the University's comprehensive Transportation Demand Management Program. The Project is well served by public transit via the MBTA Green Line B Branch and bus routes, the Commuter Rail at Yawkey Station, and the extensive Boston University Shuttle operations, which together will foster a reduction in the share of trips by automobile and reduce impacts on surrounding streets. The Project is not expected to result in any significant changes to peak hour operating conditions at study area intersections.

5.1.2 PROJECT DESCRIPTION

The Project will be located at the corner of Commonwealth Avenue and Granby Street at 665 Commonwealth Avenue within the Boston University Charles River Campus. The Site is currently used as a public surface parking lot containing 126 parking spaces. There are 35 Boston University permitted off-street parking spaces along the 16-foot-wide paved private alley at the northern boundary of the Site. Three existing curb cuts are located along Commonwealth Avenue, one of which is currently used for accessing the surface parking lot. Granby Street has three existing curb cuts, one of which is utilized to access the alley.

The Data Sciences Center will be home to three departments and institutions focused on computational or data sciences. Computer Sciences, Mathematics &

Statistics, and the Hariri Institute will move from several different locations and will be co-located in the Data Sciences Center. The Project also includes classrooms and other types of teaching spaces.

The Data Sciences Center will be comprised of approximately 305,000 sf of GFA and will include 19 stories above grade, including two stories of mechanical penthouse.

The Project will replace the existing surface parking lot and the Boston University permit parking spaces on the south side of the alley. On-site parking will be eliminated. Pedestrian access will be provided via Granby Street, Commonwealth Avenue, as well as the reconstructed alley. The landscape improvements to the portion of the alley adjacent to the Project will provide a pedestrian friendly laneway that will also allow access to service the adjacent buildings. No changes are planned for the portion of the alley located east of the Project. Vehicles can access the laneway using routes similar to the existing truck and delivery routes.

As an associated public realm improvement, the Project proposes to convert Granby Street from a one-way southbound roadway to a two-way, two-lane roadway. The existing on-street parking spaces on both sides of Granby Street between Commonwealth Avenue and Bay State Road will be replaced by a dedicated bicycle lane in each direction.

5.1.3 STUDY AREA

The Study Area is bounded by Commonwealth Avenue to the south, Granby Street to the West, Bay State Road to the north, and Silber Way to the east. The Study Area also includes the existing private alley between Granby Street and Silber Way adjacent to the north side of the Site. The Study Area includes the following four signalized and three unsignalized intersections (See Figure 5-1, Study Area Intersections):

- Commonwealth Avenue/St. Mary's Street (signalized);
- Commonwealth Avenue/Cummington Mall (signalized);
- Commonwealth Avenue/Granby Street (signalized);
- Commonwealth Avenue/Hinsdale Mall (unsignalized);
- Commonwealth Avenue/Silber Way/Blandford Mall (signalized);
- Granby Street/Bay State Road (unsignalized); and
- Silber Way/Bay State Road (unsignalized).

5.1.4 STUDY METHODOLOGY

Boston University's current Institutional Master Plan and Charles River Campus Transportation Master Plan (TMP) 2013-2023 were reviewed as background to existing transportation conditions along the Commonwealth Avenue corridor and in the vicinity of the Site. The existing conditions traffic analysis was based on new traffic counts conducted on April 12, 2018.

Additionally, University Parking & Transportation Planning Transportation Demand Management Updates, dated January 6, 2017 and February 15, 2018 and provided by Boston University's Parking and Transportation Service Office, were used to evaluate parking space utilization and TDM measures. The analysis year for the Project is 2022, consistent with the expected opening year for the Project as well as the analysis year for the TMP.

5.2 EXISTING CONDITIONS

5.2.1 EXISTING ROADWAY NETWORK

Commonwealth Avenue is a two-way, four-lane roadway located to the south of the Site. Commonwealth Avenue is classified as an urban principal arterial roadway under BTD jurisdiction and runs primarily in an east-west direction from Route 95 in Weston to the west and Arlington Street in Boston to the east. In the Study Area, the MBTA Green Line B Branch runs within the median of Commonwealth Avenue and separates the roadway directions of travel. Sidewalks are provided along the northern edge of Commonwealth Avenue westbound and along the southern edge of Commonwealth Avenue eastbound. Dedicated bike lanes and on-street parking are provided along both sides of Commonwealth Avenue.

Granby Street is located on the west side of the Site. It is classified as a local roadway under BTD jurisdiction and runs in a north-south direction between Back Street to the north and Commonwealth Avenue to the south. Granby Street is a one-way southbound, two-lane roadway south of Bay State Road and is a short two-way, two-lane roadway on the north side of Bay State Road. There are sidewalks and on-street parking along both sides of Granby Street.

Silber Way is a two-way, two-lane roadway located to the east of the Site. Silber Way is classified as a local roadway under BTD jurisdiction and runs in a north-south direction between Back Street to the north and Commonwealth Avenue to the south. There are sidewalks and on-street parking along both sides of Silber Way.

Bay State Road is a one-way westbound, one lane roadway located to the north of the Site. It becomes a two-way roadway for a short-distance west of Granby Street. Bay State Road runs in an east-west direction between University Road to the west

and Charlesgate West to the east. Bay State Road is owned by the City of Boston east of Granby Street and is classified as a local roadway under BTD jurisdiction. Bay State Road west of Granby Street from Granby Street to University Road is owned by the University. Sidewalks and on-street parking are provided along both sides of Bay State Road.

5.2.2 EXISTING INTERSECTION CONDITIONS

Existing conditions of the Study Area intersections are summarized below.

Commonwealth Avenue/St. Mary's Street is a three-legged, signalized intersection with two approaches and a median that separates the eastbound and westbound directions of travel on Commonwealth Avenue. The MBTA Green Line B Branch runs within the median of Commonwealth Avenue and crosses the intersection at grade. The Commonwealth Avenue eastbound approach consists of one through lane and one shared through/right turn lane. Left turn and U-turns are prohibited on Commonwealth Avenue eastbound approach. The Commonwealth Avenue westbound approach consists of two through lanes and one dedicated left turn lane. U-turns are permitted on Commonwealth Avenue westbound approach. Crosswalks, curb cut ramps, and pedestrian signals for crossing are provided on each leg of the intersection.

Commonwealth Avenue/Cummington Mall is a three-legged, signalized intersection with three approaches and a median that separates the eastbound and westbound directions of travel on Commonwealth Avenue. The MBTA Green Line B Branch runs within the median of Commonwealth Avenue and crosses the intersection at grade. The Commonwealth Avenue eastbound approach consists of two through lanes and one dedicated lane for making left-turn and U-turn. The Commonwealth Avenue westbound lane consists of two through lanes. Cummington Mall northbound approach consists of two dedicated left and right turn only lanes. Crosswalks, curb cut ramps, and pedestrian crossing signals are provided along Commonwealth Avenue westbound approach leg, Commonwealth Avenue eastbound departure leg, and on Cummington Mall approach leg. Cummington Mall is a Boston University owned roadway.

Commonwealth Avenue/Granby Street is a three-legged, signalized intersection with three approaches and a median that separates the eastbound and westbound directions of travel on Commonwealth Avenue. The MBTA Green Line B Branch runs within the median of Commonwealth Avenue and crosses the intersection at grade. The Commonwealth Avenue eastbound and westbound approaches each consist of two through lanes. The Granby Street approach consists of two dedicated left and right turn only lanes. Crossings, curb cut ramps, and pedestrian crossing signals are provided along all approach and departure legs at the intersection.

Commonwealth Avenue/Hinsdale Mall is a two-legged, unsignalized T-intersection with two approaches. The Commonwealth Avenue eastbound approach has one through lane and one shared through/right turn lane. Hinsdale Mall roadway approach has one right-turn-only lane and is controlled by a STOP sign. Crossing and curb cut ramps are provided on Hinsdale Mall roadway. There are no pedestrian crossing signals. Hinsdale Mall is a Boston University owned roadway.

Commonwealth Avenue/Silber Way/Blandford Mall is a four-legged, signalized intersection with four approaches, with a median that separates the eastbound and westbound directions of travel on Commonwealth Avenue. The MBTA Green Line B Branch runs within the median of Commonwealth Avenue and crosses the intersection at grade. The Commonwealth Avenue eastbound and westbound approaches both have one through lane and one shared through/right turn lane. Left turns are prohibited from both Commonwealth Avenue eastbound and westbound approaches. The Silber Way and Blandford Mall approaches both have one shared left turn/through/right turn lane. Crossings, curb cut ramps, and pedestrian crossing signals are provided on each leg of the intersection. Blandford Mall is a Boston University owned roadway.

Granby Street/Bay State Road is a four-legged, unsignalized intersection with three approaches. The Bay State Road eastbound and westbound approaches are controlled by STOP signs. The Granby Street southbound approach has one shared through/right turn lane, the Bay State Road eastbound approach has one shared left turn/right turn lane, and the Bay State Road westbound approach has one shared left turn/through/right turn lane. Bay State Road is owned by the City east of Granby Street and west by the University.

Silber Way/Bay State Road is a four-legged, unsignalized intersection with three approaches controlled by an all-way STOP sign. Silber Way northbound approach has one shared left turn/through lane, Silber Way southbound approach has one shared through/right turn lane, and Bay State Road westbound approach has one shared left turn/through/right turn lane. Crossings and curb cut ramps are provided on each leg of the intersection. Bay State Road is owned by the City east of Granby Street and west by the University.

5.2.3 EXISTING (2018) TRAFFIC VOLUME

Intersection turning movement counts (TMCs) and vehicle classification counts were conducted at the seven study intersections on Thursday, April 12, 2018. The TMCs were collected during the weekday morning peak period between 7:00 and 9:00 AM, and afternoon peak period between 4:00 and 6:00 PM. The vehicle classification counts were collected for autos, heavy vehicles (trucks and buses),

bicycles, and pedestrians. The traffic count volumes were summarized in 15-minute increments.

Based on the TMCs, the AM peak hour at the study intersections occurred from 8:00 to 9:00 AM and the PM peak hour occurred from 5:00 to 6:00 PM.

See Figure 5-2, Existing (2018) Conditions at AM Peak Hour Vehicle Volume; and Figure 5-3, Existing (2018) Conditions at PM Peak Hour Vehicle Volume.

5.2.4 EXISTING (2018) TRAFFIC OPERATIONS ANALYSIS

The latest SYNCHRO 9.2 software was used for analyzing the peak hour traffic operations using Highway Capacity Manual (HCM) methodology. The results of the analysis are summarized in Tables 5-7 and 5-8, which provide overall level of service (LOS), delay, queue lengths, and volume-to-capacity ratio results for the Study Area intersections. The delay-based level of service thresholds provided in the 2000 Highway Capacity Manual are summarized for signalized and unsignalized intersections in Table 5-1.

Table 5-1: Intersection Level of Service Criteria

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

Source: Highway Capacity Manual, Special Report 209, Transportation Research Board, National Research Council, Washington, DC, 2000.

In general, all study intersections operate at acceptable overall levels of service (LOS C or better). Some minor-street turning movements experience higher levels of delay at signalized intersections, but do not exceed LOS E. Additionally, left turns from Commonwealth Avenue are generally LOS D and LOS E. There is one movement operating marginally above LOS F thresholds at the stop-controlled approach of Hinsdale Mall at Commonwealth Avenue.

5.2.5 CRASH ANALYSIS

A crash analysis at the Study Area intersections was conducted to identify potential vehicle accident trends by obtaining the most recent three years of crash records from MassDOT between 2013 and 2015. The MassDOT database is comprised of

crash data from the Massachusetts Registry of Motor Vehicles (RMV) Division. The crash data files are compiled by year for an entire city or town. Review of the crash data showed that none of the Study Area intersections had reported crashes from 2013 to 2015.

The Highway Safety Improvement Plan (HSIP) map of the top crash locations was also reviewed using MassDOT's online interactive map. None of the intersections or roadway segments within the Study Area are classified within an HSIP crash cluster in recent years.

5.2.6 PARKING

Boston University owns and operates nine major off-street surface parking lots and nine parking garages. Additionally, the University regulates parking along several private roadways and various small off-street parking areas located throughout the campus. According to the University's Parking and Transportation Services Office, as of February 2018, the University managed a total of 3,280 parking spaces (not including handicap and reserved spaces).

Off-Street Parking

The Site includes an existing surface parking lot, also known as Lot N or the Granby Lot. The Granby Lot is open to the public and does not accept University parking permits. The parking lot is typically used by visitors to Boston University during the day. It is also available to the public for Red Sox home games and select campus events. There are three existing curb cuts along Commonwealth Avenue, only one of which is used for parking lot ingress/egress.

Other University-owned parking facilities within a quarter-mile radius from the Site are listed below. See Figure 5-4, Off-Street Parking Facilities.

- Garage K Warren Towers at 700 Commonwealth Avenue (481 spaces);
- Garage L at 575 Commonwealth Avenue (117 spaces);
- Garage M at 595 Commonwealth Avenue (269 spaces);
- Garage Q at 730-750 Commonwealth Avenue (138 spaces); and
- Lot J at College of Arts & Sciences (CAS Lot) at 240 Bay State Road (168 spaces).

In addition, the following lots are located marginally beyond the quarter-mile radius:

- Lot O (Kenmore Lot) at 549 Commonwealth Avenue (116 spaces); and
- Lot R at 766 Commonwealth Avenue (83 spaces).

The area surrounding the Site also includes residential permit parking and University reserved parking on private roadways owned or shared by the University. There are 75 spaces within the alley at the north of the Site between Silber Way and Granby Street, most of which are Green (faculty, staff) permit spaces. The remainder of the parking spaces are for rental property tenants.

On-Street Parking

The on-street parking regulations within the Study Area are mostly comprised of no parking, two-hour parking, three-hour parking, and four-hour parking. The on-street parking on Commonwealth Avenue westbound adjacent to the Site, Granby Street, Silber Way, and Bay State Road are regulated with four-hour parking restrictions. Parking meters along Blandford Mall, Cummington Mall, and Hinsdale Mall were removed when these streets became private ways owned by the University and were consequently converted from vehicle to pedestrian use (except for authorized vehicles). Granby Street between Commonwealth Avenue and Bay State Road consists of a total of 21 metered parking spaces, with 9 spaces along the east side adjacent to the Site and 12 spaces along west side. There are 24 metered parking spaces along Commonwealth Avenue westbound between Silber Way and Granby Street. See Figure 5-5, On-Street Parking Facilities.

5.2.7 CAR SHARING SERVICES

Car sharing services provide an alternative means of short-term private vehicular transportation without the hassle of car ownership and maintenance costs. Vehicles are available for renting on an hourly or daily basis for a specific time period. They can be parked on dedicated parking spots or returned to their designated drop-off parking locations specified in the reservation. Rental fee for car sharing service covers gas, insurance, parking, and maintenance costs.

Zipcar is a major car sharing service in the Boston area. Zipcar locations at or near the Site include:

- University surface lot at Granby Street/Commonwealth Avenue – Boston University (4 vehicles);
- 854 Beacon Street – Brookline (2 vehicles); and

- University surface lot at 766 Commonwealth Avenue (Lot R) – Boston University (2 vehicles).

See Figure 5-11, Public Transportation.

5.2.8 EXISTING PEDESTRIAN ACCOMMODATIONS

Sidewalks are available along both sides of the roadways in the Study Area and are of sufficient width to accommodate the pedestrian demands in most areas. Sidewalks vary in width from six feet along Granby Street southbound south of Bay State Road to 25 feet along Commonwealth Avenue westbound. The rest of the sidewalks along Granby Street and Silber Way are ten feet wide. Sidewalks along Bay State Road vary from eight to 14 feet.

The physical conditions of the sidewalks are generally good throughout the Study Area. Crosswalks and handicap accessible ramps are provided at all study intersections. Pedestrian crossing signals are provided at the signalized intersections.

Pedestrian counts were conducted along with the vehicular TMCs on April 12, 2018. See Figure 5-6, Existing (2018) Conditions at AM Peak Hour Pedestrian Volume; and Figure 5-7, Existing (2018) Conditions at PM Peak Hour Pedestrian Volume.

5.2.9 EXISTING BICYCLES ACCOMMODATIONS

Bicycle facilities located in the vicinity of the Site include painted bike lanes along the northern edge of Commonwealth Avenue westbound and the southern edge of Commonwealth Avenue eastbound, outdoor bicycle racks, and bike storage rooms. There are several on-street bicycle racks within a 500-foot radius of the Site, which provide a total storage capacity of approximately 330 bikes. See Figure 5-8, Bike Rack Locations and Capacities.

Bicycle counts were conducted along with the vehicular TMCs on April 12, 2018. Bicycle volumes are highest along Commonwealth Avenue. See Figure 5-9, Existing (2018) Conditions at AM Peak Hour Bicycle Volume; and Figure 5-10, Existing (2018) Conditions at PM Peak Hour Bicycle Volume.

5.2.10 PUBLIC TRANSPORTATION

MBTA Services

The Site is served by six MBTA services. The MBTA Green Line B Branch runs along the median on Commonwealth Avenue, providing train service from Boston College to Park Street in Boston. The MBTA Green Line C and D Branches also run within

the quarter-mile radius of the Site, however they do not have stops at a quarter-mile distance.

The major MBTA bus routes operating near the Site are Routes 57 and 57A, which run along Commonwealth Avenue from Watertown Yard to Kenmore Station and from Oak Square to Kenmore Station, respectively. Other MBTA bus routes within the quarter-mile distance of the Site include Routes CT2 and 47, which provide crosstown services.

The Site is also served by the Framingham/Worcester Line of the MBTA Commuter Rail service, with the nearest stop at the Yawkey Station.

See Table 5-2 MBTA Service Operations; and Figure 5-11, Public Transportation.

Table 5-2: MBTA Service Operations

Route	Origin–Destination	Weekday Peak Hour Frequency (min)	Hours of Service
Green Line B Branch	Boston College – Park Street	6	Weekdays: 5:01 AM - 12:53 AM Saturday: 4:45 AM - 12:52 AM Sunday: 5:20 AM - 12:52 AM
Bus Route 57	Watertown Yard – Kenmore Station	10-14	Weekdays: 4:33 AM - 1:30 AM Saturday: 4:33 AM - 1:21 AM Sunday: 6:00 AM - 1:32 AM
Bus Route 57A	Oak Square – Kenmore Station	10-16	Weekdays: 7:05 AM - 7:06 PM No weekend service
Bus Route CT2	Sullivan Square - Ruggles	20-26	Weekdays: 6:35 AM - 7:26 PM No weekend service
Bus Route 47	Central Square, Cambridge – Broadway Station	10-24	Weekdays: 5:15 AM - 1:31 AM Saturday: 5:00 AM - 1:40 AM Sunday: 7:30 AM - 1:04 AM
Framingham /Worcester Line	Worcester – South Station	9 – 60	Weekdays: 4:45 AM - 1:51 AM Weekend: 6:40 AM – 12:30 AM

Source: Subway and Bus: MBTA Summer 2018 Schedule, Commuter Rail: MBTA Schedule for Framingham/Worcester Line effective May 21, 2018.

Boston University Shuttle (BUS) Service

Boston University operates a free shuttle service (BUS) that connects the Charles River Campus to the Boston University Medical Campus and provides service for the students and faculties of both campuses (see Figure 5-11, Public Transportation). The live view BUS tracking system on the BUS website and BUS mobile app provides real-time information of bus locations traveling along the route.

The BUS provides weekday and Saturday service throughout the year and Sunday evening and late-night service during Fall and Spring seasons only. The University uses larger articulated buses instead of standard city bus-type vehicles to accommodate increased demand during the weekday peak periods. The peak period bus routes only serve CRC and operate on a loop along Commonwealth Avenue between Harry Agganis Way and Kenmore Square. The Sunday evening and late-night service is also available in CRC only. Table 5-3 summarizes the BUS service operations.

Table 5-3: Boston University Shuttle (BUS) Operations

Boston University Shuttle (BUS) Route	Origin–Destination	Weekday Peak Hour Frequency (min)	Hours of Service
BUS Fall/Spring Route	Weekday & Saturday: Student Village II (33 Harry Agganis) – 710 Albany Street – Student Village II (33 Harry Agganis) Sunday: Agganis & Commonwealth Avenue – Student Village (Buick Street)	10	Weekdays: 7:00 AM – 11:55 AM Saturday: 6:30 AM – 5:25 PM Sunday: 7:05 PM – 2:00 AM
BUS Summer Schedule	Student Village II (33 Harry Agganis) – 710 Albany Street – Student Village II (33 Harry Agganis)	30	Weekdays: 7:00 AM – 11:25 AM Saturday: 6:30 AM – 5:25 PM

Source: Boston University Parking & Transportation Services. The BUS Schedules. http://www.bu.edu/thebus/about-the-bus/

5.2.11 BICYCLE SHARING SERVICES

The Site is located in close proximity to bicycle sharing locations. BLUEbikes, formerly known as Hubway, is Metro Boston's public bike share program. Hubway was launched in 2011, and the name was changed to BLUEbikes in the Spring of 2018. BLUEbikes now consists of more than 1,800 bikes at over 200 stations across Boston, Brookline, Cambridge, and Somerville.

Three BLUEbike stations are located near the Site, including the BLUEbikes station on Park Drive, which is within a quarter-mile of the Project. The location of the BLUEbikes stations are listed below and shown in Figure 5-11, Public Transportation.

- Park Drive at Buswell Street (14 bicycle docks);
- Silber Way at Commonwealth Avenue (19 docks);
- Kenmore Square (13 bicycle docks); and
- Boston University Central – 725 Commonwealth Avenue (11 bicycle docks).

5.3 NO-BUILD (2022) CONDITION

The 2022 No-Build Condition analyzes the future transportation conditions within the Project Study Area without the proposed Project. Traffic volume changes based on annual growth rate and growth associated with specific developments near the Project are included in the No-Build (2022) traffic analysis.

5.3.1 BACKGROUND TRAFFIC GROWTH

A background traffic growth rate was applied to the Existing Condition peak hour traffic volumes to account for general future traffic growth in the Project Study Area. Based on BTD guidance, an annual growth rate of one-half percent per year for four years was applied to the 2018 Existing Condition vehicle volumes for the No-Build (2022) condition.

5.3.2 SPECIFIC DEVELOPMENT TRAFFIC GROWTH

Traffic growth from current or future development projects proposed in the vicinity of the Charles River Campus was also included to estimate No-Build (2022) traffic volumes. The Boston Planning and Development Agency and Town of Brookline's websites were reviewed to identify current and planned projects. The following projects in the City of Boston are located near the Project Study Area and were reviewed for relevance to the Project Study Area:

- **Kenmore Square Hotels, Boston, MA (560-574 Commonwealth Avenue/645-665 Beacon Street)** – Involves the construction of a 24-story hotel building containing approximately 382 rooms at 560-574 Commonwealth Avenue and a 19-story hotel building containing approximately 295 rooms at 645-665 Beacon Street with underground parking. As of the writing of this PNF, the Kenmore Square Hotels PNF filing (March 12th, 2018) did not identify a project vehicle trip distribution or provide a detailed traffic analysis. Lacking this information, it was not possible to assess how many project trips (if any) are expected to affect the Project Study Area. When this information is made available, the relevancy of this project to the No-Build (2022) traffic volumes will be reassessed.

- **Kenmore Square Redevelopment Project (541 Commonwealth Avenue and 650-600 Beacon Street, Boston MA)** – Involves redevelopment of seven parcels known as 533-541 Commonwealth Avenue and 650-660 Beacon Street. Six of the existing buildings will be demolished, and one will be renovated and expanded to construct two new, mixed-use buildings. Includes approximately 282,500 square feet of newly constructed and renovated office and retail space, and approximately 60 parking spaces. This project is under review by the BPDA and will generate additional vehicle trips within the Project Study Area. The relevant trips associated with this project have been included in the No-Build (2022) conditions.

- **Boston Children's Hospital (819 Beacon Street, Boston)** – Involves the construction of an office building supporting Boston Children's Hospital uses with ground-floor retail and 432 parking spaces. This project is under review by the BPDA. This project does not generate vehicle trips within the Project Study Area.

- **Fenway Center - Phase 1 (0 Brookline Avenue)** – Phase 1 of the Fenway Center project includes building 1 and building 2 of the Fenway Center proposal, which consists of 346,000 square feet and approximately 312 residential units. This project is under construction. This project does not generate vehicle trips within the Project Study Area.

- **Fenway Center (Parcel 7 Air Rights)** – Involves a four building, mixed-use development with a parking garage to be built over the Mass Pike. The development will range from 7 to 22 stories and total approximately 819,000 gross square feet, approximately 552 residential units, and approximately 1,340 parking spaces. This project is under construction and will generate additional vehicle trips within the Project Study Area. The relevant trips associated with this project have been included in the No-Build (2022) conditions.

- **839 Beacon Street** – Involves the construction of a five-story mixed-use building containing 45 residential units, 4,500 square feet of ground floor commercial space, and 30 parking spaces. The total size of the building is 46,850 square feet. This project is under construction. This project does not generate vehicle trips within the Project Study Area.

- **Landmark Center Redevelopment (201 Brookline Avenue)** – Involves the expansion of the existing Landmark Center with the construction of a 506,000 square-foot, 14-story office/laboratory building on the southwest corner of Brookline Avenue and Fullerton Street. The project has been approved by the

BPDA with a request for a Development Impact Report. This project does not generate vehicle trips within the Project Study Area.

- **Boston University Charles River Campus Transportation Master Plan (2013-2023)** Boston University's TMP identified multiple planned institutional projects through 2022. The TMP assumed year 2022 as the future year for traffic analysis, as it represented the 10-year horizon from the existing conditions analysis year of 2012. In addition, the TMP assumed a 2.5 percent growth in University employment through 2022, equating to approximately 150 new employees. These trip generators were quantified and assigned to the roadway network as part of the 2022 traffic analysis. To be conservative, the institutional trip generation identified by the TMP has been included in the No-Build (2022) analysis in its entirety.

5.3.3 NO-BUILD (2022) CONDITION TRAFFIC VOLUMES

Morning and afternoon peak hour traffic volumes for the future No-Build (2022) condition are illustrated in Figures 5-12 and 5-13, respectively. The future No-Build (2022) traffic volumes include the background traffic growth and specific development traffic growth.

5.3.4 NO-BUILD (2022) CONDITION TRAFFIC OPERATIONS ANALYSIS

Tables 5-7 and 5-8 provide a summary of the future No-Build (2022) traffic operations analysis at the Study Area intersections. In general, no significant changes are observed from the Existing (2018) Conditions to the No-Build (2022) Condition. All study intersections operate at acceptable overall levels of service (LOS C or better). Consistent with the Existing (2018) Condition, some minor-street turning movements experience higher levels of delay at signalized intersections, but do not exceed LOS E. Additionally, left turns from Commonwealth Avenue are generally LOS D and LOS E. There is one movement operating above LOS F thresholds at the stop-controlled approach of Hinsdale Mall at Commonwealth Avenue, which also occurs in the Existing (2018) Condition.

5.4 BUILD (2022) CONDITION

The Project will replace the existing surface parking lot and will be home to three departments and institutions focused on computational or data sciences. Computer Sciences, Mathematics & Statistics, and the Hariri Institute will move from several different locations to be co-located in the Data Sciences Center. The Project also includes general classrooms and teaching space. The Data Sciences Center will be comprised of approximately 305,000 sf of GFA.

Associated public realm improvements for the Project will include reconstruction of the alley on the north side of the Site and the conversion of Granby Street to a two-way, two-lane roadway. The existing on-street parking spaces on both sides of Granby Street will be replaced by dedicated bike lanes in each direction.

5.4.1 SITE ACCESS AND CIRCULATION

The Site will have no added curb cuts for vehicular access along Granby Street and Commonwealth Avenue. As part of the Project, the alley along the northern side of the Site will be reconstructed from Granby Street to the eastern boundary of the Site. Access for loading, deliveries, and trash pick-up will be provided on the north side of the Site via the new, pedestrian-friendly laneway. Vehicles can access the laneway using routes similar to the existing truck and deliveries routes.

Pedestrian access to the Data Sciences Center will be provided via two main building entrances: one provided at the western end near the corner of Granby Street and Commonwealth Avenue and the other at the eastern end near the Sargent College building, which is also accessible via Commonwealth Avenue. Pedestrians can also access the building midblock from the north through a landscaped courtyard space. The first floor of the Data Sciences Center does not extend the entire length of the Site near the Sargent building, allowing a north-south pedestrian connection between Commonwealth Avenue and the laneway.

5.4.2 PARKING

The Project will remove 126 spaces provided at the University-owned Granby Lot. The widening and reconstruction of the private laneway will also remove 35 University reserved off-street permit spaces. The Project does not include a replacement for the University-owned spaces. The proposed reconfiguration of Granby Street will replace 21 on-street metered parking spaces with dedicated bicycle lanes on either side of Granby Street between Commonwealth Avenue and Bay State Road.

The Granby Lot currently contains five handicap-accessible parking spaces, three of which are located on the eastern side adjacent to the Sargent College building. The Project will provide two handicap-accessible spaces along Commonwealth Avenue in close proximity to the Project's eastern accessible entrance and Sargent College to mitigate the displaced handicap spaces.

