



NOTICE OF PROJECT CHANGE

15 Necco Street

5 and 15 Necco Street, Boston MA 02210

SUBMITTED TO

Boston Redevelopment Authority
d/b/a Boston Planning & Development Agency

SUBMITTED BY

ARE-MA No. 74, LLC a joint venture between affiliates of Alexandria Real Estate Equities ("ARE") and National Development, and ARE-MA No. 72, LLC, an affiliate of ARE

PRODUCED BY



IN ASSOCIATION WITH

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November 5, 2019

Brian P. Golden, Director
Boston Planning & Development Agency
One City Hall, 9th Floor
Boston, MA 02201

**Re: Notice of Project Change
15 Necco Street
Boston, MA**

Dear Director Golden:

ARE-MA No. 74, LLC, a joint venture between affiliates of Alexandria Real Estate Equities ("ARE") and National Development, and ARE-MA No. 72, LLC, an affiliate of ARE (collectively, the "Proponent"), is pleased to submit the enclosed Notice of Project Change ("NPC") documenting the proposed changes to the project previously approved and known as the General Electric Company ("GE") Headquarters Project (the "GE Project"), located at 5 Necco Street and 15 Necco Street in the Fort Point neighborhood of South Boston. The GE Project was approved by the Boston Redevelopment Authority, d/b/a the Boston Planning & Development Agency ("BPDA") on November 1, 2016 pursuant to Article 80B of the Boston Zoning Code (the "Zoning Code"), and the GE Project as so approved is referred to below as the "previously approved project." The BPDA issued a Scoping Determination Waiving Further Review pursuant to Section 80B-5.3(d) of the Zoning Code on November 4, 2016, and on March 9, 2017, the BPDA issued a Partial Certification of Compliance and Consistency for the rehabilitation of the historic former Boston Wharf Company buildings located at 5 and 6 Necco Court and sometimes known as the "Brick Buildings."

The approximately 2.7-acre project site is located on the western side of Necco Street (a private roadway) and is bounded to the east by Necco Street, to the south by privately-owned land currently used for surface parking, to the west by the Fort Point Channel, and to the north by Necco Court, a private way (the "Project Site"). The Project Site was conveyed in May 2019, and ARE-MA No. 74, LLC is owner of the 15 Necco Street property, while ARE-MA No. 72 is the owner of the Brick Buildings (which are now known as 5 Necco Street).

The purpose of this NPC is to document the limited design and program modifications proposed to be made to the previously approved project that was presented and analyzed in the combined Expanded Project Notification Form/Expanded Environmental Notification Form submitted by GE to the BPDA in August 2016 (and simultaneously submitted to the MEPA Office). The previously approved project consisted of two key components which together, were to comprise the new GE global headquarters campus: (i) the rehabilitation of the Brick Buildings, as the first component; and (ii) the construction of a

new GE headquarters office building at 15 Necco Street (the "New Building"), as the second component. Each component was also to include related site, landscape and streetscape improvements.

The rehabilitation of the Brick Buildings is nearing completion, and GE has commenced its use of floors 2-6 as its corporate headquarters. That rehabilitation work has included the restoration to functionality of two historic pedestrian bridges which connect the two buildings and exist over Necco Court, respectively, as well as the construction of a rooftop addition and a connective addition between the Brick Buildings such that they now comprise the single building known as "5 Necco Street." The rehabilitation of the Brick Buildings has been accompanied by permanent improvements to the City's Harborwalk along the entire length of the Project Site.

The proposed changes to the previously approved project described and analyzed in this NPC relate to the New Building and related site/landscape improvements. Key modifications include:

- A shift in the proposed use of the New Building from a single-tenant corporate headquarters to a multi-tenant building with a mix of office, research and development and life sciences uses on the upper floors, with more active Facilities of Public Accommodation uses (e.g., retail and/or restaurant uses) on the ground floor;
- Improved pedestrian connectivity, including a pedestrian corridor through the New Building to enhance access to new open spaces to be constructed by others south of the New Building (which open space areas are currently the subject of a BPDA-commissioned design process as part of the 100 Acres Master Plan);
- Increased transparency, porosity, and permeability throughout the Proposed Project through the creation of additional building entrances and connections between the active ground floor uses and surrounding landscaped/open space areas;
- Enhancing the use of Necco Street as the primary arrival experience for the New Building by proposing new public entrances at the southeast and southwest corners of the building;
- Eliminating the previously-proposed elevated pedestrian bridge connecting 5 Necco Street and the New Building at the sixth floor that was intended to facilitate creation of a corporate campus; and
- Eliminating the previously-proposed large building canopy over the pedestrian walkway that will run between 5 Necco Street and New Building, thereby creating approximately 6,745 square feet more open space available to the public than was proposed for the previously approved project.

At a proposed height of approximately 173 feet, the New Building will comply with the 180-foot height limitation established for the Project Site under the existing Planned Development Area Development Plan and the 100 Acres Planned Development Area Master Plan No. 69, as discussed in the NPC.

This NPC contains a detailed project change description; an update on the Project's urban design elements; analysis of traffic and transportation impacts; and assessments of the Project's anticipated environmental impacts.

Director Brian P. Golden
November 5, 2019
Page 3

We look forward to working with you and your staff during your review of this proposed project change. If you have any questions or if any additional information would be helpful, please do not hesitate to contact me.

Thank you.

Very truly yours,



Sherry Clancy, Vice President
National Development

cc: Jonathan Greeley
Aisling Kerr
Thomas Andrews, Alexandria Real Estate Equities
Rebecca A. Lee, Esq., Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.

Notice of Project Change

15 Necco Street

Boston, Massachusetts

SUBMITTED TO

Boston Planning & Development Agency
One City Hall, Ninth Floor
Boston, MA 02201

PREPARED FOR

ARE-MA No. 74, LLC and ARE-MA No. 72, LLC
c/o National Development
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November, 2019

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Project Change Description

In accordance with Article 80B of the Boston Zoning Code (the “Zoning Code”), this Notice of Project Change (“NPC”) is being submitted by ARE-MA No. 74, LLC a joint venture between affiliates of Alexandria Real Estate Equities (“ARE”) and National Development, and ARE-MA No. 72, LLC, an affiliate of ARE (collectively, the “Proponent”), to describe the proposed changes to the project previously approved and known as the General Electric Company (“GE”) Corporate Headquarters Project (the “GE Project”), located at 5 Necco Street and 15 Necco Street in the Fort Point neighborhood of South Boston. The GE Project was approved by the Boston Redevelopment Authority, d/b/a the Boston Planning & Development Agency (“BPDA”) on November 1, 2016 pursuant to Article 80B of the Zoning Code, and the GE Project as so approved is sometimes referred to herein as the “previously approved project.”

The approximately 2.7-acre development site is located on Necco Street (a private roadway) and is bounded to the east by Necco Street, to the south by privately-owned land currently used for surface parking, to the west by the Fort Point Channel, and to the north by Necco Court, a private way (the “Project Site”). (Please refer to Figures 1.1 and 1.2 for the site locus and context maps, respectively.)

The purpose of this NPC is to document the limited design and program modifications proposed to be made to the previously approved project that was presented and analyzed in the combined Expanded Environmental Notification Form (“EENF”)/Expanded Project Notification Form (“EPNF”) submitted by GE to the BPDA in August 2016 (and simultaneously submitted to the MEPA Office). The previously approved project consisted of two key components which together, were to comprise the new GE global headquarters campus: (i) the rehabilitation of the historic former Boston Wharf Company buildings at 5 and 6 Necco Court (the “Brick Buildings”), as the first component; and (ii) the construction of a new GE headquarters office building at 15 Necco Street (the “New Building”), as the second component. Each component was also to include related site, landscape and streetscape improvements.

The rehabilitation of the Brick Buildings, which have been joined by a connective addition and enlarged by a rooftop addition, now comprise a single building known as “5 Necco Street.” The rehabilitation of 5 Necco Street is nearing completion and GE has commenced its use of the upper floors of the building for its headquarters offices under a lease with the Proponent.¹ The proposed changes to the previously approved project described and analyzed in this NPC relate to the New Building and related site/landscape improvements. Key modifications include:

- › A shift in proposed use from a single-tenant corporate headquarters to a multi-tenant building with a mix of office, research and development and life sciences uses on the

¹ The Proponent purchased the Project Site in May 2019.

upper floors, with more active Facilities of Public Accommodation uses (e.g., retail and/or restaurant uses) on the ground floor of the New Building;

- › Improved pedestrian connectivity, including a pedestrian corridor through the New Building to enhance access to new open spaces to be constructed by others south of the New Building (which open space areas are currently the subject of a BPDA-commissioned design process as part of the 100 Acres Master Plan);
- › Increased transparency, porosity, and permeability throughout the Proposed Project through the creation of additional building entrances and connections between the active ground floor uses and surrounding landscape/open space;
- › Enhancing the use of Necco Street as the primary arrival experience for the New Building by proposing new public entrances at the southeast and southwest corners of the building;
- › Eliminating the previously-proposed elevated pedestrian bridge connecting 5 Necco Street and the New Building at the sixth floor that was intended to facilitate creation of a corporate campus; and
- › Eliminating the previously-proposed large building canopy over the pedestrian walkway that will run between 5 Necco Street and the New Building thereby creating 6,745 square feet ("SF") of additional open space than was proposed in the previously approved project.

At a proposed height of approximately 173 feet, the New Building will comply with the 180-foot height limitation established for the Project Site under the existing zoning regulations, as discussed below.

The following chapter describes the existing site conditions and status of the build-out of those portions of the previously approved project that were advanced by GE. It also describes and compares the changes to the new construction portion of the previously approved project proposed by the Proponent and presents an updated project schedule and a summary of public benefits associated with the Proposed Project. A discussion of the anticipated regulatory controls, permits, and approvals, and community outreach and agency coordination activities conducted for the Proposed Project also follows.

1.1 Existing Conditions and Project Site Update

The Project Site is located within the Fort Point neighborhood of South Boston and is comprised of two rehabilitated historic brick buildings now known as 5 Necco Street, a surface parking lot currently being used for construction staging, and a portion of the City's Harborwalk. The Project Site is shown on the plan included as Figure 1.2, and Figure 1.3 shows photographs of existing conditions at the Project Site.

As the initial phase of the previously approved project, the Brick Buildings have been combined, connected by a new addition, expanded through a rooftop addition, and rehabilitated by GE. GE is currently leasing floors 2-6 as their corporate headquarters and has commenced its occupancy of that space. The ground floor area of 5 Necco Street will consist of the office lobby for 5 Necco Street, as well as two spaces that are being marketed to

retail/restaurant tenants that will operate Facilities of Public Accommodation ("FPA")², as defined by M.G.L. Chapter 91 ("Ch. 91") regulations.

The former surface parking lot on the southern portion of the Project Site is currently being used as a construction staging area for the 5 Necco Street renovation and is the site of the proposed New Building. The footprint of the New Building will conform substantially to the footprint of new building planned for the previously approved project.

The shoreline of the Project Site consists of a stone seawall bordered by a portion of the Harborwalk and an existing public boat dock. In connection with the Brick Building renovations, the Harborwalk has been reconstructed to meet the width envisioned by the South Boston Waterfront District Municipal Harbor Plan Amendment dated May 2009 (the "South Boston MHP"), and water and electricity infrastructure has been installed to support public programming at the Project Site.

In connection with the City of Boston approvals of the previously-approved project, GE committed to a range of mitigation measures, some of which, like the widening and reconstruction of the Harborwalk have been substantially completed. The completed Harborwalk improvements will be segregated from the construction site of the New Building, thereby making them available to the public throughout the construction of the New Building as much as feasible. The Proponent anticipates seeking a partial Certificate of Compliance in November 2019 for the improvements associated with 5 Necco Street in the January 2017 Order of Conditions.

Additional landscape improvements associated with the New Building site will be undertaken by the Proponent as part of the development of the Proposed Project. Please refer to Figures 2.7 and 2.8a-c of Chapter 2, *Urban Design*, for a depiction of the landscape and public realm improvements to be delivered with the Proposed Project. Please also refer to [Appendix B](#) for a summary of the mitigation measures and public benefits associated with the previously approved project and their completion status.

The entire Project Site was acquired by the Proponent on May 8, 2019. Please see Section 1.9 below for additional details on the ownership and legal context of the Project Site.

1.2 City and State Review History and Status

1.2.1 Article 80B and Article 80C Review

On August 1, 2016, GE submitted a combined Expanded Environmental Notification Form and Expanded Project Notification Form to the BPDA and the MEPA office, respectively (the "EENF/EPNF"). On the same day, GE submitted the "Development Plan for General Electric Company Headquarters Campus, South Boston, Massachusetts within Planned Development Area No. 69, South Boston/The 100 Acres" (the "Original PDA Development Plan") and a Third

² Facilities of Public Accommodation are qualified under the State's Waterways Regulations (Ch. 91) where goods and services are regularly available to the public on equal terms. Examples of FPAs include restaurants, performance areas, hotels, retail spaces, and educational and cultural institutions.

Amendment to the Master Plan for Planned Development Area No. 69, South Boston/The 100 Acres" (the "PDA Master Plan"), each pursuant to the provisions of Article 80C and Section 3-1A of the Zoning Code. On November 1, 2016, the BPDA Board voted to approve the GE Project pursuant to Article 80B of the Zoning Code and in connection therewith, to authorize the issuance of a Scoping Determination waiving further review pursuant to Section 80B-5.3(d) of the Zoning Code. In addition, the BPDA Board also voted to petition the Boston Zoning Commission ("Zoning Commission") for approval of the Original PDA Development Plan and the Third Amendment to the PDA Master Plan. The Original Development Plan and the Third Amendment to the PDA Master Plan were approved by the Zoning Commission on November 16, 2018 and became effective on November 18, 2018.

The BPDA issued a Scoping Determination Waiving Further Review for the GE Project pursuant to Section 80B-5.3(d) of the Zoning Code on November 4, 2016, and on March 9, 2017, the BPDA issued a Partial Certification of Compliance and Consistency for the rehabilitation of the historic former Boston Wharf Company Brick Buildings. The Inspectional Services Department subsequently issued a building permit allowing the rehabilitation of the Brick Buildings to proceed.

1.2.2 Massachusetts Environmental Policy Act Review

On August 1, 2016, GE submitted the EENF/EPNF with a request for a Phase 1 Waiver, together with a request for approval to file a Single Environmental Impact Report ("SEIR") for the GE Project. On October 5, 2016, the Secretary of Energy and Environmental Affairs ("EOEEA") issued a Certificate on the EENF approving the submission of an SEIR, as well as a Draft Record of Decision ("ROD") granting a Phase 1 Waiver, both of which were noticed for public review in the State's Environmental Monitor the same day. The Final ROD granting the Phase 1 Waiver was issued on October 21, 2016. On December 15, 2016, the Proponent submitted an SEIR responsive to the scope thereof requested in the Secretary's Certificate on the EENF. On January 27, 2017, the Secretary of EOEEA issued a Certificate on the SEIR determining that the GE Project adequately and properly complied with MEPA and its implementing regulations.

The Proponent is filing a Notice of Project Change under MEPA for the Proposed Project concurrently with the filing of this NPC to address the proposed changes in the use of the New Building and certain landscape improvements, and related to the Proponent's proposed amendment of the existing M.G.L. Ch. 91 License for the previously approved project with a consolidated written determination in the Proposed Project and special Chapter 91 license in the 5 Necco Street and 15 Necco Street projects.

1.2.3 Chapter 91 Licensing

MassDEP issued a nonwater-dependent use license (MassDEP License No. 14385; the "License") based on the previously approved project on April 19, 2017. The previously approved project complied with the Ch. 91 regulations as modified by the South Boston MHP and authorized the rehabilitation of the Brick Buildings with a connecting atrium between the two buildings and a rooftop addition; the construction of a new 12-story office building with a

pedestrian bridge connecting to the Brick Buildings; open space areas available for the public's use; a large building canopy on the new headquarters building; a widened and reconstructed Harborwalk along the Fort Point Channel; public amenities (such as public restrooms on the ground floor of the headquarters building); and streetscape improvements along Necco Street. Proposed ground FPAs at 5 Necco Street and the new GE headquarters building were detailed in the License (e.g., GE Museum).

The Proponent is seeking a Consolidated Written Determination ("CWD") to enable the issuance of separate Ch. 91 licenses for the 5 Necco Street and 15 Necco Street properties, and the two open space parcels, thereby facilitating future separation of ownership and financing for the two structures and their associated open space. Together, the open spaces, FPA, water-dependent use zone ("WDUZ"), and building heights at the Project Site will continue to comply with the dimensional and use standards established pursuant to the Ch. 91 regulations as modified by the South Boston MHP.

1.3 Project Change Description

The following section summarizes the proposed modifications to the New Building component of the previously approved project. Figure 1.4 presents the previously approved project site plan. The previously approved project was contemplated to include GE occupancy in both 5 Necco Street and the new office building at 15 Necco Street; GE will now occupy office space only at 5 Necco Street. The Proponent proposes the construction of a new, 12-story, approximately 316,000-square foot ("SF") multi-tenant office/life sciences/research and development building with active ground floor uses, such as retail and restaurant spaces within the southern portion of the Project Site (15 Necco Street). Because of the Project Site's proximity to public transit and nearby public parking facilities, the New Building will not include any underground parking. (Please refer to Figure 1.5 for the proposed site plan for the Proposed Project.)

The New Building, together with its related site, streetscape, and landscape improvements, will be substantially similar in location to that designed for the previously approved project. While the footprint of the New Building will conform substantially to the footprint of the new building planned for the previously approved project, the key difference is that the New Building has a new architectural design and will be a multi-tenant building with active ground floor retail/restaurant tenants (additional more traditional FPAs than previously proposed) and a north-south pedestrian corridor through the building to facilitate pedestrian connectivity in the area. The redesign of the New Building as a multi-tenant office/life sciences/research and development building will encourage and allow for more engagement with the public and the Harborwalk alongside the Fort Point Channel. Section 2.3.2 of Chapter 2, *Urban Design*, provides additional detail on the pedestrian access and circulation improvements proposed.

Compared to the previously approved project, the Proposed Project will result in a substantial increase of 6,745 SF of open space accessible to the public, which is due mainly to the removal of the previously proposed large building canopy over the pedestrian plaza area that will run between the 5 Necco Street and 15 Necco Street buildings.

The Proposed Project is highly responsive to the vision and planning goals established in the PDA Master Plan and will comply with the 180-foot height limitation established for the New Building.

1.3.1 Proposed Development Program Comparison

Table 1-1 below presents a summary of the New Building's development program as compared to the previously approved project. The Proponent does not propose any changes to the recently rehabilitated 5 Necco Street structure; GE has begun occupying the upper floors of that building as its headquarters space. At least 75% of the ground floor areas of both 5 Necco Street and 15 Necco Street will constitute public uses, as required under M.G.L. Ch. 91 regulations. Potential ground floor uses may include cafe/restaurant, retail, gym, lobby gathering space, gallery space and public restrooms. The ground floor uses associated with the GE Project included museum space, community work lounge, and coffee bar/café. The New Building includes an approximately 60/40 life science/office use split compared to the entirely corporate office use proposed for the GE Project.

Table 1-1 Development Program Comparison for the New Building

Use/Element	Previously Approved Project	Project Change	Change
Project Site (Square Feet)	115,855 SF (2.7 acres)	115,855 sf (2.7 acres)	No Change
Building Height (Feet) to top of highest occupiable	173 ft. (12 stories)	173 ft. (12 stories)	No Change
Building Footprint (Square Feet)	23,250 SF	24,055 SF	+805 SF
<u>Building Uses</u> (Square Feet)			
Office/Life Sciences	277,000 SF	295,100 SF	+18,100 SF
Ground Floor Facilities of Public Accommodation	<u>17,500 SF</u>	<u>18,150 SF</u>	<u>+650 SF</u>
Total (Gross Floor Area)	293,300 GFA	316,100 GFA	+22,800 GFA
Parking	30 spaces	0 spaces	(-30 spaces)

1.3.2 Proposed Building Design Modifications

Figures 1.4 and 1.5 presents a side-by-side comparison of the previously approved project and Project ground floor plans. The new architectural design for the New Building responds to the anticipated multi-tenanted office and life science, research and development, retail and restaurant uses, and includes indoor spaces that will welcome the public, as well as a roof terrace amenity for building tenants. The New Building will have two main entryways on its northern and southern facades, in order to create a new, accessible and weather protected north-south pedestrian corridor through the building to facilitate pedestrian connectivity in the area, and providing new, accessible connections to the future open space area to the south of the Project Site (Figure 1.6). The new building entrance on Necco Street

at the southeast corner of the New Building will be created by shifting the building service and loading area north, allowing for active ground floor uses at both corners of the building along its eastern edge.

The previously approved project was contemplated as a corporate headquarters campus and, therefore, some design elements have been eliminated from the building design, including:

- › The large building canopy over the pedestrian walkway that ran between the Brick Buildings and the new building;
- › The elevated pedestrian bridge connecting 5 Necco Street and the New Building at the sixth floor; and
- › A below-grade 30-space parking area.

The proposed New Building will be a multi-tenant space and no longer requires these connections across the two structures, thus allowing the creation of 6,745 SF of additional open space accessible to the public between the New Building and 5 Necco Street. The elimination of these elements allows for additional tree plantings and landscaping and associated active uses such as outdoor dining, promoting views of the sky and allowing for clear sightlines from the east to the Fort Point Channel and beyond. The below-grade parking area is no longer required; however, below grade space will have covered bicycle parking.

1.3.3 Proposed Site Design Modifications

The proposed site design reflects the Harborwalk, streetscape features, resiliency measures, sustainability goals, and stormwater management systems as previously permitted, and improves on the landscape and public realm features for public enjoyment. The site design modifications include an additional seating area for outdoor dining facing the Fort Point Channel, and creates new connections from the New Building to the newly-constructed Harborwalk along the Fort Point Channel, as well as to the future open space area to the south contemplated in the BPDA's "Fort Point District 100 Acres Master Plan" (2006) and the PDA Master Plan. Please refer to Chapter 2, *Urban Design*, for additional details on the building's architecture and the proposed public realm improvements.

1.4 Anticipated Project Schedule

- › Final completion of 5 Necco Street - Q1 2020;
- › Construction commencement of 15 Necco Street – Q3 2020;
- › Substantial completion of 15 Necco Street (core/shell) – Q4 2022; and
- › Tenant Fit-out work at 15 Necco Street – Market-dependent; likely commencing – Q1 2023.

1.5 Summary of Public Benefits

The rehabilitation of the Brick Buildings, including the restoration of the historic pedestrian bridge over Necco Court, is nearly completed, and is expected to be completed by year end, exclusive of tenant-fit work in the ground floor spaces. This rehabilitation work has been undertaken consistent with the U.S. Secretary of the Interior's Standards and Guidelines for the Rehabilitation of Historic Structures, as approved by the Fort Point Landmark District Commission.

The previously approved project anticipated a range of public benefits, as summarized below, some of which have been achieved and some of which will be delivered in concert with the development of the New Building. These public benefits include vastly improved public access to the Fort Point Channel, the creation of open space on what had been previously designated as a development parcel under the BPDA's 100 Acres Master Plan (Parcel G1), and 6,745 SF of addition open space area than was proposed in the previously approved project.

Public Use and Enjoyment

- › The Proposed Project will provide a total of approximately 60,000 SF of publicly accessible open space, including an enhanced and inviting Harborwalk, civic plaza for public gatherings, passive lawn spaces, and waterfront overlooks. This represents an increase of 6,745 SF of open space over the 52,966 SF of open space included in the previously approved project.
- › The Proposed Project will transform the Project Site into a new meaningful destination on the City's Harborwalk, attracting a broad range of visitors, day and night, year-round.
- › The New Building will be a multi-tenant building with active uses occupying at least 75 percent of the New Building ground floor as Facilities of Public Accommodation, which may include cafes/restaurants, retail shops, gym, lobby gathering space and/or gallery space. The New Building will also include ground floor restrooms for the public.
- › The Proposed Project will provide substantial public benefits and is protective of the Public Trust rights inherent in filled tidelands. It will significantly enhance public access to and use of the waterfront at the Project Site.

Building and Urban Design/Public Realm

- › The Proposed Project will provide iconic architecture that marks the western entrance to the 100 Acres area and creates a connection between the Project Site and the future park to be created by others to the south.
- › The rehabilitation of 5 Necco Street and the construction of 15 Necco Street will collectively result in the elimination of approximately 203 existing surface parking spaces.
- › The Proposed Project will include the construction of new sidewalks where they did not previously exist, the reconstruction of sidewalks at the Project Site to be universally accessible, and the installation of new lighting to enhance the area's attractiveness and sense of safety for pedestrians.

- › The Proposed Project will provide increased transparency, porosity, and permeability throughout the Project Site where possible; the New Building will contain north-south pedestrian corridor that will enable pedestrians to circulate freely through the building and to surrounding landscape/open spaces, including a new park area to be constructed by others south of the New Building.
- › The New Building will include a more welcoming and active, multi-tenanted ground floor than the previously approved project, with retail and restaurant tenants that enhances a very open and civic approach to the Project Site.
- › The pedestrian bridge previously contemplated to connect GE facilities in the new headquarters building and 15 Necco Street will not be constructed as part of the Proposed Project, and the New Building will not include a large building canopy to its west, thus creating more open space available for the public's active use, such as outdoor dining.
- › The Proposed Project will eliminate underground parking, which will provide more opportunity for landscape plantings at outdoor seating terrace, and on the west side of the building.

Environment/Sustainability

Sustainable and high-performance building strategies are at the core of the design for the New Building. The strategies which result in public benefits are summarized below, grouped into the categories of energy conservation, water conservation, and site location and design.

Energy Conservation/GHG Emissions Reductions

- › Achieving an estimated 25.3 percent reduction in stationary source CO₂ emissions for the New Building by reducing overall energy consumption by approximately 35.6 percent through the incorporation of Energy Conservation Measures ("ECMs") and energy-efficient design strategies, such as high-efficiency heating and cooling systems, a geothermal heat pump system and lighting systems.
- › Achieving an Energy Use Intensity ("EUI") target of 119 for the New Building by using:
 - Heat recovery chillers connected to a ground-source bore field, supplemented with gas-fired boilers due to site constraints;
 - Fixed exterior shades;
 - 15 percent reduction in lighting power density below the existing base code requirements;
 - Energy recovery system with free reheat coils;
 - Condensing gas-fired boilers; and
 - Premium efficiency water-cooled chiller plant.
- › Incorporating a 120 to 230-kW solar photovoltaic ("PV") array, producing between 138,000 to 211,000 kWh of electricity annually, equivalent to one to two percent of total building electricity consumption.
- › Purchasing Renewable Energy Credits ("RECs") to cover the extent of annual electricity consumption

Water Conservation

- › High-efficiency plumbing fixtures, WaterSense appliances and roof rainwater capture/reuse will contribute to a reduction in potable water demand for the New Building of over 35 percent compared to the existing Building Code baseline requirement. Native and salt-water tolerant plantings will reduce potable water demand for the landscape features.
- › Further reduction of potable water use for HVA makeup water and site irrigation through use of a rainwater harvesting system.
- › Further reduction in potable water use for site irrigation compared to a conventional irrigation system through the incorporation of an advanced irrigation system and the use of native/adaptive landscaping.

Site Location & Design

- › Emphasis on walkability and bikeability and proximity to multiple public transportation options will further reduce the Project's environmental impact.
- › The New Building will provide up to 100 secure and short-term bicycle parking spaces. The exact ratio of interior covered/secured bicycle spaces within the building and outdoor/public bike racks around the New Building will be defined as design advances, but the bicycle parking accommodations at the Project Site will conform to the City of Boston's Bicycle Parking Guidelines.
- › The 30 below-grade parking spaces that were a part of the previously approved project are not part of the program for the new Building.
- › The Proponent will encourage its tenants to incentivize their employees and visitors to rely on alternative modes of transportation to help reduce traffic in the Fort Point area through implementation of a substantial Transportation Demand Management Plan (TDM) plan, including encouraging on-site tenants to become a member of the Seaport Transportation Management Association.³
- › New/upgraded stormwater management and treatment systems on-site will improve water quality, reduce runoff volume, and control peak rates of runoff in comparison to existing conditions. This system will include landscape features that will recharge the local groundwater table, making it more resilient to saltwater inundation from coastal flooding.
- › Green or vegetated roof areas will be utilized where feasible to further mitigate stormwater surcharge while reducing heat island effects.
- › The Proposed Project includes a landscape design that promotes native plant material, permeability, accessibility and resiliency.
- › Outdoor lighting will be designed to minimize light pollution through the incorporation of "Dark Sky" strategies.

³ The Seaport Transportation Management Association is a nonprofit transportation management association in the South Boston Waterfront working to improve economic vitality in the area by supporting sustainable commuter options through advocacy and commuter services.

Resiliency

- › Potential impacts associated with predicted sea level rise, and increased frequency and intensity of storm events, as well as the need for a flexible building space have been considered through the following design strategies. As with the previously approved project, the Project will continue to incorporate those resilient design elements to which the previously approved project committed.
- › The design will provide protection to the Project relative to the Federal Emergency Management Agency 100-year and 500-year floodplain limits through site grading and landscaping.
 - By raising the Project Site grade so that the finished floor elevation for 5 Necco Street and the New Building is at 19.5 feet BCB, the Project will be resilient to extreme storm events, and takes into consideration sea level rise scenarios over the lifetime of the Project.
- › Additional site and building resilient measures include:
 - Placing critical mechanical and life safety/standby emergency building systems outside of vulnerable elevations (the 100-year floodplain with 2.47 feet of sea level rise);
 - Providing oversized stormwater conveyance infrastructure to remove stormwater effectively from the Project Site;
 - Providing an overland drainage path around the buildings and elevated pedestrian areas in case of inland flooding;
 - Designing flexible heating and cooling systems;
 - Using native/adaptive landscape, such as tidal zone planting materials that will connect to the history of the area and be resilient against flooding and saltwater intrusion; and
 - Using landscaping walls, walkways, stairways, railings, benches and bike racks which utilize materials that can withstand saltwater inundation.
 - Using modular site walls that can be raised as needed to provide building protection from sea level rise.

1.6 Regulatory Context

1.6.1 Anticipated Permits and Approvals

Table 1-2 below provides a comprehensive list of approvals and/or permits anticipated to be required for the Proposed Project.

Table 1-2 Anticipated Permits and Approvals

Agency	Permit/Approval
City of Boston	
Boston Planning & Development Agency	<ul style="list-style-type: none"> › Article 80 Notice of Project Change › Approval of Amended and Restated PDA Development Plan and Fifth Amendment to PDA Master Plan No. 69 › Amended and Restated Cooperation Agreement › Amended and Restated Development Impact Project Agreement › Boston Residents Construction Employment Plan – 15 Necco Street
Boston Civic Design Commission	› Design Review
Boston Zoning Commission	› Approval of Amended and Restated PDA Development Plan and Fifth Amendment to PDA Master Plan No. 69
Boston Transportation Department	<ul style="list-style-type: none"> › Amended and Restated Transportation Access Plan Agreement › Construction Management Plan
Boston Water and Sewer Commission	<ul style="list-style-type: none"> › Site Plan Amendment Approval › Temporary Construction Dewatering Permit › Cross Connection/Backflow Prevention Approval › Storm Drainage Modification Approval
Interagency Green Building Committee	› Article 37 Compliance/BPDA Climate Checklist
Boston Conservation Commission	<ul style="list-style-type: none"> › Extensions to existing Orders of Conditions › Amendment to Order of Conditions
Boston Fire Department	› Permit for Storage of Flammables
Inspectional Services Department	<ul style="list-style-type: none"> › Building permit – 15 Necco Street › Occupancy permit – 15 Necco Street
Commonwealth of Massachusetts	
Massachusetts Environmental Policy Act	› Notice of Project Change
Massachusetts Historical Commission	› Determination of No Adverse Effect
DEP Waterways Program	<ul style="list-style-type: none"> › Consolidated Written Determination › Ch. 91 Licenses – 5 Necco Street and 15 Necco Street
Massachusetts Department of Environmental Protection (DEP)	› Notification of Commencement of Construction
Federal	
Federal Aviation Administration	› Determination of no hazard to air navigation (building and cranes)
Environmental Protection Agency	<ul style="list-style-type: none"> › Notice of Intent – Construction General Permit › Notice of Intent – Remediation General Permit

Note: This list is subject to change based upon the evolution of the Project's design. In addition, future ground floor retail/restaurant signage and/or canopies at 5 Necco Street will require approval of the Fort Point Channel Landmark District Commission.

1.6.2 City of Boston Zoning

The Project Site is governed by two zoning documents approved by the BPDA and adopted by the Boston Zoning Commission: (i) the “Development Plan for General Electric Company Headquarters Campus, South Boston, Massachusetts within Planned Development Area No. 69, South Boston/The 100 Acres” dated November 1, 2016 and effective November 18, 2016, as amended by a First Amendment thereto dated February 8, 2018 and effective February 12, 2018 (as so amended, and as may be further amended as discussed herein, the “PDA Development Plan”), and (ii) the “Boston Redevelopment Authority Master Plan for Planned Development Area No. 69, South Boston/The 100 Acres” dated January 10, 2007 and effective January 10, 2007, as amended by a First Amendment thereto dated June 12, 2012, effective July 12, 2012; a Second Amendment thereto dated June 13, 2013, effective July 10, 2013; a Third Amendment thereto dated November 1, 2016, effective November 18, 2016 (related to the Project Site); and a Fourth Amendment thereto dated February 8, 2018 and effective March 12, 2018 (related to the Project Site) (as so amended, and as may be further amended as discussed herein, the “PDA Master Plan”).

The PDA Development Plan and the PDA Master Plan set forth the permitted uses, maximum density (floor area ratio), maximum building heights, and other development regulations for the Project Site, including the previously-mentioned open space designation for the parcels within the Project Site known as HW2 and FT1-A under the PDA Master Plan. The two PDA Plans were deliberately designed to be specific to the previously approved project and its planned operation as a corporate headquarters campus, with facilities unique to GE such as the proposed “Brilliant Lab” and a museum highlighting GE’s storied industrial history.

By contrast, the Project Site is now proposed to contain two discrete buildings housing multiple tenants, separately owned and financed, with the New Building to comprise a multi-tenant office/life sciences/research and development building with restaurant, retail and similar facilities of public accommodation on its ground floor. The New Building has a different architect as well as a different architectural design (including the previously-discussed pedestrian corridor through its ground floor), and the New Building will not contain any underground parking. In order to synchronize the zoning controls for the Project Site with the Proposed Project, the Proponent is filing with the BPDA contemporaneously with this NPC, an Amended and Restated Development Plan for the Project Site and a Fifth Amendment to the PDA Master Plan to reflect the Proposed Project. None of the key regulatory parameters for the Project Site set forth in the existing PDA Development Plan and the existing PDA Master Plan are proposed to be changed – *e.g.*, the maximum building height or building density – rather, the amended PDA Plans will reflect the deletion of GE-specific uses and features (such as the connecting pedestrian bridge between 5 and 15 Necco Street and the large building canopy at 15 Necco Street), and the substitution of parameters specific to the Proposed Project.

1.7 Community Outreach Summary

In the time period between its acquisition of the Project Site and the filing of this NPC, the Proponent has attended numerous meetings and has undertaken outreach to city and state

agencies, local elected officials and representatives of numerous community groups and organizations. Table 1-3 highlights Project-related community and neighborhood outreach activities undertaken by the Proponent since the Project Site was acquired.

Table 1-3 Agency and Community Outreach Meetings

Date	Meeting
May 14, 2019	Boston Water and Sewer Commission
May 31, 2019	MassDEP Waterways Program
June 6, 2019	Boston Inspectional Services Department
June 20, 2019	Boston Green Ribbon Commission Staff
June 27, 2019	Boston Green Ribbon Commission Staff
June 27, 2019	Boston Conservation Commission
July 30, 2019	Fort Point Neighborhood Association
August 22, 2019	MassDEP Waterways Program
September 4, 2019	BPDA staff
September 6, 2019	Trustees of Reservation
September 16, 2019	South Boston elected officials
September 26, 2019	Conservation Law Foundation
September 30, 2019	BDPA Staff Pre-Filing Meeting
October 1, 2019	Boston Civic Design Commission Staff
October 1, 2019	MEPA Office (Pre-Filing Meeting)
October 3, 2019	Fort Point Neighborhood Association
October 29, 2019	Fort Point Neighborhood Association

These discussions have covered a broad array of topics, ranging from urban design and public realm improvements and community benefits, to environmental impacts and transportation impacts. The development team welcomes the input of governmental agencies, neighbors and other stakeholders, and will continue to meet with the community and others as the Project moves through the Article 80 review process and construction.

1.8 Development Team

The following is a list of the key members of the development team for the Project:

Table 1-4 Project Team

Proponent	National Development 2310 Washington Street Newton Lower Falls, MA 02462 617-527-9800 Edward Marsteiner: EMasteiner@natdev.com Sherry Clancy: SClancy@natdev.com Naomi Mayeux: NMayeux@natdev.com
	Alexandria Real Estate Equities, Inc. 400 Technology Square, Suite 101 Cambridge MA, 02139 Thomas Andrews: TAndrews@are.com Hunter Kass: HKass@are.com William DePippo: WDePippo@are.com
Architect	Elkus Manfredi Architects 25 Drydock Avenue Boston, MA 02210 David Manfredi: dmanfredi@elkus-manfredi.com Christian Galvao: cgalvao@elkus-manfredi.com
Landscape Architect	Office of James Burnett (OJB) One Bowdoin Square, Suite 801 Boston, MA 02114 857-233-5171 Simon Beer: sbeer@ojb.com Ryan Ort: rort@ojb.com Cally Hickey: chickey@ojb.com
Legal Counsel	Mintz, Levin, Cohn, Ferris, Popeo and Glovsky, LLC One Financial Center Boston, MA 02111 617-542-6000 Rebecca A. Lee, Esq.: ralee@mintz.com

Permitting Consultant	VHB 99 High Street, 10th Floor Boston, MA 02110 617-607-2942 Lauren DeVoe: ldevoe@vhb.com Kyle Greaves: kgreaves@vhb.com Heidi Richards (Air Quality/GHG): hrichards@vhb.com Quan Tat (Noise): qtat@vhb.com
Chapter 91 / Waterways	Fort Point Associates, Inc. 31 State Street, 3 rd Floor Boston, MA 02109 Jamie Fay: jfay@fpa-inc.com Richard Jabba: rjabba@fpa-inc.com
Cultural Resources	VHB 101 Walnut Street Watertown MA 02472 617-607-1590 Nicole Benjamin-Ma: Nbenjamin-ma@vhb.com
Traffic Engineer	VHB 99 High Street, 10 th Floor Boston, MA 02110 617-728-7777 Ryan White: rwhite@vhb.com
Civil Engineer	VHB 99 High Street, 10th Floor Boston, MA 02110 617-607-2941 Richard Hollworth: rhollworth@vhb.com Will Nichols: wnichols@vhb.com
Geotechnical Services	Haley & Aldrich 465 Medford Street, #2200 Charlestown, MA 02129 617-515-4647 Mark Haley: mhaley@haleyaldrich.com
Structural Engineer	McNamara/Salvia 60 Federal Street, 5 th Floor Boston, MA 02110 617-850-4100 Joseph Salvia: salvia@mcsal.com

Wind & Glare Technical Expert	RWDI Consulting Engineers and Scientists 650 Woodlawn Road West, Guelph, Ontario, Canada N1K 1B8 519-823-1311 Derek Kelly: derek.kelly@rwdci.com
Mechanical, Electrical, and Plumbing Engineer	BR+A 10 Guest Street, 4 th Floor Boston, MA 02135 Allan Ames: AAmes@brplusa.com Ken Moore: KMoore@brplusa.com
Sustainable Design Consultant	The Green Engineer 23 Bradford Street, 1 st Floor Concord MA, 01742 Sara Michelman: sarah@greenengineer.com Matthew Smith: matt@greenengineer.com

1.9 Required Legal Information

1.9.1 Legal Judgments or Actions Pending Concerning the Proposed Project

To the Proponent's knowledge, there are no legal judgments or actions pending concerning the Project.

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

There are no known tax arrears on property in Boston owned by the Proponent.

1.9.3 Evidence of Site Control

The Project Site was acquired on May 8, 2019.