Visitors can utilize existing metered parking located along the north and south sides of Commonwealth Avenue and Bay State Road or they may park at the University owned pay-on-entry Kenmore Parking Lot (Lot O) located at the corner of Commonwealth Avenue and Deerfield Street. Boston University visitors can also park in the Agganis Arena Lot/Garage and Langsam Garage located west of the

Boston University Bridge and can walk, bike, or take public transportation (MBTA bus, Green Line trains, or BUS) to the Site.

Several Boston University owned parking facilities, including the Kenmore Lot (Lot O), Warren Towers Garage (Lot K), 575 Commonwealth Avenue Garage (Lot L), Rafik B. Hariri Building Garage (Lot M), and 766 Commonwealth Avenue Garage (Lot R) are available to the public during Red Sox events.

The University has implemented several measures to reduce the number of vehicles on campus and increase the use of sustainable modes for commuters at the Campus. The University's TDM program includes elements such as commuter choices for faculty, staff, and students; parking management; and enhanced strategies. In Year 2017, the University experienced reduction in daily parking demand on Campus as a result of its TDM initiatives, with more spaces being available during weekday peak periods in garages, including Warren Towers (Lot K), 730-750 Commonwealth Avenue Garage (Lot Q), and 766 Commonwealth Avenue (Lot R). The Proponent charges fees for parking permits for faculty, staff, and students to discourage vehicle trips to the University; limits student parking permits; and actively restricts the number of parking permits issued to undergraduate students. The University will consider a number of additional measures to further strengthen the TDM program to achieve its goal of reducing drive-alone vehicle demand.

5.4.3 CAR SHARING SERVICES

The Granby Street Lot currently consists of four parking spaces assigned for Zipcars. The Project will displace these spaces, which can potentially be relocated to another Boston University visitor parking lot. Relocated spots could be moved to the Kenmore Lot located at the corner of Deerfield Street and Commonwealth Avenue or to the Boston University owned permit only surface parking lot at 766 Commonwealth Avenue, which currently has some spaces designated for Zipcars.

5.4.4 LOADING AND SERVICE

Loading and service areas will be located on the north side of the Site behind the Data Sciences Center. Loading docks will be provided in two enclosed bays on the north elevation of the building. Vehicles for loading, deliveries, and trash pick-up will access the service bays from the reconstructed private service drive on the north side of the Site. The laneway will continue to be accessed by vehicles via Granby Street and Silber Way. The laneway will be reconstructed with adequate width to allow service trucks and vehicles to maneuver to and from the service bays in the building. In addition, the existing trash compactor will be relocated to a new location in the area.

5.4.5 PEDESTRIAN ACCOMMODATIONS

Pedestrians can enter the Data Sciences Center from two main accessible entrances provided at the western corner of Granby Street and Commonwealth Avenue and at the eastern corner near Sargent College. Pedestrians can also access the building midblock from the north via the new pedestrian courtyard space. The first floor of the Data Sciences Center does not extend the entire length of the Site near the Sargent College building, allowing a north-south pedestrian connection between Commonwealth Avenue and the laneway. Additionally, the configuration of the ground floor and the second floor provides a wide building frontage and sidewalk for pedestrians along the entire length of Granby Street and approximately half of the length along Commonwealth Avenue. See Figure 2-28, Circulation and Access Plan.

The Project will provide universal Americans with Disabilities Act (ADA) accessibility improvements at both edges of the Site, including the laneway, and will also improve access to and across the laneway. Main entrances to the Data Sciences Center will be located at ground level and will be universally accessible. The Project will preserve the sidewalks and pedestrian ramps where possible and will reconstruct where necessary to meet ADA and Massachusetts Architectural Access Board (MAAB) requirements. Additionally, the Project will provide handicap access to the rear of the adjacent University-owned townhouses on Bay State Road along the north side of the laneway.

5.4.6 BICYCLE ACCOMMODATIONS

In line with Boston University's current TDM program, the Project will encourage bicycle use and reduce parking demand. As part of the Project, Granby Street will be redesigned to provide dedicated bike lanes on both sides of the street, connecting to the existing bike lanes network on Commonwealth Avenue.

The Project will remove the bicycle racks located in the existing surface lot and will provide bicycle storage on site at the eastern end near the Sargent College building. In addition, there are several bicycle racks available within the 500-foot radius of the Site, as shown in Figure 5-8, Bike Rack Locations and Capacities.

5.4.7 PROJECT TRIP GENERATION

The Proponent anticipates that approximately 501 faculty and staff will be employed at the Project. Of these employees, the University estimates that 209 (42 percent) will be relocated from existing facilities on the Campus. The approximate 292 remaining positions will be filled by new employees. Only the 292 new employee positions are used to determine trip generation for the Project, as the existing

employees who drive to the Campus have already been accounted for in the traffic counts collected on April 12, 2018.

Project-generated vehicle trips were estimated by using vehicle trip generation rates published in the most current Institute of Transportation Engineers (ITE) Trip General Manual (10th Edition). The initial ITE trip generation was adjusted to reflect the urban location of the Project using the process described in the sections to follow, as the ITE rates were derived from data collected at suburban or rural campuses. Specifically, the average rates per employee for ITE Land Use Code 550 "University/College" were used to estimate the unadjusted ITE vehicle trips. Unadjusted vehicle trips are calculated by multiplying the ITE rate by the expected number of new employees. Table 5-4 summarizes the ITE rates and the resulting unadjusted vehicle trips and their directional distributions.

Table 5-4: Unadjusted ITE Vehicle Trips

Period	ITE Rate	Unadjusted Vehicle Trips (Total)	Directional Distribution	
			Inbound	Outbound
Morning Peak Hour	0.75	219	76%	24%
Evening Peak Hour	0.79	231	33%	67%
Daily	8.89	2,596	50%	50%

Source: ITE 10th Edition, 2017

The unadjusted vehicle trips were converted into person trips by applying the national average vehicle occupancy of 1.14 for Massachusetts work trips (statewide) as presented in the 2017 National Household Travel Survey. Person trips were then distributed to transportation modes using the modal split data documented from the Charles River Campus TMP, shown in Table 5-5. The final adjusted vehicle trips are summarized in Table 5-6.

Table 5-5: Charles River Campus Modal Splits

Mode of Travel	AM Peak
Single Occupancy Vehicles	44.2%
Public Transportation	31.4%
Walk	13.5%
Bicycle	6.0%
Car/Van Pools	2.3%
Other	2.6%
Total	100.0%

Source: Boston University Charles River Campus Transportation Master Plan, 2013-2023.

Table 5-6: Adjusted ITE Vehicle Trips

Period	Inbound Trips	Outbound Trips (veh)	Total Trips (veh)
Morning Peak Hour	84	26	110
Evening Peak Hour	38	78	116
Daily	653	653	1,306

5.4.8 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The net new Project-generated vehicle trips were assigned to the roadway network based on the BTD Area 4 trip distribution rates. As the Project provides no on-site parking, the net new vehicles trips were then distributed to Project-Site-adjacent parking structures based on proximity and expected utilization. See Figure 5-14, Project-Generated Vehicle Trips (Inbound); Figure 5-15, Project-Generated Vehicle Trip Distributions (Outbound); Figure 5-16, Net New Project-Generated Vehicle Trips - AM Peak Hour; and Figure 5-17, Net New Project-Generated Vehicle Trips - PM Peak Hour. The following is a summary of the assumed distribution of new project trips to nearby parking facilities:

- 60 percent - Garage K, Warren Towers at 700 Commonwealth Avenue (481 spaces);
- 10 percent - Garage L at 575 Commonwealth Avenue (117 spaces);
- 10 percent - Garage M School of Management at 595 Commonwealth Avenue (269 spaces); and
- 20 percent - Surface lot at College of Arts & Sciences (CAS Lot) at 240 Bay State Road (168 spaces).

In addition to the quantification and distribution of net new vehicle trips generated by the Project, the Build Condition traffic analysis also accounts for the Project-related traffic re-distributions described below.

Redistribution of Existing Granby Lot (Lot N) Vehicular Traffic

The existing vehicular traffic associated with the Granby Lot to be displaced by the Project was assumed to redistribute to other University-owned public parking facilities to the west and east of the Study Area. As a conservative assumption, the existing Granby Lot traffic remains within the Study Area roadway network and is thereby included in the Build (2022) traffic volumes to be analyzed. The Granby Street Lot is a daily pay-on-entry parking lot open to the public and does not accept University parking permits. It is typically used by Boston University visitors during the day and is also available during Red Sox events. The University can utilize its

parking website to provide directions to visitors to use another lot, such as the Kenmore Lot near Deerfield Street.

Redistribution of Traffic Related to the Granby Street Two-way Conversion

As described previously, Granby Street is proposed to be converted to a two-way street as an associated public realm improvement with the Project. A redistribution of traffic was assumed to occur as a result of this improvement, which is anticipated to affect the distribution of traffic using two adjacent parallel roadways (Silber Way and Granby Street) to travel between Bay State Road and Commonwealth Avenue. It should be noted that left turns will be prohibited at all times from Commonwealth Avenue eastbound to the proposed Granby Street northbound travel lane and therefore no traffic will be distributed to this prohibited movement.

In addition to Project-generated trips utilizing the new northbound travel lane of Granby Street, traffic unrelated to the Project was assumed to shift from Silber Way northbound to Granby Street northbound. Specifically, 50 percent of the northbound left-turn volume at Silber Way and Bay State Road was assumed to be rerouted to Granby Street northbound via Commonwealth Avenue westbound. Given the one-way westbound configuration of Bay State Road and limited potential destinations along Granby Street to the north of Bay State Road, the latent traffic demand for the proposed northbound Granby Street is expected to be low.

The proposed reduction of travel lanes on Granby Street southbound from two turning lanes to a single shared lane is expected to shift southbound traffic from Granby Street to Silber Way, where there is under-utilized traffic signal capacity. To account for this expected change in travel patterns, 30 percent of future southbound traffic on Granby Street is assumed to redistribute to Silber Way southbound (15 percent), and Commonwealth Avenue westbound (15 percent). The justification for this redistribution is two-fold:

1) Existing PM peak hour traffic data indicates that a large portion of traffic on Granby Street is originating from the east along Bay State Road (219 vehicles/hour) rather than from the west (56 vehicles/hour). Given the surrounding roadway network and limited sources for this relatively large portion of traffic, it follows that the majority of this traffic is cut-through traffic bypassing Commonwealth Avenue westbound coming from the intersection of Bay State/Charlesgate West/Beacon Street. The recent elimination of the slip lane onto Bay State Road from Charlesgate West discourages this cut-through behavior and thereby is expected to result in a redistribution of traffic from Bay State Road westbound and Granby Street southbound to Commonwealth Avenue westbound.

2) Southbound traffic on Granby Street originating from the east has the opportunity to easily shift to Silber Way, where there is under-utilized signal capacity. Currently, the appeal of using Granby Street over Silber Way is due to the extra turn lane provided at Granby Street, which is particularly advantageous for the aforementioned cut-through traffic seeking to return to Commonwealth Avenue westbound. Since the proposed design of Granby Street eliminates this, it is reasonable to assume that traffic will seek the shortest/quickest route, and traffic volumes and delays are expected to be more evenly distributed between the two roads.

5.4.9 BUILD (2022) CONDITION TRAFFIC VOLUMES

The Build (2022) traffic volumes were developed by estimating Project-generated traffic volumes, distributing these volumes, and assigning them to the Study Area roadways. The Build (2022) traffic volume networks were developed by adding the No-Build (2022) traffic volumes, the net new traffic volumes expected to be generated by the Project, and the other Project-related traffic redistributions described in Section 5.4.8.

See Figure 5-18, Build (2022) Conditions at AM Peak Hour Vehicle Volume; and Figure 5-19, Build (2022) Conditions at PM Peak Hour Vehicle Volume.

5.4.10 BUILD (2022) CONDITION TRAFFIC OPERATIONS ANALYSIS

Tables 5-7 and 5-8 provide a summary of the future Build (2022) traffic operations analysis at the Study Area intersections. No significant changes are observed for overall intersection operations from the No-Build (2022) Condition to the Build (2022) Condition, and all study intersections remain at acceptable overall levels of service (LOS C or better). Consistent with the Existing (2018) Condition and No-Build (2022) Condition, some minor-street turning movements experience higher levels of delay at signalized intersections, but do not exceed LOS E. Additionally, left turns from Commonwealth Avenue remain LOS D and LOS E. The single LOS F movement at the stop-controlled approach of Hinsdale Mall at Commonwealth Avenue also occurs in the Existing (2018) Condition.

Table 5-7: Intersection Level of Service Comparison – Weekday AM Peak Hour

Intersection	Existing (2018) AM Peak Hour					No-Build (2022) AM Peak Hour					Build (2022) AM Peak Hour				
	LOS	Delay (s)	V/C	50% Queue Length (ft)	95% Queue Length (ft)	LOS	Delay (s)	V/C	50% Queue Length (ft)	95% Queue Length (ft)	LOS	Delay (s)	V/C	50% Queue Length (ft)	95% Queue Length (ft)
Signalized Intersections															
St Mary's St @ Commonwealth Ave	**B**	**11.9**	0.51			**B**	**12.0**	**0.52**			**B**	**14.3**	**0.61**		
Commonwealth Ave EB Thru	A	3.5	0.31	62	97	A	3.7	0.33	68	107	A	4.9	0.37	84	131
Commonwealth Ave WB Left	D	50.0	0.51	64	86	D	50.0	0.52	65	88	D	51.7	0.61	89	111
Commonwealth Ave WB Thru	B	16.9	0.31	115	202	B	17.4	0.32	124	207	C	25.3	0.35	144	221
Cummington Mall* @ Commonwealth Ave	**B**	**17.4**	**0.66**			**B**	**17.8**	**0.66**			**B**	**18.9**	**0.67**		
Commonwealth Ave EB Left	E	55.0	0.66	98	159	D	54.4	0.66	101	163	D	54.5	0.67	101	166
Commonwealth Ave EB Thru	B	13.6	0.27	89	194	B	14.7	0.29	105	216	B	16.9	0.33	141	245
Commonwealth Ave WB Thru	A	9.1	0.25	77	115	A	9.3	0.25	80	117	A	9.6	0.27	89	126
Cummington Mall* NB Left	E	55.8	0.26	17	34	E	55.8	0.26	17	34	E	57.7	0.35	25	44
Cummington Mall* NB Right	A	0.6	0.05	0	0	A	0.6	0.05	0	0	A	0.6	0.04	0	0
Granby St @ Commonwealth Ave	**A**	**5.9**	**0.36**			**A**	**6.3**	**0.40**			**A**	**5.5**	**0.51**		
Commonwealth Ave EB Thru	A	3.1	0.21	36	60	A	3.3	0.22	41	69	A	3.5	0.25	46	82
Commonwealth Ave WB Thru	A	2.7	0.17	27	46	A	2.9	0.18	28	49	A	3.0	0.23	34	62
Granby St SB Left [Left/Right]	D	49.1	0.36	32	51	D	49.7	0.40	37	57	C	33.1	0.51	31	52
Granby St SB Right [Removed]	B	15.8	0.36	0	23	B	15.3	0.35	0	23	-	-	-	-	-
Silber Way @ Commonwealth Ave	**A**	**1.9**	**0.26**			**A**	**1.9**	**0.26**			**A**	**3.9**	**0.43**		
Commonwealth Ave EB Thru	A	1.8	0.19	34	45	A	1.9	0.20	36	49	A	2.7	0.22	38	65
Commonwealth Ave WB Thru	A	1.9	0.26	36	45	A	2.0	0.26	38	47	A	2.9	0.29	45	70
Silber Way SB Left/Thru/Right	A	1.2	0.14	0	0	A	1.3	0.14	0	0	A	31.0	0.43	8	46
Unsignalized Intersections															
Hinsdale Mall* @ Commonwealth Ave	**A**	**0.1**				**A**	**0.1**				**A**	**0.2**			
Hinsdale Mall* NB Right	B	14.7	0.02	N/A	0	C	15.1	0.02	N/A	0	C	16.0	0.05	N/A	5
Granby St/Back St @ Bay State Rd*	**B**	**10.3**				**B**	**10.6**				**A**	**8.0**			
[Granby St NB]	-	-	-	-	-	-	-	-	-	-	A	7.8	0.06	N/A	5
Bay State Rd EB*	A	9.2	0.02	N/A	2	A	9.2	0.02	N/A	3	A	6.7	0.02	N/A	0
[Granby St SB]	-	-	-	-	-	-	-	-	-	-	A	7.3	0.01	N/A	0
Bay State Rd WB	B	10.6	0.26	N/A	25	B	10.9	0.29	N/A	30	A	8.2	0.21	N/A	20
Silber Way @ Bay State Rd	**A**	**8.4**				**A**	**8.6**				**A**	**8.4**			
Silber Way NB Left/Thru/Right	A	8.2	0.12	N/A	10	A	8.3	0.13	N/A	13	A	8.1	0.09	N/A	8
Silber Way SB Left/Thru/Right	A	7.5	0.02	N/A	3	A	7.6	0.02	N/A	3	A	7.5	0.02	N/A	3
Bay State Rd WB Left/Thru	A	8.6	0.25	N/A	25	A	8.8	0.27	N/A	28	A	8.6	0.26	N/A	25

Notes:
1. Synchro version 9.2.914.6 was used to calculate results.
2. Signalized intersection results are based on the Lanes, Volumes, and Timings report from Synchro.
3. Unsignalized intersection results are based on the HCM 2010 reports.
4. Queue lengths for unsignalized intersections are based on a 25' vehicle length.

Symbols:
N/A - Results not reported or available.
[XXXX] - Movement is only available in the build condition.
* denotes Boston University owned roadway. Bay State is Boston University owned west of Granby Street.
# - 95th percentile volume exceeds capacity, queue may be longer.
m - Volume for the 95th percentile queue is metered by upstream signal.

Table 5-8: Intersection Level of Service Comparison – Weekday PM Peak Hour

Intersection	Existing (2018) PM Peak Hour					No-Build (2022) PM Peak Hour					Build (2022) PM Peak Hour				
	LOS	Delay (s)	V/C	50% Queue Length (ft)	95% Queue Length (ft)	LOS	Delay (s)	V/C	50% Queue Length (ft)	95% Queue Length (ft)	LOS	Delay (s)	V/C	50% Queue Length (ft)	95% Queue Length (ft)
Signalized Intersections															
St Mary's St @ Commonwealth Ave	**B**	**18.3**	**0.75**			**B**	**18.8**	**0.76**			**C**	**20.3**	**0.78**		
Commonwealth Ave EB Thru	A	7.7	0.44	125	164	A	8	0.45	132	171	A	8.4	0.46	142	176
Commonwealth Ave WB Left	D	48.6	0.75	99	147	D	49.6	0.76	105	160	E	60.5	0.78	143	252
Commonwealth Ave WB Thru	C	21.5	0.54	262	335	C	22	0.56	275	352	C	21.8	0.60	303	378
Cummington Mall* @ Commonwealth Ave	**B**	**13.8**	**0.68**			**B**	**14.6**	**0.71**			**B**	**15.7**	**0.73**		
Commonwealth Ave EB Left	E	63.3	0.68	78	#150	E	65	0.71	80	#159	E	67.8	0.73	80	m#155
Commonwealth Ave EB Thru	B	10.6	0.45	139	165	B	11.1	0.46	145	171	B	12.0	0.52	162	181
Commonwealth Ave WB Thru	A	7.1	0.43	67	98	A	7.3	0.45	71	102	A	6.3	0.49	93	93
Cummington Mall* NB Left	E	61.7	0.54	52	83	E	63.8	0.6	62	96	E	69.2	0.70	82	121
Cummington Mall* NB Right	A	1	0.09	0	0	A	0.9	0.09	0	0	A	0.8	0.08	0	0
Granby St @ Commonwealth Ave	**A**	**6.8**	**0.61**			**A**	**7**	**0.63**			**B**	**10.5**	**0.82**		
Commonwealth Ave EB Thru	A	0.6	0.34	1	1	A	0.6	0.35	1	1	A	0.6	0.40	1	2
Commonwealth Ave WB Thru	A	4.2	0.3	94	107	A	4.5	0.3	101	114	A	8.2	0.44	184	266
Granby St SB Left [Left/Right]	E	58.5	0.61	79	131	E	58.5	0.63	85	141	E	55.8	0.82	143	221
Granby St SB Right [Removed]	B	12.9	0.57	0	61	B	12.5	0.58	0	62	-	-	-	-	-
Silber Way @ Commonwealth Ave	**A**	**5.5**	**0.61**			**A**	**5.8**	**0.63**			**B**	**12.0**	**0.81**		
Commonwealth Ave EB Thru	A	3.2	0.31	69	142	A	3.3	0.33	79	162	A	7.3	0.38	150	176
Commonwealth Ave WB Thru	A	4.3	0.35	64	130	A	4.5	0.36	68	137	A	8.3	0.42	116	206
Silber Way SB Left/Thru/Right	D	38.6	0.61	22	71	D	40.7	0.63	26	76	E	60.6	0.81	76	140
Unsignalized Intersections															
Hinsdale Mall* @ Commonwealth Ave	**A**	**2.5**				**A**	**2.6**				**A**	**5.4**			
Hinsdale Mall* NB Right	F	57.5	0.54	N/A	68	F	60	0.56	N/A	70	F	95.6	0.81	N/A	100
Granby St/Back St @ Bay State Rd*	**C**	**15**				**C**	**15.8**				**A**	**8.2**			
[Granby St NB]	-	-	-	-	-	-	-	-	-	-	A	8.2	0.09	N/A	5
Bay State Rd EB*	B	11.2	0.12	N/A	10	B	11.3	0.12	N/A	10	A	7.1	0.08	N/A	5
[Granby St SB]	-	-	-	-	-	-	-	-	-	-	A	7.7	0.02	N/A	3
Bay State Rd WB	C	16.7	0.53	N/A	78	C	17.6	0.56	N/A	88	A	8.6	0.24	N/A	23
Silber Way @ Bay State Rd	**B**	**10.1**				**B**	**10.4**				**A**	**9.7**			
Silber Way NB Left/Thru/Right	A	9.1	0.19	N/A	18	A	9.3	0.21	N/A	20	A	8.6	0.13	N/A	13
Silber Way SB Left/Thru/Right	B	10.7	0.43	N/A	55	B	11.1	0.46	N/A	60	A	7.8	0.05	N/A	4
Bay State Rd WB Left/Thru	A	7.9	0.05	N/A	5	A	8	0.05	N/A	5	B	10.2	0.40	N/A	48

Notes:
1. Synchro version 9.2.914.6 was used to calculate results.
2. Signalized intersection results are based on the Lanes, Volumes, and Timings report from Synchro.
3. Unsignalized intersection results are based on the HCM 2010 reports.
4. Queue lengths for unsignalized intersections are based on a 25' vehicle length.

Symbols:
N/A - Results not reported or available.
[XXXX] - Movement is only available in the build condition.
* denotes Boston University owned roadway. Bay State is Boston University owned west of Granby Street.
# - 95th percentile volume exceeds capacity, queue may be longer.
m - Volume for the 95th percentile queue is metered by upstream signal.

5.5 TRANSPORTATION MITIGATION MEASURES

As described in Section 5.4 Build (2022) Condition, no traffic-related impacts are associated with the Project. The Project will displace approximately 35 existing University parking spaces reserved for University Parking Permit holders located in the laneway north of the Site. In addition, 126 off-street public spaces in the Granby Lot and 21 on-street parking spaces along Granby Street between Commonwealth Avenue and Bay State Road will be removed. Granby Street is proposed to be reconfigured to accommodate a two-way, two-lane roadway with bike lanes in both directions. This would grant direct access to Boston University faculty, staff, students, and visitors bound to the Boston University Admissions Office from Commonwealth Avenue via Granby Street rather than Silber Way and Bay State Road. This would reduce the traffic volume on Bay Street Road between Silber Way and Granby Street.

To accommodate the reduction in parking supply, Boston University has a proven and robust TDM program that has effectively reduced parking demand on campus. From November 2015 to February 2018 alone, Boston University documented a 10 percent reduction in occupancy rates for parking facilities campus-wide. As of 2018, an average of approximately 700 spaces remain unoccupied during peak weekday activity and is sufficient to offset the parking supply displaced by the Project. As the University continues to expand its TDM program, parking demand on campus is expected to continue to fall. The following section describes the current and planned TDM program elements.

5.5.1 TRANSPORTATION DEMAND MANAGEMENT

Boston University's Parking and Transportation Services office has established a set of initiatives with the goal of reducing the number of vehicles on campus and increasing the use of sustainable modes of travel. Reducing drive-alone vehicle demand is an essential component of the University's TDM program, and faculty, students, and staff are encouraged to pursue alternatives to driving alone. The University's TDM program includes the following components:

Commuter Choices

The University's TDM program includes a wide variety of commuter options as summarized below:

- **Ride Matching Program**: The University partners with Bay State Commute to assist employees seeking a carpool partner.
- **Carpool Parking Permit**: Employees who must drive are offered a number of incentives to carpool: discounted parking, dedicated parking spaces, discounted daily parking passes, gas cards, and eligibility for the guaranteed ride home program. Carpool parking permits must be purchased at the Parking &

Transportation Services office and all members of the carpool are required to be present at the time of purchase.

- **MBTA Pass Program**: University employees can purchase MBTA monthly passes through payroll deduction on a pre-tax basis. All regular faculty and staff can purchase subsidized MBTA passes. Up to $260 per month is tax exempt.

- **Student MBTA Semester Pass**: University students can purchase Semester MBTA Passes during the fall and spring semesters through the Parking & Transportation Services Office via the University website. The semester pass is good for four months and provides an 11 percent discount.

- **Boston University Shuttle (BUS)**: The University provides a free shuttle bus service for faculty, staff, and students that connects the CRC with the BUMC. IT operates at high frequency during weekday peak hours and provides late-night service 7 days a week.

- **Bicycle Facilities**: The University has installed a significant number of bicycle storage racks or bicycle rooms throughout the Campus to make bicycle travel convenient for users. All institutional projects will provide an appropriate amount of bicycle storage. The location of bike racks on campus can be found using the online Boston University Maps.

- **Bike Commuter Reimbursement Benefit:** The University rewards those who commute by bike with reimbursement for bike-related expenses. Employees whose commute involve a bicycle are eligible for $25 reimbursement for each month in which they held neither a BU parking permit nor subsidized transit pass.

- **Bicycle Safety**: The University's Parking & Transportation Services Office oversees the Bike Safety programs including helmet and light distribution, bicycle registration, bike parking management, education initiatives, and encouragement events as well as enforcement of:

    - **Cycling rules and regulations on campus**: Students are encouraged to register their bicycles with the Office.

- **Discounted BLUEbikes Memberships**: The University provides BLUEbikes memberships to faculty, staff and students in the Charles River Campus at a discounted annual rate of $52.50 compared to the regular annual rate of $99.

- **Guaranteed Ride Home**: The Guaranteed Ride Home (GRH) program sponsored by Boston University and provided by the Allston Brighton Transportation Management Association is available to Boston University employees. The GRH

program provides six free taxi rides, Lyft or Uber home per year for unexpected situations.

- **Workout to Work**: The University has also implemented Workout to Work program for employees who incorporate walking and running into their commute. Commuters can earn rewards from Allston Brighton TMS by participating in Workout to Work and are also eligible to use the GRH program.

- **Zipcar**: Zipcar's University program provides discounted Zipcar membership to Boston University students, faculties, staff, and alumni. There are multiple Zipcar locations in the CRC and surrounding areas.

- **Electric Vehicle Charging Stations**: The University has electric vehicle charging stations located across the CRC. The cost of charging a vehicle is $0.25 per hour for up to four hours, after which the cost increases to $0.50 per hour.

Parking Management

The University has various parking management measures to discourage vehicle trips to the University as described below.

- **Parking Fees**: The University charges fees for all parking permits issued to faculty, staff, and students. Campus parking rates reflect the true cost of parking and are nearly market-rate for all users (including faculty, staff, and students). Accurate pricing discourages unnecessary vehicle trips.

- **Limit Student Parking**: The University strongly discourages students from bringing their cars onto campus and limits the number of permits issued to students each year. The University issues a very limited number of parking permits to undergraduate students. Freshmen are not allowed to purchase parking permits.

- **Pre-Tax Parking**: The University's regular employees who purchase MBTA passes through Boston University are eligible to set aside pre-tax money from their paycheck to pay for their work-related parking costs at MBTA transit stations.

- **Limiting Construction of New Parking Spaces**: Over the course of the last two Master Plans, the University has limited the number of new spaces provided at institutional projects and has constructed new buildings with no parking. The Project will not include new parking spaces and will result in a net loss of 126 spaces at the CRC and 35 spaces at the private laneway.