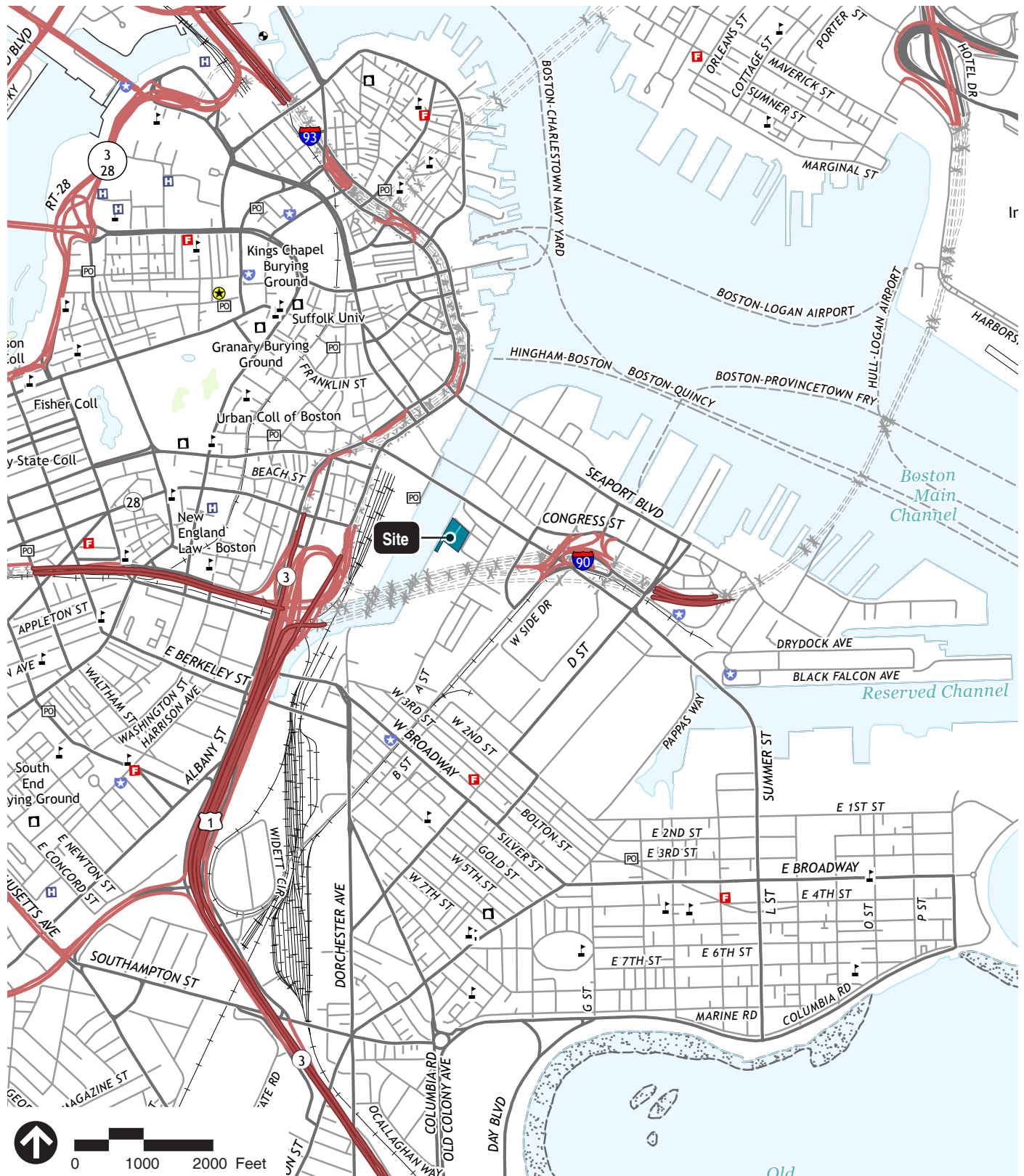
Alexandria Real Estate Equities ("ARE") is a major U.S. real estate investment trust focused on collaborative life sciences, technology and agricultural technology campuses and facilities cross the United States. ARE's assets are focused in cities like Boston which have world-class academic institutions, leading scientific and managerial talent, and sophisticated investment capital.

National Development has developed over 28 million SF of commercial, office, life sciences, residential and mixed-use developments in approximately 45 communities in the Northeast.

National Development and ARE have collaborated on the development of over 400,000 SF of development in Greater Boston, including the Longwood Center life sciences building in the Longwood Medical and Academic Area.

1.9.4 Site Control/Public Easements

There is an existing easement across the Project Site which was taken by the BRA in 2004 to accommodate the Harborwalk. In addition, the Project Site is the subject of a M.G.L. Ch. 91 License issued in connection with the previously approved project , and a portion of the Project Site comprising Parcels HW 2 and FT1-A under the 100 Acres PDA Master Plan No. 69 is designated as open space, and consistent with that designation, those parcels are the subject of a Conservation Restriction.



Source: USGS 2018 Digital Topo

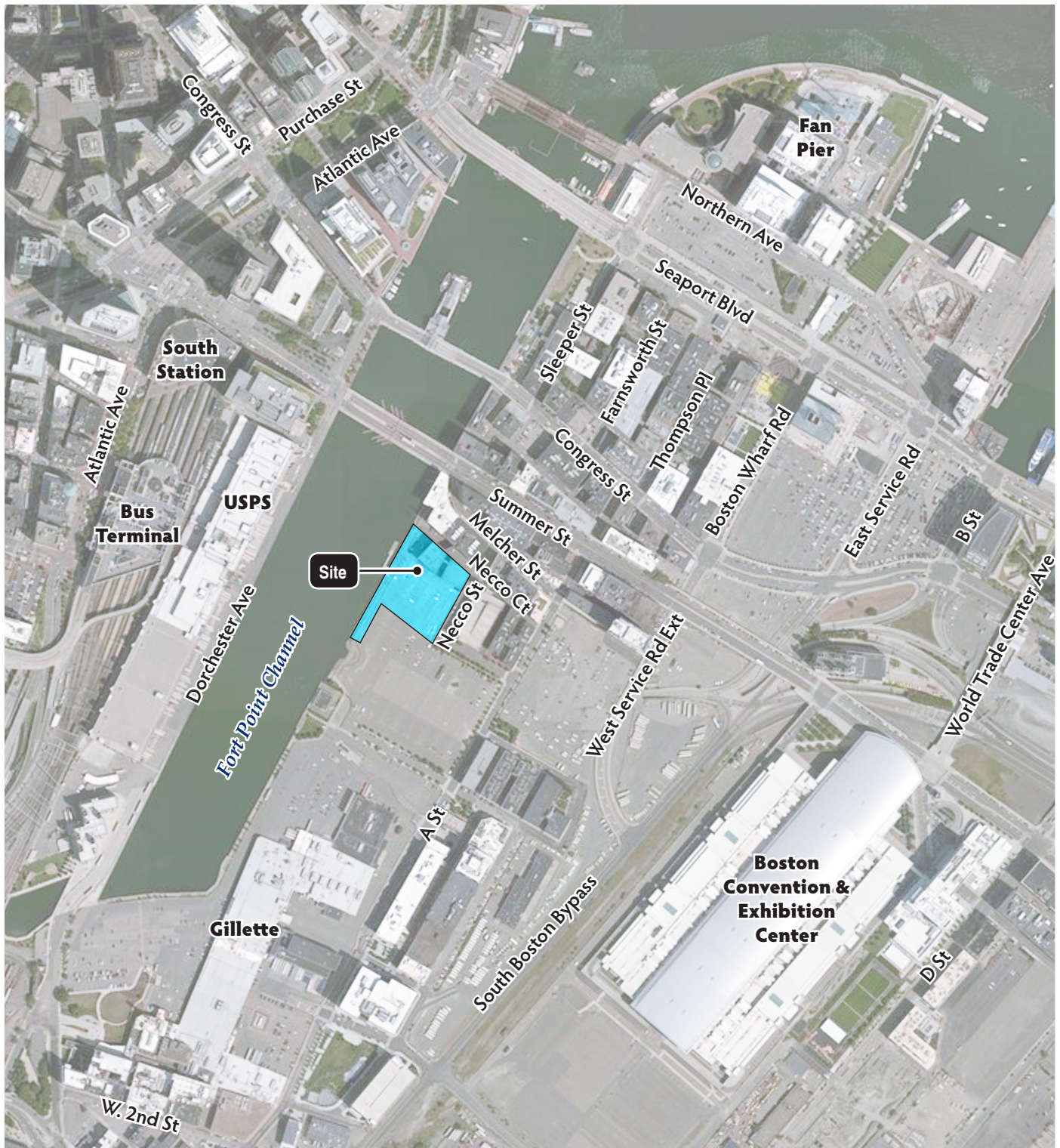
Prepared By: VHB

 Project Site



Figure 1.1
Site Location Map

15 Necco Street Project Boston, Massachusetts



0 300 600 Feet

Source: ArcGIS Online Bing Aerial



Project Site



Prepared By: VHB

Figure 1.2
Project Area Context

**15 Necco Street Project
Boston, Massachusetts**



PROJECT SITE FROM THE FORT POINT CHANNEL LOOKING EAST



PROJECT SITE FROM THE FORT POINT CHANNEL LOOKING NORTH



PROJECT SITE FROM EXISTING LOOKING NORTH



PROJECT SITE FROM EXISTING 5 NECCO BUILDING LOOKING SOUTH



Figure 1.3
Existing Site Conditions Photographs



0 20 40 Feet

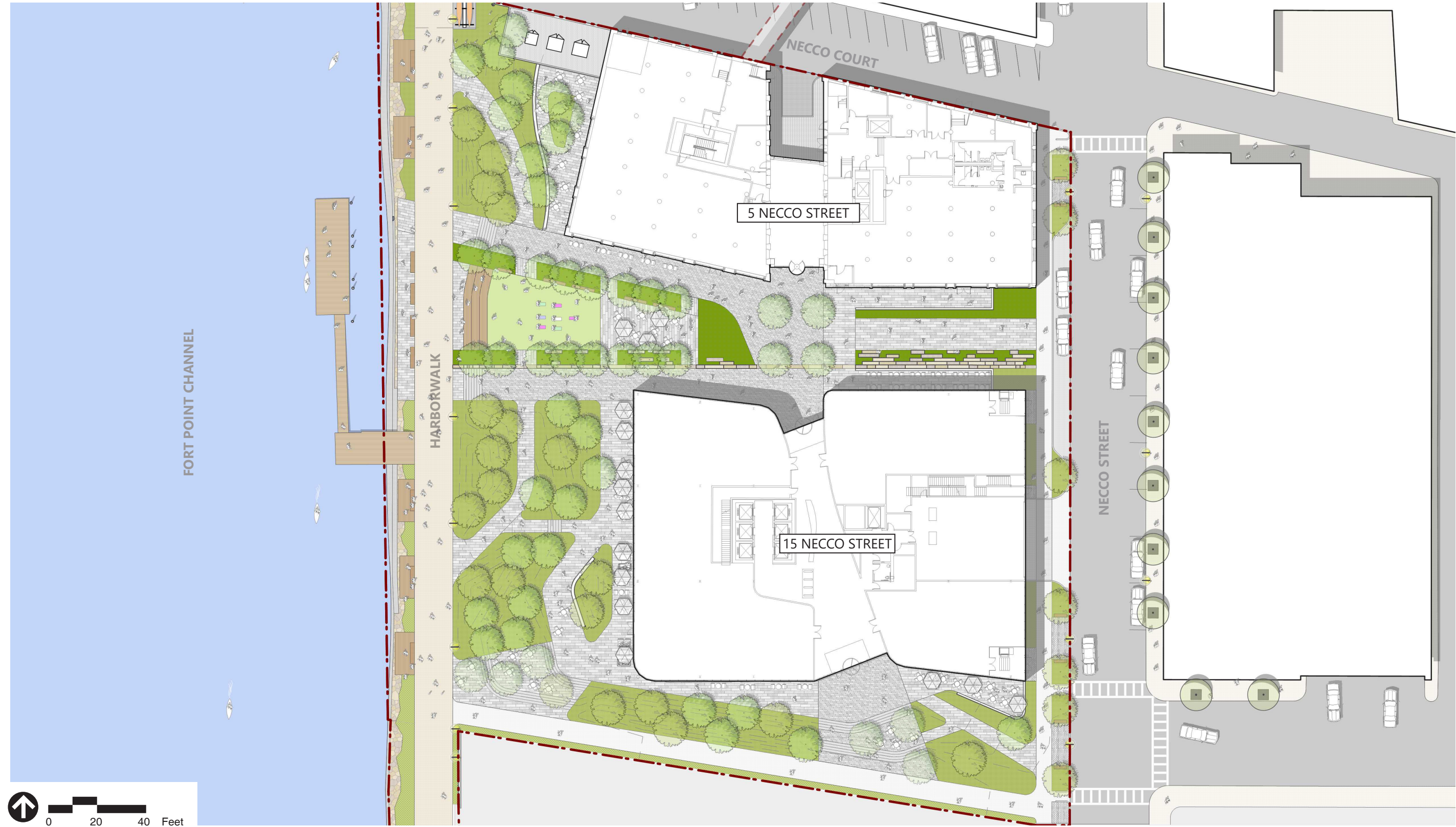
Source OJB

Site Boundary

OJB

Figure 1.4
Previously Approved Project

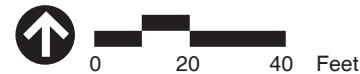
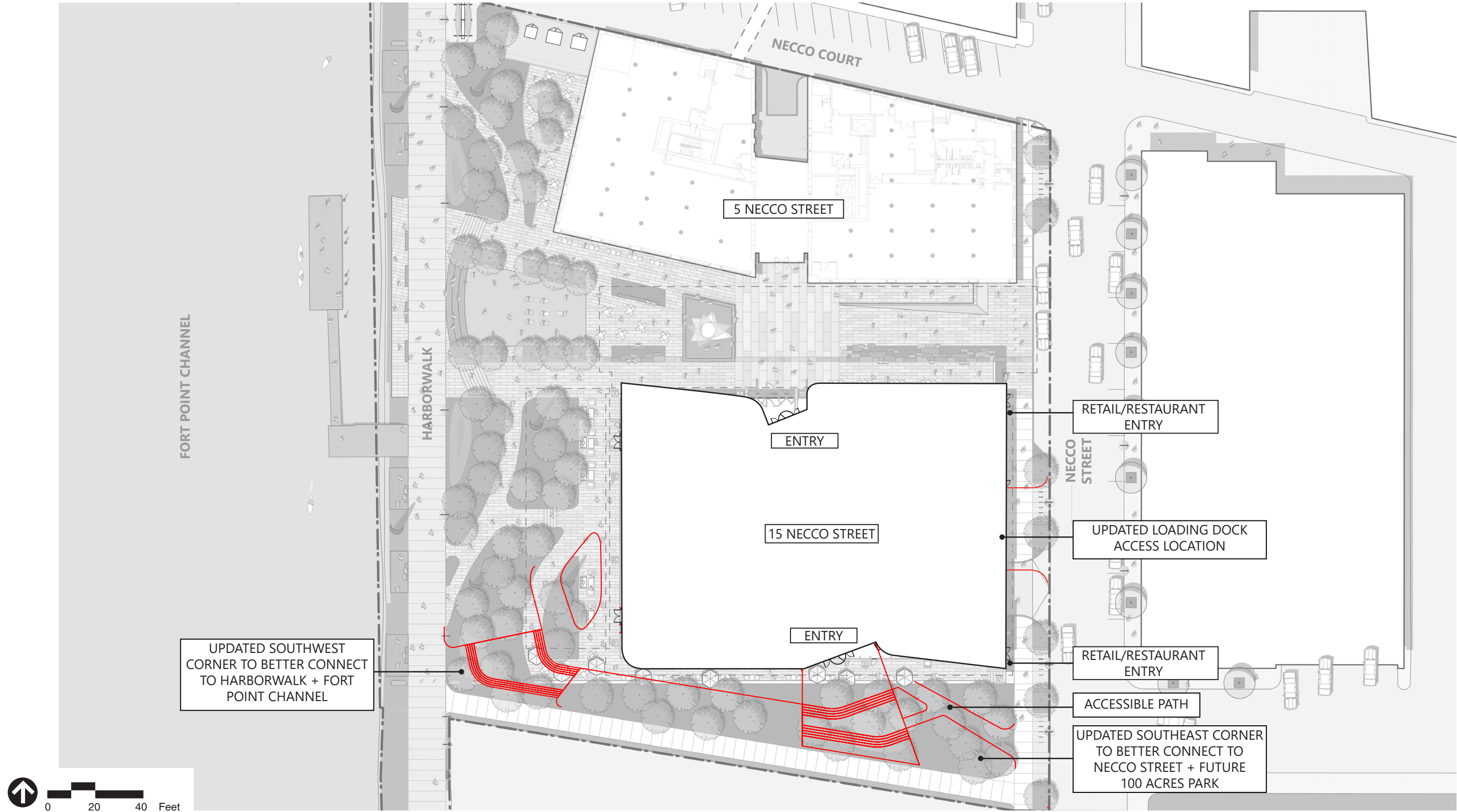
15 Necco Street Project
Boston, Massachusetts



Source OJB
- - - Site Boundary

OJB

Figure 1.5
Project Change (New Building)
Proposed Landscape Plan
15 Necco Street Project
Boston, Massachusetts



Source OJB

- Site Boundary
- Design Improvements

OJB

Figure 1.6
Proposed Pedestrian Circulation Change

15 Necco Street Project
Boston, Massachusetts

2

Urban Design

This chapter presents the neighborhood context of the Project Site, and describes the design concept for the New Building, including height, massing, character and materials, and, public realm activation, open space, and pedestrian circulation and accessibility.

Within the context of the City's 100 Acres Master Plan, adopted by the BPDA in September 2006, and the PDA Master Plan approved by the BPDA and the Zoning Commission in January 2007 (as amended to date), the Proposed Project provides the opportunity to create new publicly-accessible ground floor uses, an enhanced and enlivened pedestrian environment, and 6,745 SF of additional open space accessible to the public, all of which is designed to activate this waterfront portion of the Fort Point Channel, including the newly widened and reconstructed portion of the City's Harborwalk.

2.1 Neighborhood Context

The Proposed Project's location at the intersection of Necco Street and Necco Court within the Fort Point area provides a unique opportunity to continue the revitalization of the area and realize the vision of a dense and vibrant mixed-use district that reflects and complements the unique architectural character of the surrounding neighborhood. Historically, the Project Site has been used for industrial purposes (e.g., the former Boston Wharf Company Brick Buildings) and a large portion of the Project Site located south of the Brick Buildings has been long-used as public surface parking. The Proposed Project will be sensitive to and consistent with the land uses envisioned by the 100 Acres Master Plan, as memorialized/codified in the PDA Master Plan, including the planned open space areas, by decreasing density adjacent to the Fort Point Channel and adding cultural and community amenities both along the Harborwalk as well as within and surrounding the ground floors of the rehabilitated 5 Necco Street and the New Building. Please refer to Figure 2.1 for a plan depicting neighborhood context.

The Project Site is a short walk from South Station and the restaurants and other amenities along Summer and Congress Streets as well as the South Boston Waterfront. In addition, the Boston Convention and Exposition Center, the Rose Kennedy Greenway, the Institute of Contemporary Art, and the Lawn on D are located within walking distance from the Project Site.

One of the strengths of the Project Site is its proximity to public transit. It is located no more than a 10-minute walk from the Silver Line and South Station, a major transit hub to destinations across the region and beyond, and also a short ride to

Logan International Airport. The Project Site is also located within walking distance of the MBTA Red Line Broadway T station.

Within a short distance from the Project Site, over seven million square feet of new construction is currently underway. Seaport Square, Pier 4, the Fan Pier projects, and the multiple rehabilitation projects along the Congress Street corridor, as well as 319 A Street, 399 Congress Street and projects along the Summer Street corridor, as well as on-going planned development along A Street, will all bring a diversity of new retail and restaurant offerings to the neighborhood but will also provide millions of square feet of new residential and office space. In addition, these developments will also introduce new open spaces, public realm improvements and pedestrian amenities that will continue the on-going transformation of an historic, largely industrial district into a vibrant, 24/7 urban community. The design of the Proposed Project is intended to integrate into the fabric of the 100 Acre Master Plan and the context of the South Boston Waterfront in the Fort Point neighborhood.

2.2 Project Design Goals/Concept

The Proposed Project is planned to be a vibrant mixed-use development, combining high-quality sustainable architecture with a design that complements the urban fabric at multiple scales – City, district and pedestrian. Please refer to Figure 2.1 for a neighborhood context graphic, Figure 2.2 for a comparative building section diagram, and Figures 2.4a-c for renderings of the New Building.

The New Building has been designed within the general massing envelope of the previously approved project, but will be a multi-tenant office, research and development building in lieu of a single-user corporate campus building with active ground floor retail/restaurant tenants and a north-south pedestrian corridor through the building to facilitate pedestrian connectivity in the area. As compared to the previously approved project design, the Proposed Project will allow for more engagement with the public and the Harborwalk alongside the Fort Point Channel and the planned park to the south of the Project Site.

The New Building and the Project Site will mark the transition from 5 Necco Street, to the new “100 Acres” neighborhood that is currently evolving between the Fort Point Channel and A Street. The Proposed Project will be both aware and sensitive to the unique character of the Brick Buildings, which have been thoughtfully restored. GE is currently leasing floors 2-6 as their corporate headquarters and has commenced its occupancy of that space.

The New Building design embodies several key urban design principles specific to the Project Site and the 100 Acres neighborhood, which include:

- › Integrate all four sides of the New Building into the neighborhood so that it is inviting and interesting from all approaches;

- › Propose iconic architecture that marks the western and northern entrances to the 100 Acres neighborhood, and creates a connection between the Project Site, the future new park, and a future Fort Point Channel pedestrian bridge;
- › Propose a highly sustainable and resilient building design with a very sophisticated envelope that limits heat gain, maximizes interior daylight and allows a high degree of transparency;
- › Create a more welcoming and active, multi-tenanted ground floor with retail and restaurant tenants that enhances a very open and civic approach to the Project Site;
- › Provide increased transparency, porosity, and permeability throughout the Proposed Project where possible, creating new connections between the active ground floor uses and surrounding landscape/open spaces;
- › Create 6,745 SF of additional open space accessible to the public that is consistent with the intent of the previously approved project, reinforcing the Proposed Project's importance as a new public destination, and strengthening the connection between the future open space south of the Project Site and the Fort Point Channel pedestrian bridge; and
- › Encourage a landscape design that promotes native plant material, permeability, accessibility and resiliency.

As the Proposed Project is adjacent to the Fort Point Channel, it is designed in consideration of sea level rise, 100-year and 500-year floodplains, and overall project resiliency. As detailed in Section 3.4.2 of Chapter 3, *Sustainability, Climate Resiliency and Greenhouse Gas Emissions Assessment*, the Proposed Project will continue to incorporate and improve upon resilient design elements listed in Table 3-3 to which the GE Project previously committed.

2.2.1 Building Massing and Height Modifications

The Proposed Project is highly responsive to the vision and planning goals established in the Planned Development Area No. 69, South Boston/The 100 Acres Master Plan, and will comply with the 180-foot height limitation established for the Project Site with a proposed building height of approximately 173 feet (same as the previously approved project), subject to future design development.

The previously approved project was contemplated as a corporate campus and, therefore, some design elements have been eliminated, including:

- › The large building canopy over the pedestrian walkway that ran between the Brick Buildings and the new building;
- › The elevated pedestrian bridge connecting the Brick Buildings and New Building at the sixth floor; and
- › A below-grade 30-space parking garage.

The proposed New Building will be a multi-tenant space and no longer requires these connections creating a more publicly-accessible open space between the New Building and the Brick Buildings, as well as promoting views of the sky.

Figure 2.2 presents a comparative massing diagram. The New Building is approximately 173 feet in height (up to 12 stories) to the top of the highest occupiable floor, which is below the maximum zoning height of 180 feet. Similar to the previously approved project, the massing of the New Building is rectilinear in form and conforms to requirements outlined in the 2009 South Boston MHP. To differentiate the New Building from the GE Project, the massing acknowledges the watershed on the western facade and the City across the Fort Point Channel, announcing the Proposed Project and the 100 Acres neighborhood, and welcoming the public. At Necco Street the upper floors of the New Building have been stepped back and planned ground floor uses will increase activity and invite pedestrians to engage and permeate the participate in the amenities offered by the New Building and the Project Site, and to better relate to future planned public open space to the south of the Project Site.

Please refer to Figure 2.1 for a neighborhood context graphic, Figure 2.2 for a comparative building section plan, Figures 2.3a-d for building elevations, Figures 2.4a-c for renderings and perspective views of the New Building, and Figures 2.5a-d for floor plans.

2.2.2 Character and Exterior Materials

Consistent with the GE Project, the character and materials of the New Building include a highly sustainable and resilient building design with a very sophisticated envelope that limits heat gain, maximizes interior daylight, minimizes solar glare, and allows a high degree of transparency. The base of the New Building anchors the building through a highly-transparent lobby façade and inviting entrances that give the building a pedestrian scale and transparency that will welcome the public. The proposed multi-tenanted ground floor with retail and restaurant tenants provides new connections between the active ground floor uses and the improved civic surrounding landscape/open spaces.

The exterior walls of the New Building will consist of a high-performance enclosure. As shown in Figure 2.6, options are being evaluated and tested that may include an array of louvers on the south and west that limit solar heat gain and glare and allow optimal light transmission. A series of outdoor spaces on the upper floors of the north, south, and west elevations will open the building up to the outside, animating the new building while providing excellent views of the Fort Point Channel and the City. Vision glass will be high in light transmittance, while balancing reflectivity and energy performance requirements in order to minimize glare.

The design of the New Building element will be visually distinct and will mark the transition from the historic district to the unfolding development of the 100 Acre Master Plan. The New Building will include a curtain wall system of glass and metal

panels, with an accent of earth tones that relates to the historically industrial nature of the surrounding neighborhood. These qualities are highlighted in sunshade elements that add texture to the south and west facades. Figures 2.4a-c depict the Proposed Project from various angles, including the approach along the Harborwalk coming from the southwest, the view from the Summer Street Bridge, and the view from Necco Street.

2.3 Signage

The exterior signage for the New Building is not yet designed, and a comprehensive sign program in the New Building will be subject to BPDA approval.

The New Building entrances will be thoughtfully designed with building identification signage appropriate for the building scale. As with the previously approved project, marquee tenant identification signage may also be provided on the building facade for anchor tenants. Retail signage will be located and designed to contribute to an inviting streetscape and pedestrian environment.

Appropriate and visible wayfinding signage will be provided on-site to guide pedestrians to the Harborwalk, the Project Site, and the future open space south of the Project Site. This signage will comply with all standards of the Harborwalk. The Proposed Project may also explore the use of interpretive signage detailing the Proposed Project's use of native species plants, unique sustainability and technological elements, and resiliency features. Wayfinding signage will invite the public into the Project Site and guide them to new Building Entrance and drop off locations.

2.4 Public Realm Improvements

Consistent with the previously approved project, the Proposed Project includes improvements to pedestrian circulation and accessibility, 6,745 SF of additional open space accessible to the public than contained in the previously approved project, enhanced streetscapes, and improvements to the Harborwalk. The main goal of the Proposed Project is to create a more sustainable, active and connected environment to tie into the surrounding Fort Point neighborhood. The multi-tenant New Building will provide more active ground floor retail/restaurant uses (traditional FPAs) than the previously approved project, a new north-south pedestrian corridor through the building to facilitate pedestrian connectivity in the area, and more civic open space to the south side of the New Building that will improve connections to the future open space south of the Project Site and the expanded Harborwalk. The Harborwalk improvements completed with 5 Necco Street will be segregated from the construction site of the New Building, thereby making them available to the public throughout the construction of the New Building as much as feasible. All other spaces will be consistent with the previously approved project's intent. Please refer to Figure 1.4 for the previously approved project, and Figure 1.5 for the Proposed Project.

At least 75 percent of the ground floor of the New Building and 5 Necco Street will be publicly-accessible elements comprising FPAs as defined in the M.G.L. Chapter 91 regulations. These will include public restrooms within the ground floor of the New Building. The Proposed Project may also include retail and restaurant uses facing the Fort Point Channel, both open to the public.

As discussed above, the Proposed Project will not include the previously contemplated pedestrian bridge, or the large building canopy, which will create more publicly-accessible open space between the New Building and 5 Necco Street.

Figure 2.7 presents the proposed landscape and public realm improvements planned for the Proposed Project. Figures 2.8a-c present detailed plans for the proposed public realm improvements, which are substantially similar to those in the previously approved project. Beyond the waterfront improvements, the Proposed Project will provide spaces for public engagement, which may include public art installations, activities and other amenities. The public realm will continue to serve as a showcase for sustainable technology as part of stormwater collection and treatment. Native plantings will serve aesthetic and ecological functions, working to create an environment welcoming of both people and wildlife.

The Proposed Project's new north-south pedestrian corridor through the New Building, and the improvements to the pedestrian realm on the south side of the New Building will better serve as a catalyst for the activation of the future open space south of the Project Site. The public lobby may feature local artists' work, and connections to ground floor amenities.

2.4.1 Waterfront Access Enhancements

In connection with the City of Boston approvals of the previously-approved project, GE committed to a range of mitigation measures, some of which, like the widening and reconstruction of the Harborwalk, have been completed. The completed Harborwalk improvements will be segregated from the construction site of the New Building, thereby making them available to the public throughout the construction of the New Building as feasible.

Additional landscape improvements associated with the New Building site will be undertaken by the Proponent as part of the development of the Proposed Project. The landscape design associated with the Proposed Project includes creative seating elements, passive lawn spaces, interpretive signage, waterfront overlooks, Fort Point Channel access, and native plant displays and stormwater management features (Figures 2.7 to 2.8a-c). The New Building's enhanced ground floor retail/restaurant uses will feature accessible entrances on the north and south of the building, and along Necco Street.

The Proponent intends to seek ground floor tenants and uses that contribute to waterfront and watershed activation, and the creation of a public destination for these activities.

2.4.2 Pedestrian Access/Circulation and Accessibility

The accessibility goals of the Proposed Project remain consistent with the previously approved project. As shown in Figure 2.9, primary pedestrian access to the Project Site will remain unchanged. Users will continue to utilize the enhanced Harborwalk when entering the Project Site from Summer Street with multiple points of access to and through the Project Site. Each level of landscape will accommodate all users with continuous circulation throughout the Project Site. A primary goal of the proposed site design remains to provide universal access without the use of intrusive elements, such as walls and handrails.

Accessible routes into the interior of the Project Site will integrate with primary circulation points from all directions, increasing the porosity of the building and engaging visitors with the new, active ground floor uses.

Each of 5 Necco Street and the New Building will have a primary entrance off the pedestrian plaza to be created between the two buildings. The New Building will also have a prominent lobby entrance within its southern facade, and both buildings will have additional building entrances for the planned retail/restaurant FPAs. The new entryways on both the northern and southern facades of the New Building creating an accessible and weather protected pedestrian corridor through the building to facilitate pedestrian connectivity in the area, and to the proposed open space south of the Project Site. The Proposed Project also proposes two new accessible entrances along Necco Street at the northeast and southeast corners of the building that will connect users to the building's active ground floor uses.

The Proponent and design team remain committed to making every effort to enhance accessibility throughout the Proposed Project. Please refer to Appendix A for a completed Accessibility Checklist for the Proposed Project, as required for Article 80 review submissions.

2.4.3 Proposed Streetscape/Landscape Plan

Consistent with the previously approved project, the core of the Proposed Project's landscape design is to enhance the Harborwalk, and to create an active and vibrant waterfront that connects to and through the Project Site and enhances its attractiveness as a visitor destination. (The necessary utility infrastructure, including lighting and water, have already been installed.) Visitors and employees alike will have access to a network of amenity spaces along the waterfront that connect with a variety of flexible civic and green spaces designed for public interaction and engagement, as well as more passive areas, for leisure and relaxation.

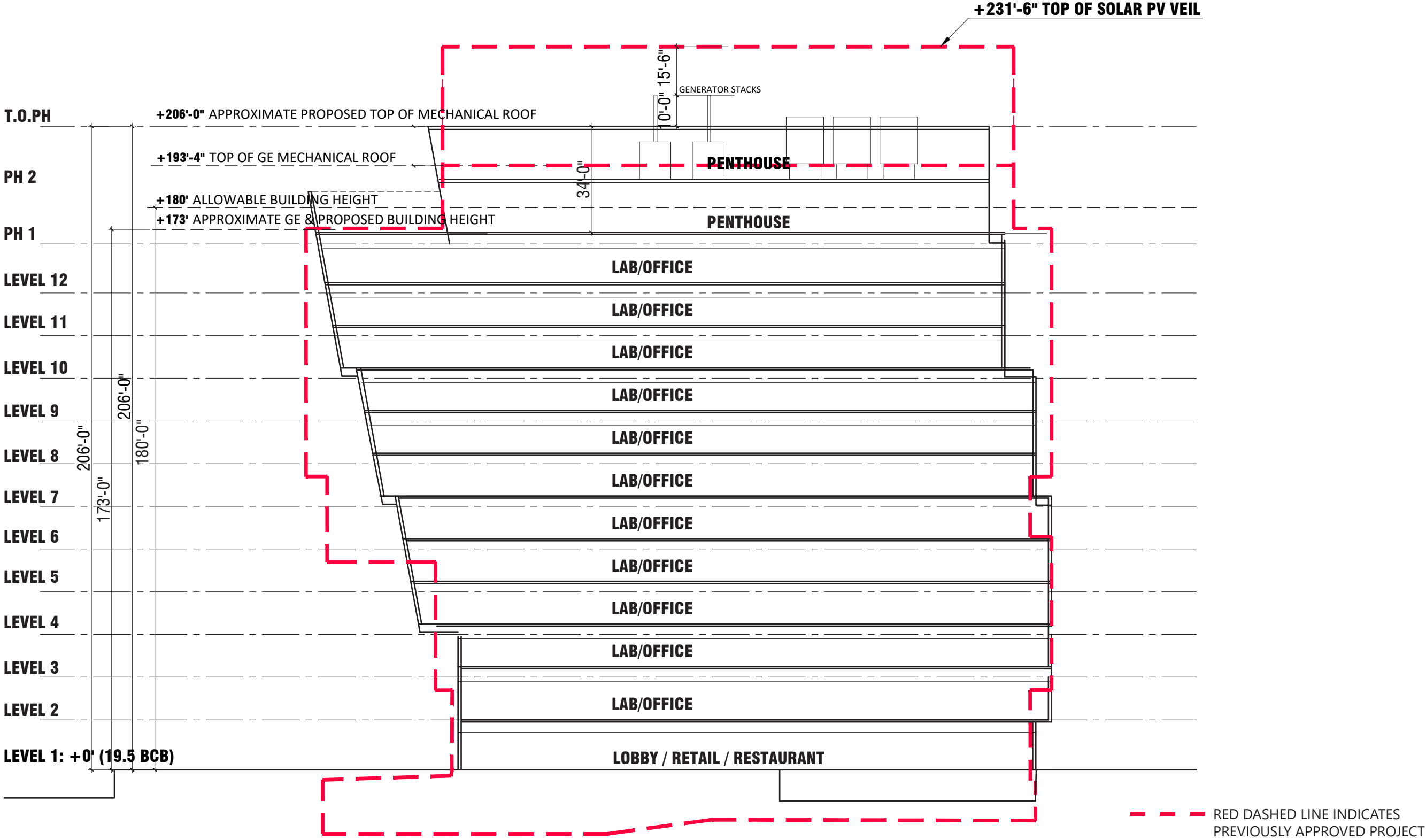
The proposed passageway between 5 Necco Street and the New Building will serve pedestrians only. Its design has been improved by the removal of the pedestrian bridge and the large covered canopy associated with the previously approved project. The new pedestrian-only corridor will now focus less on connecting these Project components as a former corporate campus, and more on enhancing

connectivity with the neighborhood. The new and redesigned pedestrian passageway between the buildings will strengthen the connection between the open space and the new active ground floor interior uses to be programmed to encourage visitor socializing and use of the FPAs, and to host cultural events. Indoor/outdoor connectivity will be further enhanced and enlivened by the proposed outdoor seating terrace along the western edge of the New Building. The design will also provide more light, air and trees for users of this space.



Figure 2.1
Neighborhood Context Map

**15 Necco Street Project
Boston, Massachusetts**



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Figure 2.2
Comparative Building Section

15 Necco Street Project
Boston, Massachusetts

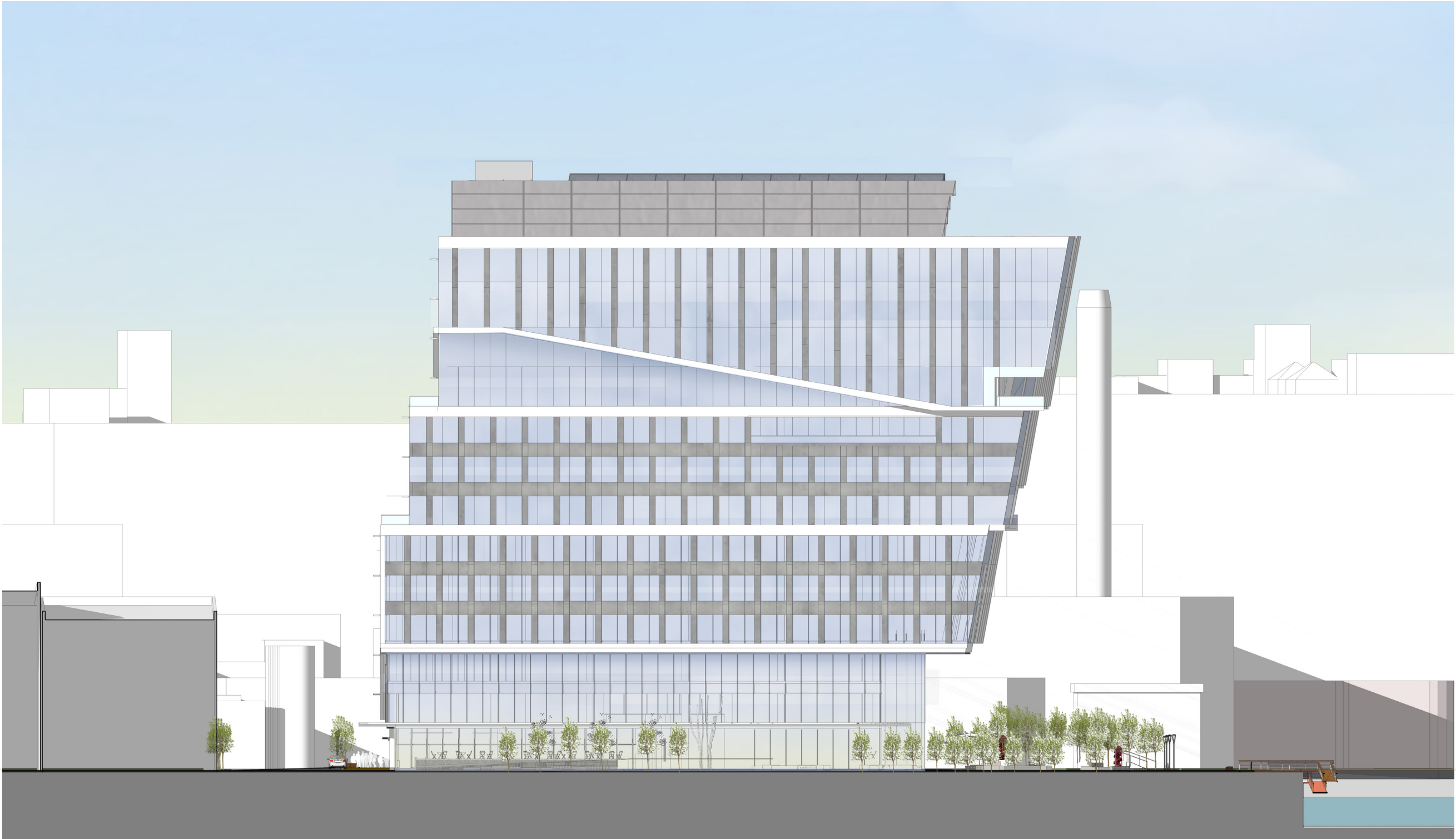


Figure 2.3a
New Building Elevation - North Facade

**15 Necco Street Project
Boston, Massachusetts**



Figure 2.3b
New Building Elevation - South Facade

15 Necco Street Project
Boston, Massachusetts



Figure 2.3c
New Building Elevation - East Facade

15 Necco Street Project
Boston, Massachusetts



Figure 2.3d
New Building Elevation - West Facade

**15 Necco Street Project
Boston, Massachusetts**



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Figure 2.4a
Perspective View From Southwest
15 Necco Street Project
Boston, Massachusetts



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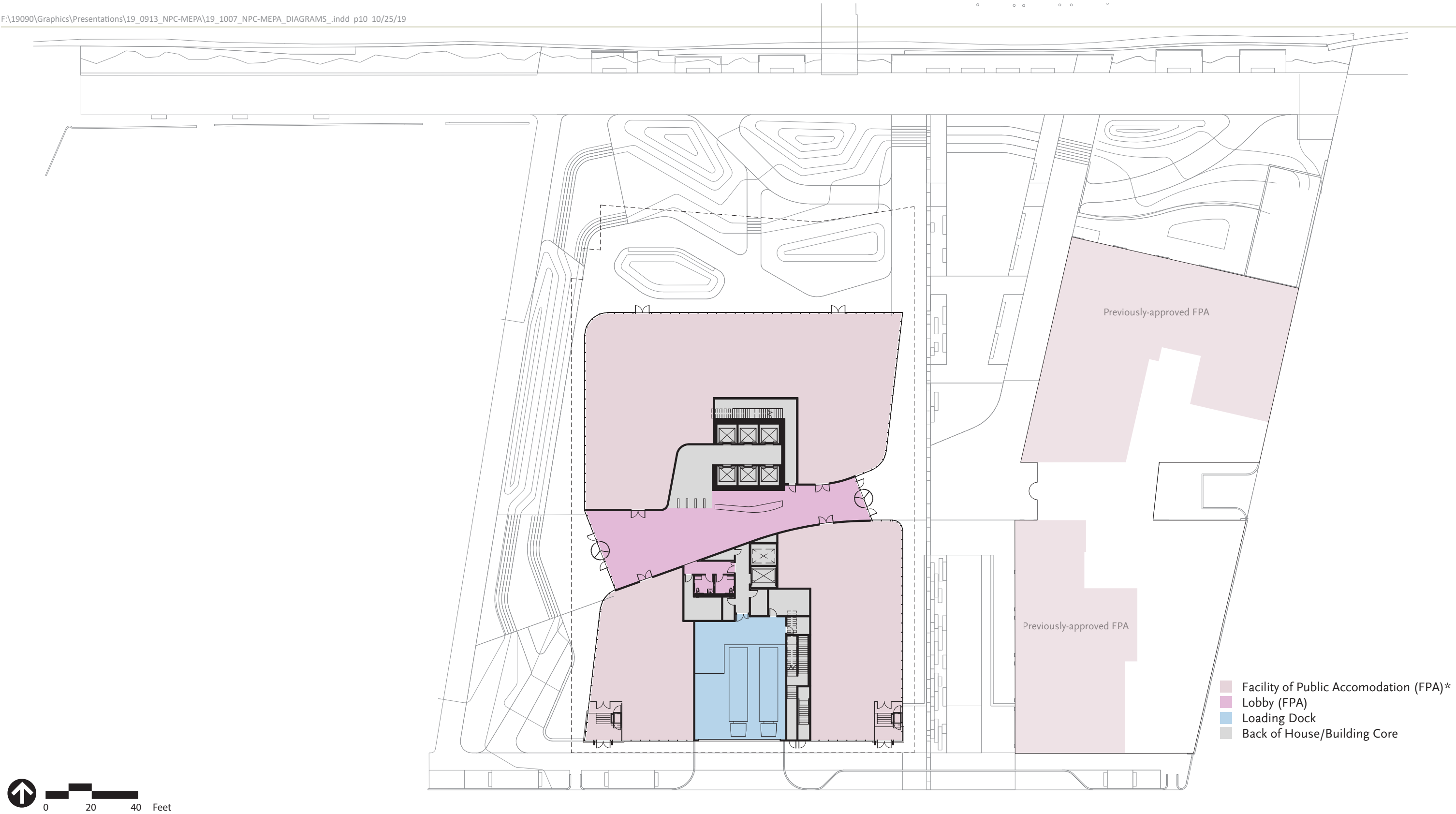
Figure 2.4b
Perspective View From Summer Street
Bridge North Facade
15 Necco Street Project
Boston, Massachusetts



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Figure 2.4c
Perspective View From Necco Street
Looking North

**15 Necco Street Project
Boston, Massachusetts**



*Potential ground floor FPA uses could include cafe/restaurant, retail, fitness, lobby gathering space, restrooms, and gallery space.