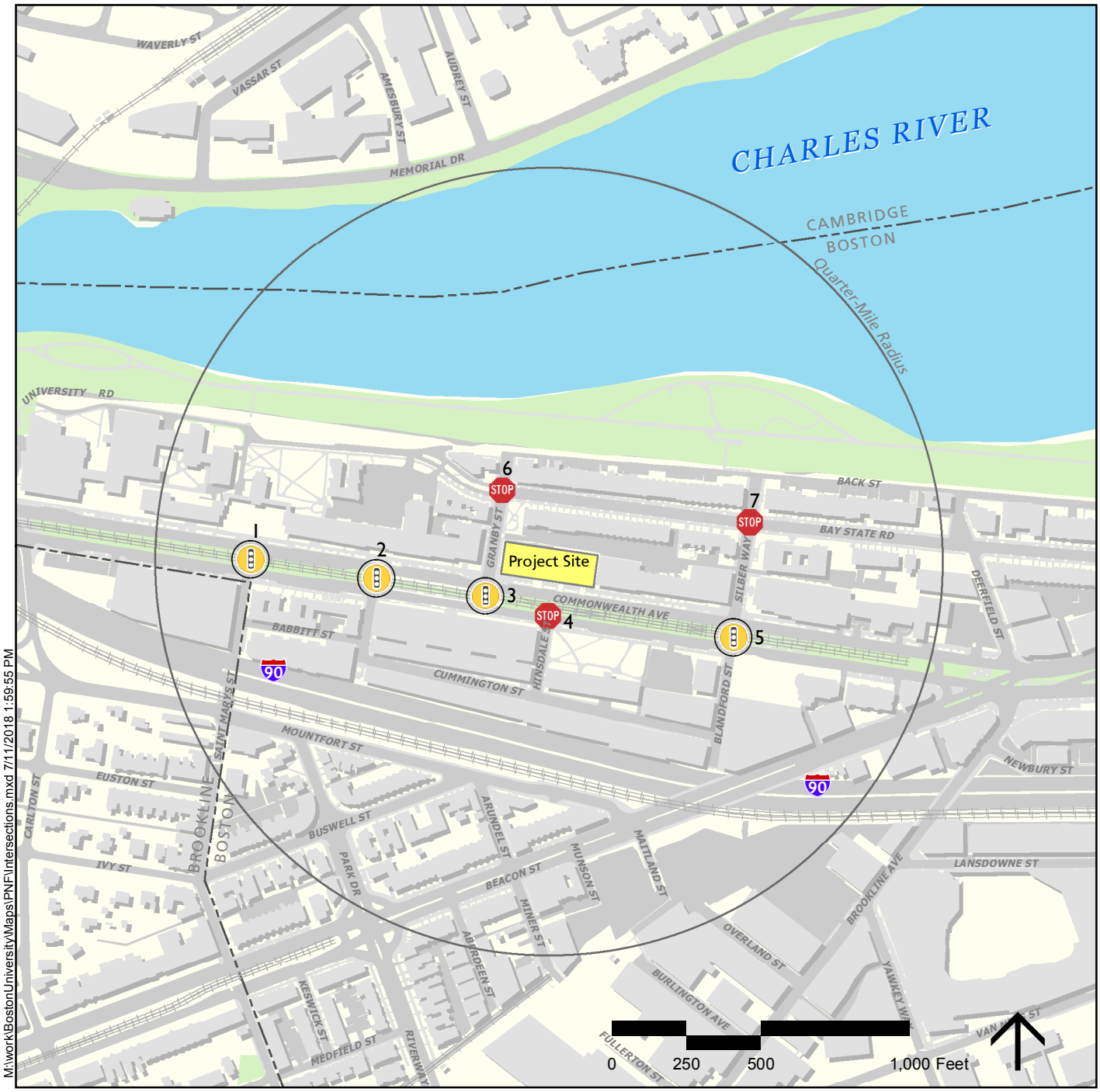
Enhanced Strategies

Boston University intends to take the following steps to further improve its TDM program:

- Consider a multiyear plan to bring the CRC parking permit rate to market levels by FY19;
- Replace the decades old legacy-based parking technology with a comprehensive, fully integrated Permit Management System and Parking Access and Revenue Control System to introduce zone and dynamic pricing policies;
- Study CRC and Boston University Medical College (BUMC) shuttle bus routes and passenger counts to assess potential route and schedule changes;
    - Advance the programs and policies identified in the Charles River Campus Bicycle Master Plan.
    - Assess current bike parking inventory, bike parking placement, bike rack styles, end-of-trip facilities and wayfinding (both on and off-campus routes);
    - Determine likely areas of growth in demand for bike parking and potential mode shift expectations, particularly after installation of protected cycle tracks on Commonwealth Avenue;
    - Recommend short, medium, and long-term bike parking facilities improvements, including areas to install sheltered bike parking and opportunities to expand capacity; and
    - Assess potential for BLUEbikes (formerly Hubway) bike share system to serve as part of the solution to the increasing demand on available bike parking.
- Raise awareness of current faculty and staff benefits and introduce new programs
    - Promote MBTA benefit and introduce new transit parking pre-tax benefit in fall 2019; and
    - Promote new commuter choice programs such as a guaranteed ride home, workout to work, ride matching, and ride share and car pool subsidies.

5.6 TRANSPORTATION ACCESS PLAN AGREEMENT

The Proponent is responsible for preparation of the Transportation Access Plan Agreement (TAPA), which is a formal legal agreement between the Proponent and the BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, transportation demand management measures, traffic impact model, and any other responsibilities that are agreed to by both the Proponent and the BTD. The TAPA will be executed after all the technical analyses are completed.



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Signalized Intersection

Unsignalized Intersection

1 Commonwealth Ave/St Marys St
2 Commonwealth Ave/Cummington Mall
3 Commonwealth Ave/Granby St
4 Commonwealth Ave/Hinsdale Mall
5 Commonwealth Ave/Silber Way/Blandford Mall
6 Granby St/Bay State Rd
7 Silber Way/Bay State Rd

Figure 5-1
Study Area Intersections
Source: AECOM, 2018

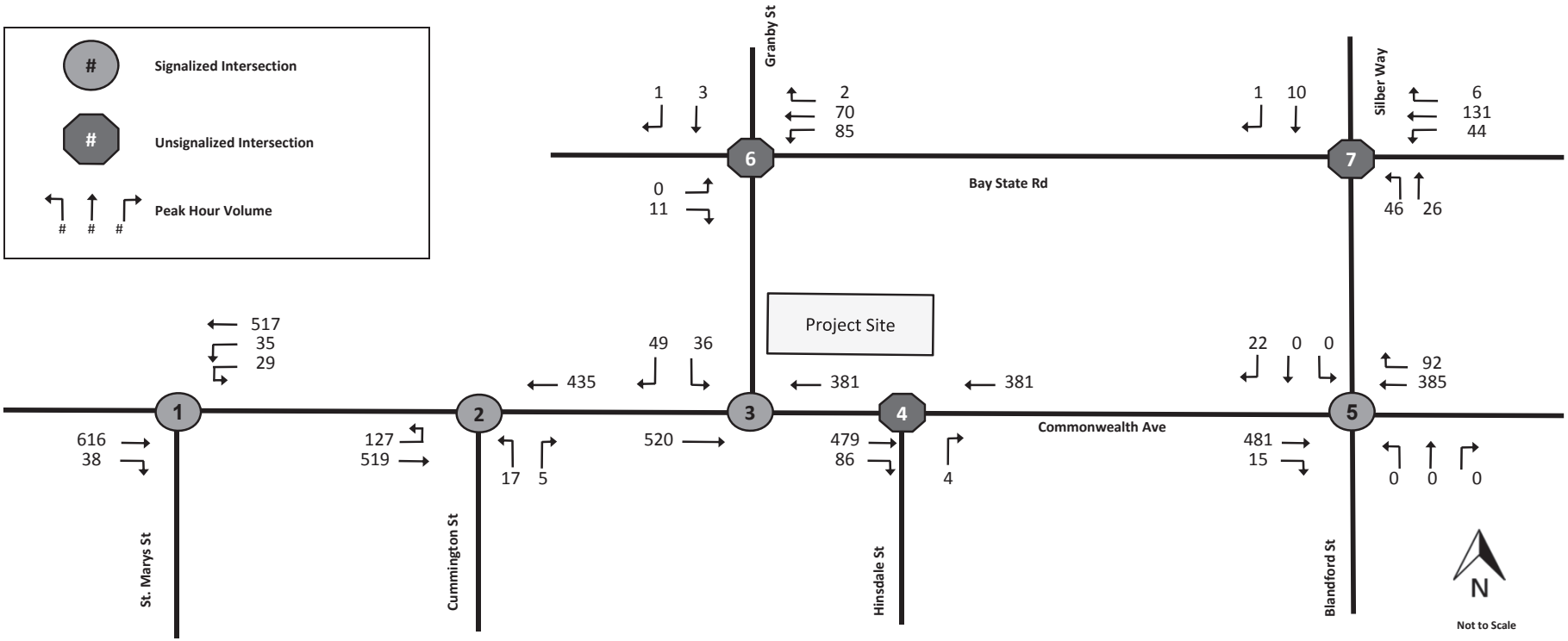


Figure 5-2
Existing (2018) Conditions at AM Peak Hour Vehicle Volume
Source: AECOM, 2018

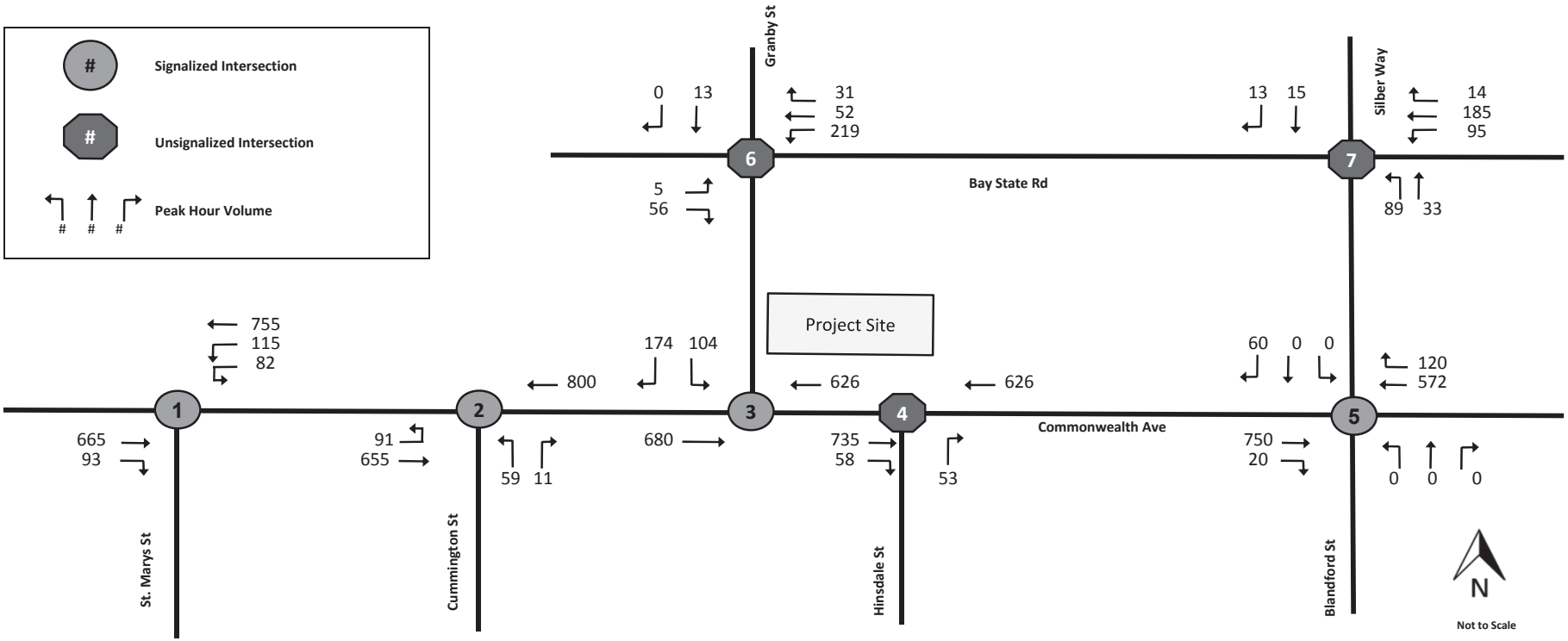
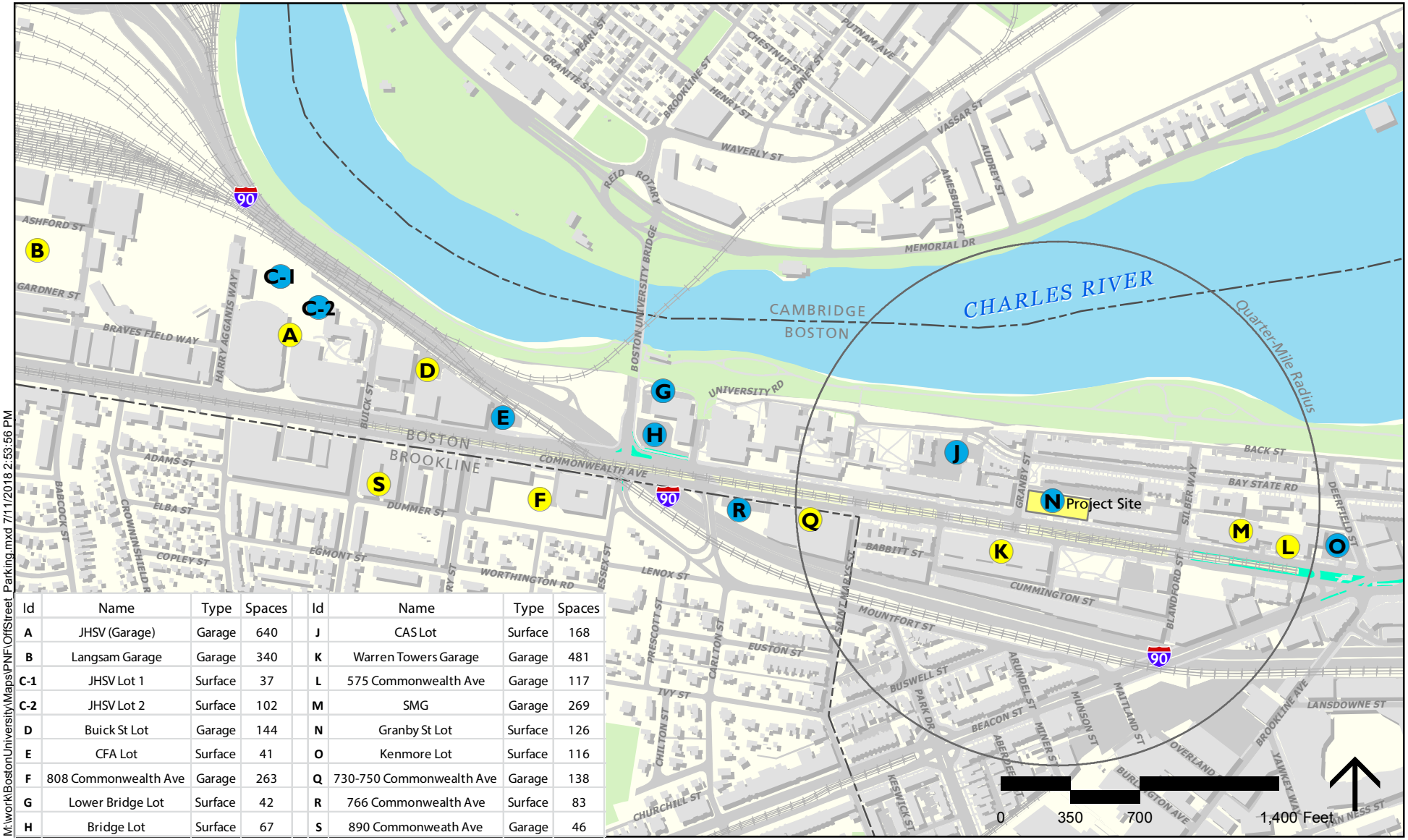


Figure 5-3
Existing (2018) Conditions at PM Peak Hour Vehicle Volume
Source: AECOM, 2018



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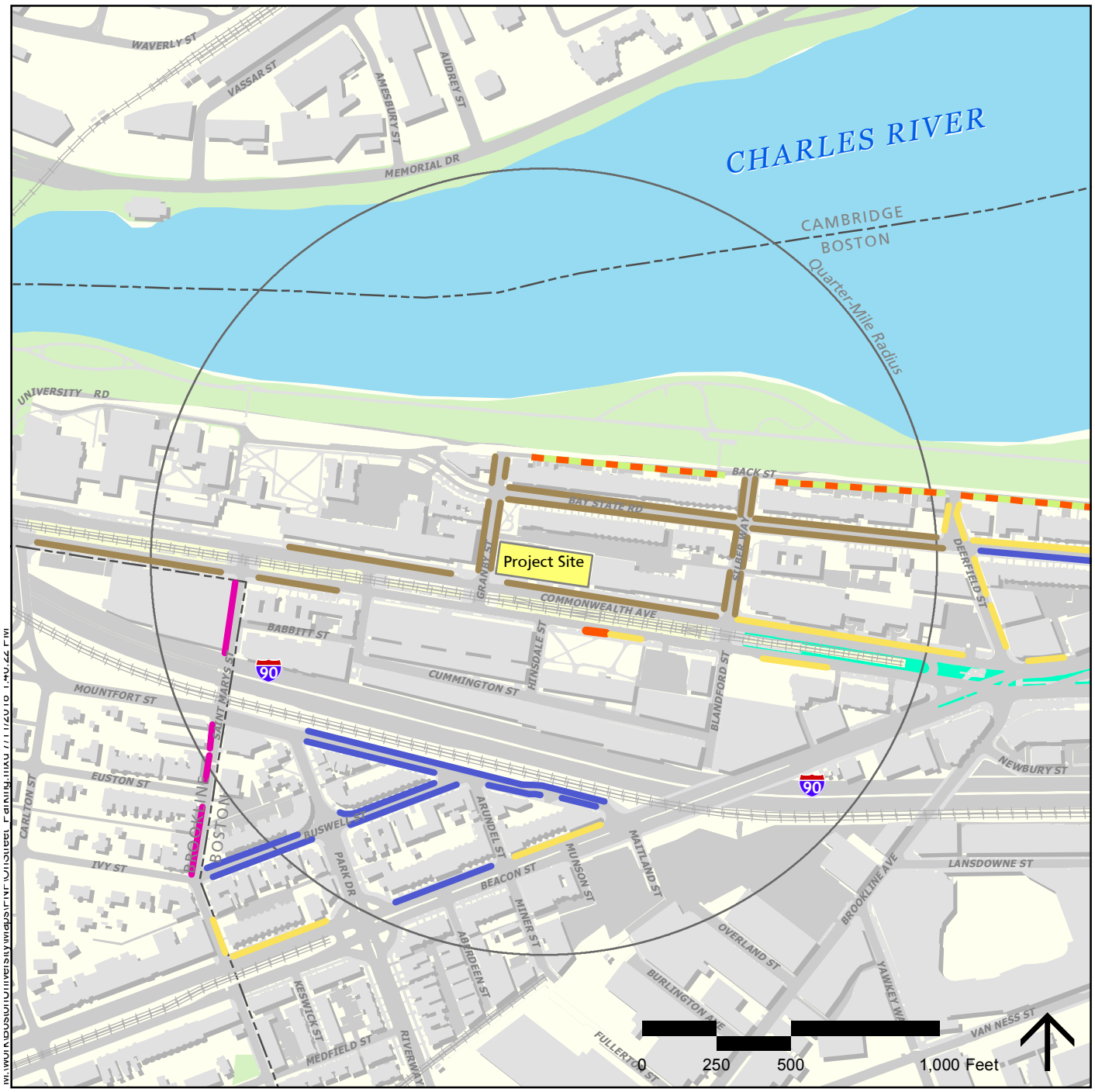
Id	Name	Type	Spaces	Id	Name	Type	Spaces
A	JHSV (Garage)	Garage	640	J	CAS Lot	Surface	168
B	Langsam Garage	Garage	340	K	Warren Towers Garage	Garage	481
C-1	JHSV Lot 1	Surface	37	L	575 Commonwealth Ave	Garage	117
C-2	JHSV Lot 2	Surface	102	M	SMG	Garage	269
D	Buick St Lot	Garage	144	N	Granby St Lot	Surface	126
E	CFA Lot	Surface	41	O	Kenmore Lot	Surface	116
F	808 Commonwealth Ave	Garage	263	Q	730-750 Commonwealth Ave	Garage	138
G	Lower Bridge Lot	Surface	42	R	766 Commonwealth Ave	Surface	83
H	Bridge Lot	Surface	67	S	890 Commonweath Ave	Garage	46

Figure 5-4
Off-Street Parking Facilities
Source: AECOM, 2018



2 Hour Meters (8AM - 6 PM M-Sat)
3 Hour Meters (3AM- 6PM M-Sat)
4 Hour Meters (8AM-6PM M-Sat)
BU Reserved Parking
Fenway/Kenmore Resident Parking
Food Truck Parking

Figure 5-5
On-Street Parking Facilities
Source: AECOM, 2018

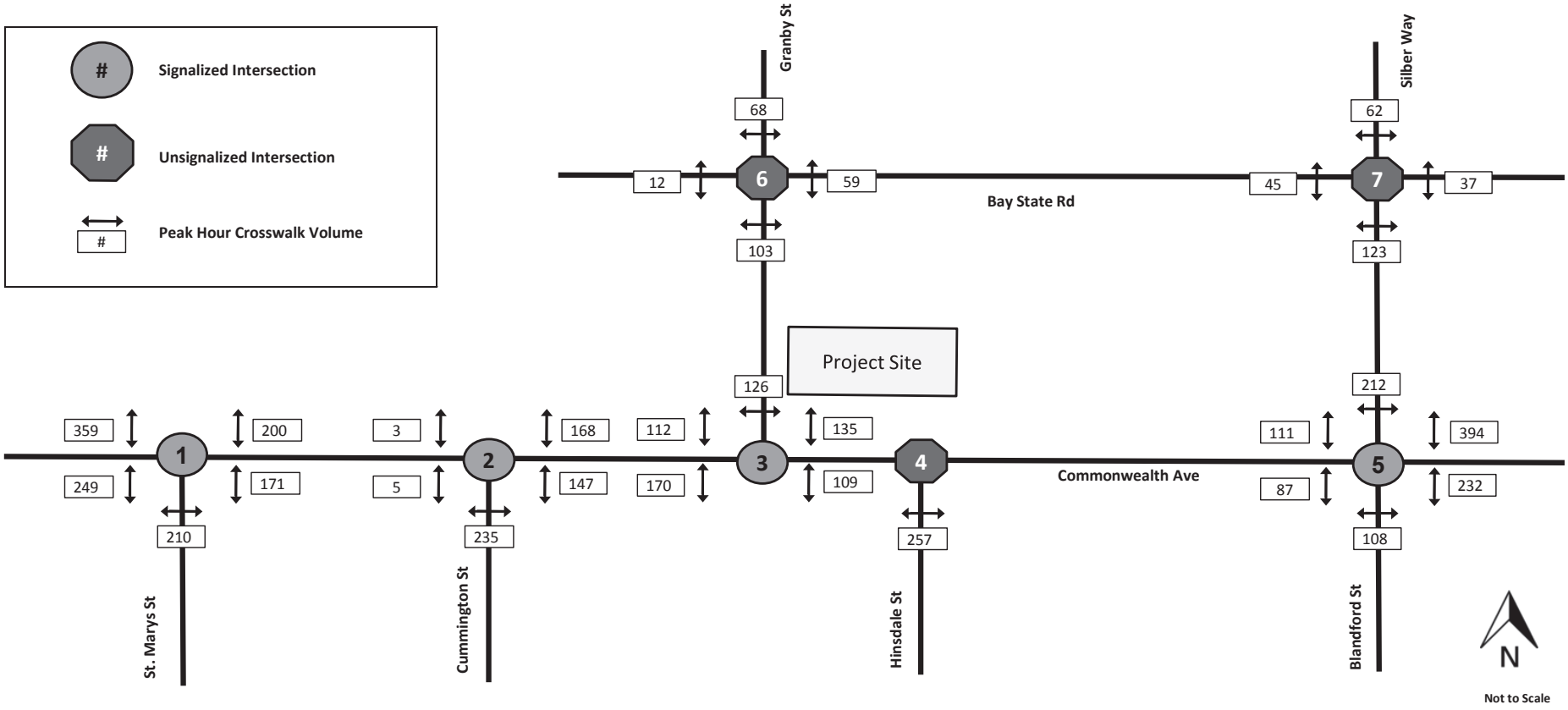


Figure 5-6
Existing (2018) Conditions at AM Peak Hour Pedestrian Volume
Source: AECOM, 2018

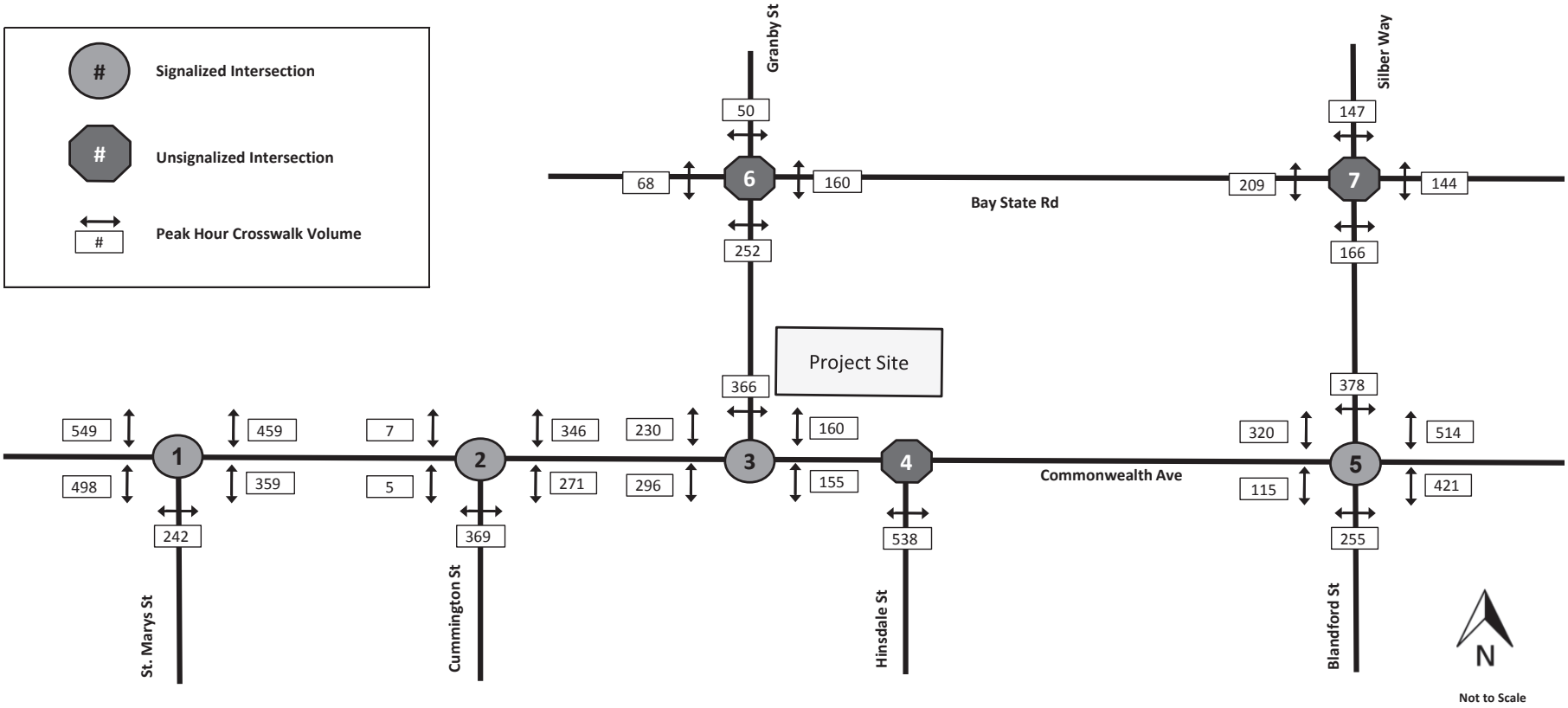


Figure 5-7
Existing (2018) Conditions at PM Peak Hour Pedestrian Volume
Source: AECOM, 2018

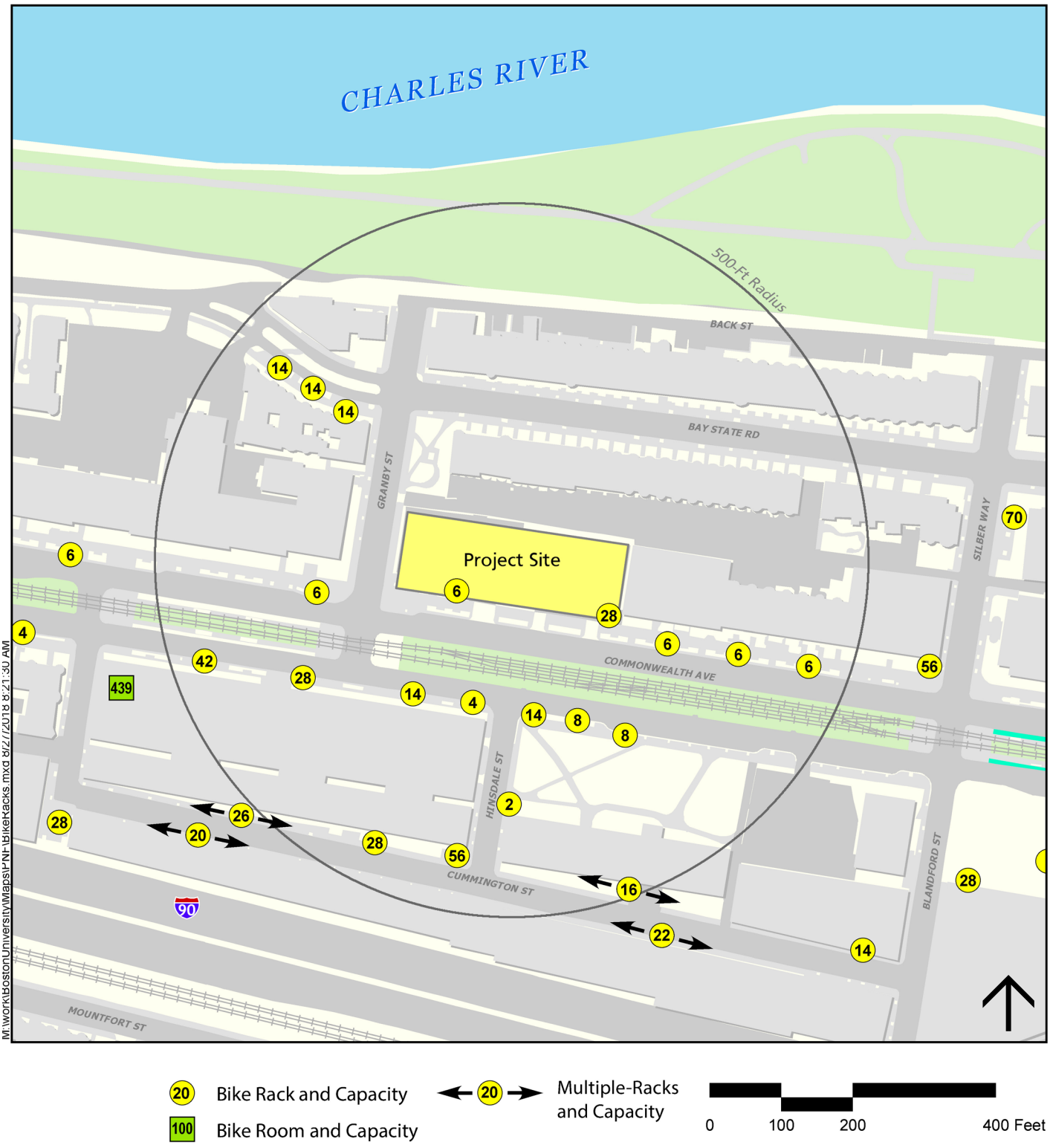


Figure 5-8
Bike Rack Locations and Capacities
Source: AECOM, 2018

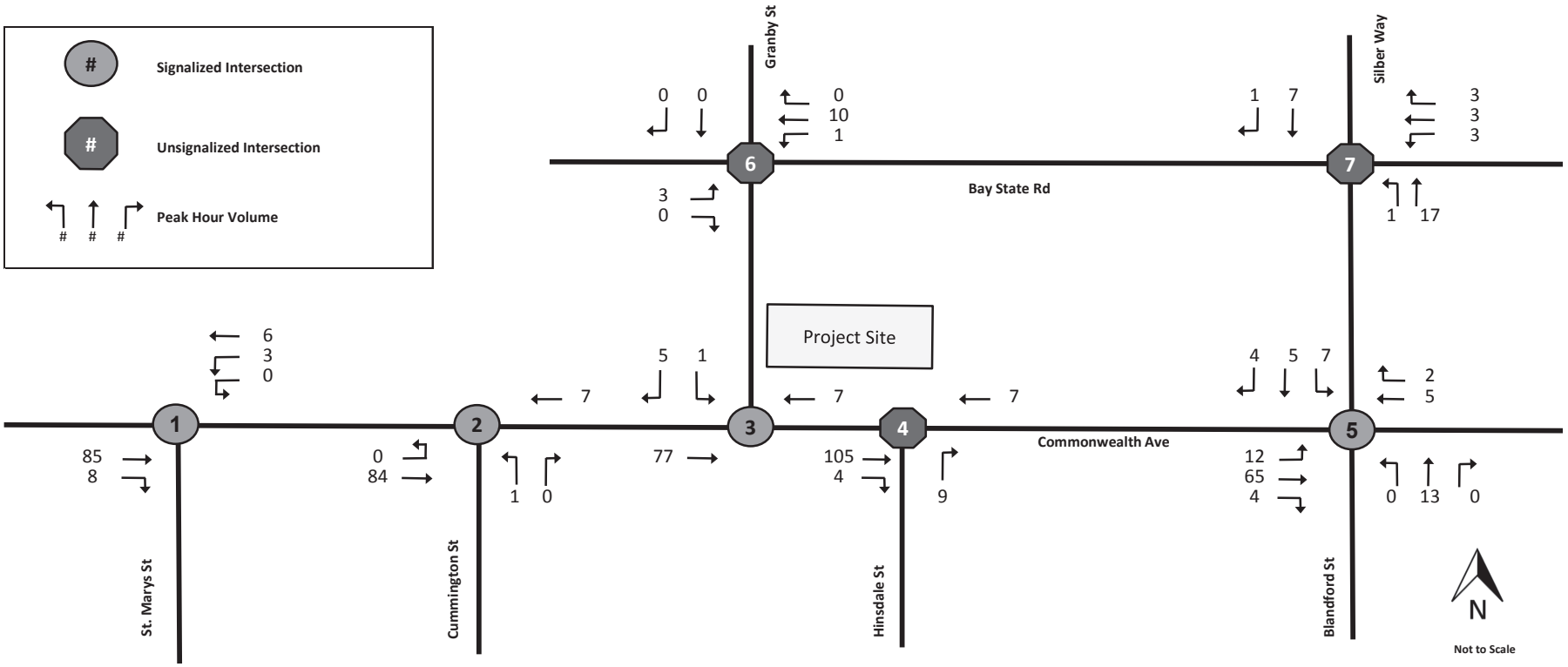


Figure 5-9
Existing (2018) Conditions at AM Peak Hour Bicycle Volume
Source: AECOM, 2018

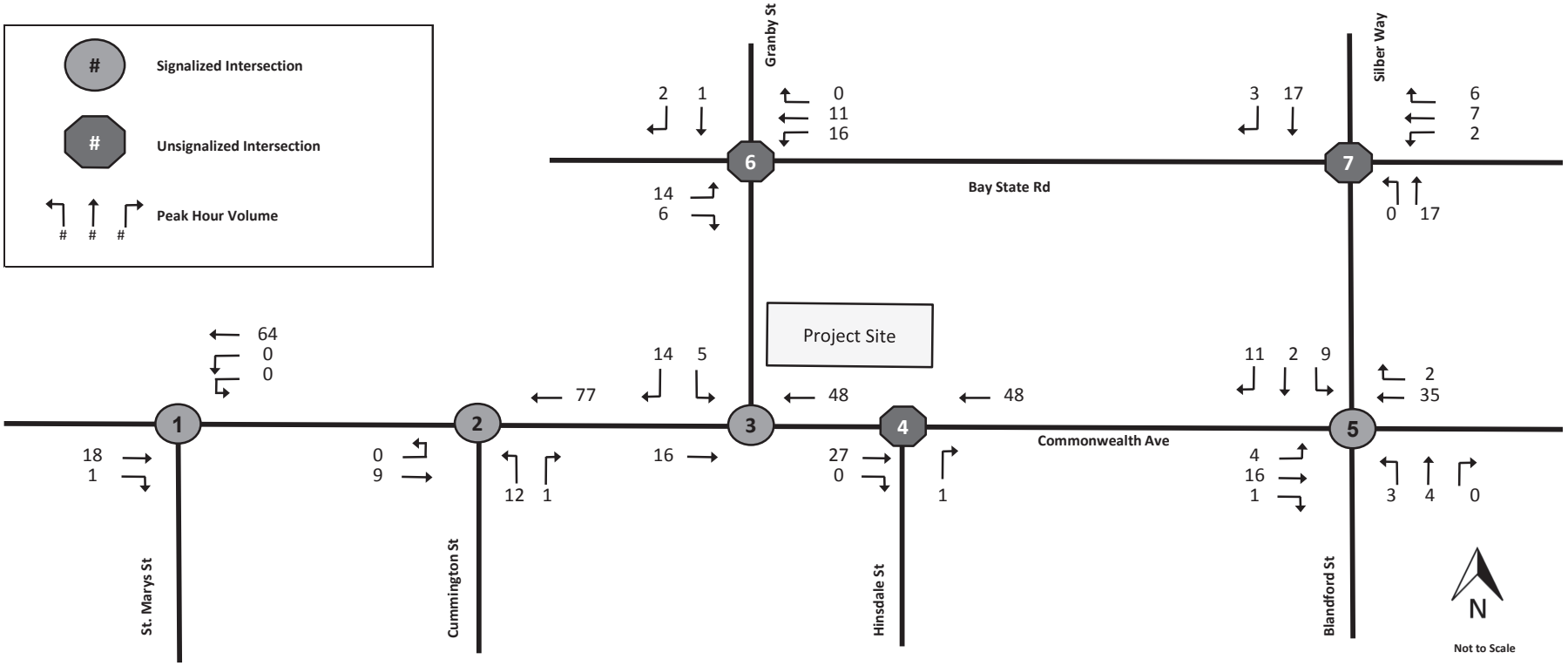


Figure 5-10
Existing (2018) Conditions at PM Peak Hour Bicycle Volume
Source: AECOM, 2018

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- Bus Stop
- BU Shuttle Stop
- Green Line Stop
- Commuter Rail Station
- Zipcar Location
- **BLUE**Bikes Locations
- Green Line
- MBTA Bus Route
- BU Shuttle Route

0 250 500 1,000 Feet

Figure 5-11
Public Transportation
Source: AECOM, 2018

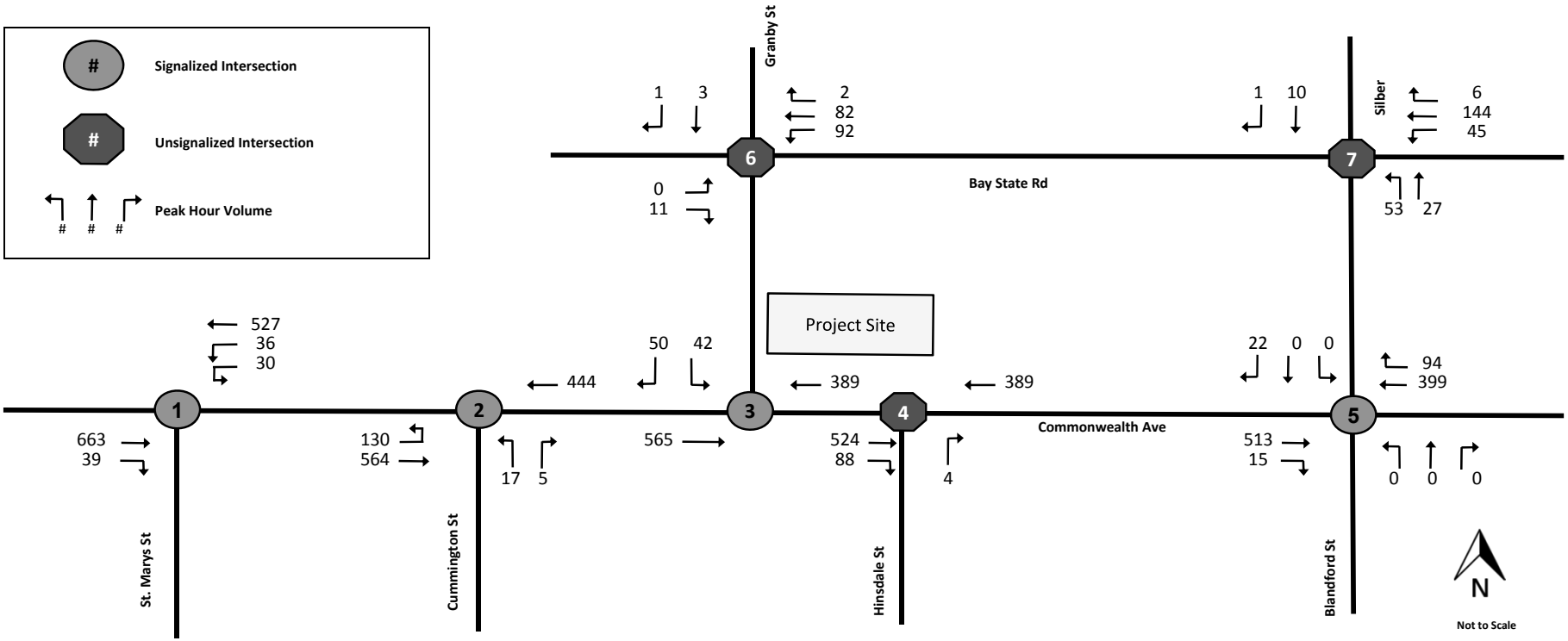
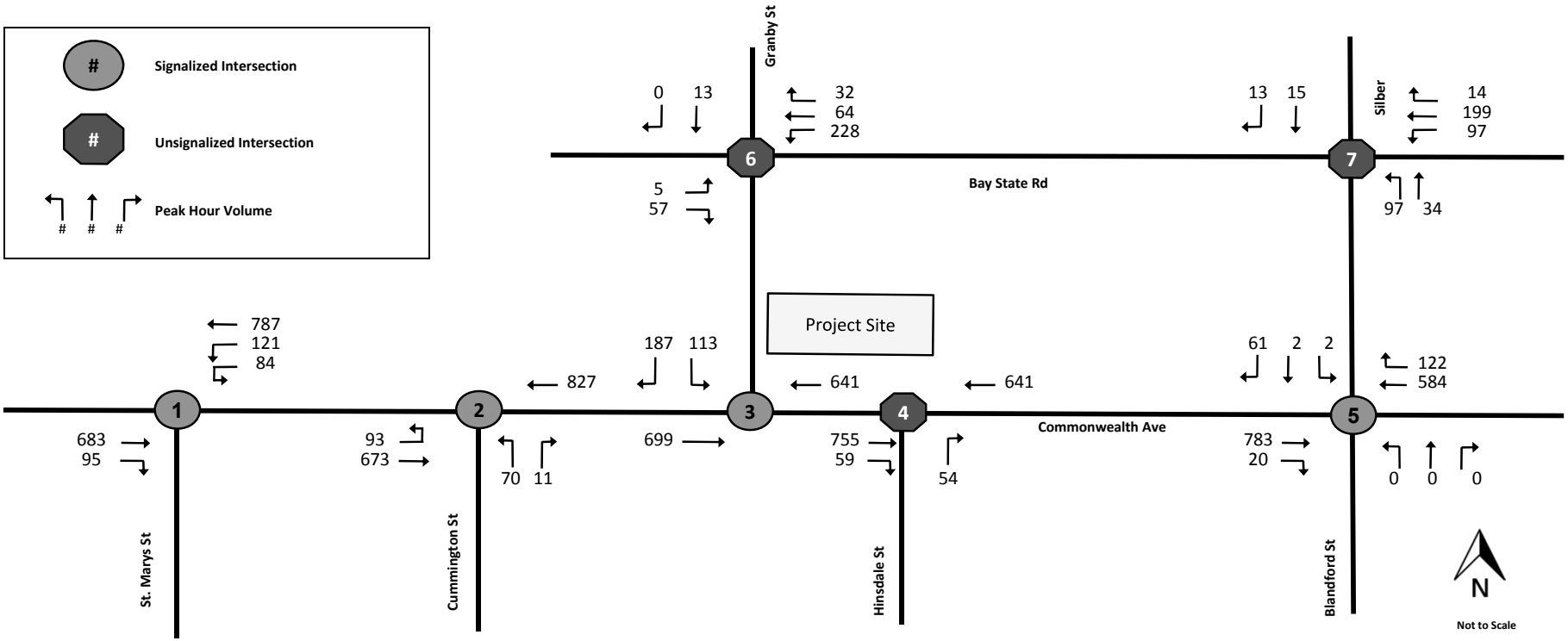


Figure 5-12
No Build (2022) Conditions at AM Peak Hour Vehicle Volume
Source: AECOM, 2018



Boston, Massachusetts

Figure 5-13
No Build (2022) Conditions at PM Peak Hour Vehicle Volume
Source: AECOM, 2018

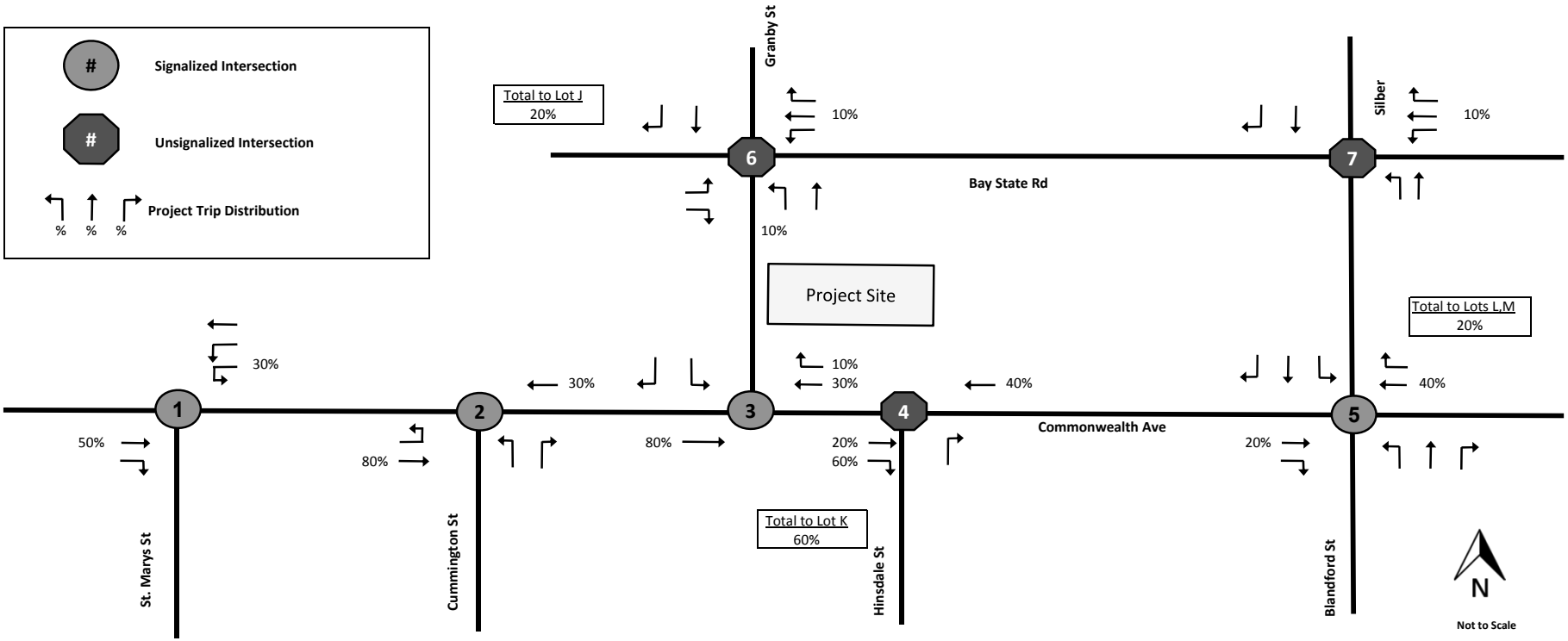


Figure 5-14
Project-Generated Vehicle Trips (Inbound)
Source: AECOM, 2018

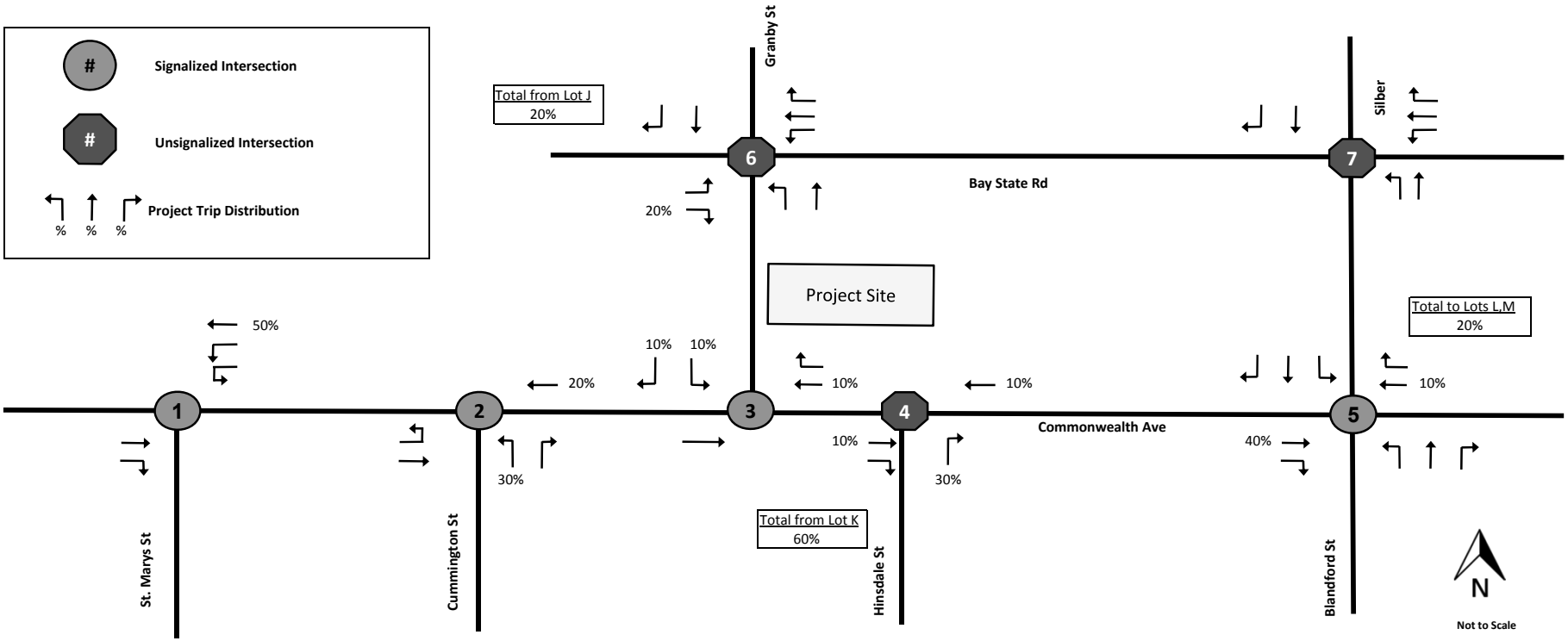


Figure 5-15
Project-Generated Vehicle Trip Distributions (Outbound)
Source: AECOM, 2018

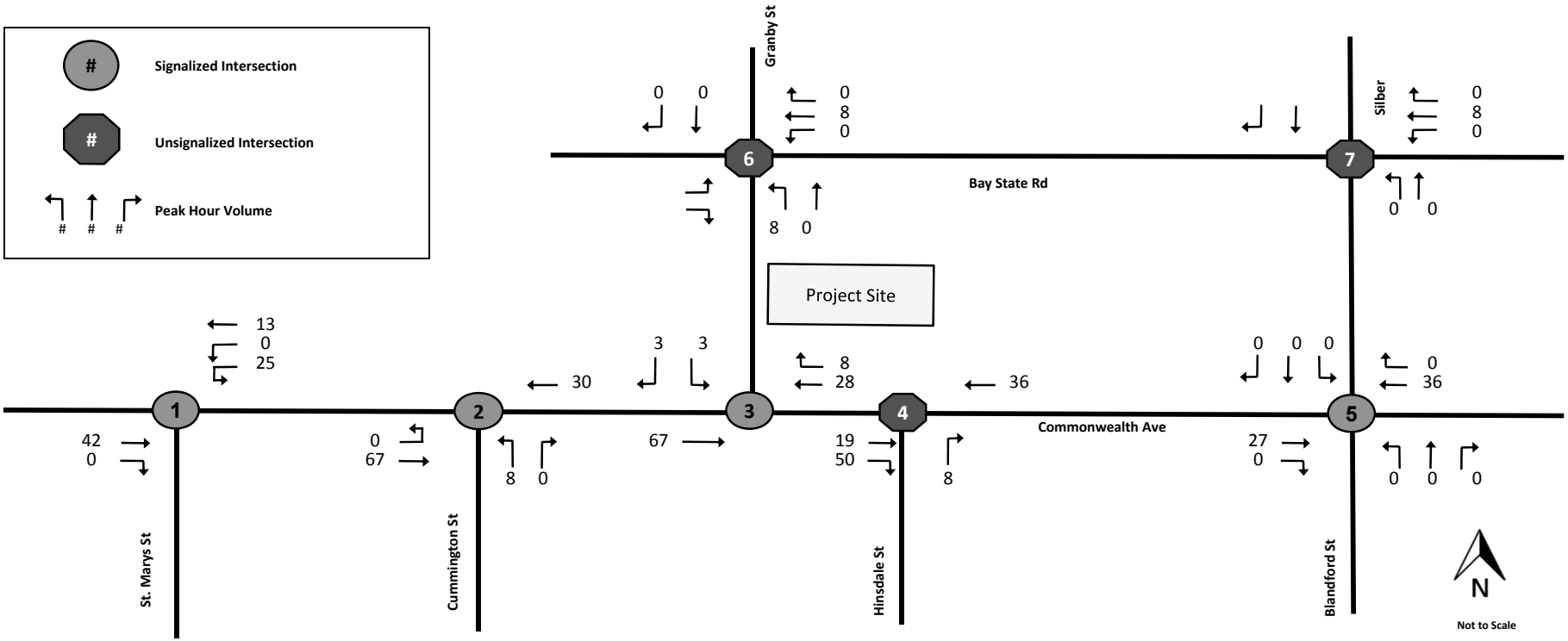


Figure 5-16
Net New Project-Generated Vehicle Trips - AM Peak Hour
Source: AECOM, 2018

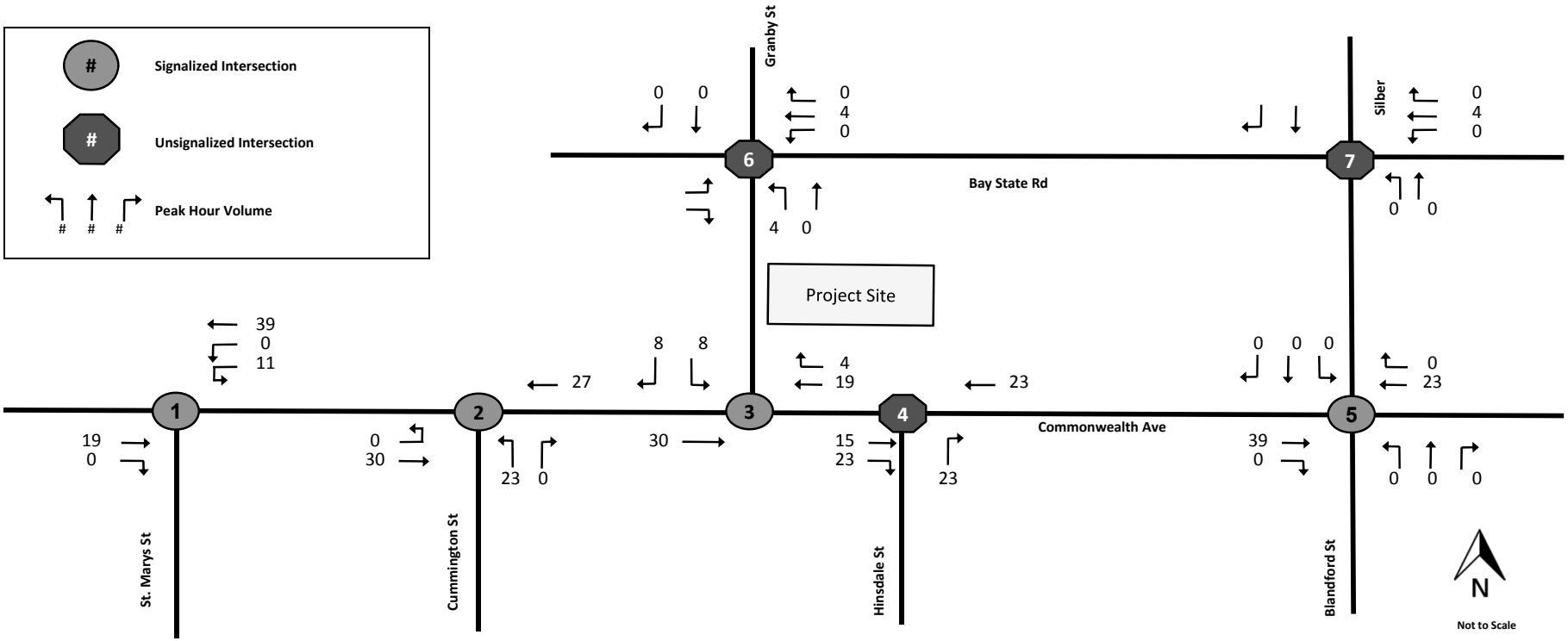


Figure 5-17
Net New Project-Generated Vehicle Trips - PM Peak Hour
Source: AECOM, 2018