Figure 2.5a
Ground Level Plan

15 Necco Street Project
Boston, Massachusetts

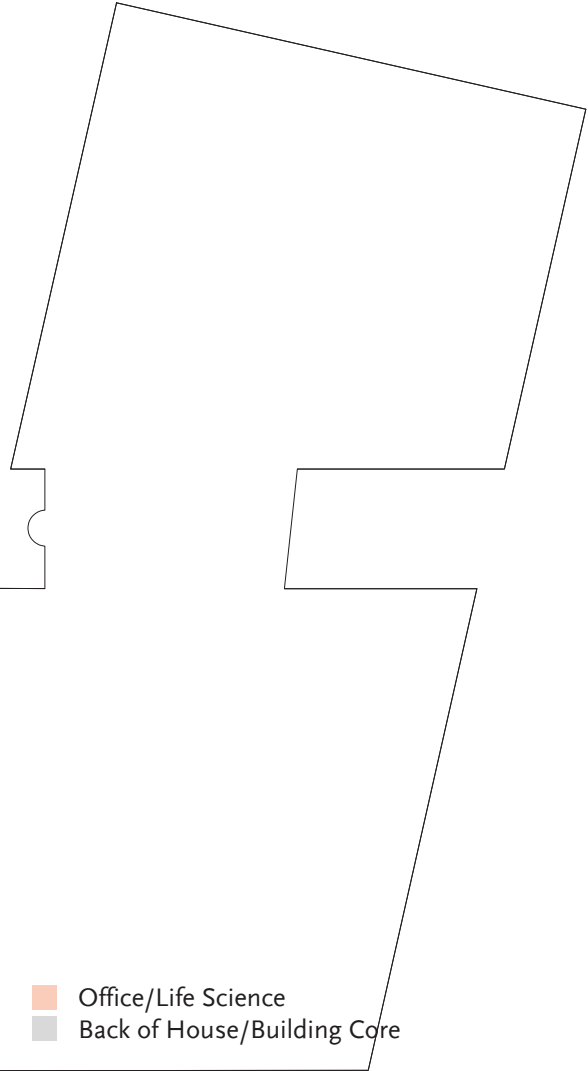
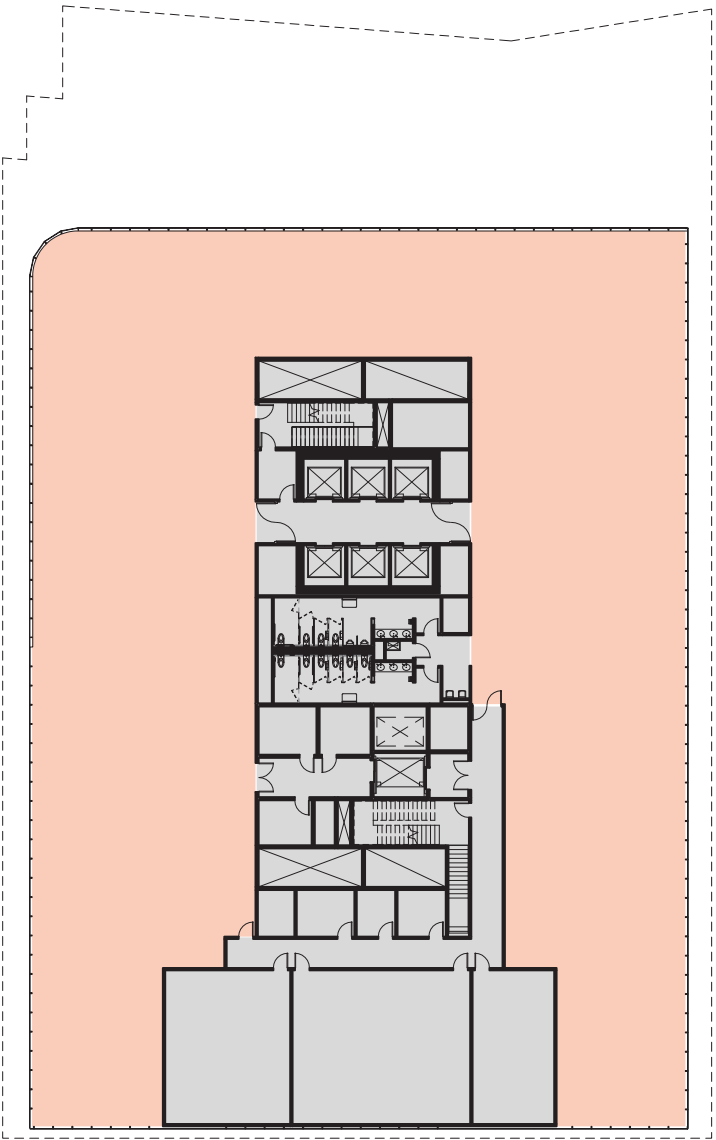
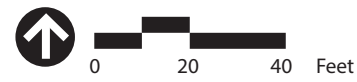


Figure 2.5b
Second Level Plan

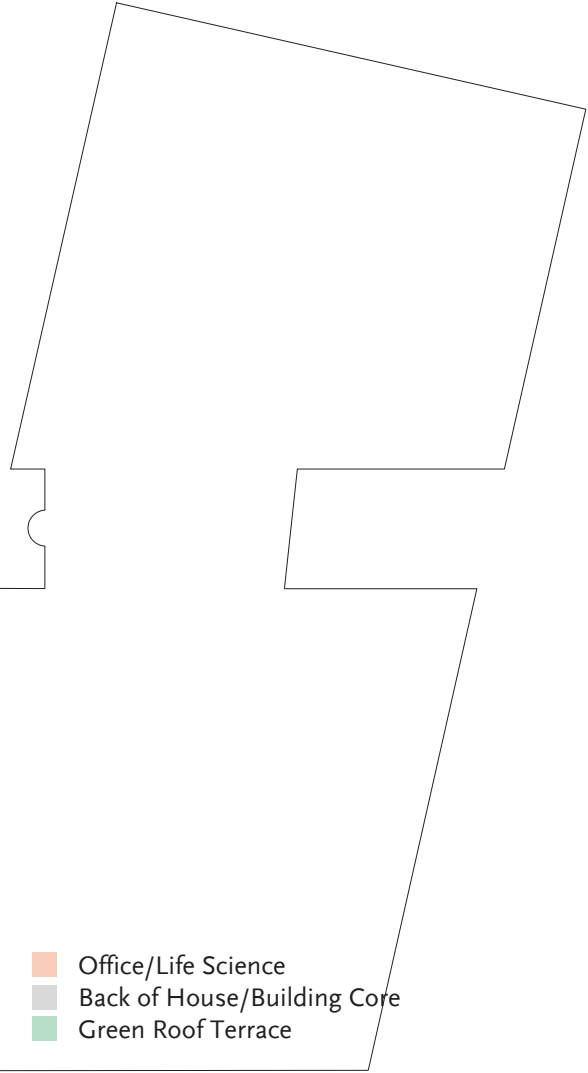
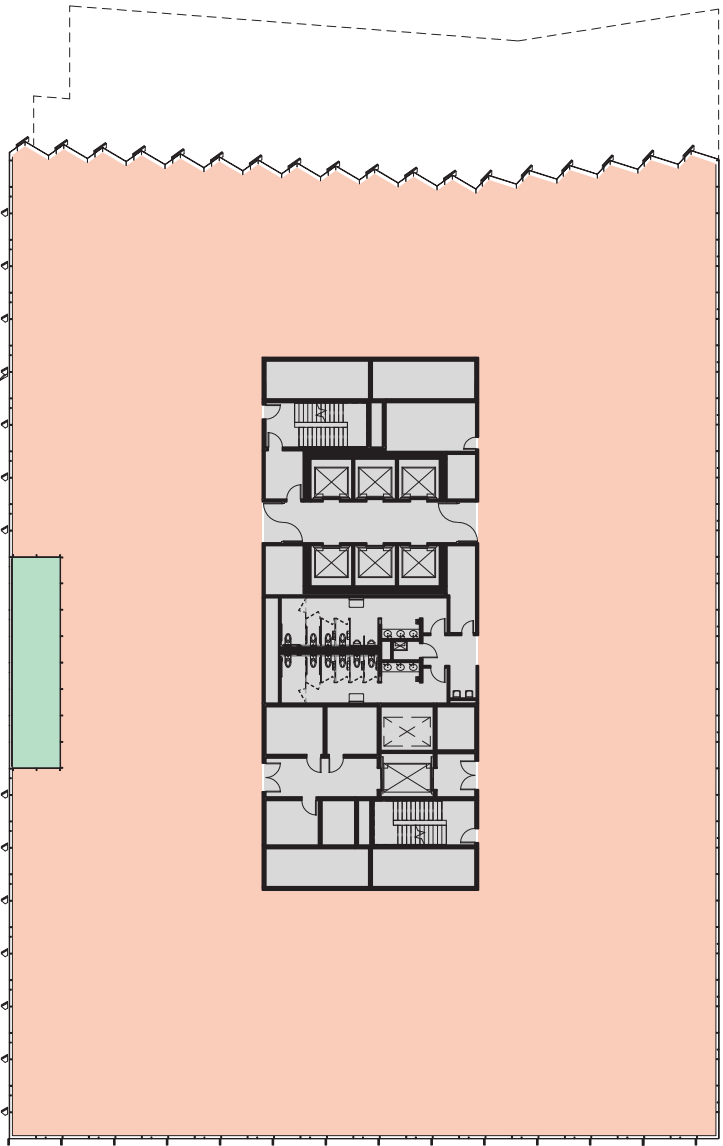
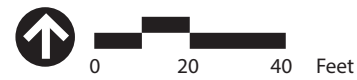
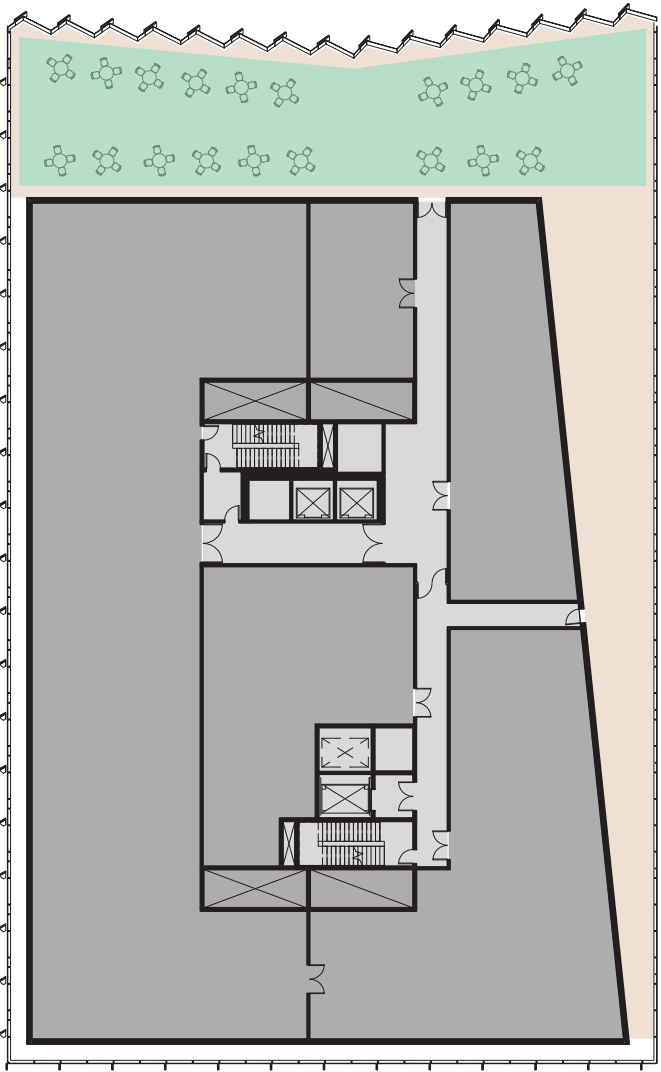


Figure 2.5c
Typical Upper Level Plan

**15 Necco Street Project
Boston, Massachusetts**



- Penthouse MEP Space
- Building Core and Circulation
- Roof Terrace
- Green Roof Zone

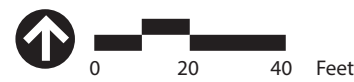
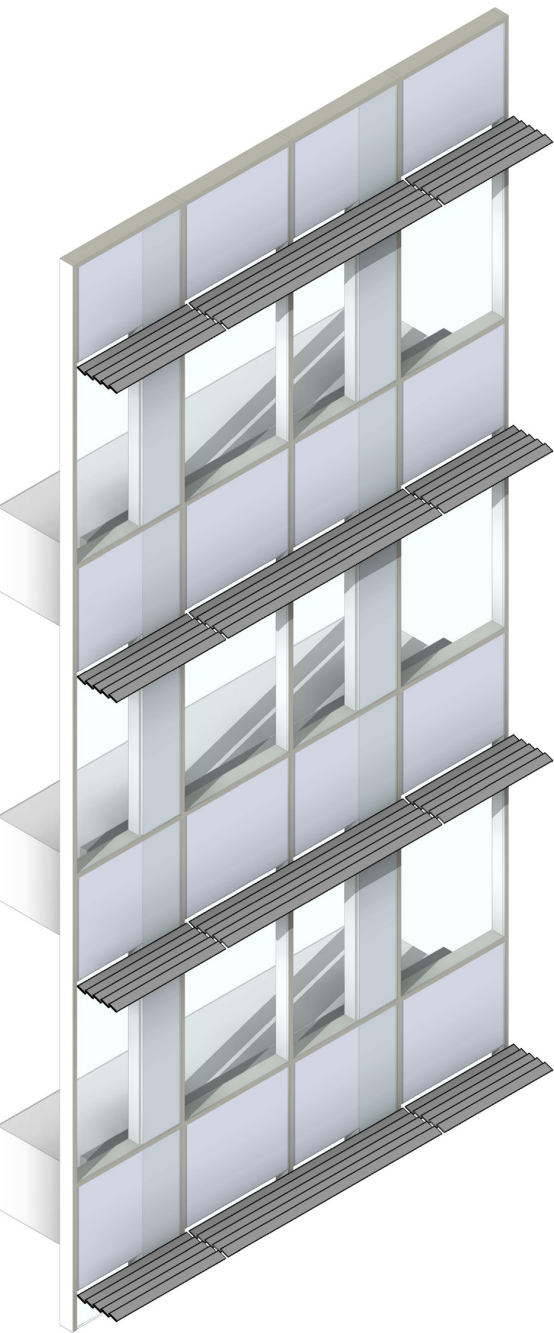
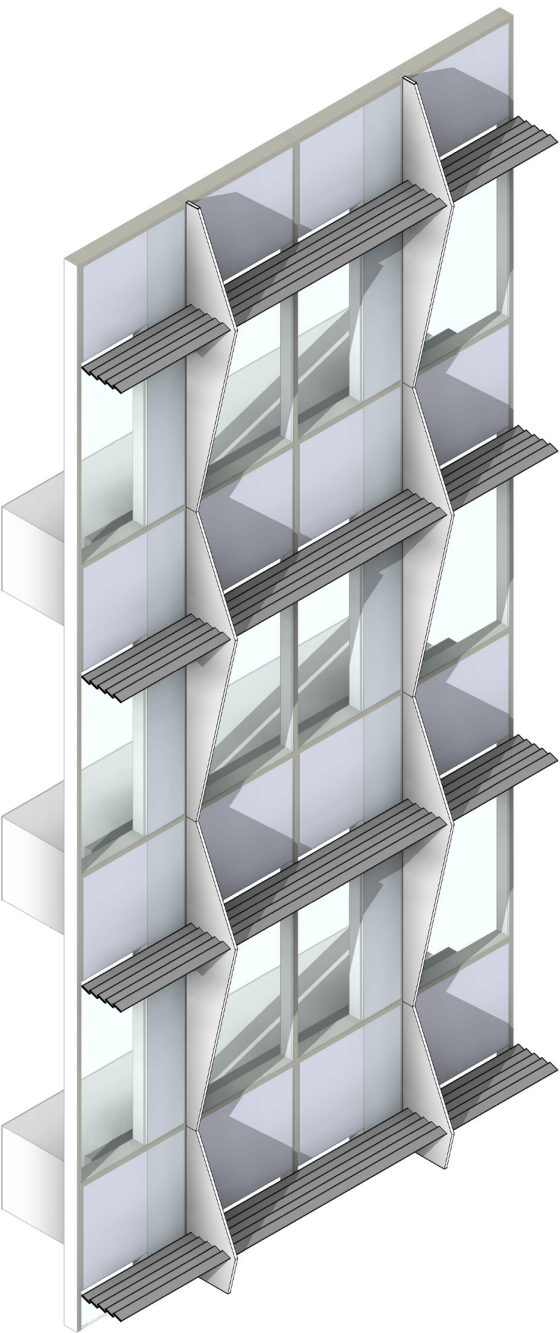


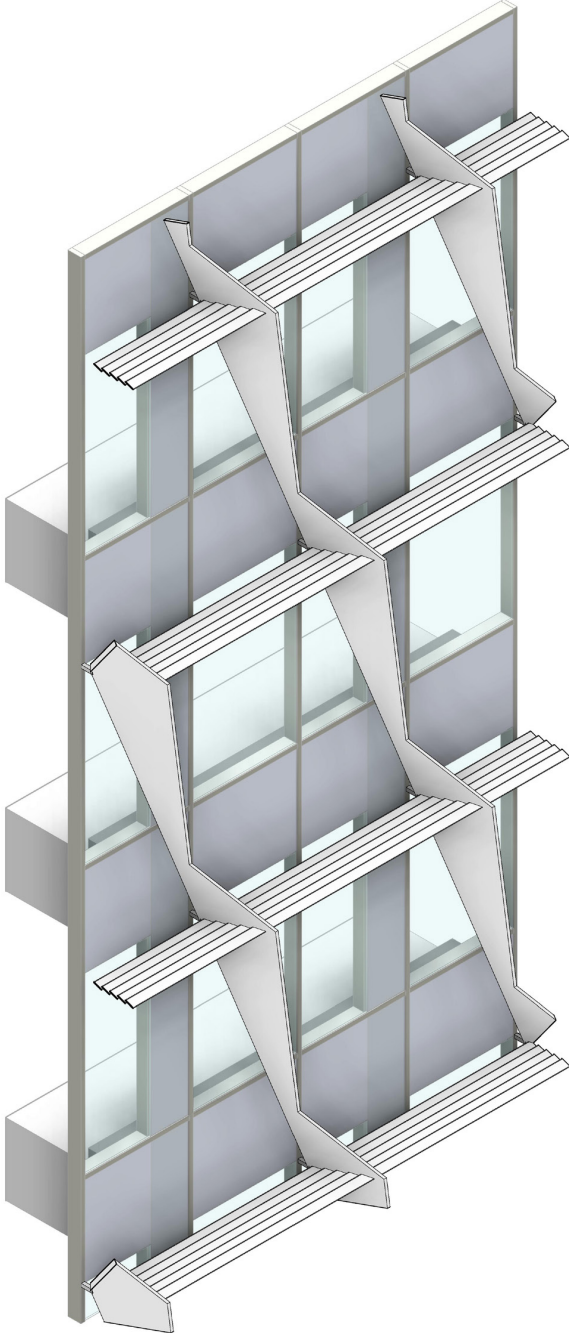
Figure 2.5d
Roof Plan



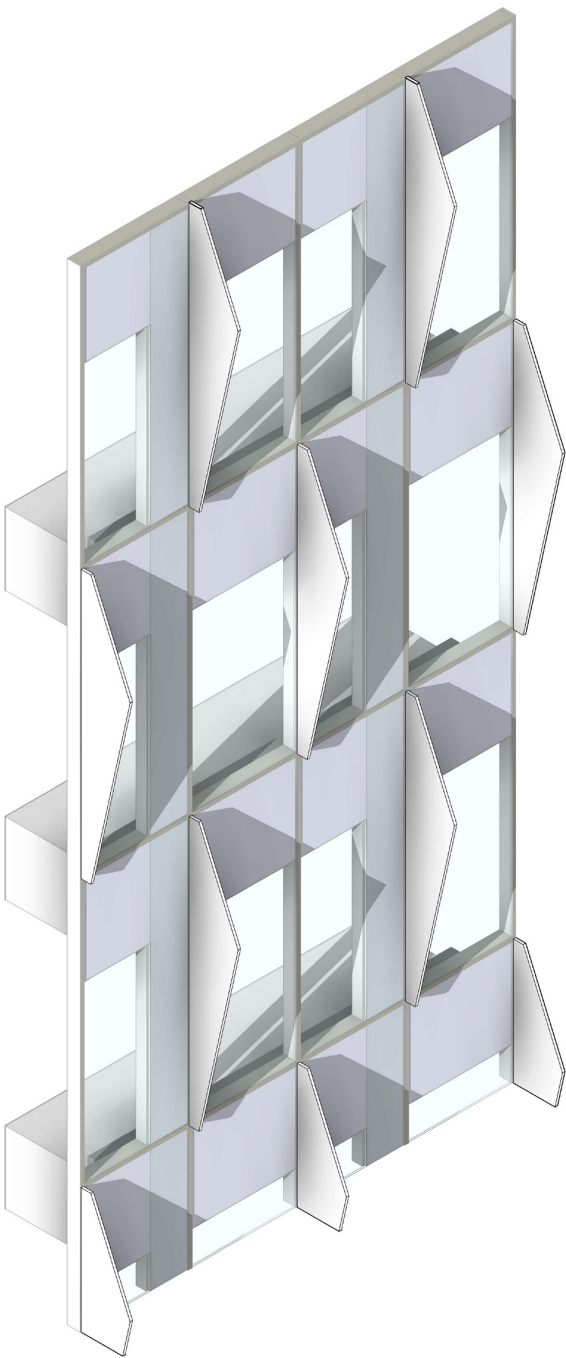
Option 1: Horizontal Louvers Only



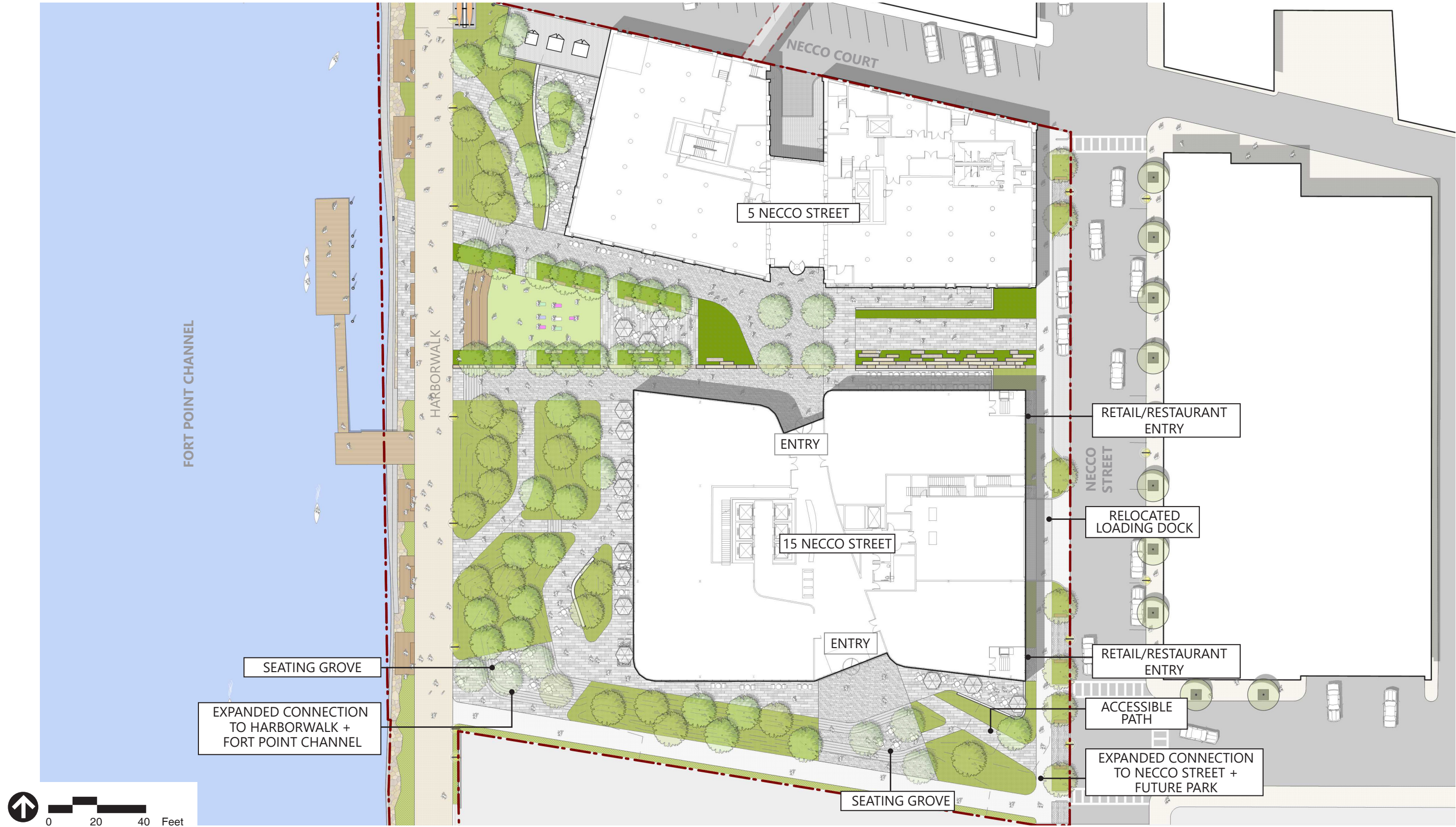
Option 2: Vertical Blades, Horizontal Louvers



Option 3: Diagonal Blades, Horizontal Louvers



Option 4: Vertical Blades Only, Staggered

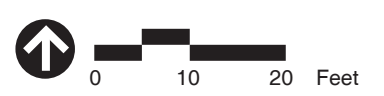


Source OJB

- Site Boundary
- Design Improvements Proposed Under the Project Change (New Building)

OJB

Figure 2.7
Project Change (New Building)
Proposed Landscape Plan
15 Necco Street Project
Boston, Massachusetts



- Source OJB
- Site Boundary
 - Design Improvements Proposed Under the Project Change (New Building)
 - Design Features Associated with the Previously Approved Project

OJB

Figure 2.8a
Open Space Element - Public Plaza

15 Necco Street Project
Boston, Massachusetts



OJB

Figure 2.8b
Open Space Element - Harborwalk

15 Necco Street Project
Boston, Massachusetts



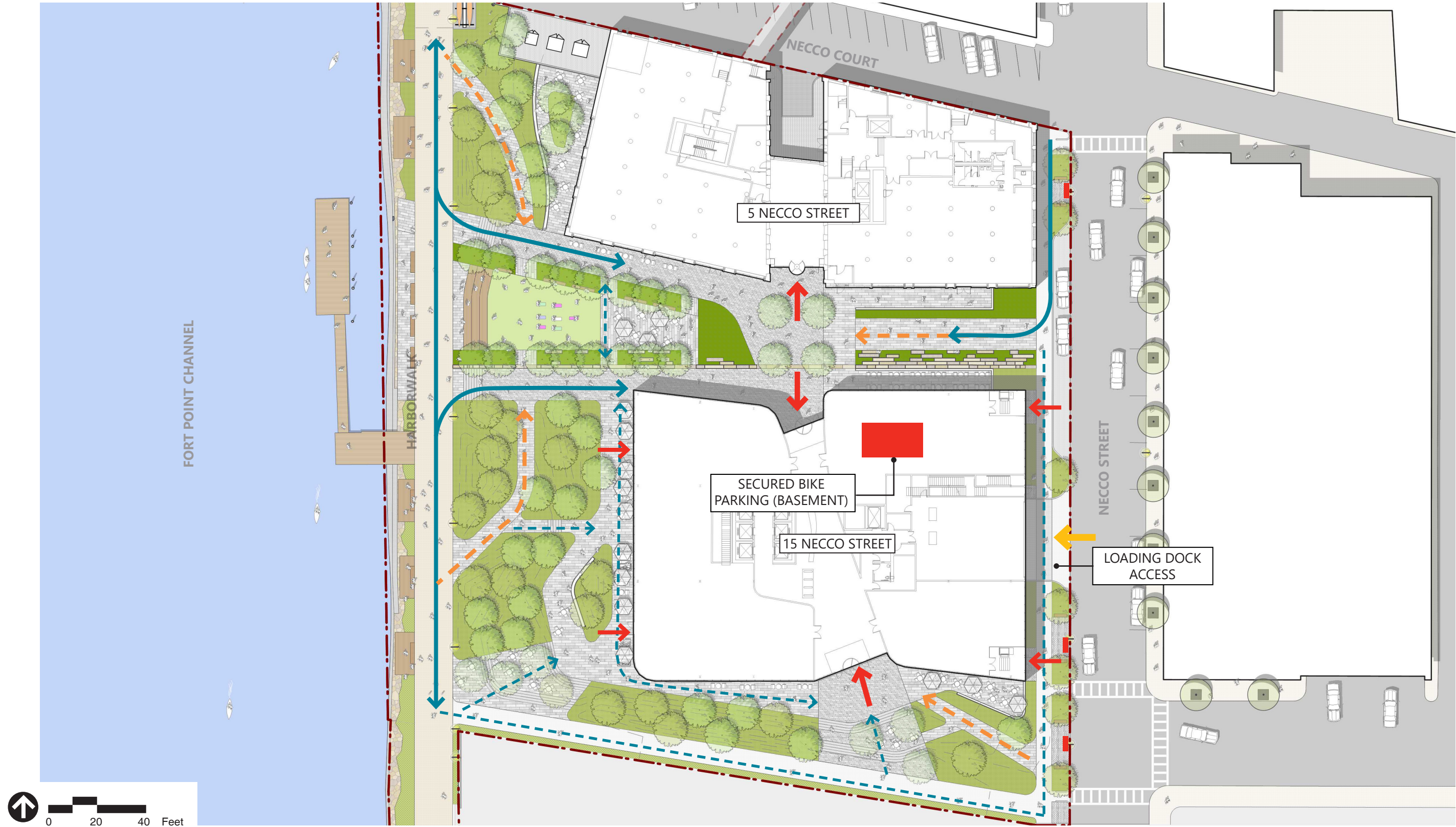
Source OJB

- Site Boundary
- Design Improvements Proposed Under the Project Change (New Building)
- Design Features Associated with the Previously Approved Project

OJB

Figure 2.8c
Open Space Element - Southeast Entry

15 Necco Street Project
Boston, Massachusetts



Source OJB

OJB

Figure 2.9
Pedestrian Access and Circulation Plan

15 Necco Street Project
Boston, Massachusetts

3

Sustainability, Climate Resiliency, and Greenhouse Gas Emissions Assessment

This chapter describes the elements of the Proposed Project related to sustainable design which are intended to demonstrate compliance with the provisions of Article 37 of the Zoning Code, which requires that project subject to Article 80B Large Project Review be LEED-certifiable. This chapter also addresses the City's Green Building policies and priorities, as set forth in the BPDA Climate Change Resiliency and Preparedness Policy (the "Resiliency Policy"). This chapter also provides an updated assessment of predicted climate change impacts and proposed site resiliency measures. The completed BPDA Climate Change Resiliency and Preparedness Checklist (the "Resiliency Checklist") is provided in Appendix A. In support of the City's Greenhouse Gas ("GHG") emissions reductions goals, this chapter also presents the estimated energy usage and GHG emissions reductions for the Proposed Project.

3.1 Summary of Key Findings and Benefits

Sustainable Design

- › The Proposed Project targets a high level of sustainability by designing the Project Site and New Building using the LEED for Core & Shell version 4 ("LEED-CS") rating system to demonstrate compliance with Article 37, Green Building of the Code.
- › The Proposed Project will be designed and constructed to be LEED-CS Gold certifiable (a minimum 60 points) and aspires to explore all possible opportunities to optimize sustainability, to the extent feasible, as the design and engineering of the Proposed Project is further advanced.
- › The sustainable design approach for 5 Necco Street is unchanged from the previously approved project. The Proponent is continuing to target a Silver certifiable level under the LEED for New Construction and Major Renovation version 4 rating system ("LEED-NC").

GHG Emissions

- › In support of Boston's GHG emissions reductions goals, the Proponent has considered and will continue to evaluate energy conservation measures to reduce overall building energy usage and reduce associated GHG emissions.
- › Preliminary energy modeling conducted for the Proposed Project assessed the current building system design and alternative energy options, and demonstrates that the proposed building designs meet the Massachusetts Stretch Energy Code

requirement to be at least 10 percent better than ASHRAE 90.1-2013 (the "Base Case").

- The New Building has been designed to reduce overall annual energy consumption by an estimated 35.6 percent compared to the Base Case through the implementation of energy-optimizing building design and systems, as well as on-site renewable energy sources (solar PV and geothermal system).
 - The New Building design is estimated to reduce stationary source GHG emissions by approximately 25.3 percent from the Base Case.
- › The Proponent has and will continue to evaluate the incorporation of on-site clean and renewable energy sources.
 - › The Proponent is committed to installing a rooftop solar PV system, and is considering and exploring incorporating a geothermal system as part of the New Building.

Resilient Design

- › Consistent with the previously approved project, the proposed site design will provide protection to the Proposed Project relative to the FEMA 100-year and 500-year floodplain limits through site grading and landscaping.
- › By raising the Project Site grade so that the finished floor elevation for the New Building is at +19.5 Boston City Base ("BCB"), the Proposed Project will minimize impacts from the 1% annual chance flood, taking into consideration a projected 40 inches of sea level rise (SLR), through 2070.
- › In addition, the Proposed Project will incorporate modular landscape solutions to accommodate fluctuations in sea level rise in the future. Refer to Figure 3.3 for a depiction of potential future resiliency strategies.

3.2 Sustainability/Green Building Design

Article 37 submittal requirements include completing a LEED scorecard to demonstrate that a project is "LEED certifiable," which means that it meets the minimum requirements to achieve a LEED Certified level (all LEED prerequisites and achieve at least 40 points) without registering or certifying the project with the USGBC. This documentation is reviewed by the Boston Interagency Green Building Committee ("IGBC"), which is responsible for advising the BPDA on a proposed project's compliance with the provisions of this article.

The Proponent intends to incorporate myriad key aspects of sustainability and high-performance building design into the New Building. The New Building will be designed and constructed to be LEEDv4 Gold certified (a minimum 60 points), thus exceeding the performance standards set forth in Article 37 of the Zoning Code. Refer to Figures 3.1a-b for a preliminary LEED scorecard. Refer also to Figure 3.2 for an infographic depicting targeted sustainability strategies associated with the New Building.

The sustainable design approach for 5 Necco Street is unchanged from the previously approved project, which is now nearing construction completion for floors 2-6. The Proponent is continuing to target a Silver certifiable level under LEED for New Construction and Major Renovation version 4 ("LEED-NC"). In compliance with Article 37 of the Zoning Code, after completion of construction and prior to filing to ISD for a Certificate of Occupancy, the original applicant, GE, will submit a final Construction Green Building Report for 5 Necco Street, and an Affidavit of Construction Compliance with the BPDA.

3.2.1 Compliance with Article 37/Green Building Design

As with the previously approved project, the Proponent is committed to incorporating many key aspects of sustainability and high-performance building design into the New Building. It will be designed and constructed targeting a Gold level certification under the LEED for Core and Shell version 4 ("LEED-CS"), in accordance with the requirements of Article 37.¹ The Proponent intends to seek third-party certification from the USGBC for the New Building.

The sustainable design approach for 5 Necco Street is unchanged from the previously approved project. The Proponent is continuing to target a Silver certifiable level under LEED for New Construction and Major Renovation version 4 ("LEED-NC"). Consistent with the previously approved project, a Master Site LEED documentation approach is being considered to accommodate both 5 Necco Street and the Proposed Project, and to streamline the documentation process for potential future certification. The LEED prerequisites and credits available to be documented through the Master Site process are indicated within the draft LEED-CS scorecard (Figure 3.1a-b). A summary of the preliminary approach to the credit categories is outlined below.

The following narrative describes credits known to be achievable by the Proposed Project based on the conceptual design of the New Building, and those to be considered or evaluated further as design advances. LEEDv4.1 is the recently released update to the LEEDv4 Rating System. Where applicable, LEEDv4.1 credits have been substituted for LEEDv4 credits as allowable within the LEED certification process. A note has been added next to the credit names below for those substituting the new credit requirements.

Community & Building Health

ARE was recognized by the Global Real Estate Sustainability Benchmark as the #1 company globally for promoting health and well-being through its real estate and operations, and received the "Best in Building Health" award from the Center for Active Design. The Project team is pursuing Fitwel Certification for the New Building,

¹ LEEDv4.1 is the recently released update to the LEEDv4 Rating System. Where applicable, more stringent LEEDv4.1 credits have been substituted for LEEDv4 credits, as allowable within the LEED certification process.

which prescribes best practices for site and building design, construction, and operations that will help the Proposed Project and neighborhood attract and retain a diverse and dynamic population, and which support occupant and community health, productivity, and safety.

The Federal Government's Center for Disease Controls and Prevention ("CDC") has shown that high Fitwel scores are correlated with the following positive impacts:

- › Increase physical activity
- › Provide healthy food options
- › Instill feelings of well-being
- › Promote occupant safety
- › Support community health
- › Increase social equity
- › Reduce morbidity and absenteeism

Integrative Process (IP)

This credit requires the team to identify and use opportunities to achieve synergies across disciplines and energy-related and water-related building systems.

Preliminary energy modeling and water budgeting were completed before the end of schematic design and design use targets are set. These analyses will inform the owner's project requirements ("OPR"), basis of design ("BOD"), design documents, and construction documents.

Location and Transportation (LT)

This category encourages project teams to take advantage of the infrastructure elements in existing communities that provide environmental and human health benefits. The LT category considers how this infrastructure affects occupants' behavior and environmental performance. The location of the Proposed Project in the Fort Point Channel Historic District in the heart of Boston on a previously developed parcel provides the opportunity to earn many of the credits in this category.

- › **Sensitive Land Protection:** The Proposed Project is located on land that is previously developed and therefore meets the credit requirements.
- › **High Priority Site:** The Proposed Project is located on an infill location in a historic district (Fort Point Channel Historic District) and therefore meets the credit requirements. This will be documented as a Master Site credit.
- › **Surrounding Density and Diverse Uses:** The Proposed Project appears to meet both aspects of the credit due to its proximity to other offices and businesses. Credit compliance will be evaluated during design and the credit will be documented as part of the Master Site.

- › **Access to Quality Transit (LEEDv4.1):** The Proposed Project is within walking distance (less than 1/2 mile) of the South Station commuter rail transit hub, which also serves as a bus depot. The credit will be documented as part of the Master Site.
- › **Bicycle Facilities (LEEDv4.1):** Covered bicycle storage will be provided in the basement of the New Building; shower rooms will be provided adjacent to bicycle storage. The Proposed Project is located adjacent to a qualifying bicycle network.
- › **Reduced Parking Footprint (LEEDv4.1):** The Proposed Project has not provided any new parking as part of the development of the Project Site and therefore complies with this credit.
- › **Green Vehicles (LEEDv4.1):** The Proposed Project has not provided any new parking as part of the development of the Project Site, but the Proponent will consider working with neighbors to potentially provide some parking along Necco Street. Achievement of this credit is contingent on the final design.

Sustainable Sites (SS)

- › **Prerequisite** - Construction Activity Pollution Prevention: The Project-specific construction documents will include erosion and sedimentation control guidance for onsite implementation by the Construction Manager, (CM). The CM is required to implement a compliant erosion and sedimentation control plan that meets local requirements and the 2012 U.S. Environmental Protection Agency (EPA) Construction General Permit or local equivalent.
- › **Site Assessment:** A site assessment of key attributes is completed and documented at the start of design to evaluate sustainable options and inform related decisions about site design. The credit will be documented as a Master Site credit.
- › **Site Development: Protect or Restore Habitat (LEEDv4.1):** The intent of the credit is met by the design – to restore damaged areas to provide habitat and promote biodiversity. Achievement of this credit, requiring 25 percent of previously disturbed area to be restored, is contingent on the final design. If achieved, the credit will be documented as a Master Site credit.
- › **Open Space:** The proposed site design meets the intent of the credit – to create exterior open space that encourages interaction with the environment, social interaction, passive recreation, and physical activities. Achievement of the credit is contingent the final design. If achieved, the credit will be documented as a Master Site credit.
- › **Rainwater Management (LEEDv4.1):** In accordance with the BPDA Smart Utilities Policy, site stormwater infiltration systems—which include subsurface recharge chambers and Green Infrastructure elements—will promote groundwater recharge to the extent of 1.25 inches over the post-development impervious site cover. If achieved, the credit will be documented as a Master Site credit.

- › **Heat Island Reduction:** An SRI-compliant roof will be specified where the roof is not vegetated. Compliant hardscapes will be installed. The credit will be documented as a Master Site credit.
- › **Light Pollution Reduction:** The Proposed Project will evaluate the use of compliant exterior and site light fixtures and if the light trespass from the site can be minimized. Achievement of this credit is contingent on the final design.
- › **Tenant Design and Construction Guidelines:** The Proposed Project will provide a set of guidelines for prospective tenants that outlines the sustainability strategies employed by the base building and provides guidance for tenants that are interested in pursuing a LEED Interior Design and Construction certification for their fit-out space.

Water Efficiency (WE)

Preliminary water balance calculations indicate that the selection of low-flow, high-efficiency fixtures, WaterSense appliances and roof rainwater capture/reuse will reduce the potable water demand for the Proposed Project over 35 percent compared to a code baseline. Native and salt-water tolerant plantings will reduce potable water demand for the landscape features.

- › **Prerequisite/Credit: Outdoor Water Use Reduction:** Both can be met if no permanent irrigation is required. Reducing the Proposed Project's landscape water requirement by at least 30 percent from the calculated baseline for the site's peak watering month meets the prerequisite; 50-100 percent earns points for the credit. A minimum of a 50 percent reduction from baseline is expected; the credit will be documented as a Master Site credit.
- › **Prerequisite/Credit: Indoor Water Use Reduction:** Through the specification of low-flow high-efficiency plumbing fixtures, the Proposed Project will exceed the required 20 percent annual potable water use reduction and will target the annual potable water use reduction by at least 35 percent.
- › **Prerequisite/Credit: Water Metering:** Permanent meters for buildings and associated grounds must be installed and the data shared with USGBC for a minimum of five years. The credit can be earned by installing meters for two or more subsystems; this is being pursued and the systems to be sub-metered will be evaluated as design progresses.
- › **Cooling Tower Water Use:** A potable water analysis will be conducted to measure five control parameters in order to maximize the number of cooling tower cycles that can be achieved without exceeding the allowed concentration level of the parameters. Achievement of this credit is contingent on the final design.

Energy and Atmosphere (EA)

- › **Prerequisite/Credit: Fundamental and Enhanced Commissioning and Verification:** The Proponent will engage a Commissioning Agent ("CxA") during

all phases of the Proposed Project to review the proposed design and ultimately confirm the building systems are installed and function as intended and desired. The Proposed Project is pursuing Monitoring-Based and Enhanced Commissioning and Building Envelope Commissioning, which will be documented as part of the Construction Application.

- › **Prerequisite/Credit: Energy Performance:** As design progresses, the design team will continue to use whole building energy modeling to document the annual energy use and cost savings. The Proposed Project intends to employ the approved Alternative Compliance Path (“EApc95”) for this credit, allowing the Proponent to evaluate the performance of the Proposed Project using the GHG Emissions reduction and Source Energy savings in addition to the cost savings metric. Early energy modeling results indicate an estimated annual savings of 29 percent (13 points) for the Proposed Project when compared to a baseline building performance as calculated using the rating method in Appendix G of ANSI/ASHREA/IESNA Standard 90.1-2010.²
- › **Prerequisite/Credit: Energy Metering:** Permanent meters for buildings must be installed and the data shared with USGBC for a minimum of five years. The credit can be earned by installing meters for all whole-building energy sources used by the building and any individual energy end uses that represent 10 percent or more of the total annual consumption of the building; this is being evaluated as design progresses.
- › **Prerequisite: Fundamental Refrigerant Management:** As per the prerequisite requirements, the specifications for refrigerants used in the building HVAC & R systems will not permit the use of CFC based refrigerants.
- › **Renewable Energy Production:** Renewable energy systems are being evaluated for the Proposed Project. The Proponent is committed to installing a rooftop solar PV system and is considering and exploring incorporating a geothermal system as part of the New Building. Achievement of this credit is contingent on the final design.
- › **Enhanced Refrigerant Management:** Once the mechanical cooling equipment has been specified, submitted, and approved, final calculations will be run to confirm if credit requirements are met.
- › **Green Power and Carbon Offsets:** This credit can be achieved by purchasing Green Power and Carbon Offsets for 50 percent (1 point) or 100 percent (2 points) of the building’s total energy use, for a minimum of five (5) years. The Proponent has committed to purchasing RECs and Carbon Offsets for 100 percent of the building’s energy use, for two total points. This credit will be documented within the Construction Application.

² Please note that the LEED v4 rating system requires performance evaluation against ASHRAE Standard 90.1-2010 to demonstrate compliance with the Energy Performance prerequisite and credit. The Massachusetts Stretch Energy Code requires evaluation against the more recent IECC 2015/ASHRAE Standard 90.1-2013, which will present differing performance results than the LEED documentation.

Materials and Resources (MR)

This category now focuses on minimizing the embodied energy and other impacts associated with the extraction, processing, transport, maintenance, and disposal of building materials. The requirements are designed to support a life-cycle approach that improves performance and promotes resource efficiency. Each requirement identifies a specific action that fits into the larger context of a life-cycle approach to embodied impact reduction.

- › **Prerequisite: Storage and Collection of Recyclables:** Recyclables will be collected throughout the building and designated storage for collected recyclables will be provided in the Proposed Project. The recyclables will be collected by a contracted waste management company on a regular basis. Additionally, safe collection, storage, and disposal of batteries and e-waste will be incorporated into the project design.
- › **Prerequisite/Credit: Construction and Demolition Waste Management (LEEDv4.1):** A Construction Waste Management Plan (CWMP) must be submitted for the prerequisite. The CM will endeavor to divert as much demolition debris and construction waste from area landfills as possible with a minimum diversion rate of 75 percent overall. The LEED credit will be evaluated based on performance during the construction process.
- › **Building Life-Cycle Impact Reduction (LEEDv4.1):** For three total points under Option 4 of this credit, a Whole-Building Life-Cycle Assessment (LCA) must be conducted of the Project's structure and enclosure that demonstrates a minimum of 10% reduction, compared to a baseline building, in at least three of the six impact categories evaluated. The Proponent and project team are currently considering study of the embodied carbon of the Project as a means of further reducing the overall carbon footprint. This credit will be evaluated during the design process.
- › **Building Product Disclosure and Optimization – Environmental Product Declarations (LEEDv4.1):** The Proposed Project building must use at least 10 different permanently installed products sourced from at least three different manufacturers with EPD documentation. This credit will be documented within the Construction Application.
- › **Building Product Disclosure and Optimization – Sourcing of Raw Materials (LEEDv4.1):** To achieve this credit, the Proposed Project must each use at least 20 different permanently installed products sourced from at least five different manufacturers that have publicly released a report from their raw material suppliers. This credit will be evaluated during the design process.
- › **Building Product Disclosure and Optimization – Material Ingredients (LEEDv4.1):** The Proposed Project building must use at least 10 different permanently installed products sourced from at least three different manufacturers that use approved programs to demonstrate the chemical inventory of the product to at least 0.1 percent. This credit will be documented within the Construction Application.

Indoor Environmental Quality (EQ)

Construction practices will promote a high level of indoor air quality during construction. Low-emitting materials (low to no Volatile Organic Compounds, or VOCs) will be used throughout the Proposed Project to promote health and wellness for occupants. Quality views of the Boston skyline and Fort Point Channel will be provided for occupants. Design strategies will focus on occupant comfort, controllability, and well-being.

- › **Prerequisite - Minimum Indoor Air Quality Performance:** The Proposed Project mechanical systems are designed to meet or exceed the requirements of ASHRAE Standard 62.1-2010 sections 4 through 7. Outdoor air intake flow is monitored.
- › **Prerequisite - Environmental Tobacco Smoke Control:** The Proposed Project building will be smoke-free, and smoking will be prohibited within 25 feet of building entrances, openings, and air intakes. Signage will be posted as required.
- › **Enhanced Indoor Air Quality Strategies:** The design team will aim to minimize and control the entry of pollutants into the building and to contain chemical use areas. Achievement of this credit is anticipated.
- › **Low-Emitting Materials (LEEDv4.1):** This credit now includes requirements for product manufacturing as well as project teams. It covers VOC emissions in the indoor air and the VOC content of materials, as well as the testing methods by which indoor VOC emissions are determined. Different materials must meet different requirements to be considered compliant for this credit. The building interior and exterior are organized in eight categories, each with different thresholds of compliance. The building interior is defined as everything within the waterproofing membrane. The building exterior is defined as everything outside and inclusive of the primary and secondary weatherproofing system, such as waterproofing membranes and air- and water-resistive barrier materials. One point is currently targeted to be achieved, which will require meeting the thresholds of compliance for two of the eight product categories. Categories being targeted for compliance are: Flooring and Composite Wood.
- › **Construction Indoor Air Quality Management Plan:** The CM will be required to develop and implement a compliant Indoor Air Quality Management Plan for the construction and pre-occupancy phases of the Proposed 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). Other credit requirements include protecting absorptive materials, providing proper filtration media, and prohibiting the use of tobacco products inside and within 25 feet of the building entrances during construction.
- › **Quality Views:** A direct line of sight to the outdoors via vision glazing must be provided for 75 percent of all regularly occupied floor area; a clear image must be provided of the exterior. The Proposed Project is pursuing this credit and final calculations will be provided during final design.

Innovation in Design (IN)

- › **Innovation – Purchasing, Lamps:** The Proposed Project will be designed with 100 percent LED lighting technology that exceeds the efficiency of their mercury-containing counterparts. This will eliminate the use of mercury-containing lamps within the Proposed Project, reducing the exposure hazards of building occupants and staff.
- › **Innovation – O+M Starter Kit:** Green Cleaning Policy and Integrated Pest Management: The Proposed Project will develop and implement a Green Cleaning Policy to be utilized within the building that complies with the specific requirements under LEED-EB:O+M Rating System. Additionally, the Proposed Project will develop and implement an Integrated Pest Management Program that will emphasize low-impact pest control methods that reduce potential exposure of occupants to harmful pesticides on the Project Site.
- › **Pilot Credit – Integrated Analysis of Building Materials:** The Proposed Project will 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 products life cycle. Qualitative analysis will meet the requirements of this Pilot Credit.
- › **LEED Accredited Professional:** The design team for the Proposed Project includes several LEED Accredited Professionals (AP). Therefore, this credit will be achieved.

Regional Priority Credits

Applicable Regional Priority Credits (RPC) for the Proposed Project include:

- › High Priority Site (2 points threshold)
- › Rainwater Management (2 points threshold)
- › Renewable Energy Production (5 percent – 2 points threshold)
- › Optimize Energy Performance (8 points threshold)
- › Indoor Water Use Reduction (40 percent – 4 points threshold)

The High Priority Site credit will be met as a Master Site credit. The Rainwater Management RPC will be met as a Master Site credit. The Proposed Project is tracking to achieve the Optimize Energy Performance credit. The Proposed Project may be able to achieve the Renewable Energy Production credit; final energy cost savings provided by the PV system will be determined later in design.

Boston Green Building Credits

Appendix A of Article 37 lists Boston Green Building Credits, which are credits that may be included in the calculation toward achieving a LEED certifiable project. These credits were developed by the City and are intended to address local issues unique to development within Boston. The credits include the following categories: Modern Grid, Historic Preservation, Groundwater Recharge, and Modern Mobility.

- › **Modern Grid:** The Proposed Project is not eligible for this credit as the proposed design does not qualify as a Distributed Generation/Combined Heat and Power project.
- › **Historic Preservation:** There is no change from the previously approved project. The 5 Necco Street component includes the renovation of the Brick Buildings, which are both listed in the State and National Registers of Historic Places as contributing structures to the Fort Point Channel Historic District. The proposed renovation of the Brick Buildings will be undertaken in accordance with the Fort Point Channel Landmark District design standards and criteria.
- › **Groundwater Recharge:** The Project Site is located within the Groundwater Conservation Overlay District (GCOD) and, therefore, the Proposed Project is required to promote the recharge of at least 1 inch of surface runoff over the post-development condition site impervious area within the Project Site limits. As currently designed, site stormwater infiltration systems—which include subsurface recharge chambers and Green Infrastructure elements—will promote groundwater recharge to the extent of 1.25 inches over the post-development impervious site cover.
- › **Modern Mobility:** The Proposed Project is providing covered, secure bicycle storage with convenient changing/shower facilities and is evaluating incorporation of additional requirements as listed for this credit, as applicable to the Project Site. Achievement of this credit is anticipated.

3.3 Approach to Energy Conservation/GHG Emissions Reductions

In alignment with regional efforts to reduce GHG emissions and in support of Boston's specific GHG emissions reduction targets, the Proponent has evaluated energy conservation measures ("ECMs") for possible inclusion in the Proposed Project. Whole building energy modeling based on the conceptual design of the New Building was updated from the previously approved project. The Proponent has considered the Project in the context of Boston's Climate Action Plan and the Draft Zero Carbon Building Assessment in Section 3.3.6. There is no change to 5 Necco Street from the previously approved project; therefore, the following section describes the energy efficiency measures, and associated estimated energy savings and GHG emissions reductions for the New Building only.

3.3.1 Methodology

Updated Base Case

Since the filing of the previously reviewed project in 2016, the Stretch Energy Code has been updated to require new construction projects to demonstrate a 10 percent energy savings compared to the ASHRAE 90.1-2013 energy code. The previously approved project was required to be approximately 15 percent more efficient than

the IECC2012 and ASHRAE standard 90.1-2010. The Base Case used for the updated New Building energy assessment (IECC2015/ASHRAE 90.1-2013) requires a more energy efficient building construction than the baseline of the previously approved project. As a result, the energy savings of the Design Case cannot be directly compared to the previously approved project, which was based on a less stringent baseline.

Design Case

The New Building will meet the updated code requirement to have energy consumption a minimum of 10 percent below an ASHRAE 90.1-2013 baseline. The Proposed Project includes the construction of a 316,100-square foot multi-tenant building assumed to consist of 40 percent office space and 60 percent laboratory/life sciences space. The Proponent has analyzed multiple design alternatives, resulting in the proposed Design Case.

The major ECMs included in the Design Case are external shading, a geothermal heating system supplemented by condensing boilers, reduced lighting power density and chilled beams/fan coil units. A full presentation of the modeling inputs associated with the Design Case is provided in Appendix C (listed as "Proposed Option 0"). Since the design of the Proposed Project components are conceptual, the specific proposed improvements may be subject to design modifications, as necessary, where the stationary source GHG emissions reductions goals established by this assessment will be used to guide final building design.

3.3.2 Energy Modeling Results

The previously approved project already set a high-performance bar by including many energy and CO₂ reduction strategies, including the proposed solar array, fixed exterior shades, premium efficiency HVAC systems and low lighting power density. The Proposed Project is continuing to achieve a high level of energy savings and CO₂ reduction strategies through improvements such as the high efficiency heating and cooling systems, improved lighting options and commitments to pursue a geothermal heat pump system.

Based on the Design Case, the estimated energy usage for the New Building would be reduced by approximately 35.6 percent compared to the Base Case (Table 3-1).³ The energy consumption of the overall New Building is expected to result in an estimated GHG emissions of 4,060 tons per year, which represents a 25.3 percent reduction from the Base Case (Table 3-2).

³ Energy usage savings is different from energy cost (used to determine LEED points), which is dependent on different energy sources and associated utility rates.

Table 3-1 Energy Usage Savings for the New Building

	Energy Consumption		
	Electricity (MMBtu)	Natural Gas (MMBtu)	Total (kBtu/sf)
Base Case (ASHRAE 90.1-2013)	34,800 51%	33,500 49%	185
Design Case	35,800 81%	8,200 19%	119
Design Case Savings	-1,000	25,300	66
Design Case Percent Savings	-3%	76%	35.6%

Table 3-2 Estimated Greenhouse Gas Emissions for the New Building

	Greenhouse Gas (CO ₂) Emissions		
	Electricity (short tons)	Natural Gas (short tons)	Total (short tons)
Base Case (ASHRAE 90.1-2013)	3,478 64%	1,960 36%	5,438
Design Case	3,581 88%	480 12%	4,060
Design Case Savings	-102	1,480	1,378
Design Case Percent Savings	-3%	76%	25.3%

Notes: 682 lb CO₂/MWh was used to convert electricity consumption into the amount of CO₂ emissions (2017 ISO-New England Marginal Emissions Report).

117 lb CO₂/MMBtu was used to convert gas consumption into the amount of CO₂ emissions (The Energy Information Administration Documentation for Emissions for GHG).

3.3.3 Clean and Renewable Energy Evaluation

A variety of clean and renewable energy sources have been evaluated for incorporation into the Proposed Project, including ground source heat pumps, rooftop solar, combined heat and power ("CHP"), and steam. Based on the analysis, roof-mounted solar PV panels and ground source heat pumps are the most effective strategies to incorporate into the New Building Design.

Geothermal (Ground Source Heat Pumps)

The Proponent is considering and exploring incorporating ground source heat pumps into the design of the building and the energy modeling of the Design Case, presented above. The Design Case assumes that 35 loops at 800 feet can be accommodated on-site. The Proponent has analyzed an alternative geothermal system composed of 56 loops at 800 feet, but further feasibility analysis has shown that the site cannot accommodate the increased system size. As the ground source heat pumps alone will not be sufficient to fulfill the Project's energy need, the system will be supplemented by condensing gas-fired boilers.

Solar Photovoltaic (PV) Systems

An evaluation of incorporating roof-mounted solar PV systems has been conducted for the Proposed Project (please refer to Appendix C). At a minimum, the Proponent is committed to providing a 120-kW Solar PV array on the rooftop of the mechanical penthouse. The Proponent has explored an alternative solar PV system that incorporates a 230-kW Solar PV array on the rooftop of the mechanical penthouse, and building-integrated PV arrays on the south, east, and west facades of the mechanical penthouse in order to maximize the PV array area. The solar PV array is expected to produce between approximately 138,000 to 211,000 kWh of electricity annually, reducing GHG emissions by approximately 42 to 72 tons per year (based on the range of system sizes from 120-kW to 230-kW). These systems would benefit from \$18,000 to \$28,000 of incentives through the Solar Massachusetts Renewable Target ("SMART") Program.

Combined Heat and Power (Co-Generation)

Co-generation, the combined generation of electricity and heat, will continue to be reviewed as the design progresses. CHP was considered for the Proposed Project; however, CHP was ruled out because it is most favorable when there is a significant year-round heat requirement, such as residential and such a system would reduce the rooftop space available for the solar PV system. The Proposed New Building uses have limited heat demands.

Steam

The Proposed Project is located outside of the area where access to the district's steam energy is available. Boston's Green Steam Territory does not cross the Fort Point Channel into the area in which the Proposed Project is located.

3.3.4 Renewable Energy Credits

The Proponent will further reduce GHG emissions by purchasing RECs to offset all electricity consumed by the New Building, including tenant end uses. Based on the energy modeling conducted for the Design Case, the purchase of RECs is equivalent to reducing additional GHG emissions by approximately 3,581 tons per year.

3.3.5 Incentive Programs

The Proponent has considered the many incentive programs that are available to assist in purchasing assets that will reduce the energy consumption and GHG emissions associated with the New Building. Depending on the final design, the Proponent may be entitled to the following incentives:

- › Utility Incentives;
- › Federal Investment Tax Credits for Solar and Geothermal;
- › Solar Massachusetts Renewable Target Program;

- › Alternative Energy Credits; and
- › Federal Accelerated Depreciation for Solar and Geothermal.

The Proponent has estimated that design of the New Building under the Design Case could result in a total one-time incentive of \$1,073,000 and a total annual incentive of \$48,000. The details of this analysis are presented in Appendix C.

3.3.6 Zero Carbon Building Assessment

In 2010, the Boston Climate Action Leadership Committee and Community Advisory Committees presented the City's first climate action plan: Sparking the Climate Revolution 2010. The City recently released its latest update, the 2019 Climate Action Plan Update, which focuses on the implementation of priority actions, built on the results of the Carbon Free Boston report, to reach carbon neutrality by 2050. Specifically, the 2019 Plan Update requires strengthening of green building zoning requirements to a zero net carbon standard. The IGBC has started this process by drafting guidelines to require Zero Carbon Building Assessment for projects in the Article 37 process.

The Proponent has prepared a zero carbon alternative assessment for the Project in line with the Zero Carbon Building Assessment and Climate Action Plan goals. The full analysis is presented in Appendix C. The Proponent has evaluated an alternative to the Design Case to result in an all-electric building. The all-electric design alternative replaces the high-performance run-around energy recovery system with a dual-wheel energy recovery system, the gas-fired boilers with electric resistance boilers, and improves the building's envelope. The resulting overall energy usage savings compared to the Base Case would be approximately 45.5 percent and the GHG emissions reductions would be approximately 31.6 percent. Additionally, since the Proponent is committed to purchasing RECs to offset all electricity consumed by the New Building, the result would be a carbon neutral building design. The electric resistance boilers that supplement the geothermal system result in a high electric demand charge, which erodes most of the energy cost savings from the other efficiency measures under current conditions. Appendix C further details the construction costs, incentives, and overall financial feasibility in the Zero Carbon Building Assessment. While not a part of the current Design Case, the Proponent is planning to reserve space in the New Building to be used for battery storage to meet future energy needs.

3.4 Resiliency and Climate Change Preparedness

As required by the BPDA for all projects subject to Article 80B Large Project Review, the Proponent has considered anticipated changes in the Boston area climate, as reflected in the Resiliency Checklist provided in Appendix A.

The Project Site was evaluated for the previously approved project in terms of vulnerability to anticipated climate change impacts related to flooding based on two

reports: the Massachusetts Office of Coastal Zone Management (CZM)'s *Sea Level Rise: Understanding and Applying Trends and Future Scenarios for Analysis and Planning* (2013) and the Boston Research Advisory Group's *Climate Change and Sea Level Rise Projections for Boston* (2016). Since completion of the above analysis, revised projections and additional information have become available. Therefore, this NPC reevaluates the Project Site based on the most recent projections from the City of Boston's *Climate Ready Boston Report* (2016) and the BPDA's current *Resiliency Policy* (2017), *Resiliency Checklist* (2017), and the online *Sea Level Rise Flood Mapping* tool, and discusses the Proposed Project's consistency with the 2018 *Coastal Resilience Solutions for South Boston* ("CRB South Boston").

3.4.1 Updated Vulnerability Assessment

Climate Ready Boston and the BPDA's Climate Resiliency Guidance document indicate that sea level in Boston will continue to rise throughout the century, with 4 to 8 inches of SLR above 2000 sea levels by 2030; 7 inches to 1.5 feet by 2050; 1.3 to 3.1 feet by 2070; and 2.4 to 7.4 feet (with a maximum possible of 10.5 feet) by 2100.

The currently effective FEMA Flood Insurance Rate Map ("FIRM") indicates that the Project Site is currently susceptible to flooding from the one percent annual chance flood (also known as the 100-year flood) up to approximately 16.5 feet of elevation Boston City Base datum ("BCB"), or the "base flood elevation" ("BFE"). According to the *Climate Ready Boston Map Explorer*, due to its adjacency to the Fort Point Channel, the Project Site is projected to be inundated by the 10 percent annual chance flood by 2030. CRB South Boston asserts that the east side of the Fort Point Channel will face exposure to flooding from average monthly high tides by mid- to late-century. This means that inundation is expected at average monthly high tide without any storm conditions.

BPDA's Climate Resiliency Guidance

The BPDA's Climate Resiliency Guidance document states that projects within the FEMA Special Flood Hazard Area ("SFHA") or the BPDA Sea Level Rise – Flood Hazard Area ("SLR – FHA") should use its recommended Sea Level Rise – Design Flood Elevation ("SLR – DFE") for the year 2070 as the minimum performance target for assessing SLR impacts and for reducing or eliminating flood risk, potential damage, and related adverse impacts.

The projected SLR – DFEs are comprised of two components: the SLR-BFE and freeboard. The SLR-BFE is based on the Boston Harbor Flood Risk Model ("BH-FRM") results, which include 40-inches of SLR, 2.5 inches of local subsidence, and the one percent annual chance coastal flood event in 2070. Freeboard, an added measure of protection, is achieved by raising the first floor an additional amount above the BPDA SLR-BFE. The BPDA recommends setting the SLR – DFE using 12-inches of freeboard for non-critical, non-residential uses and 24-inches for critical buildings, infrastructure and ground floor residential. The BFE at the Project Site for 2070 is 19.5 feet BCB, resulting in an SLR – DFE of 20.5 feet BCB for non-residential uses. As

described below, this information was incorporated into the Proposed Project's design to the maximum extent practicable.

3.4.2 Proposed Resiliency Measures

Resiliency measures for the previously approved project as well as the currently Proposed Project are described below.

Previously Approved Resiliency Measures

Based on the initial flood vulnerability analysis presented in the EENF/EPNF, as well as site constraints related to accessibility, the previously approved project's finished floor elevation ("FFE") was set at 19.5 feet BCB for both 5 Necco Street and the New Building, which is approximately seven inches above CZM's projected BFE for the Project Site in 2075 under an intermediate-high emissions scenario. As a result, the FFE of 5 Necco Street was raised to meet an elevation of 19.5 BCB. This FFE also provides over two feet of freeboard above today's 500-year flooding event.

In addition, the FFE and site grading provided resiliency to inland flooding by including a drainage path from Necco Street across the lower site elevations and Necco Court, to the Fort Point Channel in the event that the local BWSC drainage infrastructure were to surcharge. The previously approved project also committed to a variety of measures related to the impacts of climate change, which are listed in Table 3-3 below.

Currently Proposed Resiliency Measures

The existing Necco Street pedestrian right-of-way, the area between the two buildings, and the newly-completed Harborwalk along the Fort Point Channel are built to an elevation of 15.5 feet BCB, and the landscape improvements between the Harborwalk and the New Building have been designed to address the slope change and to withstand storm events.

The Proposed Project has substantially the same footprint as the previously approved project. It maintains the 19.5 BCB FFE, eliminates the previously proposed below-grade parking garage, and updates the loading dock access location. These changes do not impact the New Building's resiliency to climate change. As with the previously approved project, the Proposed Project will continue to incorporate those resilient design elements listed in Table 3-3 below to which the previously approved project had committed. In addition, the Proponent has identified modular landscape enhancements that can be installed to increase resiliency to future sea level rise in an adaptive way. Please refer to Figure 3.3 for an illustration of the potential future resiliency measures.

Under the previously approved design, it was a challenge to achieve the grade change up to 19.5 feet of elevation at the entry locations to meet current ADA code requirements. Since the previously approved project was reviewed, the City now suggests to include one foot of freeboard.

During the Proponent's evaluation of a further increase of the FFE to 20.5 BCB, several challenges and considerations arose:

- › The additional grading to achieve ADA compliance with such an increase would result in a significant amount of additional hardscape; the introduction of steps between 5 Necco Street and the New Building entrances, both within the plaza and around the Project Site; hand-rails on all stairs; and switch-back ramping;
- › Even if an additional foot of fill were added to meet the 20.5 BCB target FFE, geotechnical experts advise that the fill outside the building would result in surface settlement settle given the composition of the fill and soil at the Project Site; consequently, there would be a strong potential for differential settlement issues in the future at the ground plane and the finished floor;
- › The additional fill could impact accessible routes between the New Building and the Harborwalk, which was recently widened and reconstructed as a component of the rehabilitation of 5 Necco Street;
- › The additional foot of fill would meet the target FFE of 20.5 BCB, but it would not generate a significantly more adaptive strategy for the New Building; and
- › Further increasing the grade change to the plaza between 5 Necco and the New Building would increase the risk of water being inadvertently directed into the basement of 5 Necco Street during regular and extreme weather events, as opposed to only during King Tides or flooding events.

Since the target FFE is likely to change as climate change projections are updated, the Proposed Project utilizes multiple strategies, as outlined in Figure 3.3, to allow for flexible adaptation over time. The strategies to be implemented in the future may include:

- › Increase the height of the landscaped areas to the target FFE of 20.5 BCB so that the landscape functions as berms, the height of which can be increased over time as elevation requirements are adjusted through the use of modular seat walls;
- › Add modular blocks to seat walls and other landscape walls to make up as many additional feet of elevation as required at the time of implementation of the Proposed Project; and
- › Utilize deployable flood barriers when necessary, such as aqua-fencing, with a minimum elevation of 20.5 BCB at the entry points to the Harborwalk in order to preserve access to the Harborwalk during extreme weather conditions.

The strategies utilized by the Proposed Project will protect the Project Site, the Brick Buildings, and the New Building against the potential flooding predicted by today's climate change projections and will position the buildings to seamlessly adapt to potential future conditions.

Table 3-3 Comparison of Previously and Currently Proposed Resiliency Measures

Resiliency Measure	Previously Approved Project	Currently Proposed Project (New Building)
Set FFE at 19.5' BCB.	✓	✓
Locate all electrical distribution system equipment/ components on the second floor.	✓	✓
Locate all life safety/ standby emergency generators on the roof.	✓	✓
Limit building systems and operations located in basement to non-critical systems and those which could withstand inundation.	✓	✓
Design flexible heating and cooling systems	✓	✓
Consider both movable and permanent flood barriers to protect garage entrance (set below SLR-BFE to match existing adjacent grade) up to 19.5 BCB.	✓	N/A ¹
Evaluate Green Infrastructure measures as site design advances to retain stormwater on-site in excess of 1.25 inches over the site's impervious cover.	✓	✓
Store roof runoff in holding tanks for reuse for cooling tower makeup and irrigation.	✓	✓
Design stormwater infrastructure to capture and convey short-duration, high-intensity precipitation events.	✓	✓
Install backflow preventers on all connections to the sanitary sewer system to prevent surcharging of sanitary sewer flows into the building.	✓	✓
Design the internal stormwater and sanitary sewer piping to be watertight up to the second floor to provide additional gravity head to promote discharge of stormwater and sanitary sewer flows should the backflow preventers fail to operate properly.	✓	✓
Specify watertight wall penetrations for utilities at the building face to prevent the intrusion of elevated groundwater levels.	✓	✓
Design the Project to enhance prevailing winds during the summer months to increase pedestrian comfort during extreme heat days.	✓	✓
Design surficial landscape to be tolerant to inundation by saltwater.	✓	✓
Provide an overland drainage path around the buildings and elevated pedestrian areas in case of inland flooding;	✓	✓
Install green/vegetated roofs to reduce heat island effect and help create a micro climate to enhance usability during all seasons.	✓	✓
Specify native plant materials to minimize need for irrigation and maintenance, while providing habitats for local fauna.	✓	✓
Explore the use of plant materials known for hydraulic redistribution to ensure survival under the multitude of climate conditions projected to be encountered over the Project Site's design life.	✓	✓
Identify additional flood adaptation measures that could be employed incrementally, including increasing the height of the landscaped areas and adding modular blocks to landscaping walls.	X	✓

¹ Due to the proximity to public transit and adjacent public parking facilities, the Project proposes no new parking spaces.

3.4.3 Consistency with CRB South Boston

As noted in Section 3.4.1 above, in the absence of a district-scale flood barrier, low-lying portions of South Boston are projected to be inundated by high-probability coastal storm flooding as early as 2030, and by tidal flooding by mid-to late century. This set of circumstances has implications not only for the Project Site, but also for adjacent low-lying inland areas. According to CRB South Boston, without action to eliminate flood paths on the east side of the Fort Point Channel (including on the Project Site), a one-percent annual chance flood event in the 2030s (assuming nine inches of SLR) would result in over \$317 million in direct physical damage, displacement, and relocation costs. Approximately 101 structures and 1,120 would potentially be impacted in such an event.

In response, through the CRB South Boston planning process, the City explored a variety of near- and long-term options for district-scale flood protection measures. CRB South Boston identified shore-based strategies, such as earthen berms, cheek walls, seawalls, and land-making, as the most beneficial for the Fort Point Channel. Its phasing strategy indicates that protecting the stretch of the Fort Point Channel adjacent to the Project Site is a near-term priority and should be completed by 2025.

The City identified three near-term steps that should be taken to increase resilience to projected coastal flooding along the Fort Point Channel, including:

1. Create a 40- to 50-foot wide Harborwalk park with an earthen berm landside of the existing Harborwalk;
2. Use new development to provide a continuous line of protection along the waterfront; and
3. Assess the structural soundness of the existing buildings to withstand flooding.

The Project is consistent with this approach and is able to accommodate the phased shore-based district-scale flood protection measures that will be coordinated by the City. The Project includes construction of an 18-foot wide Harborwalk. The New Building will be set back approximately 114 feet from the shoreline, providing ample space for the existing Harborwalk park and to implement a continuous line of flood protection measures. Also, as described in Section 3.4.2 above, the New Building will be designed to withstand flooding over the course of its design life.



LEEDv4 BD+C: Core and Shell (LEEDv4 CS)

Project Scorecard - Article 37 Report

DRAFT

Project: **15 Necco St**

Address: **Boston, MA 02210**

Date: **October 2019**

The Green Engineer
Sustainable Design Consulting

Yes Maybe No					
1	0	0		INTEGRATIVE PROCESS	1
D	1			IPc1 Integrative Process	1
Yes Maybe No					
18	2	0		LOCATION & TRANSPORTATION	20
D			N	LTc1 LEED for Neighborhood Development Location	20
D	2			LTc2 Sensitive Land Protection	2
D	2	1		LTc3 <u>High Priority Site</u>	2-3
D	6			LTc4 Surrounding Density and Diverse Uses	1-6
D	6			LTc5 Access to Quality Transit	1-6
D	1			LTc6 Bicycle Facilities	1
D	1			LTc7 Reduced Parking Footprint	1
D		1		LTc8 Green Vehicles	1
Yes Maybe No					
6	5	0		SUSTAINABLE SITES	11
C	Y			SSpr1 Construction Activity Pollution Prevention	Req'd
D	1			SSc1 Site Assessment	1
D		2		SSc2 Site Development - Protect or Restore Habitat	1-2
D		1		SSc3 Open Space	1
D	2	1		SSc4 <u>Rainwater Management</u>	2-3
D	2			SSc5 Heat Island Reduction	1-2
D		1		SSc6 Light Pollution Reduction	1
D	1			SSc7 Tenant Design and Construction Guidelines	1
Yes Maybe No					
5	4	2		WATER EFFICIENCY	11
D	Y			WEpr1 Outdoor Water Use Reduction	Req'd
D	Y			WEpr2 Indoor Water Use Reduction	Req'd
D	Y			WEpr3 Building-level Water Metering	Req'd
D	1	1		WEc1 Outdoor Water Use Reduction	1-2
D	3	1	2	WEc2 <u>Indoor Water Use Reduction</u>	1-6
D		2		WEc3 Cooling Tower Water Use	1-2
D	1			WEc4 Water Metering	1
Yes Maybe No					
23	4	6		ENERGY & ATMOSPHERE	33
C	Y			EApr1 Fundamental Commissioning and Verification	Req'd
D	Y			EApr2 Minimum Energy Performance	Req'd
D	Y			EApr3 Building-level Energy Metering	Req'd
D	Y			EApr4 Fundamental Refrigerant Management	Req'd
C	6			EAc1 Enhanced Commissioning	2-6
D	13	1	4	EAc2 <u>Optimize Energy Performance</u>	1-18
D	1			EAc3 Advanced Energy Metering	1
C			2	EAc4 Demand Response	1-2
D	1	2		EAc5 <u>Renewable Energy Production</u>	1-3
D		1		EAc6 Enhanced Refrigerant Management	1
C	2			EAc7 Green Power and Carbon Offsets	1-2



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Figure 3.1a

LEED Scorecard

15 Necco Street Project
Boston, Massachusetts

Yes Maybe No					
	2	6	6	MATERIALS & RESOURCES	14
D	Y			MRpr1 Storage & Collection of Recyclables	Req'd
C	Y			MRpr2 Construction and Demolition Waste Management Plan	Req'd
C		3	3	MRc1 <u>Building Life-Cycle Impact Reduction</u>	2-6
C	1		1	MRc2 Building Product Disclosure & Optimization-EPD's	1-2
C		1	1	MRc3 Building Product Disclosure & Optimization-Raw Materials	1-2
C	1		1	MRc4 Building Product Disclosure & Optimization-Material Ingredients	1-2
C		2		MRc5 Construction and Demolition Waste Management	1-2
Yes Maybe No					
	5	4	1	INDOOR ENVIROMENTAL QUALITY	10
D	Y			EQpr1 Minimum IAQ Performance	Req'd
D	Y			EQpr2 Environmental Tobacco Smoke (ETS) Control	Req'd
D	2			EQc1 Enhanced IAQ Strategies	1-2
C	1	1	1	EQc2 Low-Emitting Materials	1-3
C	1			EQc3 Construction IAQ Management Plan	1
D		3		EQc7 Daylight	1-3
D	1			EQc8 Quality Views	1
Yes Maybe No					
	4	2	0	INNOVATION	6
D	1			INc1.1 Innovation: Purchasing Lamps (Low Mercury Lighting)	1
D	1			INc1.2 Innovation: O&M Starter Kit - Green Cleaning + IPM	1
D		1		INc1.3 Innovation: Pending Options	1
C		1		INc1.4 Innovation: Pending Options	1
C	1			INc1.5 Pilot Credit: Integrative Analysis of Building Materials.	1
C	1			INc2 LEED Accredited Professional	1
Yes Maybe No					
	3	1	0	REGIONAL PRIORITY <u>01603</u> (underlined)	4
D	1			RPc1 <u>LTc3 High Priority Site (2 pts)</u>	1
D	1			RPc2 <u>SSc4 Rainwater Management (2 pts)</u>	1
D		1		RPc3 <u>WEc2 Indoor Water Use Reduction (4 pts)</u>	1
D	1			RPc4 <u>EAc2 Optimize Energy Performance (8 pts)</u>	1
D				RPcX <u>EAc5 Renewable Energy Production (5%/2 pts)</u>	1
D				RPcX <u>MRc1 Building Life-Cycle Impact Reduction (2pts)</u>	1
Yes Maybe No					
	67	28	15	PROJECT TOTALS (Certification Estimates)	110

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

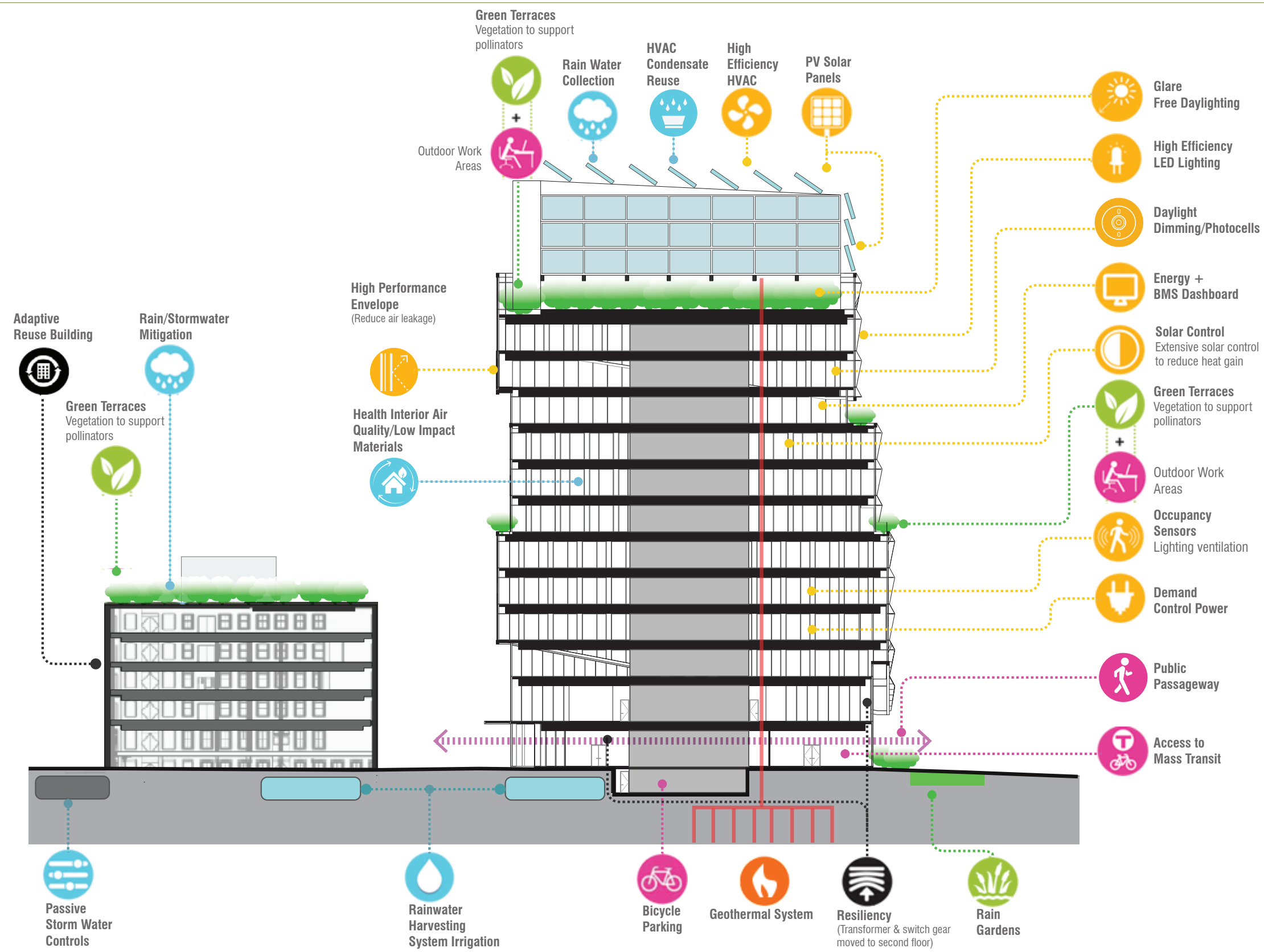


Prepared By: VHB

Figure 3.1b

LEED Scorecard

**15 Necco Street Project
Boston, Massachusetts**



ELKUS | MANFREDI
ARCHITECTS

Figure 3.2
Sustainability Strategies

15 Necco Street Project
Boston, Massachusetts



Source OJB

- Permanent Wall*
- Deployable*
- Bermed Landscape*

*Height can be increased over time as needed to respond to changes in SLR

OJB

Figure 3.3
Potential Future Flood
Control Measures
15 Necco Street Project
Boston, Massachusetts

4

Environmental Protection Update

This chapter presents information on the potential impacts to environmental conditions that may occur as a result of the Proposed Project compared to those studied for the previously approved project as a result of building architectural design changes or use changes. Specifically, the impacts to the pedestrian wind environment, shadows, daylight, solar glare, water use, wastewater generation and historic resources were evaluated for the Proposed Project, in compliance with the requirements set forth in Article 80B of the Zoning Code. Since the Proposed Project will have a substantially equivalent impacts on air quality, water quality, flood hazard, groundwater/geotechnical conditions, solid and hazardous waste, noise and drainage/stormwater management as the previously approved project, no additional analyses were conducted related to these topics for the Proposed Project.