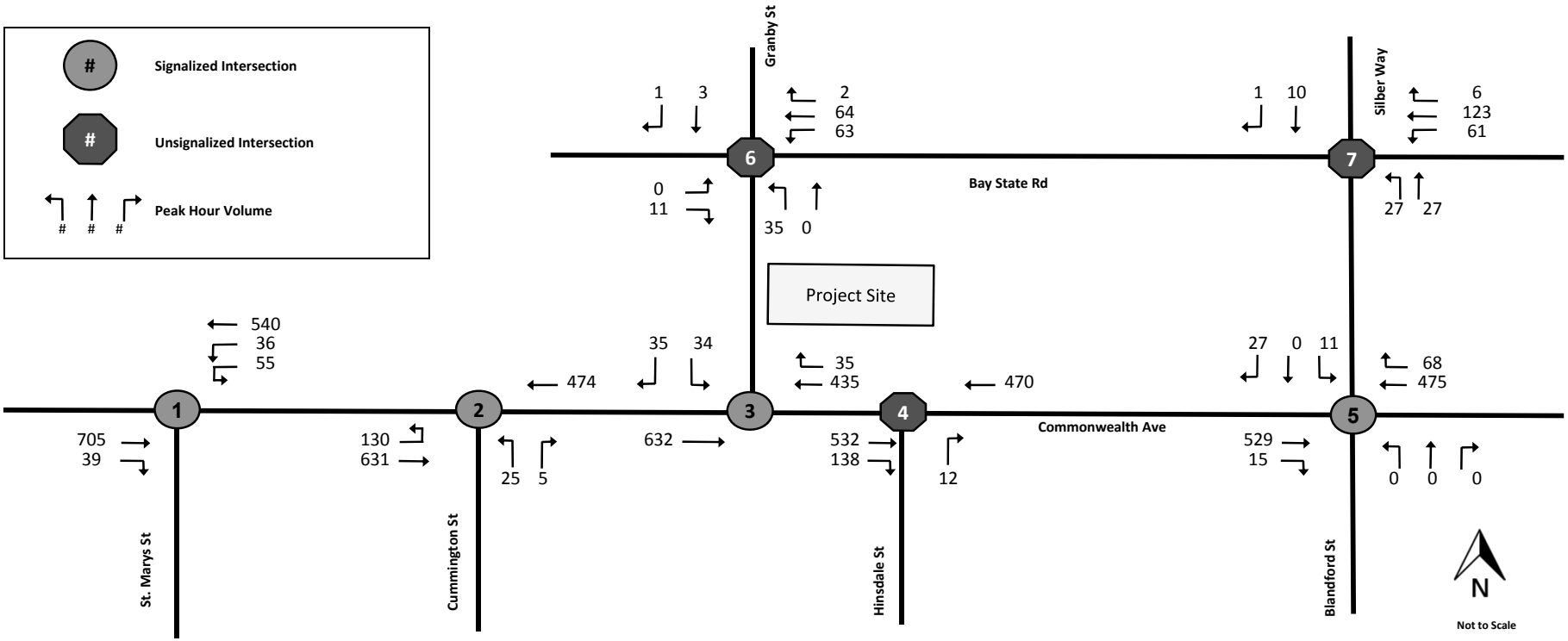
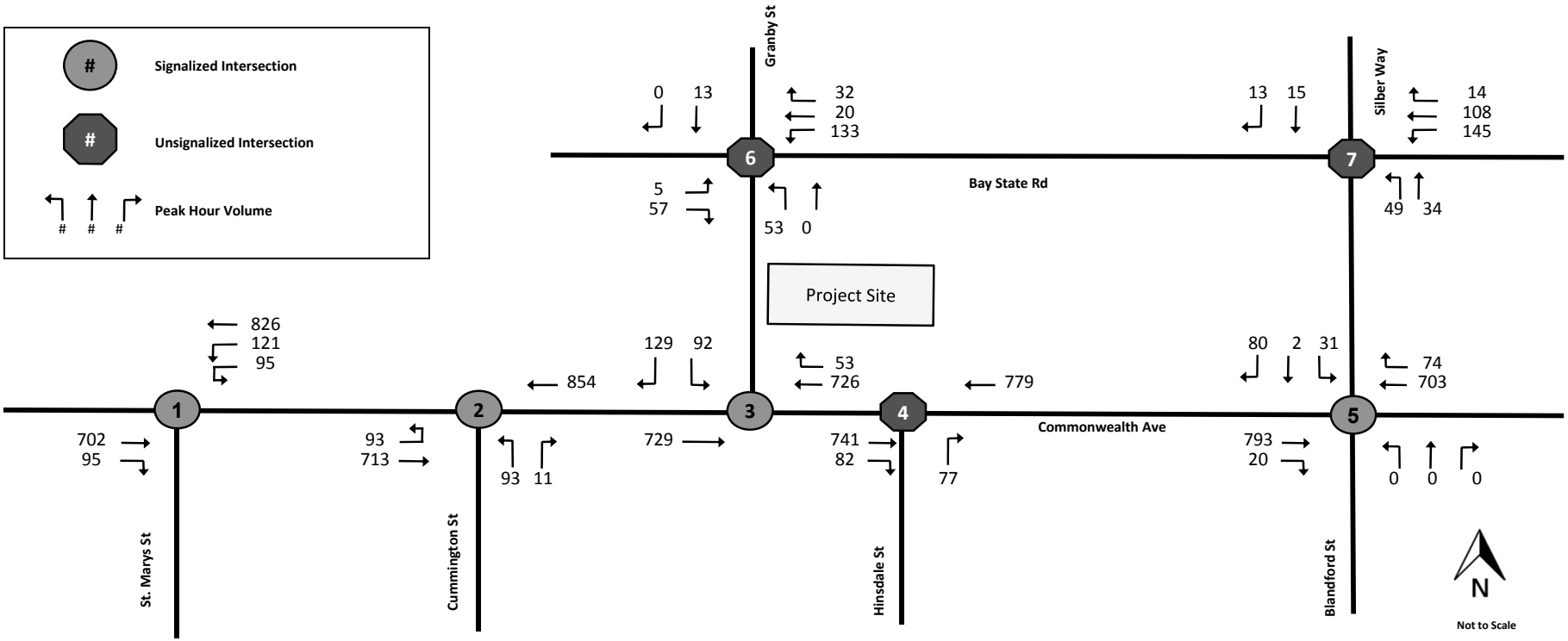


Figure 5-18
Build (2022) Conditions at AM Peak Hour Vehicle Volume
Source: AECOM, 2018



Boston, Massachusetts

Figure 5-19
Build (2022) Conditions at PM Peak Hour Vehicle Volume
Source: AECOM, 2018

Chapter 6

ENVIRONMENTAL

CHAPTER 6: ENVIRONMENTAL

6.1 INTRODUCTION

The Project has been thoughtfully designed to consider and improve the environmental conditions of the Site. The building will be constructed and operated in full compliance with local, state, and federal environmental regulations and will not create undue wind, shadow, noise, solar glare, or air quality impacts in the surrounding areas. An appropriate Construction Management Plan (CMP) will be prepared and approved by the City prior to commencement of construction to avoid and mitigate construction period impacts.

6.2 WIND

The Site is comprised of an existing surface parking lot situated along Commonwealth Avenue, which serves as the spine of the University's Charles River Campus. This portion of the campus is characterized by a wide variety of low to high-rise institutional and academic buildings as well as open spaces. The properties immediately abutting the Site contain landscaped open space and buildings five to six stories in height.

The proposed building will have a maximum height of 305 feet, with main entrances located along the east and west facades.

Computer modeling will be used to generate a qualitative assessment of the pedestrian environment near the Site to evaluate existing and future conditions. The analysis will be based on a review of regional long-term meteorological data for the Boston area, conceptual design drawings of the proposed building, engineering discretion, and the results of computer-generated computation. The results of these analyses will be measured against the Boston Redevelopment Authority (BRA dba BPDA) standards for acceptable wind conditions and will be provided in future submittals to the BPDA.

6.2.1 INITIAL RESULTS SUMMARY

Rowan Williams Davies & Irwin Inc. (RWDI) prepared a preliminary wind assessment prior to conducting the wind tunnel studies to assess the pedestrian wind conditions for the Project. The results and conclusions of the preliminary study find that appropriate wind conditions are expected at the east entrance, and most areas on sidewalks. Accelerated wind speeds and potentially uncomfortable conditions are expected at the sidewalks close to the northwest and southwest corners of the building. Project features including stepped facades, recessed facades, and the presence of the building overhang will provide mitigation. A preliminary assessment prepared by RWDI is included as Appendix C.

6.3 SHADOW

A shadow study was prepared to evaluate the potential shadow impact of the Project for existing and build conditions. Specific times during the year were evaluated and include the spring (March 21), summer (June 21), fall (September 21), and winter (December 21) months during the morning (9:00 AM), midday (12:00 Noon), and afternoon (3:00 PM) periods. Early evening (6:00 PM) shadow impacts were evaluated for the spring, summer and fall.

The dates and times during which shadow conditions were simulated are identified in Table 6-1, Shadow Study Dates and Times. The results of the shadow analysis are illustrated in Figures 6-1 through 6-4, Shadow Studies. The existing shadow is shown in grey, and new shadow is depicted in red.

Table 6-1: Shadow Study Dates and Times

Date	Time
Vernal Equinox – March 21st	9:00 AM, 12:00 PM, 3:00 PM, 6:00 PM
Summer Solstice – June 21st	9:00 AM, 12:00 PM, 3:00 PM, 6:00 PM
Autumnal Equinox – September 21st, EDT	9:00 AM, 12:00 PM, 3:00 PM, 6:00 PM
Winter Solstice – December 21st, EDT	9:00 AM, 12:00 PM, 3:00 PM, 6:00 PM

6.3.1 VERNAL EQUINOX – MARCH 21ST

New shadows in the morning (9:00 AM) fall on the existing Boston University Arts & Sciences buildings on the west side of the proposed building and do not reach Bay State Road. At noon, the shadows shift toward the north and extend over the Boston University owned townhouses on Bay State Road but do not reach beyond the shadows that the townhouses cast over a small portion of Storrow Drive. By mid-afternoon (3:00 PM), the new shadow falls along a small portion of Storrow Drive. No new shadow falls onto the Charles River Esplanade during these times, although at 6:00 PM shadow will partially obscure a portion of the Esplanade covered by tree canopy.

6.3.2 SUMMER SOLSTICE – JUNE 21ST

During the summer months (June 21), there is little impact of shadow except to immediately adjacent Boston University owned buildings. In the morning, some shadow falls on the Arts & Sciences building on the west side of Granby Street. At noon, the shadow is confined to a small number of the townhouses on the south side of Bay State Road, which is similar to the effects at 3:00 PM. In the early evening (6:00 PM), the shadow falls along Commonwealth Avenue and is confined to Boston University owned buildings. No shadow falls on the Charles River Esplanade during these times.

6.3.3 AUTUMNAL EQUINOX – SEPTEMBER 21ST, EDT

During the fall (September 21), the shadows are essentially the same as those described above for the spring, except they are shifted by one hour due to the difference in daylight savings time. During the early evening in the fall, there is no appreciable net impact on shadow.

6.3.4 WINTER SOLSTICE – DECEMBER 21ST, EDT

During the winter (December 21) when the sun is low in the sky, the shadow impacts extend farther from the building. In the morning, the only new shadow is a relatively thin section cast over the open space of the Charles River Esplanade and extending into the Charles River. At noon, shadow is cast across Storrow Drive onto the Charles River Esplanade. In the mid-afternoon, a relatively narrow shadow is cast on the Charles River Esplanade and onto a portion of the Charles River.

6.3.5 CONCLUSIONS

Except for the Winter Solstice, net new shadow is minimal. The shadows cast during the Winter Solstice are limited in duration and do not significantly exceed similar impacts of surrounding buildings into the Charles River Esplanade or the Charles River.

6.4 DAYLIGHT

At a maximum height of 305 feet, the Data Sciences Center is appropriately scaled to respond to neighboring structures and the width of Commonwealth Avenue and Granby Street. Adjacent buildings are owned and occupied by the University. A daylight study utilizing the Boston Redevelopment Authority Daylight Analysis Computer Program (BRADA) will be included in future submissions to the BPDA if required.

6.5 SOLAR GLARE

The design includes deep overhangs due to the building geometry as well as vertical fins to be installed on the facade to aid in reducing solar gains on the building envelope and glare. Preliminary facade design studies included, among others, optimizing shading device orientation and size, estimating the solar heat gain through the facade glazing, and critical time of day when shade is required. These studies were performed during early conceptual design.

As the design of the building progresses, detailed analysis of the exterior materials will be performed for different glazing options and shading strategies, including options such as motorized shades, ceramic frit on glass, dynamic glazing, and roll-on shades.

6.6 AIR QUALITY

This section provides a qualitative review of potential air quality sources and impacts from the Project. Air quality impacts from construction operations are addressed in Section 6.12.5, Construction Air Quality.

6.6.1 EXISTING AIR QUALITY

Existing air quality at the Site is consistent with urban conditions. The presence of the Charles River and other open space provides some amelioration of impacts from stationary and mobile sources in the vicinity of the Site.

6.6.2 PARKING SOURCES

The Site is currently covered with a paved surface parking lot containing 126 public spaces. The Project will eliminate these parking spaces and thus result in a net reduction of air quality impacts from parking sources. In addition, 35 spaces will be removed from the alley to the north of the building.

The Project also aims to encourage bicycle use and further reduce parking demand. The Proponent's robust Transportation Demand Management (TDM) program, combined with the Project's proximity to the MBTA Green line and bus lines, indicates that air pollution from vehicle sources will be minimized.

6.6.3 TRAFFIC SOURCES

During a typical day, there is not expected to be a significant change in the level of service of surrounding intersections after the Project is open. Given the Project's proximity to public transit and bicycle orientation, the Project will redistribute the 126 existing parking spaces on the Site to University-owned parking facilities within the vicinity of the Project. Faculty and staff will be encouraged to park at the nearby Boston University owned lots and garages. Visitors to the Site can utilize existing metered parking located along the north and south sides of Commonwealth Avenue, or they can park at the University owned pay-on-entry parking facility located at the corner of Commonwealth Avenue and Deerfield Street. See Chapter 5, Transportation, for a full description of existing and proposed transportation conditions.

TDM strategies are a significant component of the Project and are anticipated to assist in minimizing adverse air quality impacts. As described in Section 5.5, Transportation Mitigation Measures, the Project will utilize the following TDM initiatives to encourage employees and visitors to access the Site via alternative means of transportation that have lesser impacts on overall air quality for the Project:

- Promote public transit and dissemination of transit information;
- Provide a ride-matching service for car and van pools;
- Provide secure, indoor bicycle storage for employees and students; and
- Provide publicly accessible outdoor bicycle storage for the Project's visitors.

6.6.4 BUILDING OPERATION SOURCES

Building operations are not expected to affect air quality in the surrounding area. Mechanical and venting equipment will be selected to meet all state and federal standards for emissions.

6.7 NOISE

The Proponent does not anticipate an increase in noise impacts associated with the academic, administrative, or research uses at the Site. The Boston Air Pollution Control Commission regulates noise in the City of Boston based on zoning and land use classification. The regulations define fixed noise limits for the use of equipment serving the building, which is limited to a maximum level of 60 decibels (dBA) for daytime use and 50 dBA for nighttime use in institutional areas. These levels are sound limits for equipment assessed at the boundaries of the Project. The limits apply to equipment that operates on a significant basis to serve the building, such as air conditioning equipment and fans. In addition to the overall sound level requirements, the regulations list specific octave band frequency limits for daytime and nighttime periods.

Most of the Project's mechanicals will be located within the interior on the basement floors, with a minimal number of condensing and venting units located on the roof. Based on general equipment design, the rooftop equipment is not expected to produce significant sound levels at the building property line, though noise control measures will be provided if required. Rooftop screens will conceal vents and condensing units and will provide some acoustical dampening.

6.8 FLOOD ZONES

Climate change adaptation has gained national attention as a critical environmental factor that must be addressed in new development projects. In Boston, sea level rise has become a particularly serious concern. Recent weather patterns and future modeling demonstrate that the impact of storms on the City are likely to continue to intensify, necessitating careful consideration of a project's location and flood-resiliency features.

According to the BPDA Sea Level Rise Flood Hazard Mapping Tool, the nearest future flood impact area (along the Charles River) is at Elevation 14.1′ Boston City Base (BCB). The limits

of this flood area are approximately 200 feet north of the Site. As the Finished Floor Elevation of the ground floor is proposed at Elevation 21.0', and basement levels will be designed to minimize or avoid impacts during flood events, the Project is well positioned to respond to future flood conditions.

6.9 WATER QUALITY

Domestic water service will be provided to the building by Boston Water and Sewer Commission (BWSC). No aquifers or drinking water wells are located near the Site.

6.10 GROUNDWATER

Several groundwater monitoring wells exist at and in the vicinity of the Site. Data obtained from the on-site monitoring well and Boston Groundwater Trust (BGwT) wells indicate that groundwater levels range from El. 8.5 to El. 10.5 BCB.

The Project is located within the Groundwater Conservation Overlay District (GCOD). Therefore, the Project design will comply with GCOD and City standards by establishing design and construction methodology that protects groundwater. An engineer's certification report will be submitted to demonstrate that the standards have been met and that the Project will have no negative impacts to groundwater levels. Methods include use of fully waterproofed basement (walls and mat slab) for the portion of the structure that extends below groundwater levels. The Project will have no long-term groundwater pumping.

The Proponent will coordinate with the Boson Groundwater Trust (BGwT) regarding groundwater monitoring prior to and during construction. Several existing wells in the area are shown on the BGwT website. One groundwater monitoring well may be installed to document existing groundwater levels and hydrogeologic conditions. If required, the new well will be installed prior to the start of construction and will be installed in accordance with City and BGwT standards for permanent monitoring wells. The well will be installed at a location where it will be accessible for long term monitoring.

6.11 GEOTECHNICAL

6.11.1 SUBSURFACE SOIL CONDITIONS

Based on available test boring information obtained at the Site, subsurface soil conditions underlying the proposed building are characterized by the general soil profile in the Table 6-2.

Table 6-2: Project Site Soil Profile

Generalized Description	Approximate Elevation of Top of Layer (ft, BCB)
Fill	Ground Surface
Organic Deposits	El. 7 to El. 9
Glaciofluvial Deposits	El. 1 to El. -1
Marine Deposits	El. -8 to El. -15
Glacial Till	El. -160
Bedrock (Cambridge Argillite)	El. -200

Note that in general, ground surface elevations at the Site range between approximately El. 20 and 22.

6.11.2 FOUNDATION DESIGN AND CONSTRUCTION

The Project will include one basement level with a similar footprint to the ground floor. An additional level of sub-basement will be located on the west side of the Site, similar in footprint to floors 7-19.

The 5-story building podium will either be supported on a soil bearing mat foundation or, if the basement is reduced or eliminated in this area, the foundation will consist of pressure-injected-footings. The proposed tower levels atop the podium on the west side of the Site will be supported on a soil bearing mat foundation bearing in the marine deposits (clay).

All basement walls that extend below the groundwater level, and also the mat slab, will be fully waterproofed. The structure will not cause the groundwater to raise, pond, or be lowered in the surrounding area.

A temporary lateral earth support system will be required to complete the excavation for the below grade space. The earth support system will be a relatively impermeable wall such as continuous interlocking steel sheet piles. The excavation support wall will extend into the underlying marine deposits (clay) to create a groundwater barrier around the perimeter of the Site. Temporary construction dewatering will be required inside the limits of the excavation support wall. A National Pollutant Discharge Elimination System permit for temporary construction dewatering will be obtained for discharge of dewatering effluent during construction.

A geotechnical monitoring program will be implemented prior to and during construction and will likely consist of settlement monitoring of adjacent buildings. A program of monitoring existing observation wells located on and in the vicinity of the Site will also be conducted prior to and during construction.

6.11.3 SOLID AND HAZARDOUS WASTE

During the course of preparing the Construction Documents, the Proponent will obtain site-specific information regarding environmental conditions to evaluate for the presence of oil and hazardous materials. If the Project will generate soil requiring off-site transport, chemical testing of the material will be required by receiving facilities to identify chemical constituents and any contaminants present. Chemical testing of the material will be conducted prior to starting construction in accordance with facility requirements.

Any material leaving the Site will be required to be legally transported in accordance with local, state, and federal requirements. In addition, any regulated soil and/or groundwater conditions related to oil and hazardous materials will be managed in accordance with appropriate Massachusetts Department of Environmental Protection regulatory requirements.

6.12 CONSTRUCTION IMPACTS

The following section describes the impacts likely to result from the Project's construction and the steps that will be taken to avoid or minimize environmental and transportation-related impacts. The Proponent has designated a construction manager who is responsible for developing a construction phasing plan and coordinating construction activities with all appropriate regulatory agencies. The Project's geotechnical consultant is providing consulting services associated with foundation design recommendations, preparing geotechnical specifications, and reviewing the construction contractor's proposed procedure. The approved Construction Management Plan will address potential construction impacts in detail.

6.12.1 CONSTRUCTION MANAGEMENT PLAN

The Proponent will comply with applicable state and local regulations governing construction of the Project. The Proponent will require that the construction manager comply with the CMP developed in consultation with and approved by the Boston Transportation Department (BTD) prior to the commencement of construction. The construction manager will be bound by the CMP, which will include detailed information about construction activities, specific construction mitigation measures, construction materials, and access and staging area plans to minimize the impact on the surrounding neighborhood and pedestrian environment. The Proponent understands the challenges of managing construction activities in this urban/academic context and has extensive experience with the necessary precautions.

Construction methodologies that ensure public safety and protect nearby residents will be employed. Techniques such as temporary barricaded walkways and signage

will be used. Construction management and scheduling will minimize impacts on the surrounding environment and will include plans for construction worker commuting, routing plans for trucking and deliveries, and control of noise and dust. The University will establish a Project website which will be accessible to the public at large as well as the University community.

6.12.2 CONSTRUCTION ACTIVITY SCHEDULE

The construction period for this Project is expected to last approximately 27 months in duration. It is anticipated that construction will be completed in one phase and will start on or before October 2019 and end December 2021.

Typical construction activities will be scheduled from Monday through Friday. Weekend or off-hour activity may occasionally be necessary to minimize impact on vehicular and pedestrian traffic during delivery of large construction equipment (i.e. cranes, excavation equipment, etc.).

6.12.3 CONSTRUCTION TRAFFIC IMPACTS

Truck traffic will vary throughout the construction period, depending on the activity. Truck traffic will be heaviest during the excavation and concrete foundation work. Thereafter, truck traffic will spread evenly throughout the day.

Potential truck routes will be proposed to minimize the traffic impacts and govern access and egress to the Site.

Construction contracts will include clauses restricting truck travel per BTD requirements. Primary access to and egress from the Site will be restricted to gates approved by BTD.

6.12.4 CONSTRUCTION WORKER PARKING AND STAGING

The number of workers required for the construction of the Project will vary depending upon the stage of construction. The general contractor will be responsible for educating all construction workers about public transit options and encouraging the use of High Occupancy Vehicles (HOVs). As part of the program to promote public transportation, the following mitigation measures will be implemented:

- Prohibit personnel from parking at the Site during construction;
- Encourage construction personnel to utilize public transportation (due to the proximity of the MBTA Green Line and Kenmore Station in Kenmore, a substantial level of public transportation use is anticipated by workers);
- Post transit schedules and maps at the jobsite;

- Provide lock-up facilities for work tools to make public transportation more convenient and desirable for workers; and
- Write terms and conditions related to workforce parking and public transportation into each subcontract.

These measures will be incorporated into the CMP for the Project, which will be reviewed by the BTD prior to commencement of construction activities.

Should some of the workers choose to drive to the Site, parking will be available at off-street commercial parking lots owned by the University. The lots are pay-on-entry facilities and are not currently fully utilized during the week. Because the majority of the construction workforce will arrive prior to the AM peak traffic period and depart prior to the PM peak period, these trips are not expected to have an appreciable impact on the local transportation system.

6.12.5 CONSTRUCTION AIR QUALITY

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

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

- Use wetting agents to control and suppress dust from construction debris;
- Ensure that all trucks traveling to and from the Site will be fully covered;
- Remove construction debris regularly;
- Monitor construction practices closely to ensure any emissions of dust are negligible;
- Clean streets and sidewalks to minimize dust and dirt accumulation; and
- Wheel-wash trucks before they leave the Site during the excavation phase.

6.12.6 CONSTRUCTION NOISE IMPACTS

Intermittent increases in noise levels will occur in the short-term during construction, however, construction work will comply with the requirements of the City of Boston noise ordinance. Although there are no residential buildings proximate to the Site,

this issue will be carefully addressed to ensure that any construction related noise will not impact the surrounding academic and research buildings.

The proposed construction processes for the Project will be designed around the constraints at the Site. Construction will occur during the daytime hours as defined by Boston Noise Regulations (7:00 AM to 6:00 pm except Sundays). In some instances, second shifts may be required. When these events arise, all required permits will be in place and the Department of Neighborhood Services will be notified.

Every reasonable effort will be made to minimize the noise impact of construction activities. Mitigation measures will include:

- Schedule work during daytime hours;
- Schedule construction activities to avoid the simultaneous operation of the noisiest construction activities and reduce impacts during potential second shift operations;
- Use appropriate mufflers on all equipment and provide ongoing maintenance of intake and exhaust mufflers;
- Maintain muffler enclosures on continuously operating equipment, such as air compressors and welding generators;
- Turn off idling equipment;
- Select the quietest practical items of equipment (electric instead of diesel powered equipment); and
- Replace specific construction operations with less noisy ones where feasible and practical.

6.12.7 SEDIMENT CONTROL MEASURES

During excavation and construction, erosion and sediment control measures will be implemented to minimize the transport of Site soils to off-site areas and the BWSC storm drain system. The existing catch basins will be protected with filter fabric or silt sacks to remove sediment 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.

Other sediment controls, which will be implemented as needed during construction, will include the following:

- Stacked hay bales and/or silt fence barriers will be installed at the base of the stockpiled soils and at erosion-prone areas throughout the construction phase of the Project;
- Erosion controls will be maintained and replaced as necessary to ensure their effectiveness;
- Where necessary, temporary sedimentation basins will be constructed to prevent the transport of sediment off-site; and
- Measures to control dust will be implemented during excavation – all debris will be property contained on the Site.

6.13 RODENT CONTROL

Construction and demolition activities can disturb rodent habitat, eliminating food, shelter, and movement routes. Since the existing Site is currently used as a parking lot and there are no structures on-site, the proposed construction activity is not expected to increase rodent activity in the vicinity. The contractor will file a rodent extermination certificate along with the building permit application to the City. Rodent inspection, monitoring, and treatment in compliance with the City's requirements will be carried out before, during, and at the completion of all construction work for the Project.

6.14 WILDLIFE HABITAT

No federal, state, or local wildlife habitat has been identified on the Site.

6.15 HISTORIC AND ARCHAEOLOGICAL IMPACTS

Consistent with the Boston University Charles River Campus 2013 – 2023 Institutional Master Plan, Boston University is committed to maintaining and enhancing the value of historic resources on and around the Charles River Campus. The Proponent has invested significant resources in rehabilitating and preserving the historic brownstones along Bay State Road and has carefully introduced contemporary designs in new construction where appropriate. The proposed building will be a groundbreaking contemporary style building that showcases the innovation and forward thinking academic environment pursued at the University.

The Project has been designed to respect the historic nature of the Bay State Road – Back Bay West neighborhood. In addition to identifying any historic resources located on the Site, an Area of Potential Effect ("APE") of one-quarter mile has been analyzed for the purpose of identifying historic resources in the vicinity of the Site. The potential project-related impacts

on historic resources on and within the vicinity of the Site are discussed in the sections below. See Figure 6-5, Historic Resources.

6.15.1 HISTORIC AND ARCHAEOLOGICAL RESOURCES ON THE PROJECT SITE

No historic resources are located on the Site, and no archeological resources are known to exist on the Site.

6.15.2 CHARLES RIVER BASIN HISTORIC DISTRICT

The Charles River Basin Historic District (the "Basin"), which is located in both Cambridge and Boston, was designated in 1978 as a National Register District and is a significant feature of the University's Charles River Campus and Boston as a whole. Though the Basin has undergone significant changes in the past, it has been preserved as an attractive promenade from which spectacular views of the Boston and Cambridge skylines are visible. The Basin includes the vibrant and well-utilized Charles River Esplanade, which was listed on the National Register as a District in 1978 and was designated as a Local Landmark in 2009. The Basin also includes portions of the Charles River Reservation Parkway, which includes over 17 miles of parkland extending from Boston to Weston. Separated from the Project by several major roadways, including Storrow Drive and Bay State Road, the Project is not located within and will have no adverse effect on the Basin.

6.15.3 BAY STATE ROAD/BACK BAY WEST ARCHITECTURAL CONSERVATION DISTRICT

Designated as a Local Historic District in 1979, the Bay Sate Road/Back Bay West Architectural Conservation District (BSRACD) includes approximately 200 properties located along Bay State Road. Most buildings in the District, many of which are owned and maintained by the University, were constructed in the late 19th century in a variety of revival styles. These buildings have been well maintained and improved by both the University and private owners, including the recently restored and renovated Myles Standish Hall and Dahod Family Alumni Center. The Project will be located adjacent to the block of brick townhouses fronting on Bay State Road, west of Granby Street. These buildings will not be affected by the Project. In addition, improvements will be made to the landscape, accessibility, and back entry features of these buildings and on the laneway. The Site is not located within the BSRACD, but Project activities will occur in the district. The building's upper floors will on some levels extend over the boundary.

6.15.4 HISTORIC RESOURCES IN THE VICINITY OF THE PROJECT SITE

A review of the Massachusetts Historical Commission (MHC) Inventory revealed 122 extant inventoried historic individual properties and all or portions of 6 MHC

inventoried districts within the APE. Of the individually inventoried resources, 8 fall within the BSRACDC. An additional 55 inventoried resources fall within the Audubon Circle area. One inventoried resource is located in both the Charles River Basin Historic District – Boston and the Commonwealth Avenue Area. The remaining 57 resources are not located within a district area.

Although the Site is not located within a historical district, it immediately abuts the Bay State Road/Back Bay West Architectural Conservation District. The Site is additionally located directly adjacent to a number of inventoried properties. These resources are described in Table 6-3 and shown on Figure 6-5, Historic Resources in the Vicinity of the Site.

Table 6-3: Historic Resources in the Vicinity of the Site

Location / Name	Description / Historic Name	Impact of Project on Resource
District		
Commonwealth Avenue Area	*Inventoried Area*	Streetscape improvements to frontage along the Site
Charles River Basin Historic District - Boston	*National Register of Historic Places*	Very minor shadow during winter days
Charles River Basin Historic District - Cambridge	*National Register of Historic Places*	None
Bay State Road/Back Bay West Architectural Conservation District	*Local Historic District*	Views of the structures on the alley behind the Project will be obstructed by the building
Audubon Circle	*Inventoried Area*	none
Charles River Esplanade	*National Register of Historic Places*	
Inventoried Properties		
847 Beacon St	*Inventoried Property* Howard Coon Row House	None
121-125 Bay State Rd	*Local Historic District*	None
226 Bay State Rd Boston University History Department Offices	*Inventoried Property* Morris Rudnick Apartment Building	None

Location / Name	Description / Historic Name	Impact of Project on Resource
110-112 Cummington St Boston University College of Engineering	*Inventoried Property* Henry Turner Stable and Blacksmith Shop	None
627 Commonwealth Ave Boston University Building	*Inventoried Property* Cummings - Wolf Row House	None
858 Beacon St Boston University Building	*Inventoried Property*	None
870 Beacon St Boston University Building	*Inventoried Property* W. D. Vinal Rowhouse	None
5 Buswell St Boston University Building	*Inventoried Property*	None
21 Buswell St	*Inventoried Property*	None
509 Park Dr Boston University Building	*Inventoried Property* The Plymouth Apartments	None
147 Bay State Rd Boston University	*Local Historic District* Dr. Charles Goddard Weld House	None
854 Beacon St	*Inventoried Property*	None
100 Mountfort St Boston University Building	*Inventoried Property* Auburndale Chambers	None
685 Commonwealth Ave	*Inventoried Property* Boston University Hayden Memorial Building	None
868 Beacon St	*Inventoried Property*	None
590 Commonwealth Ave	*Inventoried Property* Commonwealth Avenue Plaza	None
111 Bay State Rd	*Local Historic District* M. I. T. Student House	None
2 Cummington St Boston University Building	*Inventoried Property*	None
728 Commonwealth Ave Boston University Apartments	*Inventoried Property* Belview Apartments	None

Location / Name	Description / Historic Name	Impact of Project on Resource
635 Commonwealth Ave Boston University Sargent College	*Inventoried Property* Remington Rand Building	None
840-842 Beacon St Boston Bicycle	*Inventoried Property*	None
834 Beacon St Boston University Jessie W. Titcomb, Row House	*Inventoried Property* W. D. Vinal - George Wheatland, Jr. Row House	None
514-522 Park Dr Loren D. Towle Apartment Building	*Inventoried Property* Audubon Court	None
745 Commonwealth Ave	*Inventoried Property* Boston University School of Theology	None
640 Commonwealth Ave Boston University School of Public Relations	*Inventoried Property* Nash New England Auto Company Showroom and Garage	None
765 Commonwealth Ave	*Inventoried Property* Boston University School of Law	None
6 Buswell St Boston University Building	*Inventoried Property* Joseph Harris Apartment Building	None
14 Buswell St Boston University Building	*Inventoried Property* The Ambassador Apartments	None
98 Mountfort St Boston University Building	*Inventoried Property* Fairbanks Chambers	None
849 Beacon St	*Inventoried Property* Howard Coon Row House	None
857 Beacon St	*Inventoried Property* Inverness Apartments	None
46 Mountfort St Boston University Building	*Inventoried Property* Mountfort Chambers	None
851 Beacon St	*Inventoried Property* Joseph Feldman Row House	None
869 Beacon St	*Inventoried Property* A. F. Arnold Row House	None

Location / Name	Description / Historic Name	Impact of Project on Resource
155 Bay State Rd	*Local Historic District*	None
735 Commonwealth Ave	*Inventoried Property* Boston University Marsh Chapel	None
1 Buswell St Boston University Building	*Inventoried Property* The Longford Apartments	None
519 Park Dr,	*Inventoried Property* The Amsterdam Apartments	None
850 Beacon St Boston University Building	*Inventoried Property* W. D. Vinal Row House	None
8 Aberdeen St	*Inventoried Property* George Robert White Two-Family House	None
677 Beacon St Boston University Classroom	*Inventoried Property* Shell Eastern Petroleum Products Office Building	None
806-820 Beacon St Boston University Building	*Inventoried Property* Wedgemere Chambers Apartments	None
96 Mountfort St Boston University Building	*Inventoried Property* Mayfield Chambers	None
506 Park Dr	*Inventoried Property*	None
735 Commonwealth Ave	*Inventoried Property* Boston University Warren Alpert Mall	None
7 Miner St	*Inventoried Property* Catherine E. Hutchinson Town House	None
828 Beacon St Boston University John P. Cushing Row House	*Inventoried Property* W. D. Vinal, - George Wheatland, Jr. Row House	None
30-38 Cummington St Boston University Building	*Inventoried Property* Nash New England Auto Company Building	None
718 Commonwealth Ave Boston University Foreign Languages Department	*Inventoried Property* Commonwealth Hall Capron Apartments	None

Location / Name	Description / Historic Name	Impact of Project on Resource
708 Commonwealth Ave Boston University Building	*Inventoried Property* James P. Neal Row House	None
605 Commonwealth Ave Boston University School of Education	*Inventoried Property* Lahey Clinic	None
1A Buswell St Boston University Building	*Inventoried Property* The Melbourne Apartments	None
13 Buswell St		None
29 Buswell St Boston University Earth - Environment House	*Inventoried Property* Warren Vinal Row House	None
31 Buswell St Boston University Building	*Inventoried Property* Warren Vinal Row House	None
853 Beacon St Boston University Dormitory	*Inventoried Property* Joseph Feldman Row House	None
848 Beacon St Boston University Building	*Inventoried Property* Warren Vinal Row House	None
232 Bay State Rd Boston University Center for Social Sciences	*Inventoried Property* Bay State Hall Aparments	None
96-100 Cummington St Boston University Buildings & Grounds Department	*Inventoried Property* William Allen Hayes Automobile Garage	None
844 Beacon St Boston University Building	*Inventoried Property* The Arundel Apartments	None
602 Commonwealth Ave Boston University Morse Auditorium	*Inventoried Property* Temple Adath Israel	None
867 Beacon St Boston University Dormitory	*Inventoried Property* A. F. Arnold Row House	None
500-504 Park Dr	*Inventoried Property* Audubon Terrace Apartments	

Location / Name	Description / Historic Name	Impact of Project on Resource
Boston University Dormitory		
264-270 Bay State Rd Boston University School of Social Work	*Inventoried Property* Bay State Terrace Apartments	None
629 Commonwealth Ave Boston University Building	*Inventoried Property* N. Henry Chadwick Row House	None
619 Commonwealth Ave Boston University School of Education	*Inventoried Property* Shapleigh Row House Commonwealth Avenue Hospital	None
860 Beacon St Boston University Building	*Inventoried Property* Wheatland and Vinal Rowhouse	None
862 Beacon St Boston University Building	*Inventoried Property* Wheatland and Vinal Rowhouse	None
866 Beacon St Boston University Building	*Inventoried Property* Wheatland and Vinal Rowhouse	None
22 Buswell St Boston University Building	*Inventoried Property* Clemetis Apartments	None
722-726 Commonwealth Ave Boston University Apartments	*Inventoried Property* The Pretoria	None
704 Commonwealth Ave Boston University Apartments	*Inventoried Property* Alden Hall Apartments	None
710 Commonwealth Ave Boston University Building	*Inventoried Property* Grenville T. W. Braman Row House	None
767 Commonwealth Ave Boston University Alumni Auditorium	*Inventoried Property* Boston University Law Library	None
838 Beacon St	*Inventoried Property* Audubon Restaurant	None
872 Beacon St	*Inventoried Property* W. D. Vinal Rowhouse	None

Location / Name	Description / Historic Name	Impact of Project on Resource
Boston University Building		
2 Buswell St Boston University Building	*Inventoried Property* The Nathan Apartments	None
27 Buswell St	*Inventoried Property*	None
735 Commonwealth Ave	*Inventoried Property* Boston University Daniel Marsh Plaza	None
824 Beacon St Boston University Lavinia Webster Row House	*Inventoried Property* W. D. Vinal – George Wheatland, Jr. Row House	None
836 Beacon St Boston Univesrity S. H. Whitwall Row House	*Inventoried Property* W. D. Vinal – George Wheatland, Jr. Row House	None
499-503 Park Dr	*Inventoried Property* Strathcona Terrace Apartment House	None
143 Bay State Rd Lahey Clinic Foundation	*Local Historic District*	None
225 Bay State Rd	*Local Historic District* William Lindsey House	None
714 Commonwealth Ave Boston University Building	*Inventoried Property* Grenville T. W. Braman Row House	None
621 Commonwealth Ave Boston University School of Education	*Inventoried Property* Hurlburt Row House Commonwealth Avenue Hospital	None
856 Beacon St Boston University Building	*Inventoried Property* Wheatland and Vinal Rowhouse	None
864 Beacon St Boston University Building	*Inventoried Property* Wheatland and Vinal Rowhouse	None
3 Buswell St Boston University Building	*Inventoried Property* W. D. Vinal Row House	None
7 Buswell St Boston University Building	*Inventoried Property* W. D. Vinal Apartment Building	None

Location / Name	Description / Historic Name	Impact of Project on Resource
17 Buswell St Boston University Building	*Inventoried Property*	None
515 Park Dr Boston University Building	*Inventoried Property* The Royal Apartments	None
235 Bay State Rd	*Inventoried Property* Boston University The Beach	None
736-738 Commonwealth Ave	*Inventoried Property*	None
826 Beacon St Boston University Dr. C. G. Cumston Row House	*Inventoried Property* W. D. Vinal – George Wheatland, Jr. Row House	None
830 Beacon St Boston University John P. Cushing Row House	*Inventoried Property* W. D. Vinal – George Wheatland, Jr. Row House	None
145 Bay State Rd Boston University Provost Office	*Local Historic District* Dr. Charles Goddard Weld House	None
675 Commonwealth Ave	*Inventoried Property* Boston University Stone Science Building	None
236 Bay State Rd Boston University English Department Offices	*Inventoried Property* Ashby Apartments	None
111 Cummington St Boston University Building	*Inventoried Property* Back Bay Realty Association Garage	None
625 Commonwealth Ave Boston University Building	*Inventoried Property* Mary E. Holden - Anna C. Hallian Row House	None
617 Commonwealth Ave Boston University School of Education	*Inventoried Property* Covel Row House Commonwealth Avenue Hospital	None
9 Buswell St	*Inventoried Property*	None
512 Park Dr	*Inventoried Property*	None
855 Beacon St Boston University Dormitory	*Inventoried Property* Joseph Feldman Row House	None

Location / Name	Description / Historic Name	Impact of Project on Resource
871 Beacon St	*Inventoried Property* A. F. Arnold Row House	None
874-880 Beacon St Ruggles Baptist Church	*National Register of Historic Places* Second Church in Boston	None
48-60 Cummington St Boston University College of Engineering	*Inventoried Property* William H. Flaherty Auto Repair	None
11 Buswell St Boston University Wellness House	*Inventoried Property* W. D. Vinal Rowhouse	None
15 Buswell St Boston University Building	*Inventoried Property*	None
730 Commonwealth Ave	*Inventoried Property* C. E. Fay Auto Sales Company	None
693 Beacon St	*Inventoried Property* Edison Electric Illuminating Transformer Station	None
822 Beacon St Charles F. Cutler Row House	*Inventoried Property* W. D. Vinal – George Wheatland, Jr. Row House	None
832 Beacon St, Boston University Mary F. Hill Row House	*Inventoried Property* W. D. Vinal – George Wheatland, Jr. Row House	None
211 Bay State Rd Boston Academy of Notre Dame W. D. Vinal House	*Local Historic District* Boston University Newman House Catholic Center	None
64-86 Cummington St Boston University Psychology Department	*Inventoried Property* C. C. Hathaway - Charles A. Dodge Building	None
565 Commonwealth Ave Boston University Building	*Inventoried Property* General Tire and Rubber Company Building	None
852 Beacon St Boston University Building	*Inventoried Property* W. D. Vinal Row House	None
24 Buswell St Boston University Building	*Inventoried Property* Carminea Apartments	None

Location / Name	Description / Historic Name	Impact of Project on Resource
765 Commonwealth Ave	*Inventoried Property* Boston University School of Law Courtyard	None
630-640 Commonwealth Ave	*Inventoried Property* Boston University Communication Park	None

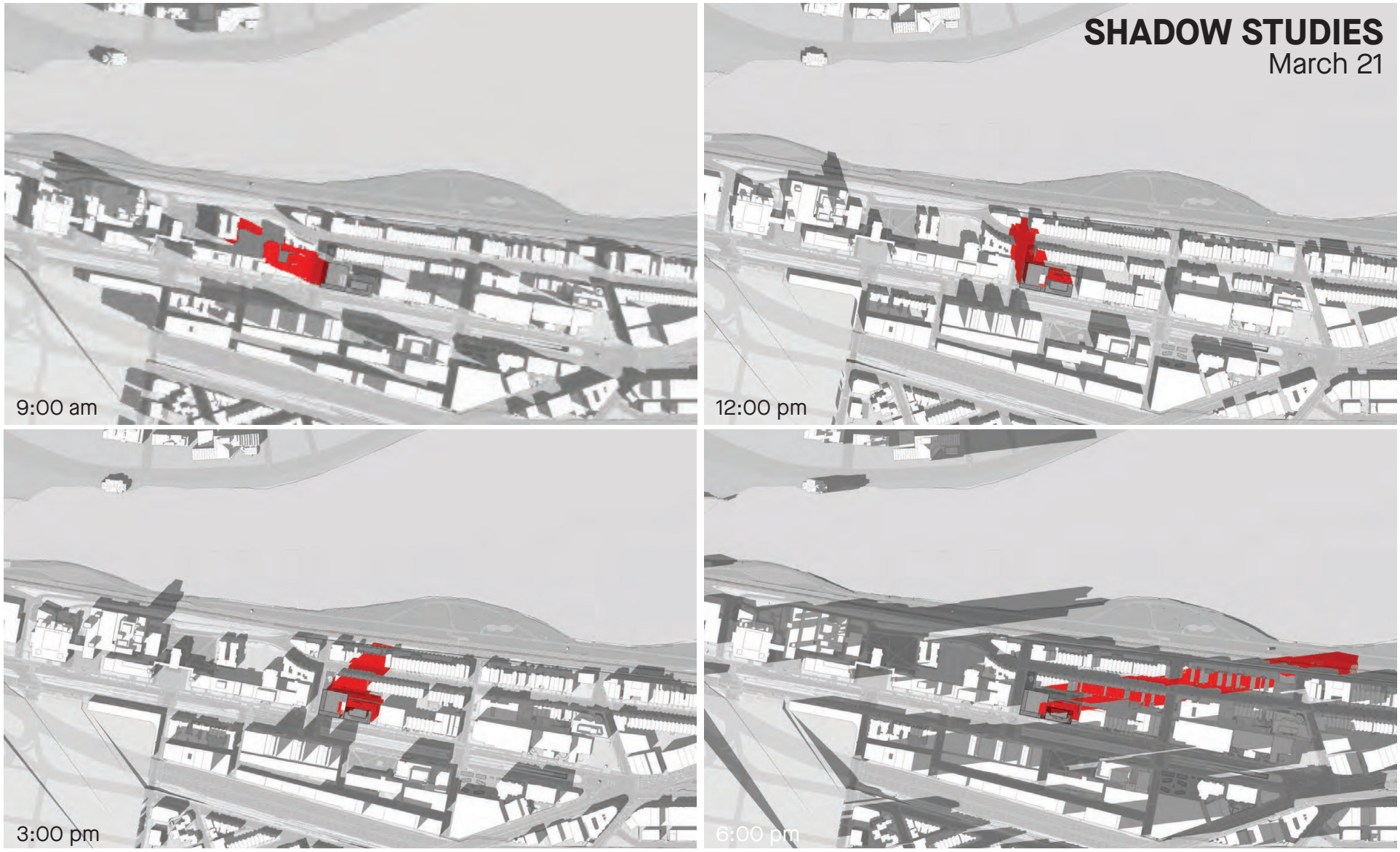


Figure 6-1
Shadow Studies, March 21
Source: KPMB Architects, 2018

Figure 6-2
Shadow Studies, June 21
Source: KPMB Architects, 2018

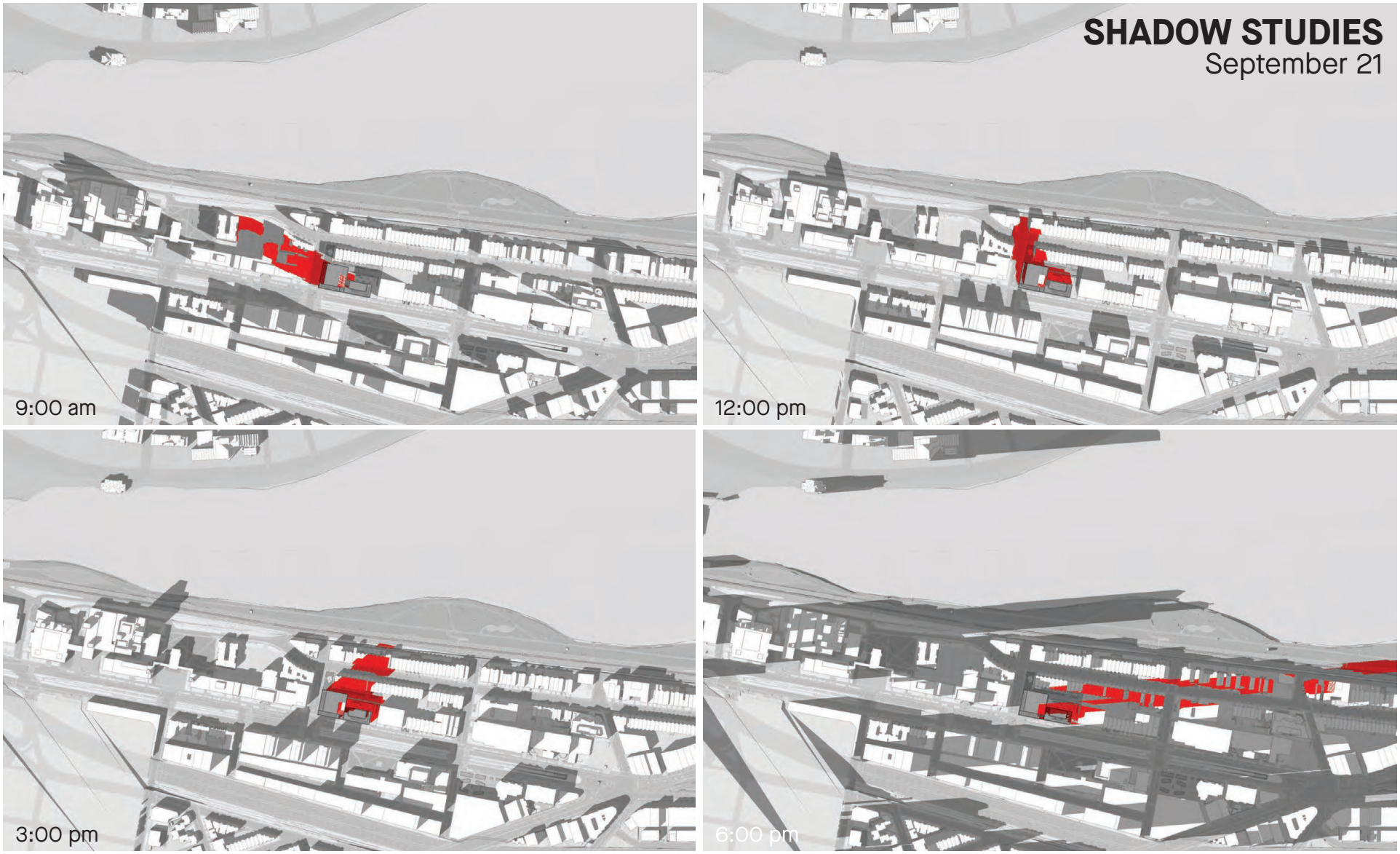


Figure 6-3
Shadow Studies, September 21
Source: KPMB Architects, 2018

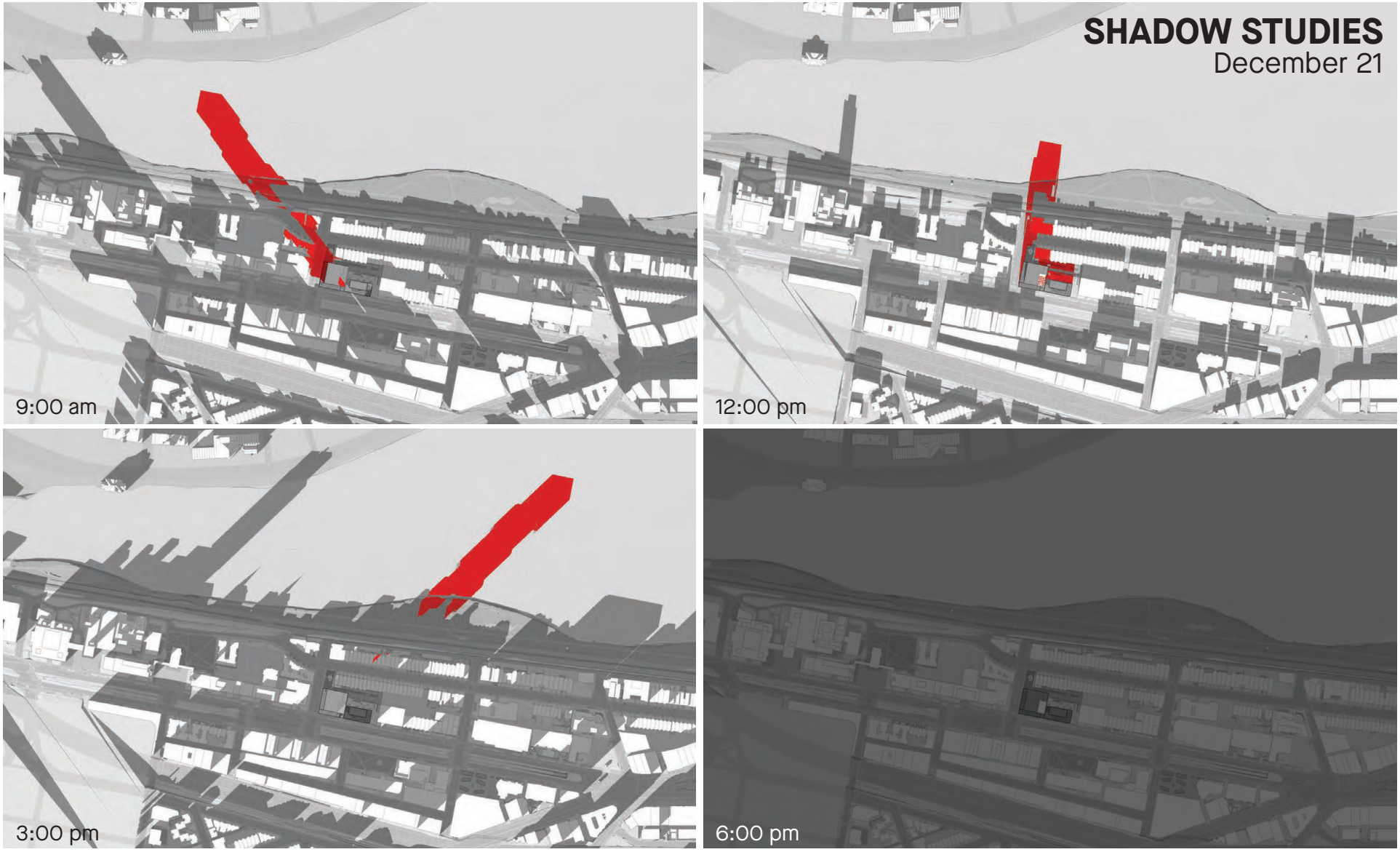


Figure 6-4
Shadow Studies, December 21
Source: KPMB Architects, 2018

Boston, Massachusetts

Figure 6-5
Historic Resources in the Vicinity of the Project Site
Source: Massachusetts Historical Commission, 2016 | Fort Point Associates, Inc., 2018

Chapter 7

INFRASTRUCTURE

CHAPTER 7: INFRASTRUCTURE

7.1 INTRODUCTION

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

- District heating and cooling
- Sewer
- Domestic water
- Fire protection
- Drainage
- Electricity
- Telecommunications

The Project, located on an existing surface parking lot, is comprised of approximately 305,000 sf of Gross Floor Area (GFA) that will house academic, meeting, office and research space on nineteen floors.

7.2 WASTEWATER

7.2.1 EXISTING SEWER SYSTEM

There are existing sewer mains in Granby Street and Commonwealth Avenue. An 18-inch Boston Water and Sewer Commission sewer main located in Granby Street flows southerly below Granby Street and westerly into an 18-inch main that runs through Boston University's property. There is also an existing 18-inch BWSC sewer main in Commonwealth Avenue, which flows westerly below the sidewalk on the north side of Commonwealth Avenue. The sewer mains eventually flow to an 84-inch x 89-inch Massachusetts Water Resource Authority (MWRA) combined sewer that ultimately ends up at the MWRA Deer Island Waste Water Treatment plant for treatment and disposal. See Figure 7-1, BWSC Sewer System Map.

7.2.2 PROJECTED SANITARY SEWER FLOW

The Project's sewage generation rates were estimated using the MassDEP Environmental Code (Title V) Section 310 CMR 15.00 and the proposed building program. Typical generation values are conservative values for estimating the

sewage flows from new construction and are used to evaluate new sewage flows or an increase in flows to existing conditions in gallons per day (GPD).

For the floors for which the architect has provided the average number of persons per floor, the generation unit was treated as a secondary school without cafeteria, gymnasium, or showers. For the floors without an average person per floor value, the office and classroom square footage were treated as an office building.

The Site is currently a parking lot, therefore there is no sewer generation from the existing use. A breakdown of the current sewer generation values for the Project are presented in Table 7-1.

The total sanitary flow for the Project is estimated to be 11,920 GPD.

Table 7-1: Projected Wastewater Generation

Use Category	Size/Units	Rate	Total Flow (GPD)
Offices	29,724 sf	75 GPD/1000 sf	2,230
Secondary School without cafeteria, gymnasium, or showers	969 people	10 GPD/person	9,690
Total			11,920

7.2.3 SANITARY SEWER CONNECTIONS

The sewer services for the Project are expected to connect to the existing BWSC-owned 18-inch sanitary sewer mains in Granby Street and Commonwealth Avenue. The proposed improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's Site Plan Review process for the Project. The BWSC's review process will include a comprehensive design review of the proposed service connections, an assessment of Project demands and system capacity, and the establishment of service accounts.

7.2.4 CAPACITY OF EXISTING SEWERS

An evaluation of the capacities of the sewer lines in Granby Street and Commonwealth Avenue was performed to determine their ability to accommodate proposed flows from the Project. The results are presented in Table 7-2 and Table 7-3.

Table 7-2: Existing Sewer Capacity Evaluation – Commonwealth Avenue

Segment: MH to MH	Street Name	Segment Size (inches)	Length (feet)	Slope (%)	Capacity (MGD)
5-4E	Commonwealth Ave	18	252	0.40	4.32
4-3E	Commonwealth Ave	18	259	0.41	4.32
3-2	Commonwealth Ave	18	249	0.41	4.32
2-4W	Commonwealth Ave	18	249	0.38	4.17

Table 7-3: Existing Sewer Capacity Evaluation – Granby Street

Segment: MH to MH	Street Name	Segment Size (inches)	Length (feet)	Slope (%)	Capacity (MGD)
22-133	Granby Street	18	99	0.48	4.73
133-20	Granby Street	18	25	0.48	4.70
20-19	Granby Street	18	285	0.40	4.31
19-18	Granby Street	18	220	0.40	4.29

Note: The Manning's equation was used to calculate tabulated values. The roughness coefficient of 0.013, fair condition PVC or DIP, was used in the equation. Pipe sizes, slopes, and segment lengths were obtained from BWSC record drawings and GIS Maps. Segment lengths were approximated and rounded to the nearest foot. Manhole numbers were taken from BWSC GIS Maps, see Fig 7-1. Where inverts were not provided, an average slope was assumed between known inverts.