4.1 Key Findings

As discussed in Section 1.1 of Chapter 1, *Project Change Description*, the Proponent has proposed changes to the previously approved project. Although the Proposed Project has changed, findings of potential environmental impacts have been either reduced, or remain the same compared to those presented in previous analyses documented in the EPNF.

Table 4-1 below highlights the key findings of the environmental impact analyses as they relate to the New Building.

Table 4-1 Environmental Impact Comparison (New Building Only)

	Previously Approved Project	Project Change
Pedestrian Wind	No negative impacts	Similar to previous wind tunnel results. Final wind study results to confirm.
Shadow	Some new shadow on Harborwalk and watersheet	Slight increase from previously approved
Daylight	Necco Street – 76.3% Harborwalk – 16.0%	Necco Street – 66.3% Harborwalk – 17.4%
Solar Glare	No negative impacts	No negative impacts. RWDI currently evaluating sunshade options for enhanced results.

	Previously Approved Project	Project Change
Transportation – Trip Generation	948 adt	1,008 adt (+60 adt)
Parking	30 spaces	0 spaces (-30 spaces)
Stormwater Management / Water Quality	Reduced impervious surface, increased infiltration	No change from previously approved
Water Use	35,440 gpd	41,325 gpd (+5,885 gpd)
Wastewater Generation	32,218 gpd	37,568 gpd (+5,350 gpd)
Air Quality	Complies with City, State, and Federal Air Quality Requirements	No change from previously approved
Water Quality	Complies with MassDEP Stormwater Management Policy and Standards	No change from previously approved
Noise	Imperceptible change	No change from previously approved
Flood Hazard	Located in FEMA flood zone, but does not contain bordering land subject to flooding.	No change from previously approved
Solid & Hazardous Waste	Complies with Massachusetts Contingency Plan	No change from previously approved
Groundwater / Geotech	No negative impacts	No change from previously approved
Construction	To implement a Construction Management Plans	No change from previously approved

4.2 Pedestrian Wind

The pedestrian wind comfort analysis for the New Building is being updated in accordance with the requirements of Section B.1 of the BPDA Development Review Guidelines. Preliminary results indicate that potential landscape changes may be needed to mitigate uncomfortable conditions along the western face of the New Building near the Harborwalk. The Proponent is committed to designing a pedestrian environment that is generally comfortable for its intended uses. Studies are continuing, and results will be shared with the City and the IAG as they are available.

4.3 Shadow

The shadow analysis for the Proposed Project has been updated since the filing of the EPNF, in accordance with the requirements of Section B.2 of the BPDA Development Review Guidelines. The Proposed Project anticipates generating a

slightly increased amount of shadow from the previously approved project. The shadows shown in the previously approved project, as well as shadows created by the Proposed Project, are consistent with the conditions anticipated by the 100 Acres Master Plan and the South Boston Municipal Harbor Plan Amendment ("MHP Amendment"). Most of the new shadows contemplated by the 100 Acres Master Plan and the MHP Amendment, as realized by the previously approved project and the Proposed Project, fall over portions of the Fort Point Channel or the Project Site to the north and east. These shadow impacts will be offset by the substantial public realm improvements associated with the Proposed Project.

4.3.1 Article 80B Shadow Study Results

Figures 4.1a-d present the anticipated net new shadow associated with the Proposed Project. The shadow study model includes all buildings under construction and any proposed buildings anticipated to be completed prior to the completion of the Proposed Project.

The incremental shadows produced are generally consistent with the existing urban shadow pattern and are not expected to have any noticeable effect on pedestrian use or enjoyment of the open space or public right-of-way in the vicinity of the Project Site. A summary of the shadow analysis results for each respective period of the year is provided below.

Vernal Equinox (March 21)

The net new shadows associated with the Proposed Project for March 21 are illustrated in Figures 4.1a. March 21 is the vernal equinox, when the length of daytime and nighttime are equal. The sun rises on March 21 at 6:45 AM EDT in the southeastern sky and sets at 6:57 PM EDT.

Summary: There is no significant change in the net new shadow on the public realm created by the Proposed Project compared to the previously approved project at 9:00 AM and 12:00 PM during this period. At 3:00 PM, the amount of shadow generated by the Proposed Project is reduced along Necco Street in comparison to the previously approved project.

In late-winter/early-spring, the sun is still relatively low in the sky. Net new shadow in the morning primarily falls on portions of the watersheet and Harborwalk immediately west of the Proposed Project. While the lower angle casts a long shadow, the narrow orientation of the New Building minimizes the amount of shaded watersheet and public realm area. Between 12:00 PM and 3:00 PM, the net new shadows are shorter and rotate northerly and easterly off the public realm and over the open space between the New Building and the 5 Necco Street.

Summer Solstice (June 21)

The net new shadows associated with the Proposed Project for June 21 are illustrated in Figures 4.1b. June 21 is the summer solstice and the longest day of the year. The sun rises at 5:07 AM EDT in the southeastern sky and sets at 8:24 PM EDT.

Summary: There is no significant change in the net new shadow on the public realm created by the Proposed Project compared to the previously approved project during this period.

During the summertime, the morning sun casts shadows across the public realm; however, due to the higher angle of the sun, the shadow quickly shortens and rotates off the public realm. As the day progresses, the shadow rotates easterly over Necco Street, exposing the entire public realm to sunlight by 6:00 PM.

Autumnal Equinox (September 21)

The net new shadows associated with the Proposed Project for September 21 are illustrated in Figures 4.1c. September 21st is the autumnal equinox and the daytime and nighttime hours are equal. The sun rises at 6:30 AM EDT in the southeastern sky and sets at 6:42 PM EDT. The shadows cast on this date are almost identical to those on March 21, the vernal equinox, as described above.

Summary: There is no significant change in the net new shadow on the public realm created by the Proposed Project compared to the previously approved project at 9:00 AM, 12:00 PM and 3:00 PM during this period. At 6:00 PM, the amount of shadow generated by the Proposed Project is slightly increased, however the net new shadow falls almost entirely on the rooftops of buildings to the east of the Project Site.

In the morning during the fall, net new shadow falls over portions of the watershed and Harborwalk while a part of the public realm receives full sunlight. As the day progresses, the shadow rotates north and east, shifting off the watershed by 12:00 PM and off the Harborwalk and waterside public realm entirely by 3:00 PM. By 6:00 PM, as a result of the low sun angle, the shadow is long, but falls to the east over Necco Street and existing buildings to the east.

Winter Solstice (December 21)

The net new shadows associated with the Proposed Project on December 21 are depicted on Figures 4.1d. December 21 is the winter solstice and the shortest day of the year. The sun is at its lowest inclination above the horizon at each hour of the day. Even low buildings cast long shadows in northerly latitudes, such as Boston. The sun rises at 7:10 AM EST and sets at 4:14 PM EST in December.

Summary: There is no significant change in the net new shadow created by the Proposed Project compared to the previously approved project at 9:00 AM and 12:00 PM during this period. At 3:00 PM, the amount of shadow generated by the Proposed Project is slightly increased, however the net new shadow falls almost entirely on the rooftops of buildings to the northeast of the Project Site.

Winter shadows due to the low sun angle extend across the Fort Point Channel to the existing U.S. Post Office building. As the day progresses, the shadow moves to the north and east over the existing buildings north of the Project Site. Although new shadow is greatest at this period, the days during this time of year are less bright and there is much less contrast between shaded and unshaded areas. Given these environmental conditions, net new shadows are minimal and fall primarily on existing building rooftops.

4.4 Daylight

The following section describes the anticipated effect on daylight coverage at the Project Site as a result of the Proposed Project, which has been updated since the previously approved project. An analysis of the obstruction of skydome under the No-Build and Build Conditions is a requirement of the Article 80, Large Project Review (Section 80B-2(c) of the Zoning Code). The daylight analysis was prepared using the BPDA's Daylight Analysis Program ("BRADA") and has been completed in accordance with the requirements of Article 80. Figures 4.2a and 4.2b illustrate this analysis.

4.4.1 Methodology

The Proposed Project was analyzed using the BRADA program and compares the Existing/No-Build Condition and Build Condition using the same methodology as was used for the previously approved project.

The following viewpoints were used for this daylight analysis:

- › **Necco Street** – This viewpoint is located on the centerline of Necco Street, centered on the eastern side of Project Site
- › **Harborwalk** – This viewpoint is located on the centerline of the Harborwalk, centered on the western side of the Project Site.

These points represent one viewpoint for each building façade when viewed from the adjacent public way, sidewalk or property line.

4.4.2 Daylight Existing/No-Build Conditions

The Existing/No-Build daylight conditions are identical to those presented in the previously approved project. Under the Existing/No-Build Condition, the skydome has minimal obstruction, which is to be expected since the location of the New Building is currently occupied by a surface parking lot. Upon completion of the Proposed Project, the viewpoints along the adjacent public ways are expected to experience an increase in skydome obstruction due to the construction of the New Building, as would be expected when redeveloping a surface parking lot.

4.4.3 Daylight Build Conditions

The changes to daylight conditions as a result of the Proposed Project are presented in Figures 4.2a and 4.2b. Under the Build Condition for the Proposed Project when compared to the previously approved project, the amount of skydome obstruction along Necco Street decreases by 10 percent, while the amount of skydome obstruction along the Harborwalk increases slightly (by 1.4 percent). In both instances, the change in skydome obstruction is the result of changes to various façade elements on the Proposed Project and the heights and setbacks of those façade elements. The Proposed Project's decreased amount of skydome obstruction along Necco Street will enhance the experience along this public way. Meanwhile, the minimal increase in skydome obstruction along the Harborwalk will not have a significant impact on the substantial public realm enhancements that the Proposed Project will create.

Table 4-2 compares the estimated skydome obstruction impacts of the previously approved project with the Proposed Project.

Table 4-2 Existing/No-Build and Build Daylight Conditions

Viewpoint	Skydome Obstruction		
	Existing / No-Build	Previously Approved Project	Proposed Project
Necco Street	3.2%	76.3%	66.3%
Harborwalk	5.8%	16.0%	17.4%

As described in Section 1.1 of Chapter 1, *Project Change Description*, the pedestrian bridge previously contemplated to connect GE facilities in the new headquarters building and Brick Buildings will not be constructed as part of the Proposed Project, and the New Building will not include a large building canopy to the west, thus creating increased views of the sky, reducing daylight obstruction from points east of the Project Site along Necco Street, and providing an opportunity to plant additional trees.

4.5 Solar Glare

The solar glare analysis for the New Building is being updated in accordance with the requirements of Section B.4 of the BPDA Development Review Guidelines. The Project as designed has incorporated vertical sun shades on the west facing façade to mitigate solar glare. The Proponent is considering and exploring opportunities for vertical and/or horizontal sun shades on the south facing façade to identify if a potential reduction in solar glare could reduce the New Building's heat load and improve occupant comfort. Studies are continuing, and results will be shared with the City and the IAG as available.

4.6 Transportation

This section provides an evaluation and summary of the Proposed Project's transportation elements, including a comparison of the expected transportation impacts of the Proposed Project versus the previously approved project. It includes an analysis of estimated trip generation characteristics and qualitatively describes anticipated parking conditions, loading and service activities, pedestrian/bicycle amenities, and other important transportation mitigation and improvement actions that will be provided in connection with the Proposed Project. The purposes of these analyses are to:

- › Describe the transportation-related characteristics of the Proposed Project;
- › Quantify the transportation impacts that will be generated by the Proposed Project and compare those impacts to the previously approved project;
- › Develop a set of mitigation strategies and traffic improvement measures that will help to lessen the transportation effects of the Proposed Project; and
- › Demonstrate that these transportation mitigation efforts will exceed the requirements of the BPDA and the BTD and will serve as exceptional public benefits as they relate to transportation issues.

The sections below provide an overview of the Proposed Project and a summary of the findings of the transportation analysis. Subsequent sections provide a more detailed discussion of estimated traffic generation from the Proposed Project and a comparison of those estimates to the previously approved project. The final section of the section presents a detailed summary of transportation mitigation and improvement actions that the Proponent is committed to implementing in connection with the development and/or operation of the Proposed Project.

4.6.1 Project Change Description

The changes to the Proposed Project transportation impacts that are described in this NPC are due entirely to changes to the New Building. The New Building will be a multi-tenant office, research and development and life sciences building with active ground floor retail/restaurant tenants in lieu of the GE Project corporate headquarters building that was to be built as part of the previously approved project. New Building will contain new building entry points and a new north-south pedestrian corridor through the building to increase transparency, porosity, and permeability throughout the Proposed Project and around the Project Site. The Proposed Project plan includes the elimination of the previously proposed 30 below-grade parking spaces and does not propose any on-site parking.

While there were some minor adjustments to the final mix of approved ground floor uses within the 5 Necco Street building, including a slight increase in bistro/retail use, these modifications will produce negligible changes to the Project's transportation impact. Refer to Sections 4.6.3 and 4.6.4 for a discussion of the total Project trip generation, inclusive of 5 Necco Street

As detailed in Table 1-1 of Chapter 1, *Project Change Description*, the New Building has been designed within the general massing envelope of the previously approved project, but will result in a slight increase of total developable square footage due to infill of double height floors included in the previous design. In determining associated impacts of the previously reviewed project, the transportation study actually assumed a larger, 386,700 SF GE headquarters building at 15 Necco Street. Therefore, for the purposes of the transportation analysis, the New Building as proposed actually represents an approximately 70,600 SF reduction in SF as compared to the project analysis presented in the previously approved project.

The following characterize future transportation conditions at and near the Project Site once the Proposed Project is completed:

- › In connection with the City of Boston approvals of the previously-approved project, GE committed to a range of mitigation measures, some of which, like the widening and reconstruction of the Harborwalk that have been completed in their entirety. The completed Harborwalk improvements will be segregated from the construction site of the New Building, thereby making them available to the public throughout the construction of the New Building as feasible.
- › The Proposed Project will significantly improve the pedestrian realm through the constructing of new sidewalks where there are none now; the reconstruction of sidewalks adjacent to the Project Site to be universally compliant; and the installation of new street lighting;
- › The existing surface parking at the Project Site will be eliminated;
- › A dedicated drop-off area will be provided along Necco Street, adjacent to the New Building;
- › Any incremental Project-related traffic impacts to study area intersections are expected to be minor;
- › The Proponent will implement a substantial TDM Plan to encourage its tenants to incentivize their employees and visitors to use alternative modes of transportation;
- › The New Building will provide up to 100 secure and short-term bicycle parking spaces. The final ratio of interior covered/secured bicycle spaces within the building and outdoor/public bike racks around the building will be defined as the design advances, but bicycle parking at the Project Site will conform to the City of Boston's Bicycle Parking Guidelines; and
- › Loading and service activities will be accommodated via two truck loading dock spaces and one compactor bay on the ground floor of the New Building. The dock area will be accessed via a curb cut along Necco Street.

4.6.2 New Building Trip Generation

The New Building will have FPA uses on the ground floor and the Proposed Project assumes these will predominantly consist of restaurant and retail uses. To assess the

impact of the New Building portion of the Proposed Project and stay consistent with the methodology used for the previously approved project, trip estimates presented in this NPC are based on standard Institute of Transportation Engineers (ITE) trip rates published in ITE's *Trip Generation Manual*, 9th Edition. The trip generation for the New Building was estimated using the following Land Use Codes (LUCs):

- › LUC 760 - Research and Development Center
- › LUC 820 – Shopping Center
- › LUC 932 - High-Turnover (Sit-Down) Restaurant

Table 4-3 summarizes the estimated total number of unadjusted (raw ITE) vehicle trips generated by the New Building during an average weekday and during commuter peak hours. These trip results do not account for alternative modes of transportation.

Table 4-3 New Building Unadjusted Trip Generation Summary by Land Use

Time Period	R+D Trips	Retail Trips	Restaurant Trips	Total Trips
Weekday				
Daily (vpd)	2,508	384	762	3,654
Morning Peak				
Hour (vph)				
Enter	281	5	36	322
Exit	<u>58</u>	<u>3</u>	<u>29</u>	<u>90</u>
Total	339	8	65	412
Evening Peak				
Hour (vph)				
Enter	49	16	35	100
Exit	<u>280</u>	<u>17</u>	<u>24</u>	<u>321</u>
Total	328	33	59	421

Source: ITE, *Trip Generation Manual*, 9th Edition - Land Use Code 760, 820 and 932

vpd = vehicles per day

vph = vehicles per hour

Vehicle Occupancy Rates ("VOR") were applied to the unadjusted ITE trip generation to convert the unadjusted vehicle trips to person trips. Keeping with the same methodology used in the previous study, the VORs were based on the FHWA's 2009 *National Household Survey*. A VOR of 1.13 was used for R+D trips, 1.78 for retail trips and 2.20 for restaurant trips.

A summary of the estimated person trip expected to be generated by the New Building is provided in Table 4-4 below.

Table 4-4 New Building Estimated Person Trip Generation Summary

Time Period	Total Unadjusted Vehicle Trips	Total Person Trips
Weekday		
Daily	3,654	5,178
Morning Peak Hour		
Enter	322	406
Exit	<u>90</u>	<u>135</u>
Total	412	541
Evening Peak Hour		
Enter	100	163
Exit	<u>321</u>	<u>399</u>
Total	421	562

Source: ITE, *Trip Generation Manual*, 9th Edition - Land Use Code 760, 820 and 932
FHWA, 2009 National Household Survey

To account for alternative modes of transportation typical of an urban environment, mode shares were applied to the person trip generation estimates. Mode shares utilized for the previously approved project were assumed for the office land use. For the restaurant and retail land uses, mode shares from a comparable area development project (*99 A Street PNF*, March 21, 2019) were utilized. Mode shares by land use are shown in Table 4-5 below.

Table 4-5 Mode Split by Land Use and Time of Day

Time of Day	R+D			Retail/Restaurant		
	Automobile	Transit	Walk/Bike	Automobile	Transit	Walk/Bike
Daily	31%	49%	20%	20%	20%	60%
Morning Peak						
Entering	33%	55%	12%	20%	20%	60%
Exiting	27%	25%	48%	20%	20%	60%
Evening Peak						
Entering	29%	37%	34%	20%	20%	60%
Exiting	33%	56%	11%	20%	20%	60%

Source: GE Headquarters Project Expanded ENF/PNF, August 1, 2016
99 A Street PNF, March 21, 2019

After VOR was applied to the ITE unadjusted vehicle trips to produce person trips (Table 4-4), these trips were then split into modes based on the mode splits (Table 4-5). VORs were again applied to the vehicle trips to produce adjusted vehicle trips. Table 4-6 summarizes the estimated trips by mode for the New Building, using the methodology described.

Table 4-6 New Building Estimated Trip Generation Summary

Time Period	Auto (vehicles)	Transit (people)	Walk/Bike (people)
Weekday			
Daily	1,008	1,862	1,985
Morning Peak Hour			
Enter	101	192	91
<u>Exit</u>	<u>22</u>	<u>30</u>	<u>73</u>
Total	123	222	164
Evening Peak Hour			
Enter	25	42	83
<u>Exit</u>	<u>101</u>	<u>194</u>	<u>85</u>
Total	126	236	168

4.6.3 Project Total Trip Generation

To compare the transportation impacts of the Proposed Project versus the previously approved project, Table 4-7 presents a summary of the total Project trip generation, which also includes the 98,300 SF 5 Necco Street building. In line with the previously approved project methodology, the 5 Necco Street is classified as a corporate headquarters land use. While there were some minor adjustments to the final mix of approved ground floor uses within the 5 Necco Street building, including a slight increase in bistro/retail use, these modifications will produce negligible changes to the Project's transportation impact.

Table 4-7 Total NPC Project Estimated Trip Generation Summary

Time Period	Auto (vehicles)	Transit (people)	Walk/Bike (people)
Weekday			
Daily	1,252	2,292	2,162
Morning Peak Hour			
Enter	147	279	110
<u>Exit</u>	<u>25</u>	<u>33</u>	<u>79</u>
Total	172	312	189
Evening Peak Hour			
Enter	29	48	88
<u>Exit</u>	<u>142</u>	<u>273</u>	<u>100</u>
Total	171	321	188

As shown in Table 4-7, the Proposed Project is anticipated to generate 147 entering and 25 exiting vehicle trips during the morning peak hour. In addition to these trips, the Proposed Project will also generate approximately 189 walk/bike trips and 312 transit trips during the morning peak hour. During the evening peak hour, the Proposed Project will generate 29 entering and 142 exiting vehicle trips. The walk/bike mode of travel will account for approximately 188 trips and transit will total approximately 321 trips during the evening peak hour.

4.6.4 Trip Generation Comparison

As mentioned previously, the development program proposed in connection with this NPC represents an overall reduction of approximately 70,000 SF in building size as compared to the previously approved project transportation impact study program. The Proposed Project will also eliminate the 30 on-site parking spaces.

Table 4-8 provides a comparison of the vehicle trip generation estimates for the Proposed Project to those estimates made in support of the previously approved project.

Table 4-8 Comparative Vehicle Trip Generation Analysis

Time Period	Previously Approved Project	Proposed Project	Estimated Change
Weekday			
Daily	1,200	1,252	+52
Morning Peak Hour			
Enter	233	147	(-86)
<u>Exit</u>	<u>14</u>	<u>25</u>	<u>+9</u>
Total	247	172	(-75)
Evening Peak Hour			
Enter	20	29	+9
<u>Exit</u>	<u>203</u>	<u>142</u>	<u>(-61)</u>
Total	223	171	(-52)

As shown in Table 4-8, the Proposed Project is expected to have nearly equivalent or lower vehicle trip generation characteristics when compared to the previously approved project, depending upon the time period and directionality being compared. During the morning peak hour, this Project is expected to generate 75 fewer vehicle trips than the previously approved project. During the evening peak hour, this Project has been estimated to generate 52 less vehicle trips than the previously approved project. For an average weekday, this Project is expected to generate about 52 additional vehicle trips than the previously approved project. Traffic generation as a result of the Proposed Project has remained relatively constant compared to the conservative transportation analysis presented in the previously approved project. This is due, almost entirely, to the updated ground floor program of the New Building and 5 Necco Street to include more traditional FPAs, including restaurant, retail and bistro space. These land uses, while producing more trips throughout the day on a per square foot basis compared to office space, produce trips that are generally made by non-vehicular modes (public transit, walking or biking).

4.6.5 Traffic Impact Assessment

The transportation study that was prepared and submitted in support of the previously approved project included a comprehensive and thorough analysis of the

transportation impacts as required by both the BPDA/Article 80 and the MEPA development review and approval processes. That study assessed the transportation impacts of the previously approved project and laid out a comprehensive package of transportation mitigation and improvement actions to lessen its transportation impacts and provide improvements to the future transportation infrastructure.

As shown in Table 4-8, the traffic impacts of the Proposed Project are expected to be generally similar to, or lower than those projected for the previously approved project, which were studied in detail. Further, access to the Proposed Project will be identical to that of the previously approved project. The Proposed Project's drop-off and loading facility will remain located along Necco Street, albeit a slightly different location. Consequently, the impact analysis that was prepared and submitted in connection with the review and approval of the previously approved project continues to provide an accurate and conservative summary of transportation impacts that can be expected from the future construction of the New Building and the Proposed Project as a whole.

The Proponent will continue to honor the wide array of transportation mitigation and improvement actions that were committed to under the previous review and approval process, as described in detail below.

4.6.6 Parking

Within the vicinity of the Project Site there are a variety of on-street parking options including metered and reserved private parking spaces along Necco Court and Necco Street. Figure 4.3 shows the current on-street parking regulations within a quarter-mile of the Project Site.

The previously approved project included 30 below-grade parking spaces in the GE headquarters building at 15 Necco Street (0.06 spaces/ksf). The garage was to be accessed via a ramp on Necco Street, and these spaces were to be reserved for building employees.

The Proposed Project does not include any parking facilities; any parking needed to support the Project Site will be accommodated via the available off-street parking within the area. As presented in Section 4.6.7, a recent canvas of nearby parking facilities (including the Necco Street Garage just across the street), indicates that there continues to be available, public parking spaces in public parking garages located within close proximity to the Project Site and the Channel Center Garage, which is a 5-8 minute walk away).

The Proposed Project will result in the permanent elimination of approximately 203 existing surface spaces that were long-operated by a former owner of the Project Site. All of these spaces have already been discontinued for several years to accommodate construction activities related to the renovation of the 5 Necco Street.

As agreed upon with adjacent property owners, the Proposed Project will also displace permanently some on-street reserved private parking spaces located along

the western side of Necco Street, where both a pick-up/drop-off area and the entrance to the loading docks will supplant parking spaces.¹

The Project Site is located within the South Boston Parking Freeze area overseen by the Boston Air Pollution Control Commission BAPCC. The freeze caps the number of parking spaces in South Boston to address traffic congestion and limit air pollution. Overall, the Project will be reducing the number of off-street public parking spaces by 203.

4.6.7 Parking Demand Analysis/Sufficiency of Parking Space Inventory

An inventory of parking spaces and the peak parking space occupancy was conducted to determine how many spaces are designated as off-street public parking spaces within a 10-minute walk to/from the Project Site on a typical weekday. This will help to determine current usage patterns and identify if there are sufficient spaces to accommodate building visitors and employees who might choose to drive, while recognizing that the implemented TDM program will encourage the use of other transportation modes. The data was collected by the various parking vendors of each location. Peak parking occupancy occurs between the hours of 10:00 AM and 12:00 PM - when commuter parking usage is typically greatest.

Figure 4.4 and Table 4-9 present a snapshot of the parking spaces that will exist in an approximate five-year time frame. The table excludes the 203 spaces on the Project Site that will be eliminated by the Proposed Project. It also excludes a lot at 391 Congress Street, which is planned for redevelopment.

Table 4-9 Anticipated 2021 Parking Supply

Public Parking Location	Total Public Spaces	Peak Available Spaces	Percent Occupied
1-321 Congress St	83	0	100%
2-Farnsworth Garage	374	19	95%
3-Stillings Garage	583	35	94%
4-379 Congress St	40	0	100%
5-390 Congress St	221	0	100%
6-Necco Garage	565	30	95%
7-Channelside Lot (to remain)	777	160	79%
8-Channel Center Garage	950	266	72%
Total	3,593	510	86%

Sources: Parking Lot Operator provided data, October 2019

¹ Necco Street is owned by the owner of the Necco Street Garage, and the former owner of the Project Site negotiated legal arrangements to facilitate the creation of the streetscape improvements planned for the west side of Necco Street.

Project Demand

Consistent with the approach for the trip generation estimates and to stay consistent with the methodology used for the previously approved project, peak period parking demand estimates presented in this NPC are based on standard ITE parking rates published in *Parking Generation*, 4th Edition. The parking demand for the Proposed Project was estimated using the following LUCs:

- › LUC 710 - Office Building (average peak period parking demand vs. employees)
- › LUC 820 – Shopping Center (average peak period parking demand vs. 1,000 SF GFA, on a non-Friday, non-December)
- › LUC 932 - High-Turnover (Sit-Down) Restaurant (average peak period parking demand vs. 1,000 SF GFA)

It should be noted that *ITE Parking Generation* does not have a separate land use code for Research and Development, life sciences or Corporate Headquarters, instead it combines office uses because of similar parking demand characteristics.

The average demand for the peak period on a weekday ranges from about 260 to 280 spaces.

This estimated range is based on about 1,000 people occupying the office/life sciences/research and development component of the Proposed Project, which includes on-site vendors and visitors.

As shown in Table 4-9 above, there were 510 available and empty spaces during the peak time period. The Channel Center Garage has by far the greatest number of empty and unused spaces that would be available to building visitors and employees. It is a half-mile/five to eight-minute walk from the Project Site. This evaluation demonstrates that there is sufficient public parking available within the area to support the Proposed Project.

4.6.8 Loading and Service

Loading and service activities, access and management will generally remain unchanged from the previously approved project. The New Building will continue to include two truck loading dock spaces and one compactor bay within the New Building footprint. However, the loading docks will now be located on the ground floor, rather than below-grade. The dock area will be accessed via a curb cut along Necco Street. This driveway will be flush at the sidewalk level to prioritize pedestrian safety.

4.6.9 Project Improvements/Transportation Mitigation

The Proponent has developed transportation improvements and enhancements to help alleviate transportation impacts generated by the Proposed Project and provide transportation infrastructure enhancements to the surrounding area, focusing on

pedestrian facilities. This transportation improvement plan includes the elements described below.

Pedestrian Realm Improvements

Consistent with the previously approved project, the Proposed Project will include improvements to pedestrian circulation and accessibility, new open space available to the public, enhanced streetscapes, and improvements to the Harborwalk. Currently a surface parking lot, at full build-out, the Project Site will include a vibrant streetscape with pedestrian connections through and around the Project Site. The New Building proposes a more welcoming and active, multi-tenanted ground floor than the previously approved project with retail and restaurant tenants that encourages public interaction at the Project Site. The Proposed Project proposes a new north-south pedestrian corridor through the plaza and the building lobby to facilitate pedestrian connectivity to surrounding buildings and street networks. The landscape changes on the south side of the Project feature connections to the future open space area south of the Project Site and the expanded Harborwalk, and the new design is more civic in its approach with the goal of engaging the public as well as New Building visitors. All other landscaped spaces at the Project Site will be generally consistent with the intent of the previously approved project, although notably, the Proposed Project will result in a decrease in hardscape as compared to the previously approved project. Notably, the Proposed Project as redesigned includes 6,745 square feet more open space than contained in the previously approved project. Refer to Chapter 2, *Urban Design*, for additional details on public realm and open space improvements.

Transportation Demand Management

TDM commitments made in connection with the previously approved project will be maintained. Consistent with the City's goals to reduce automobile-dependency, the Proponent will encourage all of its tenants to provide TDM measures to encourage the use of alternative modes of transportation, reduce automobile-dependency, and promote healthy lifestyles. These TDM measures would include the following:

- › The Proponent would have an on-site Transportation Coordinator responsible for:
 - Managing loading operations and deliveries;
 - Promoting the use of alternative transportation measures and carpooling; and
 - Developing an orientation packet which tenants can use to inform new employees of all available transportation options.
- › Transit information in the New Building lobby including a real time transit arrival time screen;
- › Directions on the New Building's website and a website application to encourage use of alternative commute modes;

- › Short-term public and secure tenant employee bicycle spaces on-site;
- › Various amenities for commuters who walk and bike including:
 - Lockers and showers;
 - Periodic on-site bicycle workshops and classes; and
 - Providing a bicycle tune-up day on-site.
- › Loaner umbrellas.

In addition, the Proponent is committed to working with others to understand the opportunities for utilizing consolidated area-wide shuttle services as the Proposed Project advances. The Proponent is considering sponsorship of a nearby BlueBikes station. All TDM measures will be codified in the Amended and Restated Transportation Access Plan Agreement ("TAPA"), which each Proponent will execute with BTM (i.e., separate TAPA's for 5 Necco Street and 15 Necco Street).

4.7 Infrastructure

The following chapter provides an update to the Proposed Project capacity needs and potential impacts on utilities due to the project change. For the purposes of this analysis, this section only discusses infrastructure updates related to the New Building.

Generally, the Project Site is well-served by existing infrastructure systems and, based on initial investigations and consultations with local utility service providers, it is expected that existing infrastructure systems are adequately sized to accept the demand associated with the development and operation of the Proposed Project. Since the previously approved project filings, the Proponent has advanced the proposed utility design and held initial meetings with the Boston Water and Sewer Commission ("BWSC") and Eversource Energy. At this time, no capacity issues in the existing city systems have been identified. The BWSC provided design guidelines and the team has worked closely with BWSC to meet such requirements, as evidenced by the approvals obtained in March of 2017 through the BWSC's Site Plan Review process. As the project design advances, the Proponent will continue to collaborate with the BWSC to amend the Site Plan Approvals appropriately.

4.7.1 Stormwater Management/Water Quality

In order to address the BWSC's stormwater management requirements¹ and the city's Smart Utilities Policy, as well as MassDEP's Stormwater Management Standards², the Proposed Project will incorporate on-site stormwater management and treatment systems to the maximum extent practicable. Collectively, these

¹ Consistent with the requirements of Section 32-6 of the Zoning Code and the BWSC Site Plan Approvals.

² In accordance with revisions to the Wetlands regulations, 310 CMR 10.00, and the Water Quality Regulations, 314 CMR 9.00, relating to stormwater.

systems will be designed to improve water quality (e.g., by limiting pollutants), reduce runoff volume, and control peak rates of runoff in comparison to existing conditions at the Project Site. Additionally, where feasible, the Proposed Project will reduce peak runoff rates and volumes for various design storm events for the post-development condition, as compared to the pre-development condition, including the 2-, 10-, and 25-year design storms. Stormwater runoff from proposed and modified impervious surface areas within the site limits will be treated using new or modified infrastructure, including but not limited to deep-sump, hooded catch basins, subsurface infiltration basins, landscaping, and/or proprietary treatment devices to promote phosphorus removal and reduce the Total Suspended Solids ("TSS") concentrations by at least 80 percent.

As currently designed, site stormwater infiltration systems—which include subsurface recharge chambers and Green Infrastructure elements—will promote groundwater recharge to the extent of 1.25 inches over the post-development impervious site cover, exceeding the Groundwater Conservation Overlay District ("GCOD") requirements and the requirements of Section 32-6 of the Code.

The BPDA's Smart Utilities Policy recommends the use of Green Infrastructure elements, such as permeable pavement, bioretention basins, and rainwater gardens, to retain on-site stormwater runoff prior to discharge, for certain projects subject to Article 80 review by the BPDA. The implementation of these measures will be studied further as the Proposed Project design is advanced.

4.7.2 Water Use

Proposed Water Demand and Connections

Domestic water demand is based on estimated sewage generation with an added factor of 10 percent for consumption, system losses, and other use. Based upon standard sewage generation rates outlined in the MassDEP System Sewage Flow Design Criteria, the Proposed Project will require approximately 51,718 gallons of water per day.

As described in the water conservation section below, the Proponent will continue to consider and evaluate methods to conserve water as building design evolves. New water connections will be designed in accordance with BWSC design standards and requirements. Water services to the new building will be metered in accordance with BWSC's Site Plan Requirements and Site Review Process. The review includes, but is not limited to, sizing of domestic water and fire protection services, calculation of water meter sizing, backflow prevention design, and location of hydrants and Siamese connections that will conform to BWSC and Boston Fire Department ("BFD") requirements. The Proponent will connect the Site's meter(s) to the BWSC's automatic meter reading system. Fire protection connections on the Project Site will also need approval of the BFD. The Proponent will request record hydrant flow test information from the BWSC to aid in the preliminary water design. In addition, the

Proponent will request new hydrant flow tests on the main in Necco Street to which the Proposed Project will connect.

Water Conservation Measures

Consistent with the sustainable design and operations goals for the Proposed Project, the Proponent will install low-flow and low-consumption plumbing fixtures to reduce water usage and, consequently, sanitary flow reductions. A water reduction of a minimum of 20 percent over the baseline is a requirement of Article 37 of the Boston Zoning Code, which requires new buildings to be LEED™ "certifiable." The Proponents are also committed to limiting the use of irrigation for any plantings by using local and/or drought resistant plantings. The Proposed Project will also capture rainwater from the roofs and canopies for irrigation use and HVAC make-up water, as feasible.

4.7.3 Wastewater Generation

Based on the revised development program, the Project is estimated to generate approximately 47,016 gallons per day of sanitary sewage. Table 4-10 below summarizes the proposed sewer generation rates based on Massachusetts State Environmental Code (Title V) generation rates.

Any changes to the proposed building tenancies may vary sanitary flow. Final flow estimates will be determined as the New Building leases up. The Proposed Project will comply with the MassDEP infiltration/inflow (I/I) policy, as applicable.

Table 4-10 Wastewater Generation

Program Type	Quantity	Generation Rate¹	Wastewater Generation (gpd)
Previously Approved Project			
<u>5 Necco Street</u>			
Office	91,300 SF	75 gpd/1,000 SF	6,848
Bistro-Café	75 seats	35 gpd/seat	2,625
<u>New Building (GE Headquarters)</u>			
Office	245,500 SF	75 gpd/1000 SF	18,413
Employee Community Space	325 seats	15 gpd/seat	4,875
Coffee Bar	25 seats	35 gpd/seat	875
Museum	11,100 SF	50 gpd/1,000 SF	555
Convener Space	500 seats	15 gpd/seat	7,500
Subtotal			41,691
Proposed Project (Project Change)			
<u>5 Necco Street</u>			
Office	88,300 SF	75 gpd/1,000 SF	6,623
Restaurant	75 seats	35 gpd/seat	2,625
Retail	3,000 SF	50 gpd/1,000 SF	200 ²
<u>New Building (Multi-Tenanted Office/Life-Sciences)</u>			
Office	118,200 SF	75 gpd/1000 SF	8,865
Lab/R&D	177,300 SF	110 gpd/1,000 SF ³	19,503
Retail	9,000 SF	50 gpd/1,000 SF	450
Restaurant	250 seats	35 gpd/seat	8,750
Subtotal			47,016
Net Change			+5,325

1 Based on MassDEP Title V flow calculation factors.

2 Per Title V, min. allowable wastewater generation for system design = 200 gpd

3 Wastewater generation rate based on Project MEP Consultant recommendations

4 gpd = gallons per day

5 SF = square feet

4.7.4 Other Utilities

Natural Gas Service

It is anticipated that National Grid's low-pressure gas main in Necco Street will service the Proposed Project which may require an extension of the existing main. The total estimated natural gas demand for the Proposed Project will be refined as the Proposed Project design advances. As the energy system design for the proposed Project is developed, the Proponent will coordinate proposed service connections and system requirements with National Grid to ensure adequate capacity for natural gas service is available to serve the Proposed Project, and the best means of obtaining a system connection. Similarly, the final design and installation of natural gas services will be coordinated with National Grid.

Electrical Service

Eversource Energy owns and operates the existing electrical facilities in the vicinity of the Project Site which are located along the Proposed Project frontage in Necco Street. Eversource Energy will provide electric 15 kV primary service to 5 Necco Street via the existing duct bank in Necco Court to a new pad-mounted transformer, while an existing manhole is expected to supply power via a new ductbank feeding the new 15 Necco building.

The New Building will be provided with a 15 kV class incoming switchgear consisting of two incoming sections, a metering section and two feeder sections. Equipment will be located above the ground floor of the 15 Necco building to provide protections against flooding from storm surge, sea level rise, and extreme precipitation events. As the Proposed Project design progresses, the configuration of proposed electrical services will need to be developed with Eversource Energy to determine whether their infrastructure can be used to service this Project, and the best means of obtaining a system connection. Any expansion, modification, and/or relocation of the existing electrical service and connections will be designed in accordance with Eversource standards.

Telephone and Telecommunications

It is anticipated that the Proposed Project will be fed by both Verizon and AT&T for telephone, cable TV and data services. These services will be redundant into both the 15 Necco building and 5 Necco Street. The Proponent will coordinate service connection locations and system requirements and obtain appropriate approvals.

Protection of Utilities During Construction

Existing public and private infrastructure located within the public right-of-way will be protected during construction. The installation of proposed utilities within the public way will be constructed in accordance with BWSC, BPWD, the Dig-Safe Program, and governing utility company requirements. Specific methods for constructing proposed utilities where they are near, or connect with existing water,

sewer, and storm drain facilities are subject to review by the BWSC as part of its Site Plan Review process.

The Proponent will continue to coordinate with BWSC, and applicable private utility companies to promote safe and coordinated utility operations in connection with the Proposed Project. Necessary permits will be obtained before the commencement of any work.

4.7.5 BPDA Smart Utilities Policy

The following section summarizes the approach to addressing the City of Boston's Smart Utilities Policy within the Proposed Project. Additional information is provided within the Smart Utilities Checklist included in Appendix A. Please also refer to Figure 4.5 for a graphic depicting utility connection and green infrastructure.

Green Infrastructure

The Proposed Project will incorporate green infrastructure, where feasible, to assist in absorbing, delaying, detaining and treating stormwater to reduce flooding and pollution at the Project Site. The City of Boston Smart Utilities Policy recommends that projects utilize green infrastructure to retain, on site, a volume of runoff equal to 1.25 inches of rainfall times the total impervious area prior to discharge. As recommended by the BPDA, the Proponent will work with the BWSC to evaluate green infrastructure elements capable of retaining a greater volume of stormwater infiltration capacity to the extent of 1.25 inches over the Project Site impervious area.

Adaptive Signal Technologies

Adaptive Signal Technologies ("AST"), as defined in the BPDA Smart Utilities Policy, utilizes intelligent signals, traffic cameras, pavement sensors, and visual monitoring equipment to manage real-time traffic flow of all transportation modes, including buses, pedestrians, and bicycles. The technologies are used to reduce wait time and facilitate throughput and safety at intersections. The Proposed Project does not currently include signal improvements.

Streetlight Installation

It is anticipated that street lights will be designed with electrical and fiber optics connections, with the potential to install smart sensors, Wi-Fi, or cameras on these street lights in the future, contingent on the availability of electrical and fiber optic connections. As the design progresses the Proponent will evaluate the feasibility of incorporating these features into street lights at the Project Site.

Smart sensors on streetlights can detect changes in air quality, noise pollution, gunshots and other important urban environment elements, and information captured can be used to improve the quality of life on and around the Project Site. Smart sensors can provide the potential to optimize the use of City resources in the most appropriate situation.

Public Wi-Fi access points may be installed on the light poles and embedded in building facades. The access points have potential to transmit Wi-Fi services to residents and businesses which would promote equitable access to data services on and around the Project Site.

4.8 Historic Resources

The previously approved project design evaluated potential impacts to the National Register of Historic Places-listed Fort Point Channel Historic District (BOS.WZ/NR #04000959) and the locally-designated Fort Point Channel Landmark District (BOS.ZG); other National Register-listed and inventoried properties within a one-quarter mile radius were separated from the Proposed Project by the Fort Point Channel or intervening buildings.

The Proposed Project consists of few changes, limited to the architectural design of the proposed New Building at 15 Necco Street. As detailed in Section 1.3 of Chapter 1, *Project Change Description*, the updated architectural design is similar in height, footprint, materials and massing, comprising a multiple-tiered building with a cantilever overlooking the Harborwalk. In addition, a large, west-side building canopy has been eliminated from the design of the Proposed Project. Much of the previous landscape and hardscape design has been retained, with additional connections between the New Building, the Harborwalk, and the future open space to the south. Therefore potential impacts to historic resources, namely the factors of net new shadow, urban design and visual impacts, and historic rehabilitation remain consistent with the Proposed Project.

4.8.1 Brick Buildings Rehabilitation Status

The historic warehouse Brick Buildings which have been joined by a connective addition and enlarged by a rooftop addition, now comprise a single building known as 5 Necco Street, are included in the Fort Point Channel Landmark District. The Fort Point Channel Landmark District Commission previously reviewed and approved the approved project, with provisos, in December 2017. The Proposed Project Change does not include changes to the previously-approved rehabilitation of the Brick Buildings, or to the historic pedestrian bridge which links them with each other, and the pedestrian bridge which links them over Necco Court to a building owned by a third party. The previously approved project included a potential new pedestrian bridge connecting 5 Necco Street, and the New Building; this new bridge will not be constructed as part of the Proposed Project. Therefore, there will be no change in Proposed Project impacts to the Brick Buildings.

Although the Proposed Project consists of modifications to the New Building at 15 Necco Street, information will be submitted to the FPCLDC to document that construction of a new pedestrian bridge between 15 Necco Street and the historic Brick Buildings is no longer under consideration. The Brick Buildings rehabilitation is being undertaken by the original Proponent, GE, and will comply with the provisos in

the December 2017 FPCLDC certificate. GE is completing the tenant fit-out of its space on Floors 2-6, and ARE 72, as owner of 5 Necco Street, will have stewardship responsibilities for the fit-out of the ground floor of 5 Necco Street, when tenants for that space are identified.

4.8.2 Project Change Effects on Historic Resources

Urban Design

The Proposed Project consists of few changes, limited to the building and site design of the proposed New Building at 15 Necco Street. As detailed in Section 1.3 of Chapter 1, *Project Change Description*, the proposed architectural design is similar in height, footprint, materials and massing, comprising a multiple-tiered building with a modest cantilever facing the Harborwalk. In addition, a large, west-side building canopy has been eliminated from the design of the Proposed Project. Much of the landscape and hardscape design has been retained, with additional connections between the New Building, the Harborwalk, and the future open space to the south of the Project Site. Therefore, potential impacts to historic resources, namely the factors of net new shadow, urban design and visual impacts, and historic rehabilitation remain consistent with the Proposed Project.

The design of the New Building continues to utilize materials and massing that differentiate the new construction from the nearby historic buildings, reading as clearly modern yet designed to be compatible with the district's industrial character. In addition, visual connections and open space between the built environment will continue to be reinforced through site and building design. Refer to Section 2.2 Chapter 2, *Urban Design*, for a description of the Proposed Project's design. Refer to Figures 2.4a-c for renderings of the New Building.

Shadow

As described in Section 4.3, the proposed New Building design is similar in height and massing to the previously approved building, therefore changes to the shadow impacts to historic resources are negligible (Figures 4.1a-d). The only anticipated changes are slight reductions in net new shadow along Necco Street at 3:00 PM on March 21, and on the rooftops of the Brick Buildings at 5 Necco Street in the afternoons of June 21 and September 21.

Wind

The pedestrian wind comfort analysis for the New Building is being updated in accordance with the requirements of Section B.1 of the BPDA Development Review Guidelines. Preliminary results indicate that potential landscape changes may be needed to mitigate uncomfortable conditions along the western face of the New Building near the Harborwalk. The Proponent is committed to designing a pedestrian environment that is generally comfortable for its intended uses. Studies are continuing, and results will be shared with the City and the IAG as available.



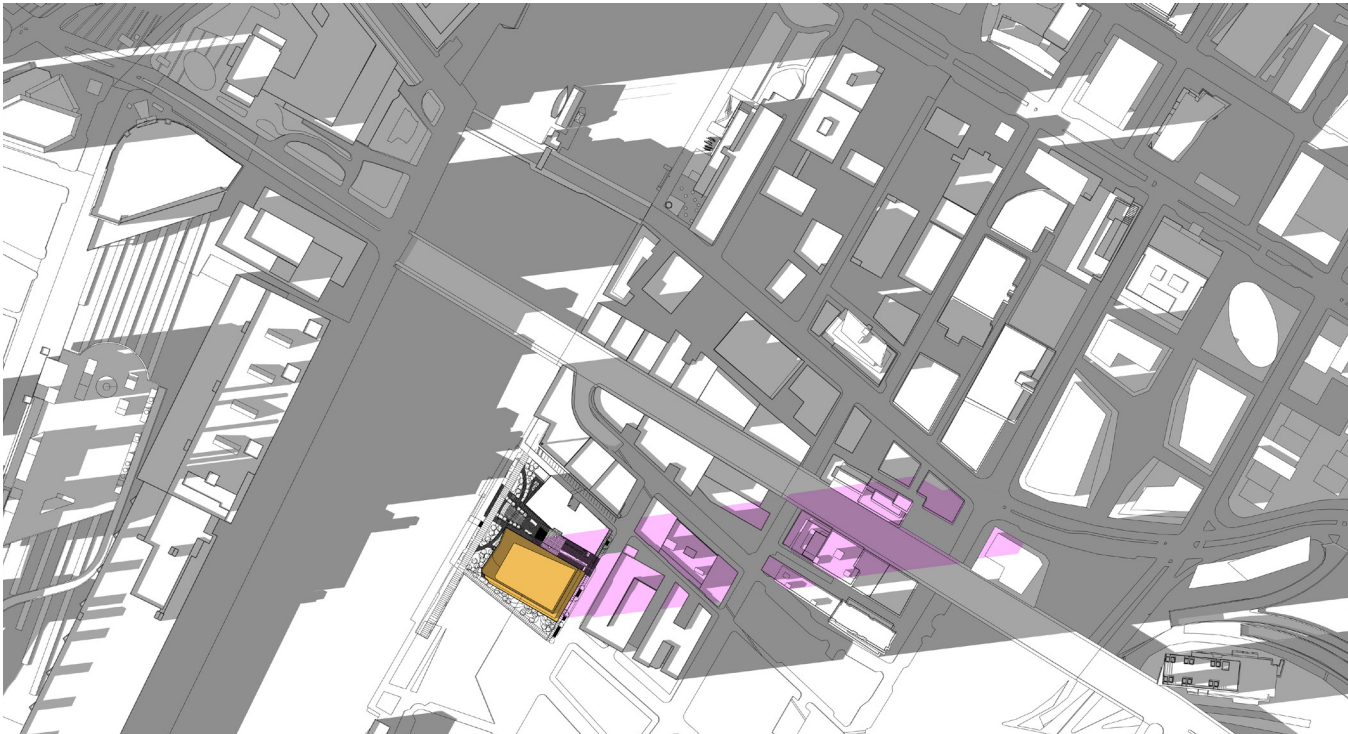
09:00 am



12:00 pm



03:00 pm



06:00 pm



Figure 4.1a
Shadow Study : March 21

15 Necco Street Project
Boston, Massachusetts



09:00 am



12:00 pm



03:00 pm



06:00 pm



Figure 4.1b
Shadow Study : June 21

15 Necco Street Project
Boston, Massachusetts



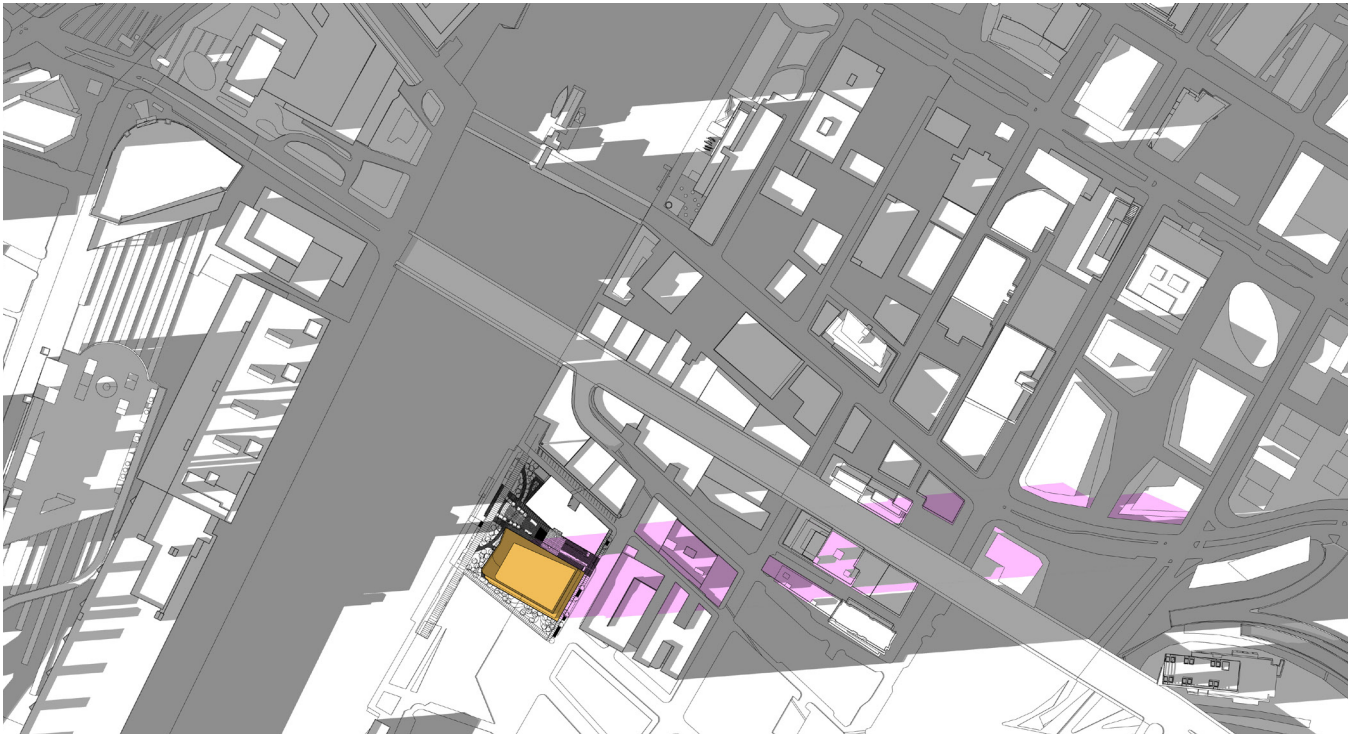
09:00 am



12:00 pm



03:00 pm

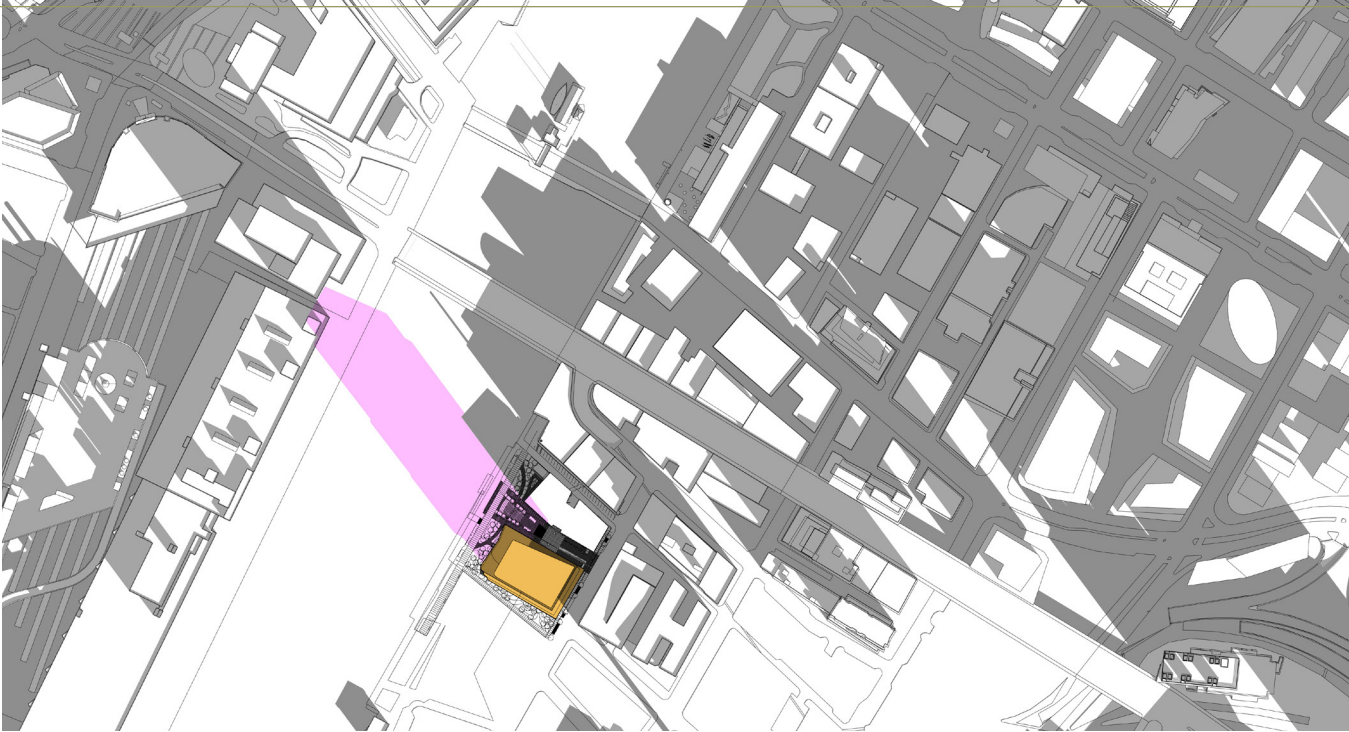


06:00 pm



Figure 4.1c
Shadow Study : September 21

15 Necco Street Project
Boston, Massachusetts



09:00 am



12:00 pm



03:00 pm



06:00 pm

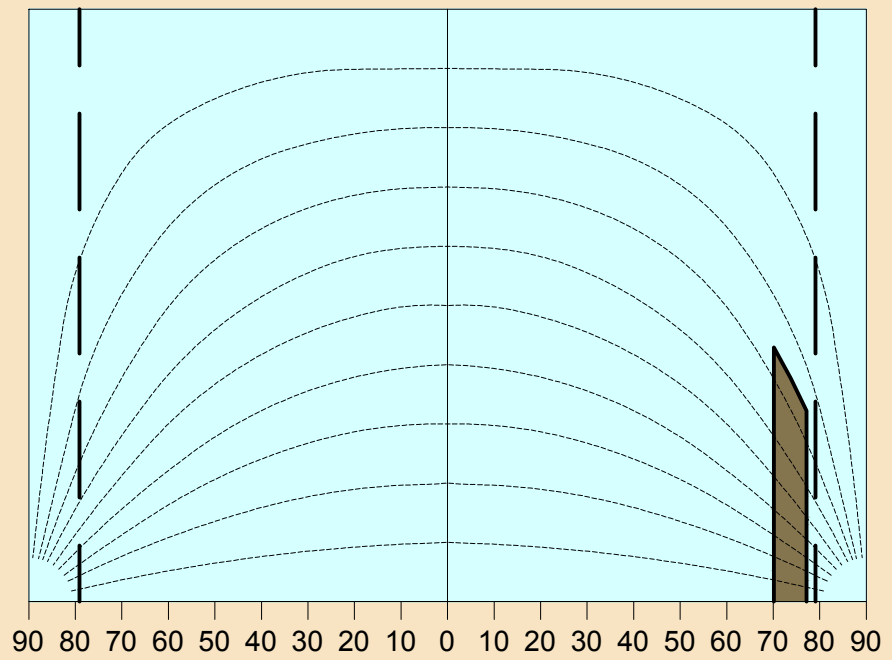
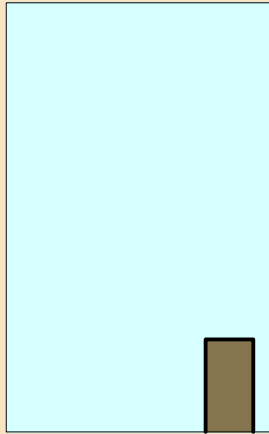


Figure 4.1d
Shadow Study : December 21

15 Necco Street Project
Boston, Massachusetts

Existing

Obstruction of
Skyplane = 2.2%



Proposed

Obstruction of
Skyplane = 66.3%

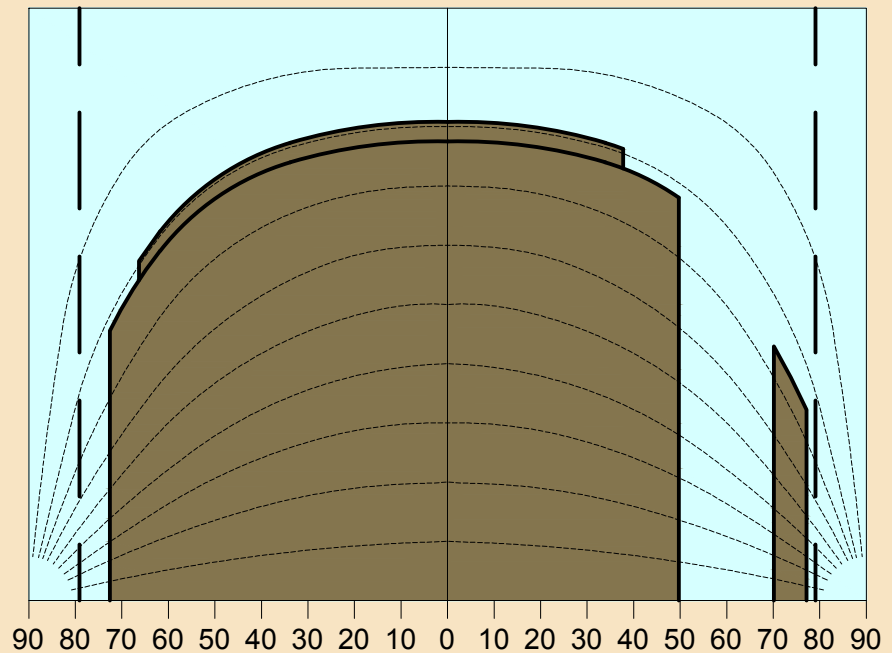
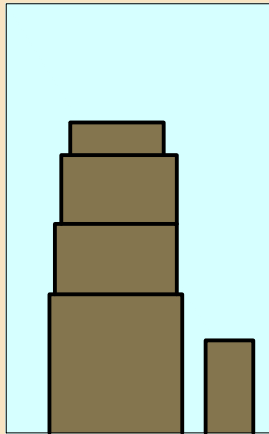


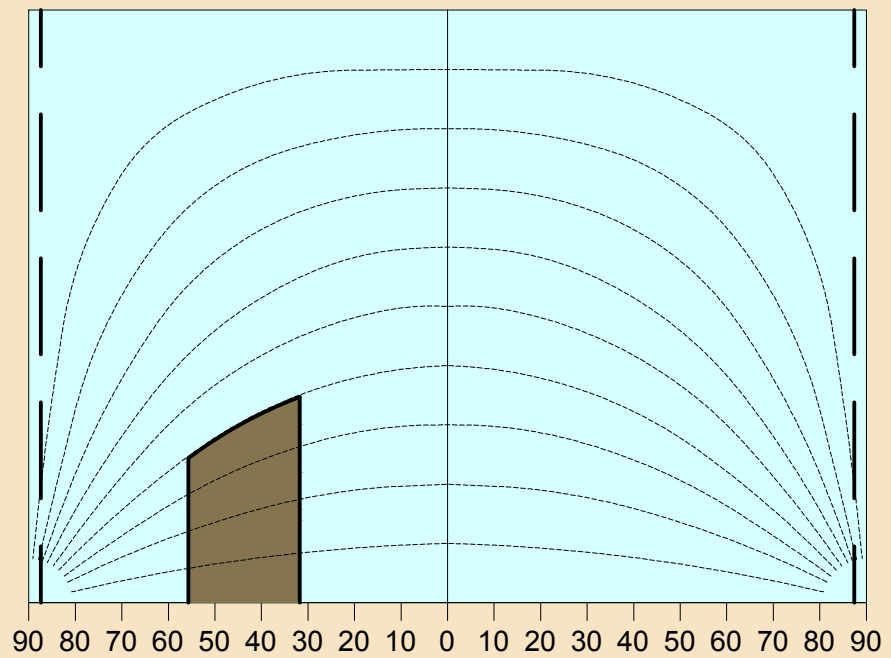
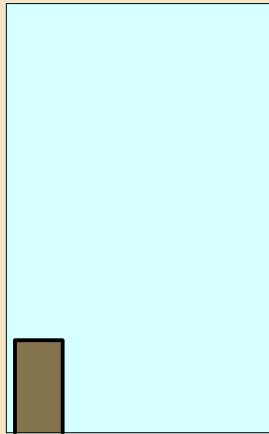
Figure 4.2a

Daylighting Analysis
Center of Necco Street

**15 Necco Street Project
Boston, Massachusetts**

Existing

Obstruction of
Skyplane = 5.8%



Proposed

Obstruction of
Skyplane = 17.4%

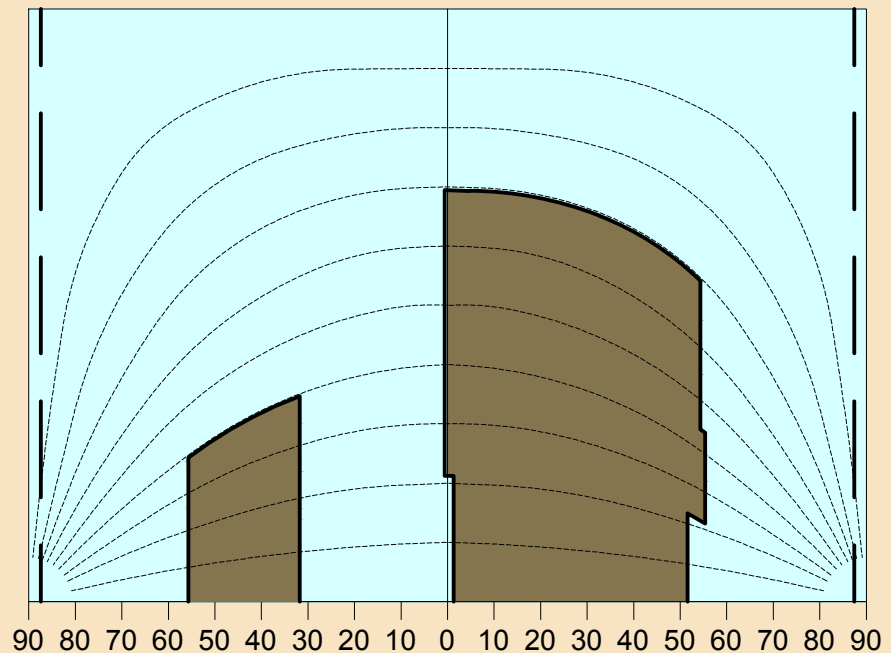
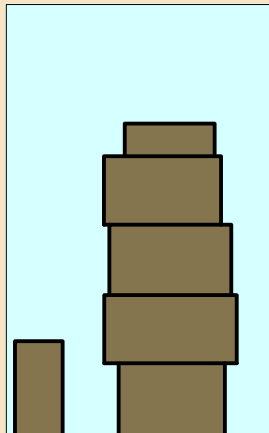
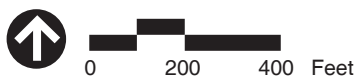
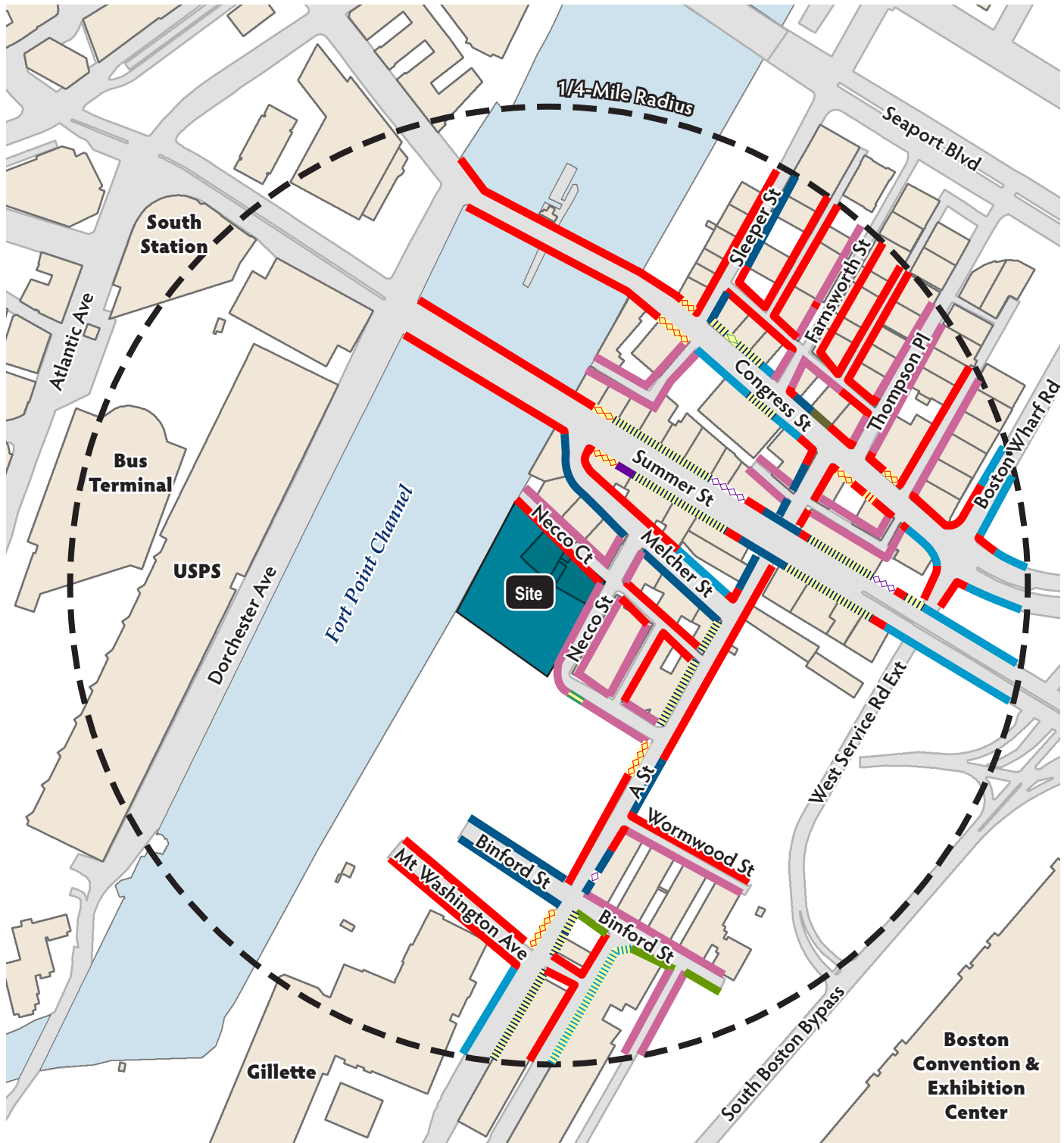


Figure 4.2b

Daylighting Analysis
Center of Harborwalk

**15 Necco Street Project
Boston, Massachusetts**



Source: BWSC

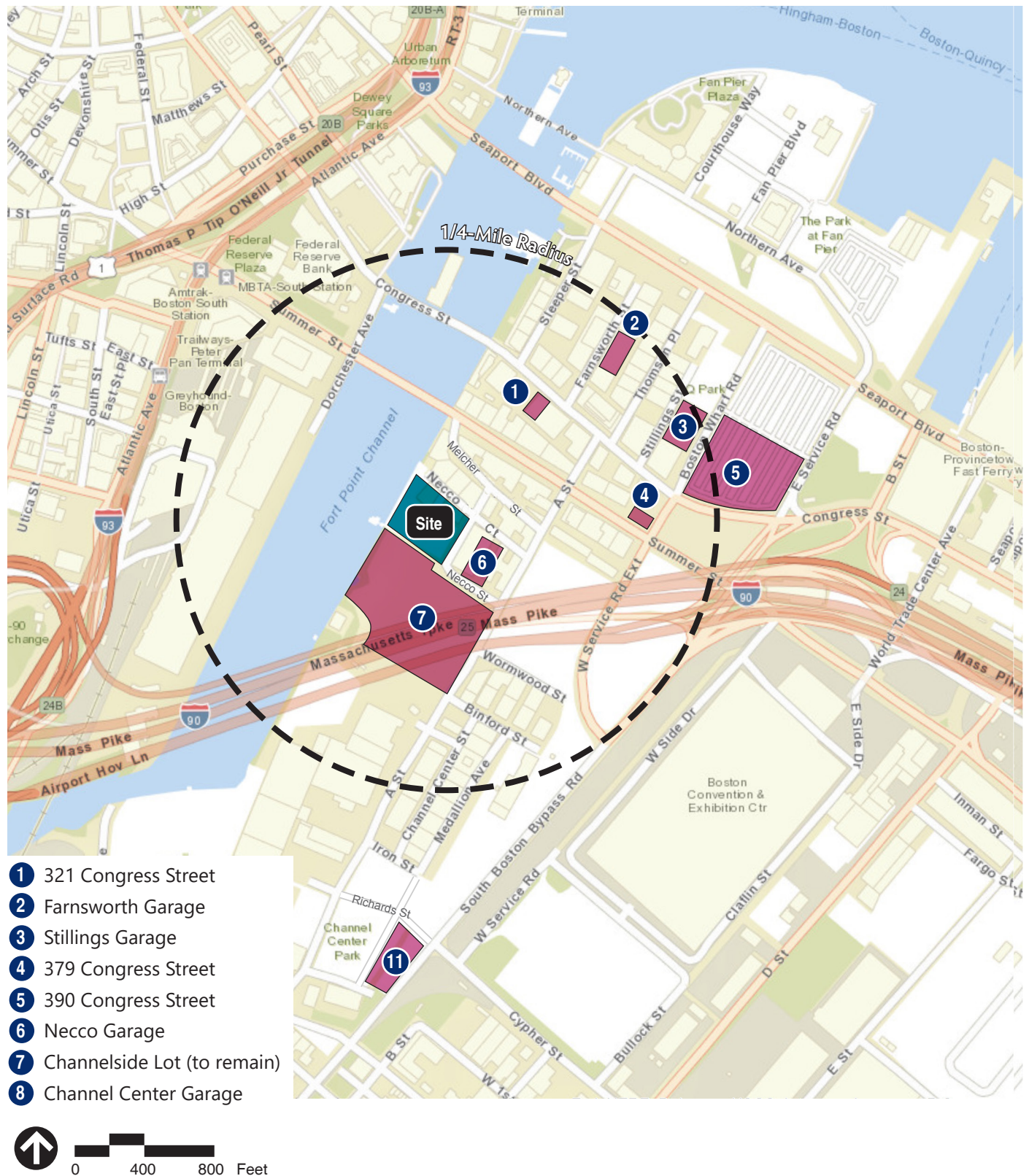
- | | |
|---|--|
| — No Parking | ◆◆◆◆ Bus Stop |
| — Resident Only | Loading |
| — Metered - 2-Hour | — Valet |
| 2-Hour, Daytime/
Residential, Overnight | ◆◆◆◆ Bluebikes |
| ◆◆◆◆ Handicapped | — Zipcar |
| — Private | — Unregulated |
| | 15-Minute |



Prepared By: VHB

Figure 4.3
On-Street Parking

**GE Headquarters Project
Boston, Massachusetts**



Source: ArcGIS World Street Map



Prepared By: VHB

Figure 4.4
Off-Street Parking

**GE Headquarters Project
Boston, Massachusetts**

Legend

ELECTRIC

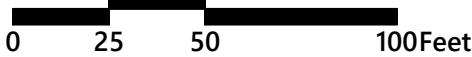
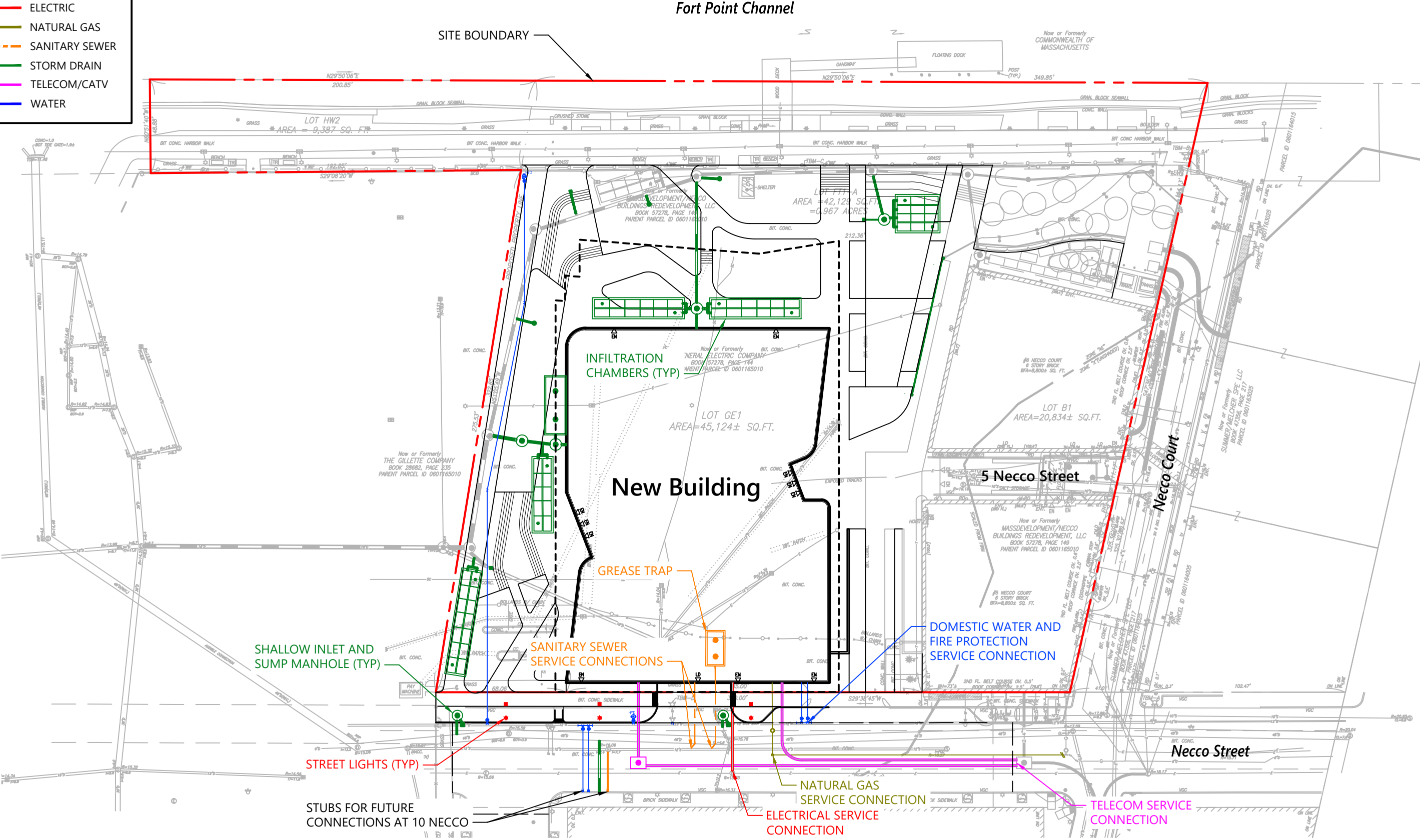
NATURAL GAS

SANITARY SEWER

STORM DRAIN

TELECOM/CATV

WATER



Utility Connections and
Green infrastructure Exhibit
15 Necco Street
Boston, Massachusetts

Figure 4.5

APPENDIX A: BPDA Checklists

Contents

- BPDA Climate Resiliency Checklist*
- BPDA Accessibility Checklist
- BPDA Smart Utilities Checklist*
- BPDA Broadband Ready Building Checklist*

*The printed copy included in this NPC is for reference. This checklist was also submitted electronically.

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BPDA CLIMATE RESILIENCY CHECKLIST

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An electronic copy will be submitted online per Article 37 guidance.