From Table 7-1, the estimated sewage discharge for the Project is 11,920 GPD, with a peaking factor of 10 0.12 million gallons per day (MGD) (total estimate = 0.012 x 10 = 0.12 MGD). This peak sewer discharge value is significantly less than the minimum 4.17 MGD full flow capacity of the 18-inch sanitary sewer main in Commonwealth Avenue and less than the 4.29 MGD full flow capacity of the 18-inch sanitary sewer main in Granby Street. On this basis, it is concluded that there is sufficient capacity in both sanitary sewer mains. The Proponent will coordinate with BWSC throughout the design process to ensure capacity is not an issue.

7.2.5 SEWER SYSTEM CONSERVATION AND MITIGATION MEASURES

To reduce impacts of the Project's sewage generation and help conserve water, the Project will meet all applicable code requirements including the installation of low-flow toilets and flow-restricting faucets. As part of the Project's goal to achieve LEED Certification, the Project will incorporate water conservation measures in accordance with LEED credits. New sanitary sewer services for the Project will be designed and construction to BWSC construction standards to minimize inflow into the sanitary sewer collection system.

7.3 WATER SYSTEM

7.3.1 EXISTING WATER SYSTEM

There are existing water mains in Granby Street and Commonwealth Avenue. Water for the Site will be provided by BWSC. There are five water systems within the City that provide service to portions of the City based on ground surface elevation. The five systems are southern low (commonly known as low service), southern high (commonly known as high service), southern extra high, northern low, and northern high.

There is an existing 8-inch, ductile iron, cement lined, southern low water main operated by BWSC along the east side of Granby Street that was installed below Granby Street in 2000.

There is an existing 16-inch, pit cast iron, southern low water main operated by BWSC on the north side of Commonwealth Avenue that was originally installed in 1893 but was replaced in 1990. This 16-inch water main feeds a hydrant on the north side of Commonwealth Avenue and an existing 4-inch fire protection service that might be abandoned. There is also an existing 12-inch low water main operated by BWSC on the south side of Commonwealth Avenue. The Project does not propose any utility crossings for the water main on the south side of Commonwealth Avenue. See Figure 7-2, BWSC Water System Map.

A capacity analysis will be performed by conducting hydrant flow tests on the existing water systems to confirm the availability of water supply for both the domestic and fire protection needs of the Project.

7.3.2 ANTICIPATED WATER CONSUMPTION

The Project's estimated water demand was estimated assuming 110 percent of the Project's sewer generation; typical engineering practice assumes a 10 percent loss between the Project's water demand and sewer generation through typical building uses. The Site is currently used as a parking lot, therefore there is no water demand at present.

A breakdown of the proposed water demand values is presented in Table 7-4. The proposed water demand for the Project is expected to be 13,112 GPD. The Proponent does not anticipate capacity issues for the Project. The Proponent will coordinate with BWSC throughout the design process to ensure capacity is not an issue.

Table 7-4: Project Water Demand

110% Sewer Generation	Average Daily Use (GPD)
110% x 11,920 GPD	13,112

7.3.3 PROPOSED WATER SERVICE

The Project's domestic and fire protection services are expected to tie into the BWSC-owned water main located in Commonwealth Avenue and/or Granby Street via new domestic and fire protection service laterals.

The domestic and fire protection water service connections required for the Project will meet the applicable BWSC, state, and federal codes and standards, including cross-connection backflow prevention. Compliance with the standards for the water system service connection will be reviewed as part of BWSC's Site Plan Review process. This review will include 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.

7.3.4 WATER SUPPLY CONSERVATION AND MITIGATION MEASURES

Measures to reduce water consumption will be incorporated into the Project design. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed.

New water services will be installed in accordance with the latest local, state, and federal codes and standards. The Project will comply with the Commonwealth's Stretch Energy Code and as such, will reduce energy use from the baseline energy conservation by approximately 30 percent. Backflow preventers will be installed at both domestic and fire protection service connections. New meters will be installed with Meter Transmitter Units as part of the BWSC's Automatic Meter Reading system.

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

7.4 STORM DRAINAGE SYSTEM

7.4.1 EXISTING STORM DRAINAGE SYSTEM

There is an existing 15-inch to 21-inch BWSC-owned storm drain that flows westerly under Commonwealth Avenue. The storm drain eventually flows to an 84-inch x 89-inch MWRA combined sewer that ultimately ends up at the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal.

There is an existing 12-inch BWSC owned storm drain that flows northerly under Granby Street and easterly to a 116-inch x 120-inch storm drain outfall into the Charles River.

The Site is currently used as a parking lot, and the majority of the lot is impervious cover. See Figure 7-3, BWSC Stormwater System Map.

The Project's potential impact of the existing storm drain mains in Granby Street was analyzed. The existing storm drain system capacity calculations for Granby Street are presented in Table 7-5.

Table 7-5: Existing Storm Sewer Capacity Evaluation – Granby Street

Segment: MH to MH	Street Name	Segment Size (inches)	Length (feet)	Slope (%)	Capacity (MGD)
46-45	Granby Street	12	46	0.40	4.32
45-47	Granby Street	18	120	0.41	4.32
47-102	Granby Street	18	14	0.41	4.32
102-106	Granby Street	24	800	0.38	4.17

BWSC did not have record information or as-builts showing the information required to analyze the storm drains in Commonwealth Avenue. The Proponent does not anticipate capacity issues for the Project since the proposed stormwater management systems will be designed to decrease or maintain the existing peak flow rate and volume of stormwater runoff from the Site. The Proponent will coordinate with BWSC throughout the design process to ensure capacity is not an issue.

7.4.2 PROPOSED STORM DRAINAGE SYSTEM

Stormwater improvements will be reviewed as a part of the BWSC Site Plan Review process. This process includes a comprehensive design review of the proposed service connections, assessment of Project demands and system capacity, and establishment of service accounts. The proposed stormwater management system will collect site runoff and one-inch of rainfall over the Project's impervious area,

per the BWSC stormwater management and the requirements of the Boston Groundwater Conservation Overlay District. The Project's storm drainage system will discharge to the BWSC-owned storm drain systems in Granby Street and Commonwealth Avenue.

Site runoff will be collected by a closed drainage system and treated before overflowing to the BWSC storm drainage system. Stormwater runoff will be directed to various proposed recharge systems on the Project Site. The recharge systems will be comprised of a combination of subsurface systems and stormwater injection wells.

Stormwater flows to the laneway will be designed to prevent an increase of flows to this area. Subsurface stormwater recharge tanks will be installed to promote infiltration of water within the laneway and from the adjacent buildings.

All work on the drainage systems will be performed in accordance with BWSC standards and will be submitted to the necessary agencies for review and approval prior to implementation.

7.4.3 MITIGATION MEASURES

The stormwater management system will maintain or decrease the peak flow rate and volume of stormwater runoff from the Site to both the storm drain systems in Granby Street and Commonwealth Avenue to the maximum extent practicable. New stormwater runoff will not be directed toward abutters. No capacity issues in the existing storm drain pipes are anticipated as a result of the Project.

Catch basins installed will be standard BWSC catch basins with deep sediment sumps and traps. BWSC "Don't Dump – Drains to Charles River" plaques will be installed at new catch basins and at existing catch basins if they are not already present.

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 remove sediment from runoff. These erosion controls will be inspected and maintained throughout the construction phase until the areas of disturbance have been stabilized through the placement of pavement, structure, or vegetative cover.

If required, site dewatering permits will be obtained, and work will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once

construction is complete, the Project will be in compliance with local and state stormwater management policies described in the following section.

7.4.4 MASSDEP STORMWATER MANAGEMENT POLICY STANDARDS

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

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

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

Compliance: The proposed design will comply with this Standard. No new untreated stormwater will be directly discharged to, nor will erosion be caused to wetlands or waters of the Commonwealth as a result of stormwater discharges related to the 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 to the maximum extent practicable. The post-development peak discharge rates will not exceed the pre-development peak discharge rates through methods involving stormwater recharge on site to the maximum extent practicable and will be coordinated with BWSC throughout the design process.

Standard #3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally 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 will comply with this standard to the maximum extent practicable

Standard #4: Stormwater management systems shall be designed to remove 80 percent 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. The Project will not have an impact on stormwater runoff quality. The Project storm drain service will not discharge to a combined sewer.

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 Project is not associated with Higher Potential Pollutant Loads (per the Policy, Volume I, page 1-6).

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 "stormwater discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

Compliance: The Project will not discharge untreated stormwater to a sensitive area or any other area.

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

Compliance: The Project is considered a re-development per the MassDEP Standards and will meet the credits to the maximum extent practicable.

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 assure 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.

7.4.5 STORMWATER QUALITY DURING CONSTRUCTION

Stormwater Management Best Management Practices relative to stormwater pollution prevention, erosion, and sediment control will be implemented during construction. These will include:

- Protection of adjacent catch basins by installation of either hay bales or filter fabrics to prevent sedimentation from entering stormwater conveyance system.
- Installation of wheel wash stations at construction site egress points to prevent tracking of mud and dirt onto public roads by construction vehicles.
- Utilization of sedimentation tanks or pits where appropriate to control and contain runoff during construction, including that derived from dewatering activities. Dewatering discharge will pass through a MassDEP approved sedimentation basin prior to discharge into the BWSC drainage system.
- Implementation of dust/emission controls. Examples of measures for dust control include use of wet suppression (alone or with approved binding agents) on a routine basis using a water truck and the use of wet spray power vacuum street sweepers on paved roadways.

7.5 ELECTRICAL SERVICES

The local electrical service provider is Eversource. During preliminary discussions, Eversource indicated that there is existing infrastructure running in the sidewalk of Commonwealth Avenue next to the Site consisting of a 15KV duct bank with eight conduits arranged in a four by two configuration and two 115 KV lines.

The building is proposed to be fed from the utility company as a primary metered electrical service. The building incoming service shall consist of a new dual line 15KV primary switchgear arrangement configured in accordance with the standards and criteria of Eversource and located in a new utility vault within the new building. A new private property manhole will be provided on the Site adjacent to the building vault location with conduits stubbed out to the property line for extension to the utility company existing infrastructure and manholes in Commonwealth Ave provided by the utility company.

7.6 TELECOMMUNICATIONS SYSTEM

Redundant Telecommunications Duct Banks will be extended from the street into the Main Distribution Frame (MDF) of the building to provide Boston University campus network and telephone services to the building. Single mode fiber optic cables will be used to distribute network and telephone services from the MDF to Intermediate Distribution Frames (IDFs) located on the individual floors. The floor IDFs will serve as an aggregation point for all the network and telephone outlet cabling located within 250′-0″. The network and telephone workstation outlet will be Category 6A structured cabling system designed to meet Boston University's campus standards.

Network and Telephone switching and routing equipment will be provided by Boston University IS&T and will be located in the MDF and IDFs to distribute the Local Area Network (LAN) to the Internet, Telephone Service Provider, and Boston University Campus Data Center. All network equipment located in the MDF or IDFs will be powered by a Centralized Uninterruptible Power Supply (UPS) located in the MDF and distributed throughout the IDFs.

7.7 DISTRICT HEATING AND COOLING OR GEOTHERMAL SYSTEMS

The heating/cooling infrastructure serving the Project will only serve the new Data Sciences Center. The goal is to provide a very low energy consumption heating, cooling, and lighting system that is leading-edge in its design and annual efficiency. The systems are being designed in collaboration with highly effective building envelope systems and shading systems to minimize external environmental cooling and heating loads. There will be no connection to existing Boston University campus chilled water and steam systems. The Proponent is exploring the installation of a stand-alone heating/cooling system that relies upon geothermal heating and cooling for the majority of the annual loads. If this option proves to be feasible, fossil fuels will not be used for primary heating and cooling.

The systems within the Data Sciences Center could include a combination of high efficiency air handling systems consisting of air handling units, geothermal heat recovery chillers, geothermal wells, load-peaking electric boilers (for partial heating), pumps, and miscellaneous fan systems.

7.8 NATURAL GAS SYSTEM

At this time, no natural gas is expected to be provided to the building under the Base building design, which uses electric boilers for heating load peaking capacity and during power outages.

7.9 UTILITY PROTECTION DURING CONSTRUCTION

Existing public and private infrastructure located within nearby public rights-of-way and the alley will be protected during the construction of the Project. The installation of proposed utility connections within public ways will be undertaken in accordance with the 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 prior to 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.

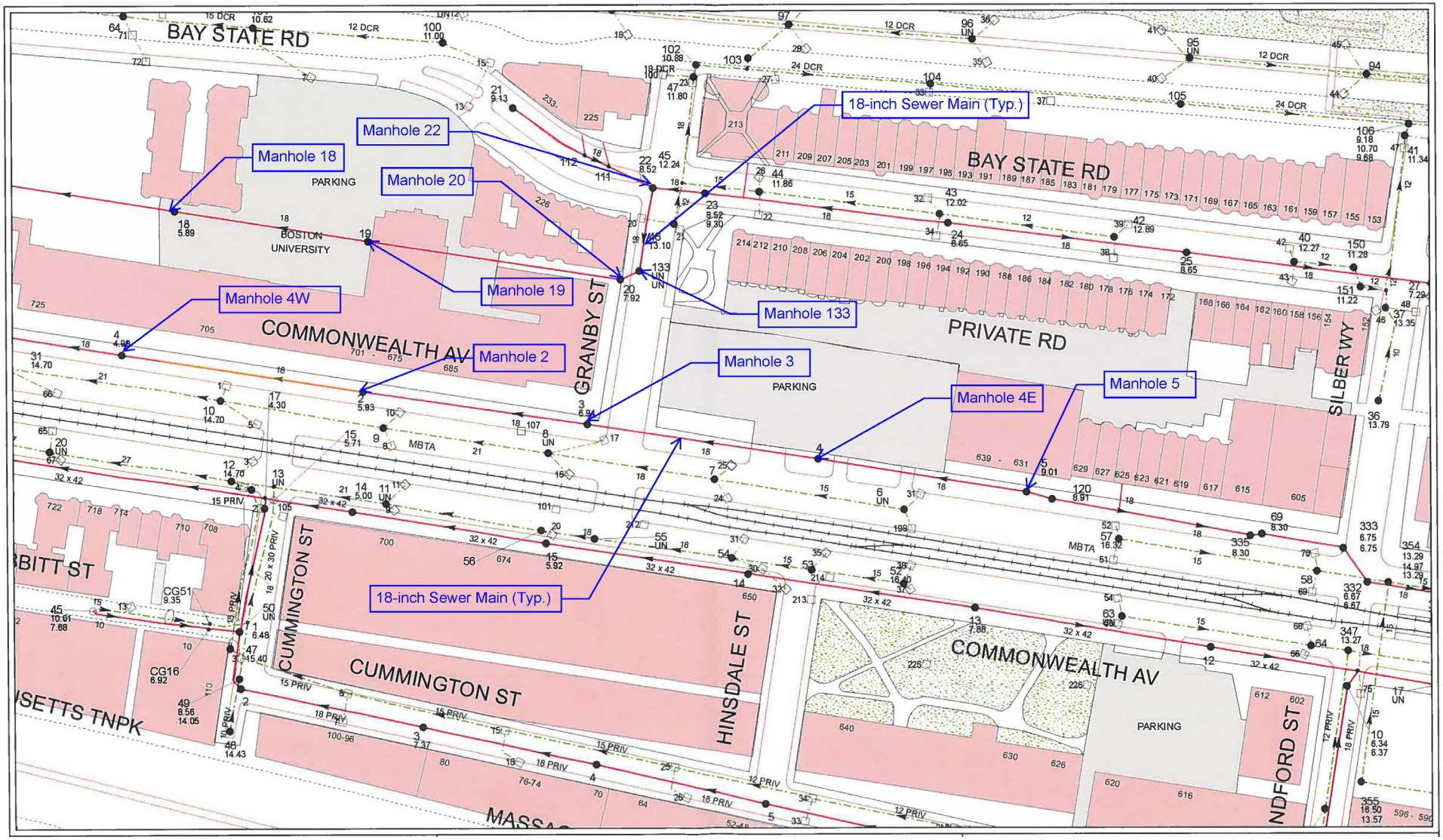
7.10 FIRE PROTECTION

Two 8″ fire services shall be provided to the building supplied from the municipal water supply located on Granby Street. Each service shall be protected with an 8″ double check valve assembly.

The fire protection system is proposed to be supplied by a fire pump rated for 1,500 GPM and 225 PSI. The fire pump shall be located in a dedicated 2-hour rated room located in the Basement Level of the building and will have direct access to the exterior of the building via 2-hour rated corridors and stairs. Two fire department connections and electric bells are required at the exterior of the building and must be located within 100′ of a fire hydrant.

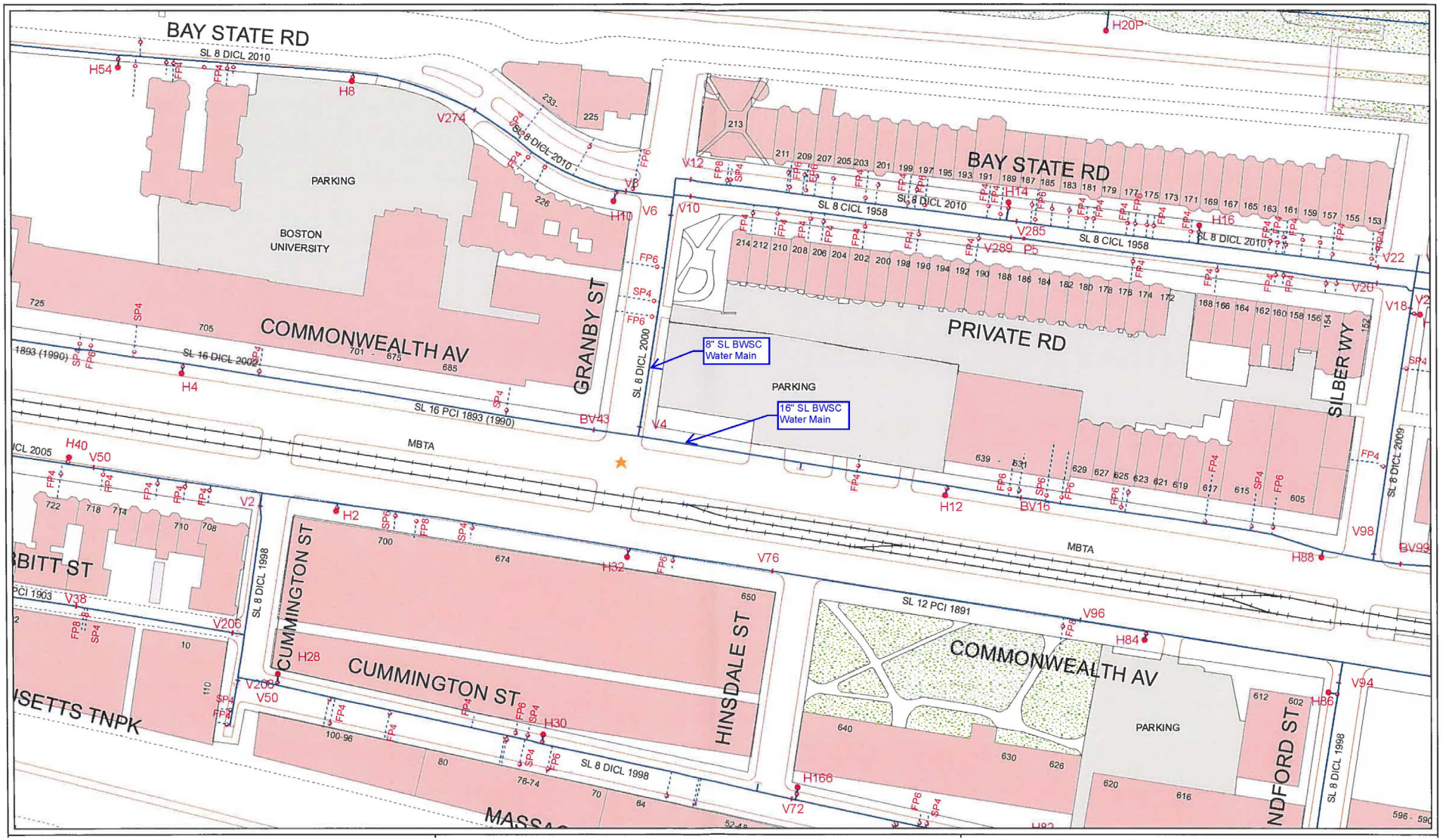
The standpipe system shall consist of three interconnected combination sprinkler/standpipe risers located on the main landing within egress stairs and one additional standpipe riser (required to satisfy 200′ travel distance requirements between stairs). All standpipes shall be 6″, consist of 2-1/2″ fire department valves, and be designed to deliver 100 PSI at the top most outlet of the building.

The sprinkler system shall be zoned per floor, with sprinkler floor control valve assemblies located within two egress stairs at each level to dual feed each sprinkler zone. All sprinklers within the atrium compartment shall be zoned separately, requiring additional sprinkler floor control valves on all floors that open to the atrium.



Boston, Massachusetts

Figure 7-1
BWSC Sewer System Map
Source: Boston Water and Sewer Commission, 2013 | Nitsch Engineering, Inc., 2018



Boston, Massachusetts

Figure 7-2
BWSC Water System Map
Source: Boston Water and Sewer Commission, 2013 | Nitsch Engineering, Inc., 2018

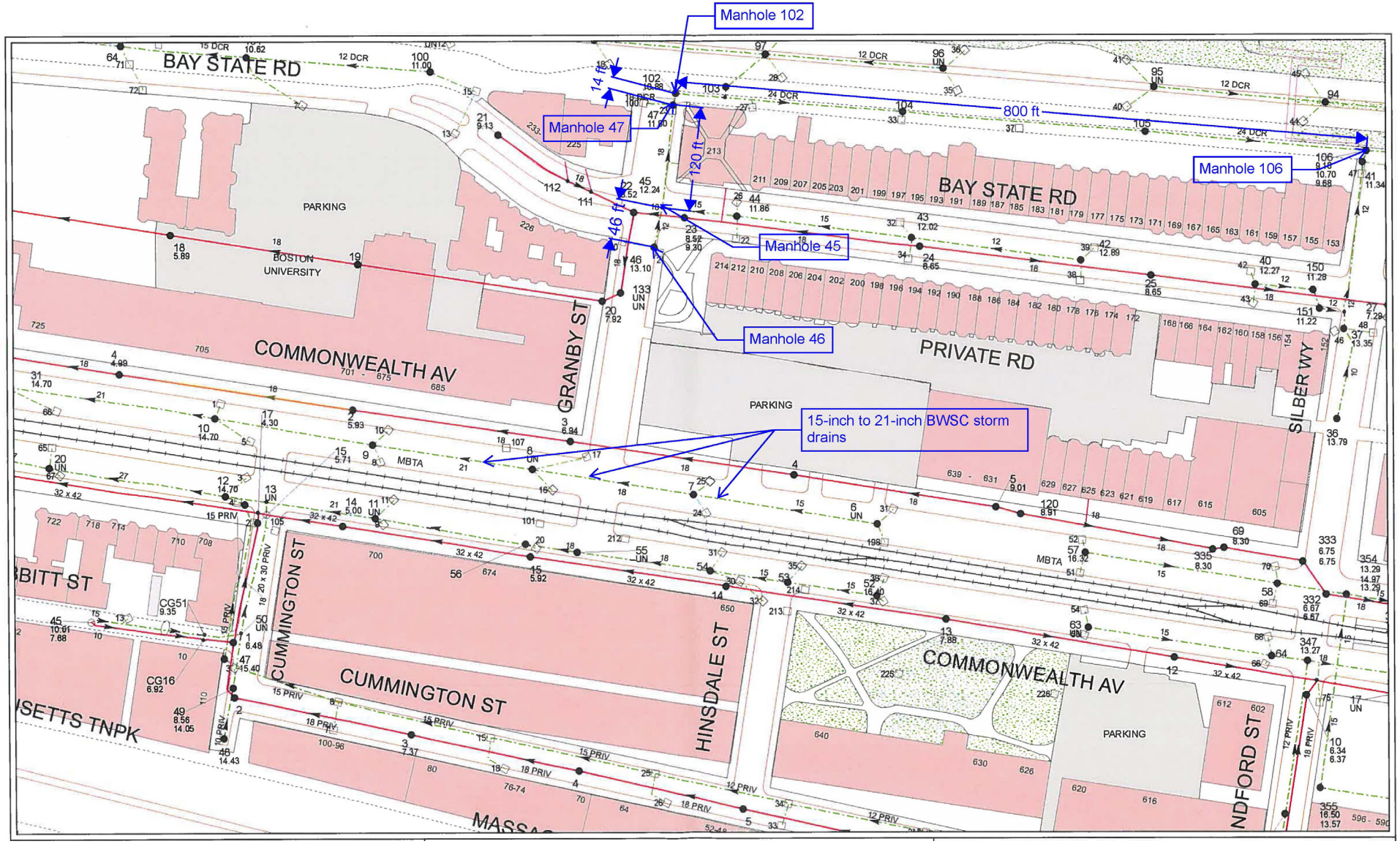


Figure 7-3
BWSC Stormwater System Map
Source: Boston Water and Sewer Commissionn, 2013 | Nitsch Engineering, Inc., 2018

Attachment A

CLIMATE RESILIENCY CHECKLIST

boston planning & development agency

Climate Resiliency Checklist

NOT FOR FILING

NOTE: Project filings should be prepared and submitted using the online Climate Resiliency Checklist.

A.1 - Project Information

Project Name:	Boston University Data Sciences Center			
Project Address:	665 Commonwealth Avenue			
Project Address Additional:	645 Commonwealth Avenue			
Filing Type (*select*)	***Initial*** *(**PNF**, EPNF, NPC or other substantial filing)* *Design / Building Permit (prior to final design approval), or* *Construction / Certificate of Occupancy (post construction completion)*			
Filing Contact	*Judith Kohn*	*Fort Point Associates, Inc.*	*jkohn@fpa-inc.com*	*617-357-7044 x211*
Is MEPA approval required	*Yes/**no***		*Date N/A*	

A.2 - Project Team

Owner / Developer:	Trustees of Boston University
Architect:	KPMB Architects
Engineer:	Nitsch Engineering
Sustainability / LEED:	The Green Engineer
Permitting:	Fort Point Associates, Inc.
Construction Management:	Suffolk Construction

A.3 - Project Description and Design Conditions

List the principal Building Uses:	Academic offices and classrooms, meeting spaces, food service
List the First Floor Uses:	Academic offices and classrooms, meeting space
List any Critical Site Infrastructure and or Building Uses:	N/A

Site and Building:

Site Area:	*42,000 SF*	Building Area:	*305,000 SF gross*
Building Height:	*305 Ft*	Building Height:	*19 Stories*
Existing Site Elevation – Low:	*19.1 Ft BCB*	Existing Site Elevation – High:	*22.0 Ft BCB*
Proposed Site Elevation – Low:	*19.1 Ft BCB*	Proposed Site Elevation – High:	*21.0 Ft BCB*
Proposed First Floor Elevation:	*21.0 Ft BCB*	Below grade levels:	*2 Stories*

Article 37 Green Building:

LEED Version - Rating System :	LEED-NC v4	LEED Certification:	***Yes** / No*

Proposed LEED rating:	*Certified/Silver/* ***Gold****/Platinum*	Proposed LEED point score:	*65 Pts.*

Building Envelope

When reporting R values, differentiate between R discontinuous and R continuous. For example, use "R13" to show R13 discontinuous and use R10c.i. to show R10 continuous. When reporting U value, report total assembly U value including supports and structural elements.

Roof:	*R30c.i.(R)*	Exposed Floor:	*R30c.i.(R)*
Foundation Wall:	*R10c.i.(R)*	Slab Edge (at or below grade):	*R10c.i.(R)*

Vertical Above-grade Assemblies (%'s are of total vertical area and together should total 100%):

Area of Opaque Curtain Wall & Spandrel Assembly:	*31.17(%)*	Wall & Spandrel Assembly Value:	*0.0625(U)*
Area of Framed & Insulated / Standard Wall:	*2.46(%)*	Wall Value	*R24(R)*
Area of Vision Window:	*65.78%*	Window Glazing Assembly Value:	*0.19(U)*
		Window Glazing SHGC:	*0.25(SHGC)*
Area of Doors:	*0.59%*	Door Assembly Value:	*0.24(U)*

Energy Loads and Performance

For this filing – describe how energy loads & performance were determined	*Energy use was calculated with a 8760 hours dynamic thermal simulation using Trnsys 18, and peak loads were calculated using Trane Trace 700.*		
Annual Electric:	*TBD (kWh)*	Peak Electric:	*TBD (kW)*
Annual Heating:	*TBD (MMbtu/hr)*	Peak Heating:	*6.2 (MMbtu)*
Annual Cooling:	*TBD (Tons/hr)*	Peak Cooling:	*650 (Tons)*
Energy Use - Below ASHRAE 90.1 - 2013:	*TBD %*	Have the local utilities reviewed the building energy performance?	*Yes /* ***No***
Energy Use - Below Mass. Code:	*TBD %*	Energy Use Intensity:	*36 (kBtu/SF)*

Back-up / Emergency Power System

Electrical Generation Output:	*2000(kW)*	Number of Power Units:	1
System Type:	*Electric Generator*	Fuel Source:	Diesel

Emergency and Critical System Loads (in the event of a service interruption)

Electric:	*1,745 (kW)*	Heating:	*2,000 (MMbtu/hr)*
		Cooling:	*0 (Tons/hr)*

B – Greenhouse Gas Reduction and Net Zero / Net Positive Carbon Building Performance

Reducing GHG emissions is critical to avoiding more extreme climate change conditions. To achieve the City's goal of carbon neutrality by 2050 new buildings performance will need to progressively improve to net carbon zero and positive.