A.1 - Project Information

Project Name:	15 Necco Street		
Project Address:	15 Necco Street, Boston MA, 02210		
Project Address Additional:	N/A		
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	Name: Sherry Clancy	Company National Development	Email sclancy@natdev.com Phone 617-559-5056
Is MEPA approval required	Yes/no		Date MEPA NPC TO be filed: Oct. 31, 2019

A.3 - Project Team

Owner / Developer:	ARE-MA No. 74, LLC a joint venture between affiliates of Alexandria Real Estate Equities ("ARE") and National Development, and ARE-MA No. 72, LLC, an affiliate of ARE (collectively, the "Proponent"),
Architect:	Elkus Manfredi Architects
Engineer:	Site/Civil - VHB Mechanical - BR+A
Sustainability / LEED:	The Green Engineer
Permitting:	VHB
Construction Management:	TBD

A.3 - Project Description and Design Conditions New Building Only

List the principal Building Uses:	New Building: Office/Life Sciences/Lab
List the First Floor Uses:	New Building: Retail/Restaurant/Lobby/Circulation
List any Critical Site Infrastructure and or Building Uses:	N/A

Site and Building: New Building Only

Site Area:	115,865 SF (2.66 acres)	Building Area:	316,500 SF
Building Height:	Up to 180 Feet	Building Height:	12 Floors
Existing Site Elevation – Low:	12.9 Ft BCB	Existing Site Elevation – High:	18.15 Ft BCB
Proposed Site Elevation – Low:	12.9 Ft BCB	Proposed Site Elevation – High:	19.5 Ft BCB

Proposed First Floor Elevation: **19.5 Ft BCB**

Below grade levels: **1 Story**

Article 37 Green Building:

LEED Version - Rating System : **LEED for Core & Shell version 4.0 and 4.1 (as applicable)**

Proposed LEED rating: **Certified/Silver/Gold/Platinum**

LEED Certification: **Yes / No**

Proposed LEED point score: **67 Pts.**

Building Envelope [New Building]

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: **0.032 (U)**

Exposed Floor: **0.040 (U)**

Foundation Wall: **.052(U)**

Slab Edge (at or below grade): **0.100 (U)**

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

Area of Opaque Curtain Wall & Spandrel Assembly:	40%	Wall & Spandrel Assembly Value:	0.200 (U)
Area of Framed & Insulated / Standard Wall:	0%	Wall Value	0.200 (U)
Area of Vision Window:	60%	Window Glazing Assembly Value:	0.340 (U)
		Window Glazing SHGC:	0.29 (SHGC)
Area of Doors:	<1%	Door Assembly Value:	0.37 (U)

Energy Loads and Performance [New Building]

For this filing – describe how energy loads & performance were determined

Energy modeling using eQuest

Annual Electric:	10,100,000 (kWh)	Peak Electric:	7,000 (kW)
Annual Heating:	24,500 (MMbtu/hr)	Peak Heating:	18.5 (MMbtu)
Annual Cooling:	1,310,000 (Tons/hr)	Peak Cooling:	14.60 (Tons)
Energy Use - Below ASHRAE 90.1 - 2013:	36%	Have the local utilities reviewed the building energy performance?:	Yes / No
Energy Use - Below Mass. Code:	36%	Energy Use Intensity:	119 (kBtu/SF)

Back-up / Emergency Power System New Building Only

Electrical Generation Output: **2,000 (kW)**

System Type: **750 + 1,250 (kW)**

Number of Power Units: **2**

Fuel Source: **Gas & Diesel**

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

Electric: **1,000 (kW)**

Heating: **9.25 (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 *New Building Only*

For this Filing - Annual Building GHG Emissions: **Approx. 4,060 (Tons)**

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

Energy analysis and life-cycle cost analysis is directly impacting design decisions.

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

The exterior walls of the New Building will consist of a high-performance enclosure. As shown in Figure 2.6 of Chapter 2, *Urban Design* of the NPC, options are being evaluated and tested that may include an array of louvers on the south and west that limit solar heat gain and glare and allow optimal light transmission.

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

The design is incorporating a closed-loop ground source heat pump (vertical bore field) as the first stage of heating and cooling with a premium efficiency water-cooled chiller plant and natural gas condensing boiler plant for peak loads.

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

The Proponent is committed to installing a rooftop solar PV system and a geothermal system as part of the New Building. At a minimum, the Proponent is committed to providing a 120-kW Solar PV array on the rooftop of the mechanical penthouse that is expected to produce approximately 138,000 kWh of electricity annually. The mechanical system is also being designed with a dedicated outdoor air system with intelligent glycol energy recovery serving fan coil units and chilled beams.

The Proponent has also incorporated Ground Source Heat Pumps into the design of the building and the energy modeling. The Proposed Project design assumes that 35 loops at 800 feet can be accommodated on-site. As the ground source heat pumps alone will not be sufficient to fulfill the Project's energy need, the system will be supplemented by condensing gas-fired boilers.

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

The Proponent has committed to purchase Renewable Energy Credits ("RECs") to offset all electricity consumed by the building, including tenant end uses.

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

The Project will provide continued energy analysis and life-cycle cost analysis through project completion.

B.2 - GHG Reduction - Adaptation Strategies *New Building Only*

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):

The closed-loop vertical bore field will provide a high efficiency heating source for the base heating loads. For peak heating loads, the natural gas boilers could potentially be converted to electric boilers or air to water heat pumps in the future. The hot water distribution is designed around a low temperature to accommodate using heat pumps.

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 *New Building Only*

Temperature Range - Low: 0 Deg.

Temperature Range - High: 91 Deg.

Annual Heating Degree Days: 5,461

Annual Cooling Degree Days: 2,897

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

Days - Above 90°: 10 to 20 #

Days - Above 100°: 1 to 3 #

Number of Heatwaves / Year: 3 to 5 #

Average Duration of Heatwave (Days): 3 #

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

High SRI roof material, vegetated areas in landscape.

C.2 - Extreme Heat - Adaptation Strategies *New Building Only*

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:

Future HVAC replacement can accommodate future weather conditions.

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 generators will support life safety and select system loads.

D - Extreme Precipitation Events *New Building Only*

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: **4.90 In.**

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

The Project has incorporated on-site stormwater management systems (e.g., infiltration systems, rainwater harvesting tank for stormwater reuse) designed to collectively reduce runoff and control peak rates of runoff in comparison to existing conditions. Rainwater runoff will be stored in holding tanks for reuse for cooling tower makeup and irrigation. Additionally, to further lessen the impacts of extreme precipitation events and reduce stormwater runoff from the site, overall site imperviousness will be reduced by replacing existing hardscape with ground level green spaces and green infrastructure, where feasible.

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):

The Project is anticipated to make use of on-site stormwater management systems to reduce the peak discharge rates of runoff. Please refer to the response to D.1 above for additional information.

Additionally, to further accommodate future, extreme rain events, critical infrastructure will be elevated above the ground floor.

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:

16.5 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:	19.5 Ft BCB		
Sea Level Rise - Design Flood Elevation:	20.5 Ft BCB	First Floor Elevation:	19.5 Ft BCB
Site Elevations at Building:	16.25 to 19.5 Ft BCB ±	Accessible Route Elevation:	16.25 & 19.5 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.:

The ground floor of the new building has been elevated to +19.5 BCB, which is intended to allow for the building to maintain operational capacity during a projected 100-year flood event in the year 2070.

Critical mechanical and life safety/standby emergency building systems will be located outside of vulnerable elevations. The standby generators will be located on the roof.

The landscaping adjacent to Fort Point Channel will be designed with native/adaptive landscape, such as tidal zone planting materials that will be resilient to flooding and potential saltwater intrusion. Hardscape site elements, such as walls, walkways, stairways, railings, benches, and bike racks, will also be designed using materials that can withstand potential saltwater inundation.

The Project will provide stormwater conveyance infrastructure to effectively remove stormwater from the Project Site. The site design will also include an overland drainage path around the buildings and elevated pedestrian areas for inland flooding.

Since the target FFE is likely to change as climate change projections are updated, the Proposed Project utilizes multiple strategies, to allow for flexible adaptation over time. The strategies to be implemented in the future may include:

- Increase the height of the landscaped areas to the target FFE of 20.5 BCB so that the landscape functions as berms, the height of which can be increased over time as elevation requirements are adjusted through the use of modular seat walls;
- Add modular blocks to seat walls and other landscape walls to make up as many additional feet of elevation as required at the time of implementation of the Proposed Project; and
- Utilize deployable flood barriers when necessary, such as aqua-fencing, with a minimum elevation of 20.5 BCB at the entry points to the Harborwalk in order to preserve access to the Harborwalk during extreme weather conditions.

The strategies utilized by the Proposed Project will protect the Project Site, the Brick Buildings, and the New Building against the potential flooding predicted by today's

climate change projections and will position the buildings to seamlessly adapt to potential future conditions

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.:

The ground floor of the new building will be set at +19.5 BCB, which is intended to allow for the building to maintain operational capacity during a projected 100-year flood event in the year 2070.

Movable and permanent flood barriers at the loading dock entrance will continue to be evaluated as the entrance is at street grade approximately three (3) feet below the building finish floor elevation. Additionally, the building systems and operations located in the basement of the new building will be limited to those which can withstand inundation or are not critical to the operation of the building. Critical mechanical and life safety/standby emergency building systems will be located above vulnerable elevations. The standby generators will be located on the roof.

Backflow preventers for wastewater and storm drainage will be evaluated.

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:

The Project does not include any residential uses. Sheltering in place is not anticipated.

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

Critical mechanical and life safety/standby emergency building systems will be located above vulnerable elevations. The standby generators will be located on the roof. This will help limit damage during flooding and reduce the amount of time needed to return to normal operations after an extreme 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.:

Infiltration systems and the proposed rainwater harvesting tank have been designed to collectively mitigate larger storm events. Flood barriers will continue to be evaluated at locations below the Sea Level Rise – Design Flood Elevation. The Project is designed to allow additional flood adaptation measures that could be employed incrementally, including increasing the height of the landscaped areas and adding modular blocks to landscaping walls.

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

Critical mechanical and life safety/standby emergency building systems will be located above vulnerable elevations

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

BPDA ACCESSIBILITY CHECKLIST

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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 BPDA 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: <i>If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.</i>			
Project Name:	15 Necco Street		
Primary Project Address:	15 Necco Street, Boston MA, 02210		
Total Number of Phases/Buildings:	1 Phase, 1 Building		
Primary Contact (Name / Title / Company / Email / Phone):	Sherry Clancy Development Project Manager National Development mailto:sclancy@natdev.com		
Owner / Developer:	ARE-MA No. 74, LLC a joint venture between affiliates of Alexandria Real Estate Equities (“ARE”) and National Development, and ARE-MA No. 72, LLC, an affiliate of ARE (collectively, the “Proponent”).		
Architect:	Elkus Manfredi Architects		
Civil Engineer:	Site/Civil - VHB Mechanical - BR+A		
Landscape Architect:	The Green Engineer		
Permitting:	VHB		
Construction Management:	TBD		
At what stage is the project at time of this questionnaire? Select below:			
	NPC	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)? <i>If yes</i> , identify and explain.	Yes; for a disabled lift on Necco Street to access ground level retail/restaurants.		

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? **[New Building Only]**

Site Area:	115,865 SF (2.66 acres)	Building Area:	316,500 SF
Building Height:	173 ft.	Number of Stories:	12 Flrs.
First Floor Elevation:	19.5 Ft. BCB	Is there below grade space:	Yes / No

What is the Construction Type? (Select most appropriate type) **[New Building Only]**

	Wood Frame	Masonry	Steel Frame	Concrete
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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:

Active ground floor uses, such as Retail and Restaurant

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 Site is located within the Fort Point area of the South Boston Waterfront neighborhood, and is comprised of two existing historic brick buildings at 5 and 6 Necco Court (the “Brick Buildings”), a surface parking lot, and a portion of the Boston Harborwalk. The Project Site is bounded to the east by Necco Street (a private roadway), to the south by privately-owned land currently used for surface parking, to the west by the Fort Point Channel, and to the north by Necco Court, which is a private way. The Project Site is also in close proximity to key area destinations including the Boston Convention and Exhibition Center (“BCEC”) and the booming development in the Seaport.

The surrounding neighborhood is part of the Fort Point Channel Planning District and has been rapidly changing over the past

	decade with new construction and rehabilitation and repurposing of historic industrial buildings.
List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops:	<p>The Project Site is well served by public transportation as it is located approximately 0.5 miles from South Station (MBTA Red and Silver Lines, Commuter Rail, and Amtrak), approximately 0.7 miles from Broadway Station (Red Line), and Courthouse Station (Silver Line), and a local and regional bus services.</p> <p>South Station, Courthouse Station, and Broadway Station are accessible stations according to MBTA's website.</p>
List the surrounding institutions: hospitals, public housing, elderly and disabled housing developments, educational facilities, others:	Artists for Humanity and JF Condon Elementary School (Boston public school) are both located in nearby South Boston neighborhood.
List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities:	<p>The following public use facilities are within proximity of the Project Site:</p> <ul style="list-style-type: none"> • Boston Convention & Exhibition Center • Boston Public Library – South Boston • Condon Community Center • District Hall • John Joseph Moakley U.S. Courthouse • Our Lady of Good Voyage Catholic Church
4. Surrounding Site Conditions – Existing: <i>This section identifies current condition of the sidewalks and pedestrian ramps at the development site.</i>	
Is the development site within a historic district? <i>If yes</i> , identify which district:	A portion of the Project Site is located in the Fort Point Channel National Register Historic District and Fort Point Channel Landmark District.
Are there sidewalks and pedestrian ramps existing at the development site? <i>If yes</i> , list the existing sidewalk and pedestrian ramp dimensions, slopes, materials, and physical condition at the development site:	<p>Yes. There is an existing, nominally 8-foot wide, concrete sidewalk along Necco Street with no ramps into current structures. There is also the existing nominally 18-foot wide, concrete Harborwalk, which runs along the west portion of the Project Site with no accessible ramps.</p> <p>In connection with the City of Boston approvals of the previously-approved project, GE committed to a range of mitigation measures,</p>

	<p>some of which, like the widening and reconstruction of the Harborwalk have been substantially completed as a component of the rehabilitation of 5 Necco Street. The completed Harborwalk improvements will be segregated from the construction site of the New Building, thereby making them available to the public throughout the construction of the New Building as much as feasible. The Proponent anticipates seeking a partial Certificate of Compliance in November 2019 for the improvements associated with 5 Necco Street in the January 2017 Order of Conditions.</p>
<p>Are the sidewalks and pedestrian ramps existing-to-remain? <i>If yes,</i> have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? <i>If yes,</i> provide description and photos:</p>	<p>No. All existing sidewalks and pedestrian ways surrounding the New Building are to be removed and replaced. Any non-compliant conditions will also be improved and brought to compliance.</p>
<p>5. Surrounding Site Conditions – Proposed</p> <p><i>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.</i></p>	
<p>Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? <i>If yes,</i> choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard.</p>	<p>Yes. The proposed sidewalks along Necco Street will be consistent with Boston Complete Streets Guidelines, Industrial Street type.</p>
<p>What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone:</p>	<p><u>Necco Street</u> <u>+8' Total (+6' Pedestrian, +2' Furnishing)</u></p> <p>Cross Slopes: Max. 2% Running Slopes: Max. 5%</p>
<p>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?</p>	<p>Pedestrian Zone: Cast in place concrete.</p> <p>Furnishing Zone: Concrete Unit Pavers.</p> <p>The materials will be on the City of Boston pedestrian right-of-way.</p>

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Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way? <i>If yes</i> , what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	No. The set dimensions will not allow for café or other programming.
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	No.
-Will any portion of the Project be going through the PIC? <i>If yes</i> , identify PIC actions and provide details.	No.
6. Accessible Parking: [New Building Only] <i>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.</i>	
What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage?	No spaces will be provided at the Project 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?	No parking will be provided on-site; therefore, no accessible spaces will be provided as part of the Project.
Will any on-street accessible parking spaces be required? <i>If yes</i> , has the proponent contacted the Commission for Persons with Disabilities regarding this need?	No on-street accessible parking spaces are anticipated to be required, and none are provided at this time.
Where is the accessible visitor parking located?	No dedicated accessible visitor parking will be provided on-site.

Has a drop-off area been identified? <i>If yes</i> , will it be accessible?	A drop-off area has been identified along the Project's Necco Street frontage, which will be made accessible.
7. Circulation and Accessible Routes: <i>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.</i>	
Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator:	Figure A.1 (attached) identifies the accessible routes through the Project Site.
Are the accessible entrances and standard entrance integrated? <i>If yes</i> , describe. <i>If no</i> , what is the reason?	Yes, the main entrances are accessible and integrated. The retail entrances at the street are accessible with lifts and that are integrated.
<i>If project is subject to Large Project Review/Institutional Master Plan</i> , describe the accessible routes way-finding / signage package.	The exterior signage for the New Building is not yet designed, but will comply with applicable signage guidelines and review procedures. Appropriate and visible wayfinding signage will be provided on-site to guide pedestrians to the Harborwalk, the Project Site, and the future open space south of the Project Site. This signage will comply with all standards of the Harborwalk. The Proposed Project may also explore the use of interpretive signage detailing the Proposed Project's use of native species plants, unique sustainability and technological elements, and resiliency features. Wayfinding signage will invite the public into the Project Site and guide them to new Building Entrance and drop off locations.
8. Accessible Units (Group 2) and Guestrooms: (If applicable) <i>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.</i>	

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What is the total number of proposed housing units or hotel rooms for the development?	No residential units are proposed as part of the Project.
<i>If a residential development</i> , 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?	N/A
<i>If a residential development</i> , how many accessible Group 2 units are being proposed?	N/A
<i>If a residential development</i> , how many accessible Group 2 units will also be IDP units? <i>If none</i> , describe reason.	N/A
<i>If a hospitality development</i> , how many accessible units will feature a wheel-in shower? Will accessible equipment be provided as well? <i>If yes</i> , provide amount and location of equipment.	N/A
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. <i>If yes</i> , provide reason.	N/A
Are there interior elevators, ramps or lifts located in the development for access around architectural barriers and/or to separate floors? <i>If yes</i> , describe:	N/A
9. Community Impact: <i>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.</i>	
Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or	Yes. Such improvements will be determined through the Article 80 review process.

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supporting other community-based initiatives?	
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 Project will provide a wide array of common and amenity areas for employees and visitors on the ground level, and in the public realm. The project team is committed to designing all areas to be welcoming and fully accessible to persons with disabilities.
Are any restrooms planned in common public spaces? <i>If yes</i> , will any be single-stall, ADA compliant and designated as “Family”/ “Companion” restrooms? <i>If no</i> , explain why not.	Yes, public restrooms will be available on the ground floor. Both are accessible.
Has the proponent reviewed the proposed plan with the City of Boston Disability Commissioner or with their Architectural Access staff? <i>If yes</i> , did they approve? <i>If no</i> , what were their comments?	The Project has not yet been reviewed with the City of Boston Disability Commissioner.
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? <i>If no</i> , what recommendations did the Advisory Board give to make this project more accessible?	The Project has not yet been reviewed with the City of Boston Disability Commissioner.
10. Attachments	

Article 80 | ACCESSIBILITY CHECKLIST

<i>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.</i>
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. Refer to Figure A.1
Provide a diagram of the accessible route connections through the site, including distances. Refer to Figure A.1
Provide a diagram the accessible route to any roof decks or outdoor courtyard space? (if applicable) Refer to Figure A.1
Provide a plan and diagram of the accessible Group 2 units, including locations and route from accessible entry. N/A
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



Source OJB

- Terraces/Landings - 2-3%
- Walkways - <5% / 2% Max Cross Slope
- Stairs
- Building Entry / Egress
- Site Boundary

OJB

A.1 Accessibility Checklist
Accessibility Diagram

15 Necco Street Project
Boston, Massachusetts

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BPDA SMART UTILITIES CHECKLIST

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boston planning &
development agency

Boston Smart Utilities Checklist

Date Submitted:

November, 2019

Submitted by:

Kyle Greaves, VHB

Background

The Smart Utilities Checklist will facilitate the Boston Smart Utilities Steering Committee's review of:

- a) compliance with the Smart Utilities Policy for Article 80 Development Review, which calls for the integration of five (5) Smart Utility Technologies (SUTs) into Article 80 developments
- b) integration of the Smart Utility Standards

More information about the Boston Smart Utilities Vision project, including the Smart Utilities Policy and Smart Utility Standards, is available at: [www.http://bostonplans.org/smart-utilities](http://bostonplans.org/smart-utilities)

Note: Any documents submitted via email to manuel.esquivel@boston.gov will not be attached to the pdf form generated after submission, but are available upon request.

Part 1 - General Project Information

1.1 Project Name

15 Necco Street Project

1.2 Project Address

15 Necco Street, Boston MA, 02210

1.3 Building Size (square feet)

New Building: 316,500 SF

**For a multi-building development, enter total development size (square feet)*

1.4 Filing Stage

Notice of Project Change

Boston Smart Utilities Checklist

1.5 Filing Contact Information

1.5a Name	Kyle Greaves
1.5b Company	VHB
1.5c E-mail	kgreaves@vhb.com
1.5d Phone Number	617-800-4833

1.6 Project Team

1.6a Project Owner/Developer	ARE-MA No. 74, LLC a joint venture between affiliates of Alexandria Real Estate Equities (“ARE”) and National Development, and ARE-MA No. 72, LLC, an affiliate of ARE (collectively, the “Proponent”)
1.6b Architect	Elkus Manfredi Architects
1.6c Permitting	VHB
1.6d Construction Management	TBD

Part 2 - District Energy Microgrids

Fill out this section if the proposed project’s total development size is equal to or greater than 1.5 million square feet.

Note on submission requirements timeline:

Feasibility Assessment Part A should be submitted with PNF or any other initial filing.

Feasibility Assessment Part B should be submitted with any major filing during the Development Review stage (i.e., DPIR)

District Energy Microgrid Master Plan Part A should be submitted before submission of the Draft Board Memorandum by the BPDA Project Manager (Note: Draft Board Memorandums are due one month ahead of the BPDA Board meetings)

District Energy Microgrid Master Plan Part B should be submitted before applying for a Building Permit

Boston Smart Utilities Checklist

Please email submission to manuel.esquivel@boston.gov

2.1 Consultant Assessing/Designing District Energy Microgrid (if applicable)

N/A - The Project is less than 1.5 million SF

2.2 Latest document submitted

N/A

2.3 Date of latest submission

N/A

2.4 Which of the following have you had engagement/review meetings with regarding District Energy Microgrids? (select all that apply)

N/A

2.5 What engagement meetings have you had with utilities and/or other agencies (i.e., MA DOER, MassCEC) regarding District Energy Microgrids? (Optional: include dates)

N/A

2.6 Additional Information

N/A

Part 3 - Telecommunications Utilidor

Fill out this section if the proposed project's total development size is equal to or greater than 1.5 million square feet OR if the project will include the construction of roadways equal to or greater than 0.5 miles in length.

Please submit a map/diagram highlighting the sections of the roads on the development area where a Telecom Utilidor will be installed, including access points to the Telcom Utilidor (i.e., manholes)

Please email submission to manuel.esquivel@boston.gov

Boston Smart Utilities Checklist

3.1 Consultant Assessing/Designing Telecom Utilidor (if applicable)

N/A- The Project is less than 1.5 million SF

3.2 Date Telecom Utilidor Map/Diagram was submitted

N/A

3.3 Dimensions of Telecom Utilidor (include units)

3.3a Cross-section (i.e., diameter, width X height)

N/A

3.3b Length

N/A

3.4 Capacity of Telecom Utilidor (i.e., number of interducts, 2 inch (ID) pipes, etc.)

N/A

3.5 Which of the following have you had engagement/review meetings with regarding the Telecom Utilidor? (select all that apply)

N/A

3.6 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding the Telecom Utilidor? (Optional: include dates)

N/A

3.7 Additional Information

N/A

Part 4 - Green Infrastructure

Fill out this section if the proposed project's total development size is equal to or greater than 100,000 square feet.

Boston Smart Utilities Checklist

Please submit a map/diagram highlighting where on the development Green Infrastructure will be installed.

Please email submission to manuel.esquivel@boston.gov

4.1 Consultant Assessing/Designing Green Infrastructure (if applicable)

VHB

4.2 Date Green Infrastructure Map/Diagram was submitted

10/29

4.3 Types of Green Infrastructure included in the project (select all that apply)

The Project will incorporate Green Infrastructure, where feasible, to assist in absorbing, delaying, detaining and treating stormwater to reduce flooding and pollution at the Project Site. At this time the Project is exploring the potential for rainwater gardens and infiltration chambers.

The Smart Utilities Policy recommends that projects utilize Green Infrastructure to retain, on site, a volume of runoff equal to 1.25 inches of rainfall times the total impervious area, prior to discharge.

4.4 Total impervious area of the development (in square inches)

Approx. 8,204,400 square inches (or approx. 56,975 square feet)¹

4.5 Volume of stormwater that will be retained (in cubic inches)*

As recommended by the BPDA, the Proponent will work with BWSC to evaluate Green Infrastructure elements capable of retaining the required 1.25 inches over the Project Site impervious area, equivalent to approx. 10,255,500 cubic inches (or approx. 5,935 cubic feet).

¹ Note: The Project Site boundary used for this analysis is consistent with the boundary for the previously approved project used during the Brick Building's BWSC site plan review process. This boundary excludes the harborwalk and the Necco Streer frontage (beyond the property line).

Boston Smart Utilities Checklist

**Note: Should equal to at least "Total impervious area (entered in section 4.4)" times "1.25 inches"*

4.6 Which of the following have you had engagement/review meetings with regarding Green Infrastructure? (select all that apply)

N/A

4.7 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding Green Infrastructure? (Optional: include dates)

None at this time

4.8 Additional Information

N/A

Part 5 - Adaptive Signal Technology (AST)

Fill out this section if as part of your project BTM will require you to install new traffic signals or make significant improvements to the existing signal system.

Please submit a map/diagram highlighting the context of AST around the proposed development area, as well as any areas within the development where new traffic signals will be installed or where significant improvements to traffic signals will be made.

Please email submission to manuel.esquivel@boston.gov

5.1 Consultant Assessing/Designing Adaptive Signal Technology (if applicable)

VHB

5.2 Date AST Map/Diagram was submitted

N/A – The Project does not propose any new signals, or upgrades to existing signals at this time.

Boston Smart Utilities Checklist

5.3 Describe how the AST system will benefit/impact the following transportation modes

5.3a Pedestrians

N/A

5.3b Bicycles

N/A

5.3c Buses and other Public Transportation

N/A

5.3d Other Motorized Vehicles

N/A

5.4 Describe the components of the AST system (including system design and components)

N/A

5.5 Which of the following have you had engagement/review meetings with regarding AST? (select all that apply)

N/A

5.6 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding AST? (Optional: include dates)

N/A

5.7 Additional Information

N/A

Part 6 - Smart Street Lights

Fill out this section if as part of your project PWD and PIC will require you to install new street lights or make significant improvements to the existing street light system.

Please submit a map/diagram highlighting where new street lights will be installed or where improvements to street lights will be made.

Please email submission to manuel.esquivel@boston.gov

Boston Smart Utilities Checklist

6.1 Consultant Assessing/Designing Smart Street Lights (if applicable)

TBD

6.2 Date Smart Street Lights Map/Diagram was submitted

All street lights created or modified as part of the Project are documented in the Utility Connections and Green Infrastructure Exhibit.

6.3 Which of the following have you had engagement/review meetings with regarding Smart Street Lights? (select all that apply)

N/A

6.4 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding Smart Street Lights? (Optional: include dates)

N/A

6.5 Additional Information

N/A

Part 7 - Smart Utility Standards

The Smart Utility Standards set forth guidelines for planning and integration of SUTs with existing utility infrastructure in existing or new streets, including cross-section, lateral, and intersection diagrams. The Smart Utility Standards are intended to serve as guidelines for developers, architects, engineers, and utility providers for planning, designing, and locating utilities. The Smart Utility Standards will serve as the baseline for discussions on any deviations from the standards needed/proposed for any given utility infrastructure.

Please submit typical below and above grade cross section diagrams of all utility infrastructure in the proposed development area (including infrastructure related to the applicable SUTs).

Please submit typical below and above grade lateral diagrams of all utility infrastructure in the proposed development area (including infrastructure related to the applicable SUTs).

Please email submission to manuel.esquivel@boston.gov



Boston Smart Utilities Checklist

7.1 Date Cross Section Diagram(s) was submitted

October 31, 2019

7.2 Date Lateral Diagram(s) was submitted

To be submitted at a later date.

7.3 Additional Information

To be submitted at a later date.

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BPDA BROADBAND READY BUILDING CHECKLIST

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ARTICLE 80 DESIGN REVIEW BROADBAND READY BUILDINGS QUESTIONNAIRE

The City of Boston is working to cultivate a broadband ecosystem that serves the current and future connectivity needs of residents, businesses, and institutions. The real estate development process offers a unique opportunity to create a building stock in Boston that enables this vision. In partnership with the development community, the Boston Planning and Development Authority and the City of Boston will begin to leverage this opportunity by adding a broadband readiness component to the Article 80 Design Review. This component will take the form of a set of questions to be completed as part of the Project Notification Form. Thoughtful integration of future-looking broadband practices into this process will contribute to progress towards the following goals:

1. Enable an environment of competition and choice that results in all residents and businesses having a choice of 2 or more wireline or fixed wireless high-speed Internet providers
2. Create a built environment that is responsive to new and emerging connectivity technologies
3. Minimize disruption to the public right of way during and after construction of the building

The information that is shared through the Project Notification Form will help BPDA and the City understand how developers currently integrate telecommunications planning in their work and how this integration can be most responsive to a changing technological landscape.

Upon submission of this online form, a PDF of the responses provided will be sent to the email address of the individual entered as Project Contact. Please include this PDF in the Project Notification Form packet submitted to BPDA.

SECTION 1: GENERAL QUESTIONS

Project Information

- Project Name: **15 Necco Street**
- Project Address Primary: **15 Necco Street, Boston**
- Project Address Additional:
- Project Contact (name / Title / Company / email / phone):
Sherry Clancy, National Development, sclancy@natdev.com, 617-559-5080
- Expected completion date: **2022**

Team Description

- Owner / Developer: **ARE-MA No. 74, LLC a joint venture between affiliates of Alexandria Real Estate Equities ("ARE") and National Development, and ARE-MA No. 72, LLC, an affiliate of ARE (collectively, the "Proponent")**
- Architect: **Elkus Manfredi Architects**
- Engineer (building systems): **BR+A**
- Permitting: **VHB and Mintz Levin**
- Construction Management **TBD**

SECTION 2: RIGHT OF WAY TO BUILDING -

Point of Entry Planning

Point of entry planning has important implications for the ease with which your building's telecommunications services can be installed, maintained, and expanded over time.

#1: Please provide the following information for your building's point of entry planning (conduits from building to street for telecommunications). Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.

- Number of Points of Entry
 - **Current conceptual design: two (2) diverse routes for redundancy.**
- Locations of Points of Entry
 - **Along Necco Street, outside of loading space and near NE corner of building.**
- Quantity and size of conduits
 - **Current conceptual design: 2 sets of (4) 4" conduits**
- Location where conduits connect (e.g. building-owned manhole, carrier-specific manhole or stubbed at property line)
 - **Current conceptual design: Conduits to connect to a new telecommunications manhole conceptually proposed in**

Necco Street (east of new loading space entry), and ultimately to a telecommunications manhole recently installed in Necco Street as part of the 5 & 6 Necco Court site improvements.

- Other information/ comments
 - N/A

#2: Do you plan to conduct a utility site assessment to identify where cabling is located within the street? This information can be helpful in determining the locations of POEs and telco rooms. Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.

- **Yes. The forthcoming utility site assessment will be based on existing conditions survey information available at the time of the design phase; a forthcoming as-built survey drawing of the site utility improvements installed as part of the 5 & 6 Necco Court Development; and record information provided by the resident utility company/companies.**

SECTION 3: INSIDE OF THE BUILDING

Riser Planning

Riser capacity can enable multiple telecom providers to serve tenants in your building.

#3: Please provide the following information about the riser plans throughout the building. Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.

- **Number of risers –**
 - **There will be one communications riser through the building.**
- **Distance between risers (if more than one) –**
 - **Not Applicable (n/a)**
- **Dimensions of riser closets;**
 - **99 sq. ft, 9'-0" x 11'-0"**
- **Riser or conduit will reach to top floor –**
 - **Yes.**
- **Number and size of conduits or sleeves within each riser –**
 - **(6) fire rated sleeves will interconnect stacked riser rooms extending the full height of the building**
- **Proximity to other utilities (e.g. electrical, heating);**
 - **No other utilities will be allowed within the riser rooms maintaining a minimum separation of 10'-0".**

- **Other information/comments**

Telecom Room

A well designed telecom room with appropriate security and resiliency measures can be an enabler of tenant choice and reduce the risk of service disruption and costly damage to telecom equipment.

#4: Please provide the following information about the telecom room plans. Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.

- What is the size of the telecom room?
Current design: 15x30ft
- Describe the electrical capacity of the telecom room (i.e. # and size of electrical circuits)
Convenience outlets will be located along all walls separated 6'-0" apart. (2) circuits shall be provided for security use and (1) additional circuit shall be provided for dedicated for telecommunications.
- Will the telecom room be located in an area of the building containing one or more load bearing walls?
Yes, it is within the core
- Will the telecom room be climate controlled?
 - **Yes**
 - No
 - Unknown
- If the building is within a flood-prone geographic area, will the telecom equipment will be located above the floodplain?
 - **Yes**
 - No
 - Unknown
- Will the telecom room be located on a floor where water or other liquid storage is present?
 - **Yes**
 - No
 - Unknown

- Will the telecom room contain a flood drain?
 - Yes
 - No
 - **Unknown**
- Will the telecom room be single use (telecom only) or shared with other utilities?
 - Telecom only
 - Shared with other utilities
 - **Unknown**
- Other information/comments

Delivery of Service Within Building (Residential Only)

Please enter 'unknown' if these decisions have not yet been made or you are presently unsure. Questions 5 through 8 are for residential development only.

#5: Will building/developer supply common inside wiring to all floors of the building?

- Yes
- No
- Unknown

#6: If so, what transmission medium (e.g. coax, fiber)? Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.

#7: Is the building/ developer providing wiring within each unit?

- Yes
- No
- Unknown

#8: If so, what transmission medium (e.g. coax, fiber)? Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.

SECTION 4: ACCOMMODATION OF NEW AND EMERGING TECHNOLOGIES

Cellular Reception

The quality of cellular reception in your building can have major impacts on quality of life and business operations.

Please provide the following information on your plans to facilitate high quality cellular coverage in your building. Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.

#9: Will the building conduct any RF benchmark testing to assess cellular coverage?

- Yes
- No
- **Unknown**

#10: Will the building allocate any floor space for future in-building wireless solutions (DAS/ small cell/ booster equipment)?

- **Yes**
- No
- Unknown

#11: Will the building be providing an in-building solution (DAS/ Small cell/ booster)?

- Yes
- No
- **Unknown**

#12: If so, are you partnering with a carrier, neutral host provider, or self-installing?

- Carrier
- **Neutral host provider**
- Self-installing

Rooftop Access

Building rooftops are frequently used by telecommunications providers to install equipment critical to the provision of service to tenants.

Please provide the following information regarding your plans for roof access and usage. Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.

#13: Will you allow cellular providers to place equipment on the roof?

- **Yes**
- No
- Unknown

#14: Will you allow broadband providers (fixed wireless) to install equipment on the roof?

- **Yes**
- No
- Unknown

SECTION 5: TELECOM PROVIDER OUTREACH

Supporting Competition and Choice

Having a choice of broadband providers is a value add for property owners looking to attract tenants and for tenants in Boston seeking fast, affordable, and reliable broadband service. In addition to enabling tenant choice in your building, early outreach to telecom providers can also reduce cost and disruption to the public right of way. The following questions focus on steps that property owners can take to ensure that multiple wireline or fixed wireless broadband providers can access your building and provide service to your tenants.

#15: (Residential Only) Please provide the date upon which each of the below providers were successfully contacted, whether or not they will serve the building, what transmission medium they will use (e.g. coax, fiber) and the reason they provided if the answer was 'no'.

- Comcast
- RCN
- Verizon
- NetBlazr
- Starry

#16: Do you plan to abstain from exclusivity agreements with broadband and cable providers?

- Yes
- No
- **Unknown**

#17: Do you plan to make public to tenants and prospective tenants the list of broadband/cable providers who serve the building?

- Yes
- No
- **Unknown**

SECTION 6: FEEDBACK

The Boston Planning and Development Agency looks forward to supporting the developer community in enabling broadband choice for resident and businesses. Please provide feedback on your experience completing these questions.

APPENDIX B: Mitigation Summary

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Mitigation Summary

In connection with the BPDA's approval of the GE Project (the "previously approved project") pursuant to Article 80B (Large Project Review) of the Zoning Code, GE entered into a Cooperation Agreement and a Development Impact Agreement with the BPDA, and a Transportation Access Plan Agreement with the Boston Transportation Department. Those contracts outlined a series of mitigation measures and public benefits that would accrue from the previously approved project. All of these commitments will be fulfilled, and some of them have already been fully or partially fulfilled. The commitments and their respective status are outlined in the chart below:

A. <u>Cooperation Agreement</u>	
1. Enter into a Transportation Access Plan Agreement (TAPA) with the Boston Transportation Department (BTD) for the project.	Completed; the Proponent has taken an assignment of the TAPA and will undertake the remaining mitigation measures outlined therein in connection with the Project, as detailed below.
2. Execute a Construction Management Plan (CMP) for the project.	Completed and performed by GE for the 5 Necco Street building renovations. The Proponent will submit a separate CMP to BTD for its approval in connection with the construction of the Project.
3. Execute a Boston Residents Construction Employment Plan for the project.	Completed and performed by GE for the 5 Necco Street building renovations. The Proponent has taken an assignment of the BRCEP and will perform the same for the construction of the Project.
4. The project shall be LEED-certifiable.	GE is completing the renovation of the 5 Necco Street building. That Building and the Project will be LEED-certifiable; the Project is being designed to be LEED-certified at the Gold level.
5. Execute a Development Impact Project Agreement for the project.	The Proponent has taken an assignment of the DIP Agreement and will fulfill all of the payment obligations thereunder, as detailed below.
6. Undertake a traffic analysis of the A Street/Binford Street intersection.	Completed; An analysis commissioned by GE from a transportation consultant was submitted to BTD and the BPDA and circulated to the GE Project Impact Advisory Group. This analysis concluded that signalization was not warranted at this location.

7. Undertake a series of climate resiliency measures in connection with the project.	All of these measures have been addressed in connection with the 5 Necco Street Building renovations and/or will be addressed in connection with the Project, including raising the grade of the Project Site to 19.5+ feet and using adaptive landscape measures that will protect against flooding and saltwater intrusion.
8. Create a range of public realm improvements, including a walkway open to the public between Necco Street and the Harborwalk; the installation of water and electricity infrastructure to support programming within the areas of the Project Site open to the public; Harborwalk improvements along the Fort Point Channel; and the build-out of two open space parcels (HW2 and FT1-A) that are part of the 100 Acres Master Plan.	All of these public realm improvements will be completed by the completion of the Project and some, like the construction of the Harborwalk and the installation of water and electric infrastructure to support public programming, have already been completed as part of the 5 Necco Street building renovations. Streetscape improvements to a portion of the west side of Necco Street adjacent to the Project Site will be completed in connection with the 5 Necco Street building renovations and the remainder will be completed as part of the Project. The build-out of the two open space parcels will be completed by the date a Certificate of Occupancy is issued for the Project (subject to climatic conditions).
9. Reconstruct the Necco Court Bridge.	GE is completing the rehabilitation of this historic bridge as part of its renovation of the 5 Necco Street building. The bridge will be part of GE's leased space.
10. Job openings for Boston residents.	GE is committed to undertaking this in connection with their occupancy of the 5 Necco Street building, and the Proponent will encourage its tenants at the Project to undertake this obligation.
11. GE Foundation \$50,000,000 obligation to Boston Public Schools and other community education and health initiatives, as well as operation of the "Brilliant Career Lab."	This is a five-year philanthropic commitment that is in progress and will be fulfilled by GE. GE continues to operate its mobile "Brilliant Career Lab."
B. <u>Transportation Access Plan Agreement</u>	
1. Create a new pedestrian walkway south of the new headquarters building that will run from Necco Street to the Fort Point Channel.	This pedestrian pathway will be a part of the Project.

2. Install streetscape improvements to the western side of Necco Street adjacent to the Project Site (e.g., new curbing, new sidewalks, street trees, bicycle parking and a new pick-up/drop-off area).	These improvements will be undertaken as part of the Project.
3. Construct at least 53,000 square feet of open space available to the public including a wider and more inviting Harborwalk, ample seating areas and green space, and interpretive signage and amenities.	The Harborwalk improvements are being completed in connection with the 5 Necco Street building renovations, and the remaining open space improvements will be undertaken as part of the Project.
4. Make 50 indoor secure bicycle parking spaces available to employees at the Project Site, with the ability to accommodate up to 120 bicycle storage spaces if demand warrants.	Approximately up to 100 indoor bicycle parking spaces will be made available at the Project for employees of building tenants.
5. Make available approximately 30 publicly accessible bicycle storage spaces on the Necco Street sidewalk adjacent to the project.	This commitment will be adhered to in connection with the Project. 10 of these bicycle storage spaces will be made available upon completion of the 5 Necco Street building renovations.
6. Construct an enclosed, underground loading dock within the Headquarters Building.	The Project will contain an enclosed loading dock. However, because the Project will not contain an underground garage, the loading dock will be at-grade with an entrance off Necco Street.
7. Undertake a range of transportation demand management measures, including appointment of a transportation coordinator, bicycle commuting amenities (on-site showers), and information about available transit amenities.	GE will undertake these measures for its employees at 5 Necco Street, and the Proponent will undertake, or encourage its tenants to undertake, these activities at the Project.
C. <u>Development Impact Project Agreement</u>	
1. Payment of Jobs Exaction payments in the amount of \$482,129 to the Neighborhood Jobs Trust; payment of Housing Exaction payments in the amount of \$2,407,758 to the Neighborhood Housing Trust.	The Proponent has taken an assignment of the DIP Agreement and will fulfill these payment obligations.