B.1 – GHG Emissions - Design Conditions

For this Filing - Annual Building GHG Emissions: *1,430 (Tons)*

For this filing - describe how building energy performance has been integrated into project planning, design, and engineering and any supporting analysis or modeling:

Building energy performance is a primary focus of the Project's design team and Proponent. A target EUI has been established and a goal for GHG emissions has been set early in design.

Describe building specific passive energy efficiency measures including orientation, massing, envelop, and systems:

The Project will incorporate: triple glazing curtainwalls with high-performing building envelope; a sawtooth envelope paneling strategy will be utilized on East, South, and West-facing facades.

Describe building specific active energy efficiency measures including equipment, controls, fixtures, and systems:

The Project will utilize daylight and occupancy controls for interior lighting, high-efficiency lighting (LEDs), dual-wheel energy recovery, chilled beams, air-cooled chillers and condensing boilers (included to meet peak and emergency loads only), etc.

Describe building specific load reduction strategies including on-site renewable, clean, and energy storage systems:

The Project is evaluating the feasibility of a geothermal system for load reductions. The Project is evaluating options to incorporate an on-site solar photovoltaic system.

Describe any area or district scale emission reduction strategies including renewable energy, central energy plants, distributed energy systems, and smart grid infrastructure:

N/A

Describe any energy efficiency assistance or support provided or to be provided to the project:

TBD

B.2 - GHG Reduction - Adaptation Strategies

Describe how the building and its systems will evolve to further reduce GHG emissions and achieve annual carbon net zero and net positive performance (e.g. added efficiency measures, renewable energy, energy storage, etc.) and the timeline for meeting that goal (by 2050):

In addition to designing an energy efficient building with a proposed Site EUI of 36 to reduce the buildings overall energy load, the Project's building systems have been selected to significantly reduce reliance on fossil fuels and to promote the ongoing use of clean energy production for the near 100% electrical based building.

C - Extreme Heat Events

Annual average temperature in Boston increased by about 2˚F in the past hundred years and will continue to rise due to climate change. By the end of the century, the average annual temperature could be 56° (compared to 46° now) and the number of days above 90° (currently about 10 a year) could rise to 90.

C.1 – Extreme Heat - Design Conditions

Temperature Range - Low:	*0 Deg.*	Temperature Range - High:	*91 Deg.*
Annual Heating Degree Days:	5,641	Annual Cooling Degree Days	2,897

What Extreme Heat Event characteristics will be / have been used for project planning

Days - Above 90°:	*10-15*	Days – Above 100°:	*1*
Number of Heatwaves / Year:	*3-5*	Average Duration of Heatwave (Days):	*3-5*

Describe all building and site measures to reduce heat-island effect at the site and in the surrounding area:

The Project is studying the feasibility of installing roof gardens on low roofs and terraces. High SRI roof and hardscape areas on-site will reduce heat absorption, and ground level trees and vegetation will reduce direct sunlight exposure on hardscape areas.

C.2 - Extreme Heat – Adaptation Strategies

Describe how the building and its systems will be adapted to efficiently manage future higher average temperatures, higher extreme temperatures, additional annual heatwaves, and longer heatwaves:

The design will consider expanded setpoints during extreme weather events to mitigate load increases over longer heatwave periods. The HVAC design will evaluate the potential for additional space to allow end-of-life equipment replacement to include considerations for re-sizing to accommodate extreme heat event increases throughout the life of the building.

Describe all mechanical and non-mechanical strategies that will support building functionality and use during extended interruptions of utility services and infrastructure including proposed and future adaptations:

Emergency generator for life-safety and heating systems.

D - Extreme Precipitation Events

From 1958 to 2010, there was a 70 percent increase in the amount of precipitation that fell on the days with the heaviest precipitation. Currently, the 10-Year, 24-Hour Design Storm precipitation level is 5.25”. There is a significant probability that this will increase to at least 6” by the end of the century. Additionally, fewer, larger storms are likely to be accompanied by more frequent droughts.

D.1 – Extreme Precipitation - Design Conditions

10 Year, 24 Hour Design Storm:	*5.5 In.*

Describe all building and site measures for reducing storm water run-off:

Stormwater conveyance pipes within the building are being designed per the plumbing code. Stormwater from the building is collected through roof drains and directed into a stormwater retention tank. The tank has been sized to accommodate a volume equal to 1.25 inches over the building roof area. Water from the stormwater retention tank is directed into stormwater injection wells around the building perimeter. Stormwater from site runoff is collected by closed drainage systems and directed into subsurface retention systems.

D.2 - Extreme Precipitation - Adaptation Strategies

Describe how site and building systems will be adapted to efficiently accommodate future more significant rain events (e.g. rainwater harvesting, on-site storm water retention, bio swales, green roofs):

Retention system designed to hold a volume equal to 1.25 inches over the impervious area of the building and the site.

E – Sea Level Rise and Storms

Under any plausible greenhouse gas emissions scenario, sea levels in Boston will continue to rise throughout the century. This will increase the number of buildings in Boston susceptible to coastal flooding and the likely frequency of flooding for those already in the floodplain.

Is any portion of the site in a FEMA SFHA?	*Yes / **No***	What Zone:	A, AE, AH, AO, AR, A99, V, VE
		Current FEMA SFHA Zone Base Flood Elevation:	*Ft BCB*

Is any portion of the site in a BPDA Sea Level Rise - Flood Hazard Area? Use the online BPDA SLR-FHA Mapping Tool to assess the susceptibility of the project site.	*Yes / **No***

If you answered YES to either of the above questions, please complete the following questions.
Otherwise you have completed the questionnaire; thank you!

E.1 – Sea Level Rise and Storms – Design Conditions

Proposed projects should identify immediate and future adaptation strategies for managing the flooding scenario represented on the BPDA Sea Level Rise - Flood Hazard Area (SLR-FHA) map, which depicts a modeled 1% annual chance coastal flood event with 40 inches of sea level rise (SLR). Use the online BPDA SLR-FHA Mapping Tool to identify the highest Sea Level Rise - Base Flood Elevation for the site. The Sea Level Rise - Design Flood Elevation is determined by adding either 24" of freeboard for critical facilities and infrastructure and any ground floor residential units OR 12" of freeboard for other buildings and uses.

Sea Level Rise - Base Flood Elevation:	*Ft BCB*		
Sea Level Rise - Design Flood Elevation:	*Ft BCB*	First Floor Elevation:	*Ft BCB*
Site Elevations at Building:	*Ft BCB*	Accessible Route Elevation:	*Ft BCB*

Describe site design strategies for adapting to sea level rise including building access during flood events, elevated site areas, hard and soft barriers, wave / velocity breaks, storm water systems, utility services, etc.:

Describe how the proposed Building Design Flood Elevation will be achieved including dry / wet flood proofing, critical systems protection, utility service protection, temporary flood barriers, waste and drain water back flow prevention, etc.:

Describe how occupants might shelter in place during a flooding event including any emergency power, water, and waste water provisions and the expected availability of any such measures:

Describe any strategies that would support rapid recovery after a weather event:

E.2 – Sea Level Rise and Storms – Adaptation Strategies

Describe future site design and or infrastructure adaptation strategies for responding to sea level rise including future elevating of site areas and access routes, barriers, wave / velocity breaks, storm water systems, utility services, etc.:

Describe future building adaptation strategies for raising the Sea Level Rise Design Flood Elevation and further protecting critical systems, including permanent and temporary measures:

A pdf and word version of the Climate Resiliency Checklist is provided for informational use and off-line preparation of a project submission. NOTE: Project filings should be prepared and submitted using the online Climate Resiliency Checklist.

For questions or comments about this checklist or Climate Change best practices, please contact: John.Dalzell@boston.gov

Attachment B

ACCESSIBILITY CHECKLIST

Article 80 – Accessibility Checklist

A requirement of the Boston Planning & Development Agency (BPDA)
Article 80 Development Review Process

The Mayor's Commission for Persons with Disabilities strives to reduce architectural, procedural, attitudinal, and communication barriers that affect persons with disabilities in the City of Boston. In 2009, a Disability Advisory Board was appointed by the Mayor to work alongside the Commission in creating universal access throughout the city's built environment. The Disability Advisory Board is made up of 13 volunteer Boston residents with disabilities who have been tasked with representing the accessibility needs of their neighborhoods and increasing inclusion of people with disabilities.

In conformance with this directive, the BDPA has instituted this Accessibility Checklist as a tool to encourage developers to begin thinking about access and inclusion at the beginning of development projects, and strive to go beyond meeting only minimum MAAB / ADAAG compliance requirements. Instead, our goal is for developers to create ideal design for accessibility which will ensure that the built environment provides equitable experiences for all people, regardless of their abilities. As such, any project subject to Boston Zoning Article 80 Small or Large Project Review, including Institutional Master Plan modifications and updates, must complete this Accessibility Checklist thoroughly to provide specific detail about accessibility and inclusion, including descriptions, diagrams, and data.

For more information on compliance requirements, advancing best practices, and learning about progressive approaches to expand accessibility throughout Boston's built environment. Proponents are highly encouraged to meet with Commission staff, prior to filing.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
   http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Massachusetts State Building Code 780 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/csl/building-codebbrs.html
4. Massachusetts Office of Disability – Disabled Parking Regulations
   http://www.mass.gov/anf/docs/mod/hp-parking-regulations-summary-mod.pdf
5. MBTA Fixed Route Accessible Transit Stations
   http://www.mbta.com/riding_the_t/accessible_services/
6. City of Boston – Complete Street Guidelines
   http://bostoncompletestreets.org/
7. City of Boston – Mayor's Commission for Persons with Disabilities Advisory Board
   www.boston.gov/disability
8. City of Boston – Public Works Sidewalk Reconstruction Policy
   http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
9. City of Boston – Public Improvement Commission Sidewalk Café Policy
   http://www.cityofboston.gov/images_documents/Sidewalk_cafes_tcm3-1845.pdf

Glossary of Terms:

1. ***Accessible Route*** – A continuous and unobstructed path of travel that meets or exceeds the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 20
2. ***Accessible Group 2 Units*** – Residential units with additional floor space that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 9.4
3. ***Accessible Guestrooms*** – Guestrooms with additional floor space, that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 8.4
4. ***Inclusionary Development Policy (IDP)*** – Program run by the BPDA that preserves access to affordable housing opportunities, in the City. For more information visit: http://www.bostonplans.org/housing/overview
5. ***Public Improvement Commission (PIC)*** – The regulatory body in charge of managing the public right of way. For more information visit: https://www.boston.gov/pic
6. ***Visitability*** – A place's ability to be accessed and visited by persons with disabilities that cause functional limitations; where architectural barriers do not inhibit access to entrances/doors and bathrooms.

1. Project Information:

If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.

Project Name:	Boston University Data Sciences Center
Primary Project Address:	665 Commonwealth Avenue, Boston MA 02215
Total Number of Phases/Buildings:	1
Primary Contact (Name / Title / Company / Email / Phone):	Judith Kohn / Vice President / Fort Point Associates, Inc. / jkohn@fpa-inc.com / 617-357-7044 x211
Owner / Developer:	Trustees of Boston University
Architect:	KPMB Architects
Civil Engineer:	Nitsch Engineering, Inc.
Landscape Architect:	Richard Burck Associates, Inc.
Permitting:	Fort Point Associates, Inc.
Construction Management:	Suffolk Construction Company, Inc.

At what stage is the project at time of this questionnaire? Select below:

PNF / Expanded PNF Submitted	Draft / Final Project Impact Report Submitted	BPDA Board Approved
BPDA Design Approved	Under Construction	Construction Completed:

Do you anticipate filing for any variances with the Massachusetts Architectural Access Board (MAAB)? ***If yes,*** identify and explain.	The Project features a design element where study and social gathering areas will be located with elevator access to some, but not all the spaces. Variances may be sought for those spaces that are not on an accessible route and for providing handrails that do not interfere with the ability to access these areas.

2. Building Classification and Description:

This section identifies preliminary construction information about the project including size and uses.

What are the dimensions of the project? The podium floor plate is approximately 20,500 sf for five stories. The upper floor plates are approximately 14,000 sf for 14 stories.

Site Area:	42,000 *SF*	Building Area:	305,000 *GSF*
Building Height:	305 *FT.*	Number of Stories:	19 *Flrs Incl. 2 story penthouse.*
First Floor Elevation:	21.0' BCB	Is there below grade space:	***Yes*** */ No*

What is the Construction Type? (Select most appropriate type)

	Wood Frame	Masonry	**Steel Frame**	Concrete

What are the principal building uses? (IBC definitions are below – select all appropriate that apply)

	Residential – One - Three Unit	Residential - Multi-unit, Four +	**Institutional**	Educational
	Business	Mercantile	Factory	Hospitality
	Laboratory / Medical	Storage, Utility and Other		
List street-level uses of the building:	Institutional classroom and teaching spaces			

3. Assessment of Existing Infrastructure for Accessibility:

This section explores the proximity to accessible transit lines and institutions, such as (but not limited to) hospitals, elderly & disabled housing, and general neighborhood resources. Identify how the area surrounding the development is accessible for people with mobility impairments and analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports.

Provide a description of the neighborhood where this development is located and its identifying topographical characteristics:	The Project is located approximately 0.3 miles west of Kenmore Square within the Boston University Charles River Campus and the Fenway/Kenmore neighborhood of Boston. The neighborhood consists of several Boston University owned academic and research buildings along Commonwealth Avenue from Kenmore Square to the Boston University Bridge, including Sargent College to the east of the Site, Boston University Department of Archaeology and Department of History to the west, and Boston University Morse Auditorium, the existing physics and biology research laboratories, College of Communication, and the newly constructed Rajen Kilachand Center for Life Sciences and Engineering to the south. Boston University-owned townhouses are located along Bay State Road to the north of the Site. Two public open spaces and University-owned parking garages and lots are located within the immediate vicinity of the Site. A variety of shops and restaurants are located in the neighborhood and are accessible by foot, bicycle, and public transportation.

	The Project is located on flat terrain.
List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops:	The Project is served by four accessible MBTA transit lines located within a quarter-mile distance of the Site. The accessible MBTA transit lines and the proximity of the accessible stops/stations to the Project Site are listed below: *MBTA Green Line B Branch (Boston College to Park Street Station)*: Boston University East Station (accessible station) is located approximately within 300 feet of walking distance from the accessible entrance on the western side of the Data Sciences Center. *MBTA bus Routes 57 and 57A (run along the Commonwealth Avenue from Watertown Yard to Kenmore Station and from Oak Square to Kenmore Station, respectively)*: The closest outbound accessible stop (to Watertown Yard) is located at Commonwealth Avenue at Granby Street, and is within approximately 200 feet of walking distance from the accessible entrance on the western side of the Site. The closest inbound accessible stop (to Kenmore Square) is located at Commonwealth Avenue at Blandford Street and is approximately within 0.2 miles of walking distance from the accessible entrance on the eastern side of the Site. *MBTA Framingham/Worcester Commuter Rail Line*: Yawkey Station is the nearest accessible station from the Site, and it is within 0.6 miles walking distance from the accessible entrance on the eastern side of the Site.
List the surrounding institutions: hospitals, public housing, elderly and disabled housing developments, educational facilities, others:	The Site is located within the Boston University Charles River Campus and is surrounded by several Boston University academic buildings located along Commonwealth Avenue as mentioned above. Other institutions are located within 1 mile of driving distance and are listed below: *Public housing*: BHA Trustman Apartments (150 Amory Street, Brookline), *Elderly and disabled housing*: West Fenway Elderly Housing (110 Peterborough Street, Boston), and *Hospitals*: Beth Israel Deaconess Medical Center and HRI Hospital.
List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities:	There are no surrounding government buildings other than a limited number of non-profit Community Centers within approximately one mile of the Site. These include the Fenway Community Center and the Brookline Community Ctr- Arts.

4. Surrounding Site Conditions – Existing:

This section identifies current condition of the sidewalks and pedestrian ramps at the development site.

Is the development site within a historic district? *If yes,* identify which district:	Yes – Local district: Bay State Road Back Bay West Architectural Conservation District.
Are there sidewalks and pedestrian ramps existing at the development site? *If yes*, list the existing sidewalk and pedestrian ramp dimensions, slopes, materials, and physical condition at the development site:	There are existing concrete sidewalks and pedestrian ramps along Granby Street and Commonwealth Avenue. The sidewalks and ramps are all in good condition. Pedestrian Ramp 1 is used to cross Commonwealth Avenue. It has a detectable warning strip, is approximately 6' wide and 3' long, and has a longitudinal slope of 5.5% and cross slope of 1.1%. Pedestrian Ramp 2 is used to Cross Granby Street. It has a detectable warning strip, is approximately 5' wide and 10' long, and has a longitudinal slope of 4.7% and cross slope of 1.9%.
Are the sidewalks and pedestrian ramps existing-to-remain? ***If yes,*** have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? ***If yes,*** provide description and photos:	Sidewalks and pedestrian ramps will be removed and reconstructed to meet ADA/MAAB requirements if they are not compliant.
5. Surrounding Site Conditions – Proposed *This section identifies the proposed condition of the walkways and pedestrian ramps around the development site. Sidewalk width contributes to the degree of comfort 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. Wider sidewalks allow people to walk side by side and pass each other comfortably walking alone, walking in pairs, or using a wheelchair.*	
Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? ***If yes***, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard.	Commonwealth Avenue is classified as a Boulevard and Granby Street is classified as a Neighborhood Connector. The portion of Commonwealth Avenue adjacent to the site has existing trees that will be replaced, and the existing granite curb and brick pavers will be replaced to match existing. The sidewalk underwent significant alteration and improvement during Phase I of the Commonwealth Avenue Improvement Project, completed in 2010. This sidewalk presently meets Complete Streets Guidelines and is consistent with the Downtown Commercial street type. The Project will preserve the sidewalk where possible and reconstruct it to meet ADA/MAAB requirements where necessary. The portion of Granby Street adjacent to the Site does not currently have trees and consists of concrete sidewalks and brick pavers. The Project proposes for the existing concrete sidewalks and brick pavers to be replaced in kind. Along the east side of Granby Street, the Project includes an 8' wide

	median with 7 new trees and two 5' bike lanes on each side of the street. Approximately 12 new trees will also be added to the back of the sidewalk within the private site on the north side of the private passageway near the intersection of Bay State Road.
What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone:	Along Commonwealth Avenue, the dimensions of the sidewalk will match existing. From the curb, there is a 10'-5" wide Furnishing Zone, 16'-0" wide Pedestrian Zone, and a Frontage width of 26'-5". The cross slopes will be less than 2.0% and the longitudinal slopes will be less than 5.0%. Along Granby Street, there is no Furnishing Zone on the east side of the street, but there is a 34' wide Pedestrian Zone that is the same as the Frontage width. The cross slopes will be less than 2.0% and the longitudinal slopes will be less than five percent.
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?	Along Commonwealth Avenue, the Furnishing Zone is comprised of the existing planters, brick pavers, flush granite bands, bike racks, and benches and other pedestrian amenities. Reconstruction will strive to match existing conditions. The Pedestrian Zone includes a 14'-6" concrete sidewalk with tooled control joints and broom finish, as well as 1'-6" of brick pavers. The 1'-6" of brick pavers will be on private property. Along Granby Street, the Furnishing Zone will include permeable pavers, proposed street lights and street trees. The Pedestrian Zone includes 9'-6" of concrete sidewalk with tooled control joints and broom finish from the curb, with 24'-6" of brick pavers within the private property. To the south of the driveway, a portion of the concrete sidewalk area will have 2'-6" of brick pavers behind the curb where it currently exists and will extend into the area of the replaced curb cut. Proposed Furnishing and Pedestrian zones will be located within the City right-of-way.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	No
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	Not applicable.

Will any portion of the Project be going through the PIC? ***If yes,*** identify PIC actions and provide details.	The PIC actions will include specific repairs along Commonwealth Avenue and Granby Street.
6. 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 – Disabled Parking Regulations*.	
What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage?	The Project does not provide parking spaces at the Site.
What is the total number of accessible spaces provided at the development site? How many of these are "Van Accessible" spaces with an 8 foot access aisle?	The Project does not provide parking spaces at the Site. There will be no accessible spaces provided at the Site.
Will any on-street accessible parking spaces be required? ***If yes,*** has the proponent contacted the Commission for Persons with Disabilities regarding this need?	The Project does not require on-street accessible parking spaces. However, two on-street accessible parking spaces will be provided along Commonwealth Avenue near the Sargent College building to mitigate the loss of the existing spaces currently in the existing surface lot of the Site. The Proponent will contact the Commission for Persons with Disabilities during the PNF comment period.
Where is the accessible visitor parking located?	The Project proposes to provide two on-street accessible parking spaces along Commonwealth Avenue near the Sargent College building to mitigate the lost handicap parking spaces currently provided in the existing surface lot of the Site. Accessible parking is also available in nearby lots owned by the Proponent.
Has a drop-off area been identified? *If yes,* will it be accessible?	The Project does not include a drop-off area.
7. Circulation and Accessible Routes:	

The primary objective in designing smooth and continuous paths of travel is to create universal access to entryways and common spaces, which accommodates persons of all abilities and allows for visitability with neighbors.	
Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator:	The two main building entrances on the east and west sides will be flush. Secondary entrances on the north side of the building will be flush. One of these is the loading dock entrance, which leads to stairs and an elevated loading dock. Emergency egress doors will be flush even though these entrances lead to stairs.
Are the accessible entrances and standard entrance integrated? ***If yes,*** *describe.* ***If no,*** what is the reason?	Yes, the main entrances are flush conditions and are fully accessible.
If project is subject to Large Project Review/Institutional Master Plan, describe the accessible routes way-finding / signage package.	Accessible routes wayfinding signage packages will be developed during the Article 80 review process
8. Accessible Units (Group 2) and Guestrooms: (If applicable) *In order to facilitate access to housing and hospitality, this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing and hotel rooms.*	
What is the total number of proposed housing units or hotel rooms for the development?	
If a residential development, how many units are for sale? How many are for rent? What is the breakdown of market value units vs. IDP (Inclusionary Development Policy) units?	
If a residential development, how many accessible Group 2 units are being proposed?	
If a residential development, how many accessible Group 2 units will also be IDP units? ***If none***, describe reason.	
If a hospitality development, how many accessible units will feature a wheel-in shower? Will accessible	

equipment be provided as well? ***If yes,*** provide amount and location of equipment.	
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs / thresholds at entry, step to balcony, others. ***If yes,*** provide reason.	
Are there interior elevators, ramps or lifts located in the development for access around architectural barriers and/or to separate floors? ***If yes,*** describe:	
9. Community Impact: *Accessibility and inclusion extend past required compliance with building codes. Providing an overall scheme that allows full and equal participation of persons with disabilities makes the development an asset to the surrounding community*.	
Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or supporting other community-based initiatives?	The Project will not be funding or improving the surrounding neighborhood outside of the social gathering spaces and the accessible toilet rooms it will make available to the community.
What inclusion elements does this development provide for persons with disabilities in common social and open spaces? Example: Indoor seating and TVs in common rooms; outdoor seating and barbeque grills in yard. Will all of these spaces and features provide accessibility?	The building will provide lounges and toilet rooms intended as common-use areas for Boston University students. The University's urban campus means that the building's common use areas will also be accessible to members of the public. As such, the new Data Sciences building will create a public gathering space with accessible toilet rooms available to the public.
Are any restrooms planned in common public spaces? ***If yes,*** will any be single-stall, ADA compliant and designated as "Family"/ "Companion" restrooms? ***If no***, explain why not.	Accessible toilet rooms are planned in common public spaces. At least one gender neutral accessible toilet room will be serving the common public areas.

Has the proponent reviewed the proposed plan with the City of Boston Disability Commissioner or with their Architectural Access staff? ***If yes,*** did they approve? ***If no,*** what were their comments?	The Project has not been reviewed by the Disability Advisory Board. The Project is likely to require a variance, which will necessitate a review and approval by the Massachusetts Architectural Access Board.
Has the proponent presented the proposed plan to the Disability Advisory Board at one of their monthly meetings? Did the Advisory Board vote to support this project? ***If no,*** what recommendations did the Advisory Board give to make this project more accessible?	No. The Proponent plans to meet with the Advisory board during the Article 80 review process.

10. Attachments

Include a list of all documents you are submitting with this Checklist. This may include drawings, diagrams, photos, or any other material that describes the accessible and inclusive elements of this project.

Provide a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations, including route distances. See attached Parking Accessibility Diagram.
Provide a diagram of the accessible route connections through the site, including distances. See attached Site Accessibility Diagram.
Provide a diagram the accessible route to any roof decks or outdoor courtyard space? (if applicable)
Provide a plan and diagram of the accessible Group 2 units, including locations and route from accessible entry.
Provide any additional drawings, diagrams, photos, or any other material that describes the inclusive and accessible elements of this project.

This completes the Article 80 Accessibility Checklist required for your project. Prior to and during the review process, Commission staff are able to provide technical assistance and design review, in order to help achieve ideal accessibility and to ensure that all buildings, sidewalks, parks, and open spaces are usable and welcoming to Boston's diverse residents and visitors, including those with physical, sensory, and other disabilities.

For questions or comments about this checklist, or for more information on best practices for improving accessibility and inclusion, visit www.boston.gov/disability, or our office:

The Mayor's Commission for Persons with Disabilities
1 City Hall Square, Room 967,
Boston MA 02201.

Architectural Access staff can be reached at:

accessibility@boston.gov | patricia.mendez@boston.gov | sarah.leung@boston.gov | 617-635-3682

Attachment C

PRELIMINARY WIND STUDY

600 Southgate Drive
Guelph, ON N1G 4P6
Canada

Tel: +1.519.823.1311
Fax: +1.519.823.1316

August 17, 2018

Luigi LaRocca, Principal
KPMB Architects
322 King Street West, Third Floor
Toronto, Ontario M5V 1J2

Re: Preliminary Wind Study
Boston University – Math and Computational Sciences Building
Boston, MA
RWDI Project 1400479

Dear Luigi,

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by KPMB Architects to provide a Preliminary Wind assessment prior to conducting wind tunnel studies to assess the pedestrian wind conditions for the proposed Boston University – Math and Computational Sciences Building in Boston, MA.

The following discussions describe the potential pedestrian wind conditions on and around the proposed development based on our reviews of the local wind climate and the design information received by RWDI on July 31, 2018, combined with our engineering judgement and experience with wind tunnel tests for buildings in Boston area.

The proposed development consists of a 19-story tower on a 5-story podium on its east side. Main entrances are located at the southwest corner and on the east side of the development. Upper terraces are located at Levels 5, 7, 10, 12, 15 and 17.

The proposed development has several positive design features such as stepped facades and the podium, which will help to break down winds as they accelerate down the tall tower façades, recessed façade at grade level at the location of the entrances and the building overhang above them which protects them from the prevailing winds, and vestibules the entrances which provide an area for pedestrians to take shelter on windy days.

Appropriate wind conditions are expected at the east entrance, and most areas on sidewalks. Accelerated wind speeds and potentially uncomfortable conditions are expected at the sidewalks of Commonwealth Ave and Granby St. close to the northwest and southwest corners of the building. This is caused by acceleration of the prevailing northwesterly and southwesterly winds downwashing off of the tower façade and around the building corners. Wind speeds are also expected to be higher than desired at the southwest entrance as a result of these accelerated wind speeds. We recommend moving

this entrance further to the north along the west façade, away from the corner, if possible. Alternatively, a wind screen on both sides of the entrance can help to mitigate the conditions.

Wind speeds are expected to be higher than desired at the terraces, in particular at the ones at higher elevations due to exposure to higher wind speeds at those elevations. Any hard or soft landscaping elements in addition to tall parapets around the perimeter of these terraces are expected to help to improve the conditions. Calm conditions are expected at the sunken terrace at Level 17 as it is protected by the walls around it from the prevailing winds.

We trust this satisfies your current requirements. Quantitative pedestrian wind results will be provided following completion of the wind tunnel testing. Should you have any questions or require additional information, please do not hesitate to contact us.

Yours truly,

Saba Saneinejad, Ph.D.
Senior Technical Coordinator

Dan Bacon
Senior Project Manager / Associate

SUS/sep

Attachment D

BROADBAND READY BUILDINGS QUESTIONNAIRE

APPENDIX D: BROADBAND READY BUILDINGS QUESTIONNAIRE

The Broadband Ready Buildings Questionnaire was filed and is available in electronic copy.