APPENDIX C: Greenhouse Gas Emissions Supporting Documentation

Contents

- Design Phase Energy Analysis Report

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NATIONAL DEVELOPMENT + ALEXANDRIA
15 NECCO STREET
SCHEMATIC DESIGN PHASE
ENERGY ANALYSIS REPORT

OCTOBER 30, 2019

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INTRODUCTION

National Development and Alexandria Real Estate are developing the 15 Necco Street site in Boston, MA. The 14 story Core and Shell building will be approximately 368,515 GSF and is being designed to accommodate future tenant space consisting of laboratory, office and retail. The floors above the first floor are designed to accommodate a mix of 60% laboratory and 40% office space. The laboratory area is assumed to be primarily biology labs, but may also contain dry lab spaces. There is also core and shell retail space on the first floor, designed to accommodate up to three restaurant tenants.

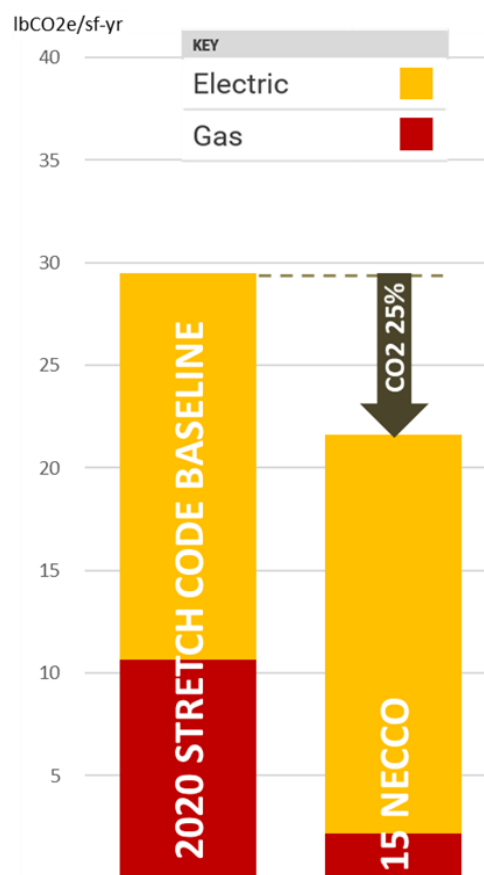
Based on the current assumptions and the preliminary design documents for the 15 Necco Street building, the energy analysis results for Proposed Option 0 indicates:

- **29%** savings for LEEDv4 (**13** points)
- **36%** site energy savings for MA 2020 Stretch Code (complies)
- **25%** GHG emissions reduction compared to the Stretch Code baseline for the City of Boston and MEPA reporting purposes

The design has been optimized to target an Energy Use Intensity (EUI) of 116 kBtu/sf*yr. This is considered best in class energy performance for large laboratory buildings, targeting approximately **49%** reduction in energy compared to the average of existing large lab buildings in Boston and Cambridge built since 2012. In addition, the Energy Conservation Measures (ECMs) prioritize reduction in fossil fuel consumption. Shifting toward reliance on electricity, rather than fossil fuels is typically referred to as 'electrification'.

National Development and Alexandria Real Estate have also committed to purchase Renewable Energy Credits (RECs) to offset all electricity consumed by the building, including tenant end uses. If this renewable energy is purchased from sources that meet the definition of additionally, the electricity consumption will be carbon neutral. The combination of reduced fossil fuel consumption and reliance on renewable electricity position the building to achieve a uniquely low operating carbon footprint, targeting approximately **90%** reduction in GHG intensity compared to the Stretch Code Baseline, **92%** compared to existing large lab buildings in Boston and Cambridge built since 2012 and **95%** compared to existing large lab buildings in Boston and Cambridge built since 1985. The goal of 15 Necco is to become a beacon for future development of low emission lab buildings in the city.

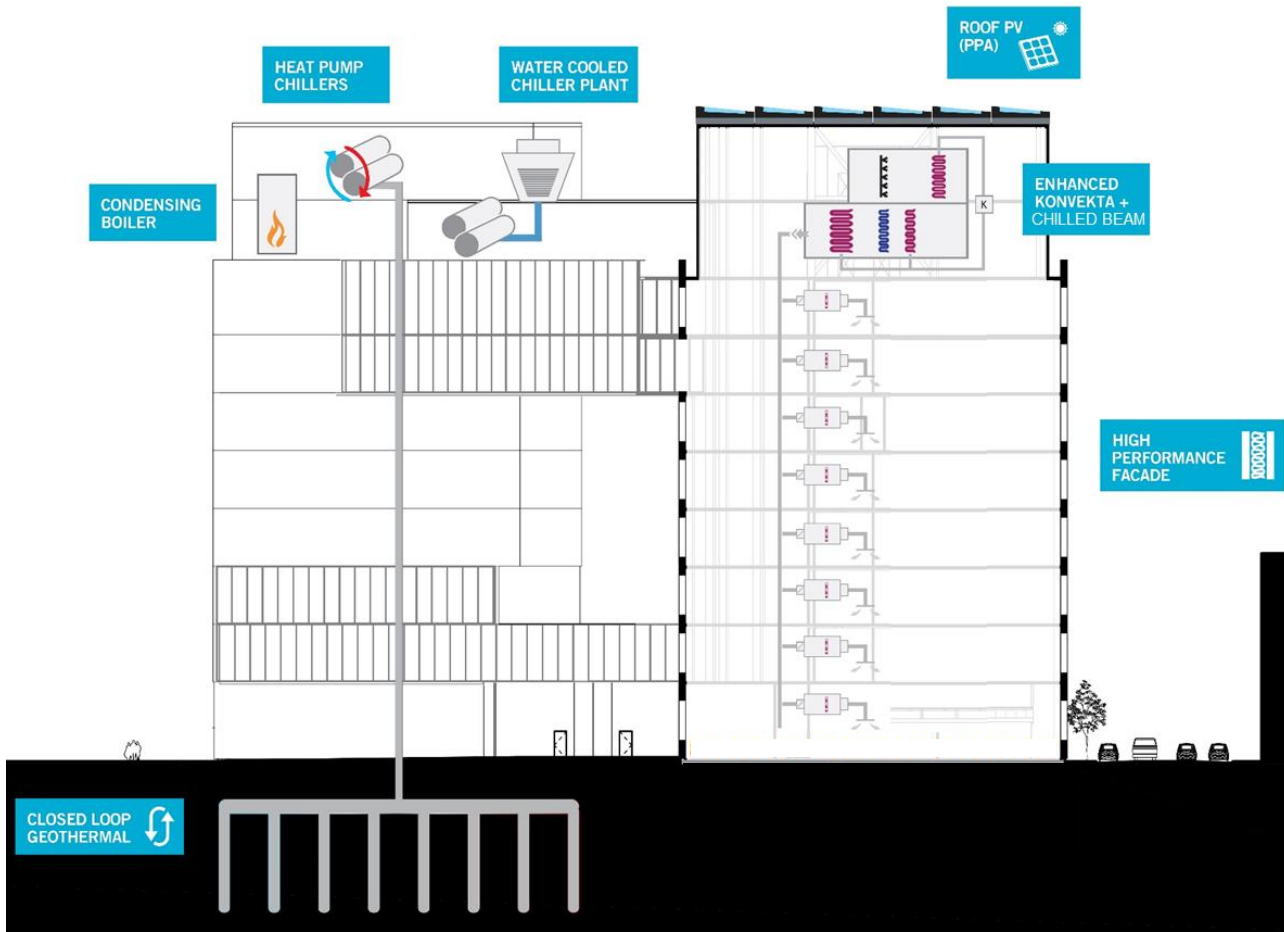
v1 15 NECCO vs. 2020 Stretch Code Baseline



The Energy Conservation Measures (ECMs) of greatest significance include the following. The graphic on the following page provides a summary of these and other high-impact energy conservation measures.

- 1. Double glazing with 4th surface low-e coating and fixed exterior shades (scope of shades TBD).*
- 2. High performance run-around heat recovery from exhaust air with free reheat coils (Konvekta).*
- 3. Lease agreements will require tenants to operate at ventilation rates in non-lab zones that do not exceed the latest ASHRAE 62.1 values and in standard R&D lab zones at make-up rates that do not exceed 8 Air Changes per Hour (ACH) during occupied hours and 4 ACH during unoccupied hours, unless forced higher due to fume hood or other dedicated exhaust requirements.*
- 4. Lease agreements will require tenant fit-outs to include supplemental cooling and heating at each zone in their fit-out, such that loads do not drive primary airflow. In zones that require 24-hour air-change rates, chilled beams, fan powered boxes serving chilled beams, or fan coil units may be used. In zones that do not require 24-hour air change rates, fan powered boxes serving chilled beams or fan coil units may be used, to fully de-couple ventilation from space conditioning.*
- 5. Heat recovery chillers connected to a ground-source bore field, sized based on the available site area and construction logistics. The design is currently targeting 35 bore holes at 800' depth each. Note that the limited site area prevents the installation of a bore field large enough to support the full heating load, so gas-fired boilers will support the remaining heating needs.*

Please note that all results are preliminary and only developed to a conceptual level. All results are subject to change as the design is refined. Assumptions are based on the latest basis of design, architectural drawings, and conversations with the project team.



ENERGY CONSERVATION MEASURES

The following table is a summary of the energy conservation measures (ECMs) that are currently incorporated in the proposed design and are included in the energy model results.

ARCHITECTURAL				
ECM	Details			
ROOF R	Roof construction assembly with effective R-30. Assembly thermal performance: Approx. 0.032 U-value			
FENESTRATION	Double glazing with 4 th surface low-e coating to limit heat loss in the winter Glass selection: SHGC-0.29, U-0.24 Assembly thermal performance: U-0.34			
EXTERIOR SHADES	The fenestration is shaded by fixed exterior shades (scope TBD), optimized to block the peak solar heat gain, enhance thermal comfort, and minimize glare.			
ELECTRICAL				
ECM	Details			
INTERIOR LPD -15%	Reduce interior lighting power density (LPD) below the MA Amendments to IECC 2018. Signed tenant lease agreement must require 15% reduction in LPD below the MA Amendments to IECC 2018. Below are some of the relevant values for reference.			
	Space Type	MA Amended Base LPD	MA Mandatory 10% Reduction	ECM for Proposed Design 15% Reduction
	Laboratory	1.33	1.20	1.13
	Open Office	0.61	0.55	0.52
	Enclosed Office	0.74	0.67	0.63
	Retail	0.84	0.76	0.71
	Leisure Dining	0.86	0.77	0.73
DAYLIGHT	Daylighting dimming controls in “base building” perimeter spaces.			
LIGHT-OCC	Occupancy / vacancy sensor control in all spaces. Additionally, provide a contact to control the HVAC system through the BAS including unoccupied airflow and space temperature.			
RECE-OCC	Automatic receptacle control for 50% of the receptacles in all spaces required by ASHRAE 90.1-2016.			

MECHANICAL

ECM	Details
DECOUPLED SYSTEMS	<p>Lease agreements will require tenant fit-outs to include supplemental cooling and heating at each zone in their fit-out, such that loads do not drive primary airflow.</p> <p>In zones that require 24-hour air-change rates, chilled beams, fan powered boxes serving chilled beams, or fan coil units may be used.</p> <p>In zones that do not require 24-hour air change rates, fan powered boxes serving chilled beams or fan coil units may be used, to fully de-couple ventilation from space conditioning.</p>
KONVEKTA	Dedicated outdoor air system with Konvekta energy recovery system with free reheat coils.
GROUND SOURCE	Heat recovery chillers connected to a ground-source bore field, sized based on the available site area and construction logistics. The design is currently targeting 56 bore holes at 800' depth each. Note that the limited site area prevents the installation of a bore field large enough to support the full heating load, so gas-fired boilers will support the remaining heating needs.
BOILER EF	Condensing gas-fired boilers to supplement ground source heat pump system.
CHILLER EF	Premium efficiency water-cooled chiller plant.

CONTROLS

ECM	Details
MIN VENT	Lease agreements will require tenants to operate at ventilation rates in non-lab zones that do not exceed the latest ASHRAE 62.1-2016 values and in standard R&D lab zones at make-up rates that do not exceed 8 Air Changes per Hour (ACH) during occupied hours and 4 ACH during unoccupied hours, unless forced higher due to fume hood or other dedicated exhaust requirements.
SAT	Supply air temperature of 65°F, relying on 'free reheat' from the Konvekta reheat coil.
SP RESET	Reset the AHU supply and return fan static pressures such that the critical zone damper is nearly wide open.
SMART	Smart building automation system with automated fault detection for continuous monitoring of all building systems, supporting prioritized preventative maintenance and optimized energy performance.

SYSTEM OPTIONS

The table below outlines the three primary options under consideration for the design of the 15 Necco Street building. These options are labeled Proposed Options 0, 1 and 2. Option 0 is generally considered to be the current building design. Option 0 includes double glazing with 4th surface low-e coating, fixed exterior shades (scope of shades is TBD), chilled beams, Konvekta heat recovery, geothermal with 35 bore-holes, and 120kW of solar panels on the penthouse.

Summary	Baseline 2020 Stretch Code Baseline	Conventional Minimally Compliant with 2020 Stretch Code	Proposed Option 0 Double Glazing with 4 th Surface Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil Fuel	100% Electric Carbon Neutral
Glazing + Curtainwall Frame	U-0.38	Double glazing Typical curtainwall frame	Double glazing with 4 th surface low-e Typical curtainwall frame	Triple glazing Enhanced curtainwall frame	same as Option 1	same as Option 1
Exterior Shades	n/a	same as Option 1	same as Option 1	Exterior shades (scope TBD)	same as Option 1	same as Option 1
HVAC System	Lab: 100% OA all- air VAV with reheat Office: return air VAV with reheat	100% OA all-air VAV with reheat	same as Option 1	100% OA DOAS chilled beams, fan powered boxes, fan coil units	same as Option 1	same as Option 1 except: add dedicated fume hood exhaust system
Exhaust Heat Recovery	Lab: none (50% turn down required) Office: 50% enthalpy	Glycol run-around	same as Option 1	Konvekta with free reheat coil	same as Option 1	Dual-wheel for general exhaust, Heat recovery chiller connected to coil in fume hood exhaust
Geothermal	None	None	same as Option 1	35 @ 800' U-bend	56 @ 800' U-bend	same as Option 2
Solar PV	3% of HVAC, DHW and lighting energy 440,000 kWh/yr	same as Option 1	same as Option 1	120 kW solar array on penthouse roof 138,000 kWh/yr	230 kW solar array on penthouse roof, S, E, and W facades 211,000 kWh/yr	same as Option 2

Option 1 is the same as Option 0, except: the double glazing with 4th surface low-e coating and conventional curtainwall frame in Option 0 is replaced with triple glazing and a high performance curtainwall frame in Option 1.

Option 2 is similar to Option 1, except: the window to wall ratio is slightly reduced to improve thermal comfort in perimeter areas, the geothermal bore field is increased from 35 bore holes to 56 bore holes (20 of which would need to be located under the building footprint, due to site constraints), domestic hot water generation is connected to the geothermal bore field, and the PV array on the penthouse is expanded to 230kW, covering the E, S, and W walls of the penthouse.

These three primary options (0, 1, and 2) are bracketed by the MA 2020 Stretch Code Baseline and a Conventional All-Air solution on the left-side and a 100% Electric solution on the right side. The 100% Electric analysis is in alignment with Carbon Free Boston goals as identified during recent BPDA Article 37 reviews, where they now request that all projects provide analysis showing an all-electric net zero ready option.

Note that MA 2020 Stretch Code requires 3 of the 11 enhanced efficiency packages to be selected and incorporated into the Baseline. For the baseline, we have selected: enhanced envelope airtightness, reduced lighting power density (-10%), and on-site solar energy generation equivalent to 3% of regulated energy consumption. Because the solar PV array in the proposed option does not meet the 3% requirement, the proposed design relies on the DOAS HVAC system for the third additional efficiency package (in addition to the enhanced envelope airtightness and reduced lighting power density). Per the MA 2020 Stretch Energy Code, the final design must reduce site energy consumption by at least 10% relative to the 2020 Stretch Code Baseline.

The table below provides more detailed information for each of the options.

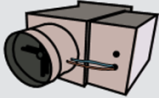
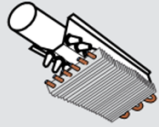
Architectural + Lighting	Baseline 2020 Stretch Code Baseline	Conventional Minimally Compliant with 2020 Stretch Code	Proposed Option 0 Double Glazing with 4 th Surface Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil Fuel	100% Electric Carbon Neutral
Space Impact (for construction cost estimate only; no change to energy model geometry)	n/a	Add 10,000 SF to penthouse Add 500 SF to 2 nd floor electrical Add 2,000 SF to occupied floor area for larger shafts Subtract 500 SF from basement	n/a	n/a	n/a	Add 300 SF to 2 nd floor transformer vault
Floor-to-Floor Height (for construction cost only)	n/a	add 2'-0" to penthouse add 6" per tenant floor x11 floors = 5'-6"	same as Option 1	per current design	same as Option 1	same as Option 1
Roof	R-30 c.i. / U-0.032	same as Baseline	same as Baseline	same as Baseline	R-40 c.i./ U-0.25	same as Option 2
Opaque Facade	U-0.055	U-0.200 spandrel without wrapped mullions	same as Conventional	same as Conventional	U-0.040 (insulate mullions with spray foam + GWB)	same as Option 2
Window:Wall (excludes penthouse and loading dock)	40% 44,847 sf window 67,345 sf opaque	60% 8'-3" typical window height above 9" sill 67,345 sf window 44,847 sf opaque	same as Conventional	same as Conventional	57% 7'-9" window height above 15" sill 64,406 sf window 47,786 sf opaque	same as Baseline
Glazing	see Assembly for U-value SHGC-0.38	1" double glazing U-0.29 / SHGC-0.29	1" double glazing, 4 th surface low-e U-0.24 / SHGC-0.29	1-7/8" triple glazing U-0.11 / SHGC-0.25	same as Option 1	same as Option 1
Curtainwall Assembly at Vision Glazing	U-0.38	U-0.37 (similar to YKK unitized) effective U-0.46 due to perimeter heat causing increase in delta-T	U-0.34 (similar to YKK unitized) effective U-0.44 due to perimeter heat causing increase in delta-T	U-0.23 likely no perimeter heat required in typical zones (requires further evaluation)	same as Option 1	same as Option 1

Architectural + Lighting Continued	Baseline 2020 Stretch Code Baseline	Conventional Minimally Compliant with 2020 Stretch Code	Proposed Option 0 Double Glazing with 4 th Surface Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil Fuel	100% Electric Carbon Neutral
Exterior Shades	n/a	same as Option 1	same as Option 1	Exterior shades (scope TBD)	same as Option 1	same as Option 1
Airtightness	0.25 cfm/sf @ 75pa (additional efficiency package 1 of 3)	same as Baseline	same as Option 1	0.08 cfm/sf @ 75pa	same as Option 1	same as Option 1
Lighting Power	Reduce by 10% (additional efficiency package 2 of 3)	same as Baseline	same as Option 1	Reduce by 15% (see ECM list for detail)	same as Option 1	same as Option 1
Lighting Control	Occ-sensor + daylight	same as Baseline	same as Baseline	same as Baseline	same as Baseline	same as Baseline
HVAC	Baseline 2020 Stretch Code Baseline	Conventional Minimally Compliant with 2020 Stretch Code	Proposed Option 0 Double Glazing with 4 th Surface Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil Fuel	100% Electric Carbon Neutral
Fume Hoods	same as Option 1	same as Option 1	same as Option 1	110 fume hoods Diversity: 60% open (57,000 cfm)	same as Option 1	same as Option 1
Plug Loads	Same as Conventional	Open Lab: 8 W/sf Lab Support: 14 W/sf Office: 2 W/sf	same as Option 1	Same as Conventional except: energy star for tenant office equip (signed lease) Office: 1.8 W/sf	same as Option 1	same as Option 1
HVAC System Lab/Office	Lab: 100% OA all-air VAV with reheat Office: return air VAV with reheat	100% OA all-air VAV with reheat 475,000 cfm capacity	same as Option 1	100% OA DOAS 320,000 cfm capacity Labs: chilled beams Lab Support: fan coil units Office: fan powered boxes serving chilled beams	same as Option 1	same as Option 1 except: add 65,000 cfm dedicated fume hood exhaust system
HVAC System Retail/Restaurant	By future tenant (assume VAV Reheat for SD model)	same as Baseline	same as Baseline	same as Baseline	same as Baseline	same as Baseline
Perimeter Finned Tube	n/a	required for comfort in all zones	same as Conventional	Likely only required in lobby/retail due to greater glazing height (requires further evaluation)	same as Option 1	same as Option 1

HVAC Continued	Baseline 2020 Stretch Code Baseline	Conventional Minimally Compliant with 2020 Stretch Code	Proposed Option 0 Double Glazing with 4 th Surface Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil Fuel	100% Electric Carbon Neutral
Lab Air Change	8 occ / 4 unocc	same as Option 1	same as Option 1	8 occ / 4 unocc (signed lease)	same as Option 1	same as Option 1
Non-Lab Vent	ASHRAE 62.1 minimum	same as Option 1	same as Option 1	ASHRAE 62.1 minimum (signed lease)	same as Option 1	same as Option 1
Exhaust Heat Recovery	Lab: none (50% turn down required) Office: 50% enthalpy	Glycol run-around	same as Option 1	Konvekta with free reheat coil	same as Option 1	Dual-wheel for general exhaust, 80% enthalpy efficiency Heat recovery chiller connected to coil in fume hood exhaust
Heating + Cooling Plant	Baseline 2020 Stretch Code Baseline	Conventional Minimally Compliant with 2020 Stretch Code	Proposed Option 0 Double Glazing with 4 th Surface Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil Fuel	100% Electric Carbon Neutral
Ground Source	None	None	Heat Pump modular VFD scroll chillers (see cooling for Tons)	Heat Pump modular VFD scroll chillers (see cooling for Tons)	Heat Pump modular VFD scroll chillers (see cooling for Tons)	Heat Pump modular VFD scroll chillers (see cooling for Tons)
Geothermal Bore Field	None	None	same as Option 1	35 @ 800' U-bend 100 tons heating 110 tons cooling	56 @ 800' U-bend 160 tons heating 170 tons cooling	same as Option 2
Heating Plant	82% Ef gas-fired	gas-fired condensing boilers 36,000 MBH firm capacity (9) 5,000 MBH (N+1)	gas-fired condensing boilers supplement ground source 21,500 MBH firm capacity (6) 5,000 MBH (N+1)	gas-fired condensing boilers supplement ground source 18,500 MBH firm capacity (5) 5,000 MBH (N+1)	gas-fired condensing boilers supplement ground source 16,500 MBH firm capacity (5) 5,000 MBH (N+1)	electric resistance boilers supplement ground source 12,500 MBH firm capacity (14) 1,000 MBH (N+1)
Humidification	None	None	None	None	None	None
Cooling Plant	Water-cooled chillers	premium efficiency water-cooled chillers 2,790 tons capacity (3) 930 ton centrifugal	premium Ef water- cooled centrifugal chillers supplement ground source 1,540 tons firm capacity (2) 715 ton centrifugal (3) 100 ton screw	premium Ef water- cooled centrifugal chillers supplement ground source 1,460 tons firm capacity (2) 645 ton centrifugal (3) 100 ton screw	premium Ef water- cooled centrifugal chillers supplement ground source 1,420 tons firm capacity (2) 625 ton centrifugal (3) 150 ton screw	premium Ef water- cooled centrifugal chillers supplement ground source 1,000 tons firm capacity (2) 415 ton centrifugal (3) 150 ton screw
Domestic Hot Water	80% Ef gas-fired	80% Ef gas-fired	80% Ef gas-fired	80% Ef gas-fired	Ground-source heat pump with 80% Ef gas-fired supplement	Ground-source heat pump with electric resistance supplement

Electrical + Renewable	Baseline 2020 Stretch Code Baseline	Conventional Minimally Compliant with 2020 Stretch Code	Proposed Option 0 Double Glazing with 4th Surface Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil Fuel	100% Electric Carbon Neutral
Electrical Infrastructure	n/a	(3) 4,000A 480V switchboards	same as Option 1	(3) 4,000A 480V switchboards	same as Option 1	(4) 4,000A 480V switchboards
		(2) 4,000A bus ducts to penthouse		(2) 3,000A bus ducts to penthouse		(3) 4,000A bus ducts to penthouse
		(2) 4,000A 480V distribution panels in the penthouse to serve major mechanical equipment		(2) 3,000A 480V distribution panels in the penthouse to serve major mechanical equipment		(3) 4,000A 480V distribution panels in the penthouse to serve major mechanical equipment
Emergency Generator	n/a	same as Option 1	same as Option 1	(1) 1,250kW life safety diesel generator and associated ATS (1) 750 gallon fuel tank (1) 750kW standby tenant equipment gas generator and associated ATS	same as Option 1	(1) 1,250kW life safety diesel generator and associated ATS (1) 1,250 diesel generator for electric boiler load for freeze protection (1) 1,500 gallon fuel tank (1) 2000A 480V ATC for electric boiler load (1) 750kW standby tenant equipment gas generator and associated ATS
On-Site Renewable	3% of HVAC, DHW and lighting energy 440,000 kWh/yr (additional efficiency package 3 of 3)	same as Option 1	same as Option 1	120 kW solar array on penthouse roof 138,000 kWh/yr	230 kW solar array on penthouse roof, S, E, and W facades 211,000 kWh/yr	same as Option 2
Off-Site Renewable	None	None	same as Option 1	100% renewable energy for electricity	same as Option 1	same as Option 1

To help explain some of the differences in the detailed table above, the table below provides a summary of the comparison between conventional All-Air systems versus Chilled Beam systems. This shows the advantages of chilled beams, including reduced cfm required from the AHUs and lower floor-to-floor height. Please note that a high degree of flexibility is maintained in the chilled beam approach, including capacity for 8 air changes per hour in the labs, sufficient cooling for high plug loads (although in particularly high load areas, fan coil units may be required), and the capacity to provide make-up air for hundreds of fume hoods (more than would ever be anticipated in this building).

ALL-AIR VS. CHILLED BEAM (60/40 LAB/OFFICE)	LAB PRIMARY AIR	OFFICE PRIMARY AIR	TYPICAL FLOOR CAPACITY	LAB SPACE COOLING CAPACITY	FLOOR TO FLOOR	CEILING CAVITY	FUME HOOD DENSITY (6'-0" HOODS)	MAX BUILDING FUME HOODS
ALL AIR VAV W/ REHEAT 	2.0 CFM/SF	1.25 CFM/SF	1.7 CFM/SF	8 W/SF LAB 14 W/SF LAB SUPPORT	14'-2"	36"	375 SF/FH	400
CHILLED BEAMS OR FAN COIL UNITS 	1.6 CFM/SF	0.5 CFM/SF	1.16 CFM/SF	8 W/SF LAB 14 W/SF LAB SUPPORT	13'-8"	30"	470 SF/FH	320 (energy model based on 100)

For comparison purposes in the construction cost for the life cycle cost analysis, the space required to house the larger mechanical systems required for the All-Air solution is accounted for as an increase to the building square footage and height. In reality, due to zoning limitations, the larger All-Air systems would result in the loss of at least an entire occupied floor of the building, plus additional loss of leasable space on the remaining occupied floors. This would result in a significant decrease in lease revenue. Ultimately, the outcome would be the same: the chilled beam approach results in a better overall financial investment.

FINANCIAL INCENTIVES

There are a number of incentives available that may contribute to the cost effectiveness of the proposed design. These incentive programs are outlined below. Please note that these values only represent potential, not actual values.

Utility Incentives: 15 Necco is in Eversource territory and is therefore eligible for utility incentives under the Mass Save program. A separate utility incentive study is required to qualify for incentives. The utilities fund the majority of the cost of the study, therefore the study must be under a separate contract from other energy analysis, such as the analysis for this report. BR+A recommends that reaching out to the utilities at the appropriate time, preferably early in design, to take advantage of the utility incentive program.

Other Year 1 Incentives: Solar and geothermal are eligible for other year 1 incentives equal to 10% of the total installed system cost.

SMART: The Solar Massachusetts Renewable Target (SMART) Program defines the incentive value of the renewable energy that will be generated by solar, in addition to the electric bill savings. Note that in this transaction, the Renewable Energy Credits (RECs) generated by the solar array are transferred to the utility company.

Alternative Energy Credits (AECs): Similar to RECs for renewable energy, the Commonwealth of MA has defined a program for renewable thermal energy credits, which includes ground source heat pumps.

Incentives		Conventional Min. Compliant	Proposed Option 0 Double Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil	100% Electric Carbon Neutral
Utility	\$	\$540,000	\$680,000	\$710,000	\$800,000	\$700,000
Other Year 1	\$	-	\$393,000	\$393,000	\$633,000	\$633,000
SMART	\$/yr	\$18,000	\$18,000	\$18,000	\$28,000	\$28,000
AECs	\$/yr	-	\$30,000	\$30,000	\$60,000	\$60,000
Total one-time Incentive	\$	\$540,000	\$1,073,000	\$1,103,000	\$1,433,000	\$1,333,000
Total Annual Incentives	\$/yr	\$18,000	\$48,000	\$48,000	\$88,000	\$88,000

CONSTRUCTION COST

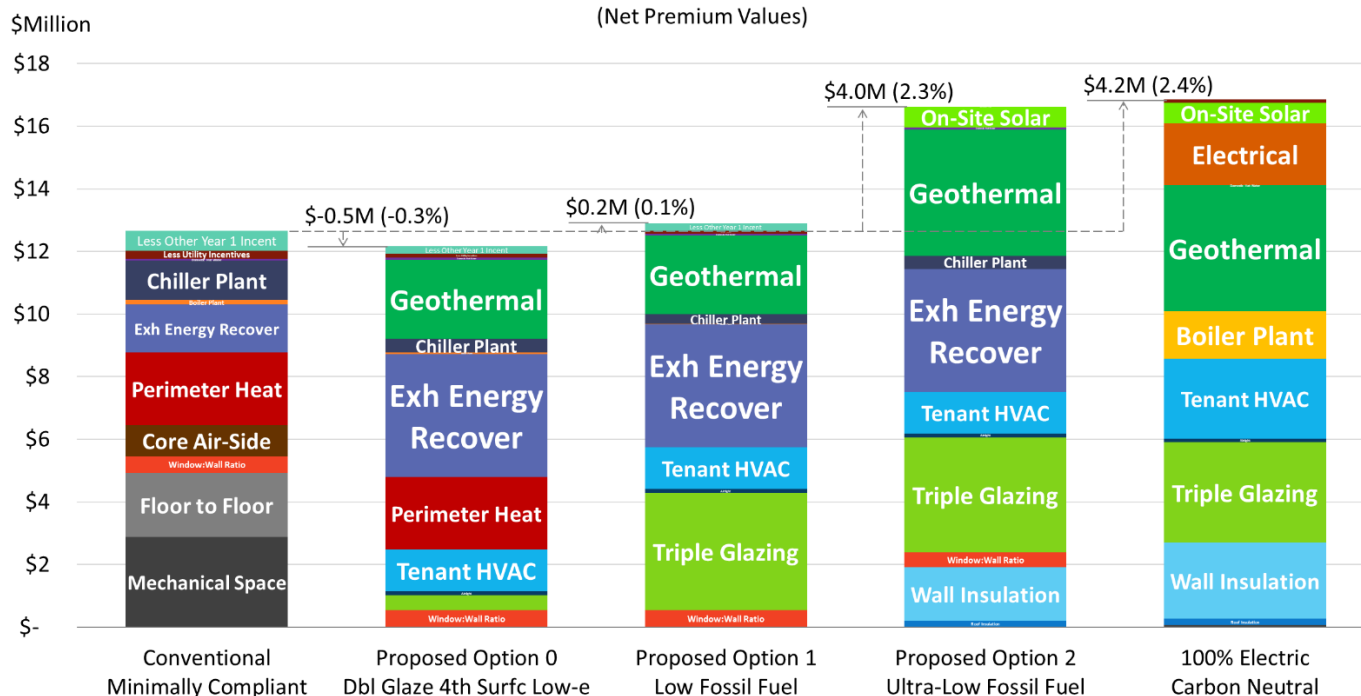
John Moriarty & Associates, and National Development, in collaboration with BR+A and trade subcontractors, calculated the difference in construction cost between each of the options. This cost estimate was developed based on the system options narrative provided in this report.

The chart below illustrates the resulting net construction cost premiums for each of the options. Note: the goal of this cost analysis is to focus on the differences between each of the options. Therefore, each color-coded category (such as "Exhaust Energy Recovery" or "Chiller Plant") is illustrated by making whichever option has the lowest cost in a given category, equal to zero. Then, for each of the other options, the relative cost increase is shown.

For example, the option with the least expensive (lowest capacity) chiller plant is the 100% Electric Carbon Neutral option. Therefore, the cost of the chiller plant in this option is shown as a zero dollar premium. The other options then show a net cost increase, because they have more expensive (higher capacity) chiller plants.

RELATIVE CONSTRUCTION COST

(Net Premium Values)



The total net construction cost premium, year 1 incentives, and net year one premiums are summarized in the table below.

		Conventional	Proposed	Proposed	Proposed	100% Electric
Year 1 Cost		Min. Compliant	Option 0	Option 1	Option 2	Carbon Neutral
Construction Cost Premium (provided by Others)	\$	lowest	\$31,000	\$805,000	\$4,852,000	\$4,982,000
Incentives yr 1	\$	lowest	\$533,000	\$563,000	\$893,000	\$793,000
Net Premium yr 1	\$	lowest	-\$502,000	\$242,000	\$3,959,000	\$4,189,000

ENERGY RESULTS

Based on current assumptions and the preliminary design documents for the 15 Necco Street building, the energy analysis results for Proposed Option 0 indicates **29%** savings for LEEDv4 (**13** points) and **36%** site energy savings for MA 2020 Stretch Code (**complies**).

Note that the LEEDv4 baseline and MA 2020 Stretch Code baseline are different. LEEDv4 is based on ASHRAE 90.1-2010 Appendix G and typically uses the metric of energy cost. But, we plan to follow the alternative compliance path that uses the average performance based on the metrics of source energy and CO2 emissions, resulting in a greater number of points than the traditional energy cost compliance path.

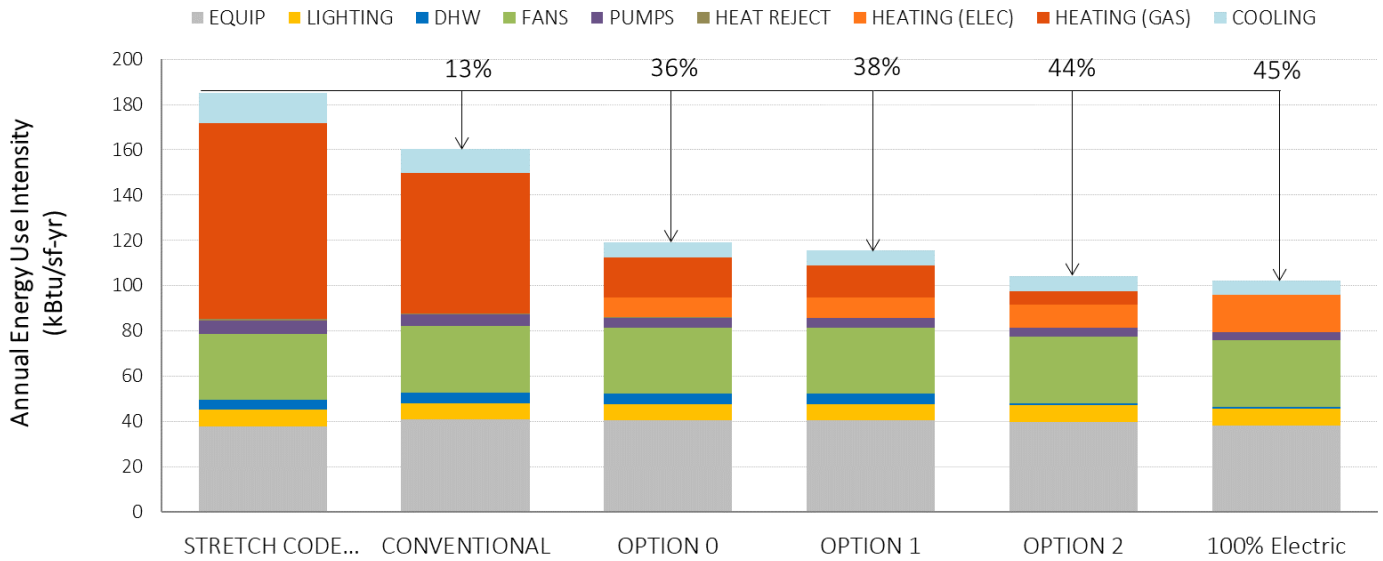
MA 2020 Stretch Code is based on the ASHRAE 90.1-2013 Appendix G protocol with 90.1-2016 requirements and 3 additional efficiency packages) and uses the metric of site energy. The table below compares Conventional (Minimally Compliant), Option 0 (Double Low-e), Option 1 (Low Fossil Fuel), Option 2 (Ultra-Low Fossil Fuel), and 100% Electric (Carbon Neutral) to each of these baselines.

Note: These energy modeling results are not predictions of future energy consumption and are to be used for comparison purposes only. BR+A cannot guarantee that these results will reflect actual energy consumption due to the uncertainty of actual schedules of use, weather and other unforeseen factors.

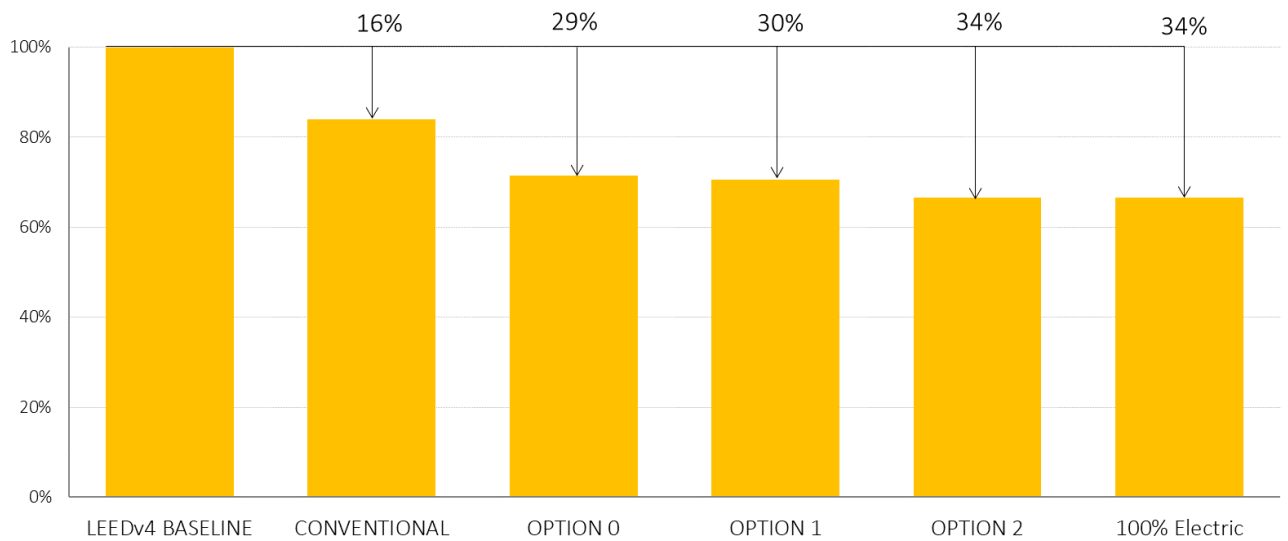
Results		Baseline LEEDv4	Baseline MA 2020 Stretch Code	Conventional Minimally Compliant	Proposed Option 0 Double Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil Fuel	100% Electric Carbon Neutral
Total Electricity Consumption	MWh/yr	11,400	10,200	10,100	10,500	10,500	10,500	10,900
Total Natural Gas Consumption	MMBtu/yr	33,500	33,500	24,500	8,200	6,900	2,500	0
Total Energy Consumption	MMBtu/yr	72,400	68,300	59,000	44,000	42,700	38,300	37,200
Total Energy Cost	\$/yr	n/a	n/a	1,962,000	1,867,000	1,854,000	1,810,000	1,945,000
Energy Cost Savings vs Conventional	\$/yr			baseline	95,000	108,000	152,000	17,000
Building Energy Use Intensity	kBtu/sf	196	185	160	119	116	104	101
Building Energy Cost per SF	\$/sf	n/a	n/a	5.32	5.07	5.03	4.91	5.28
LEED Savings (based on alternative compliance path using source energy and CO2)	%	baseline		16%	29%	30%	34%	34%
Anticipated LEED Points				7	13	13	14	14
Stretch Code Savings	%		baseline	13%	36%	38%	44%	45%

ANNUAL ENERGY USE INTENSITY BY END-USE

STRETCH CODE SAVINGS COMPARISON



LEED OPTIMIZE ENERGY PERFORMANCE SAVINGS



LIFE CYCLE COST

The table below summarizes the 20-year life cycle cost, comparing each option to the Conventional Option. A life-cycle cost analysis provides an estimate of the total cost of ownership including construction costs, maintenance costs, and energy costs over a given study period. All values are listed as premiums, relative to the lowest value in each category. This allows one to focus on the relative differences, rather than the absolute values.

Assumptions:

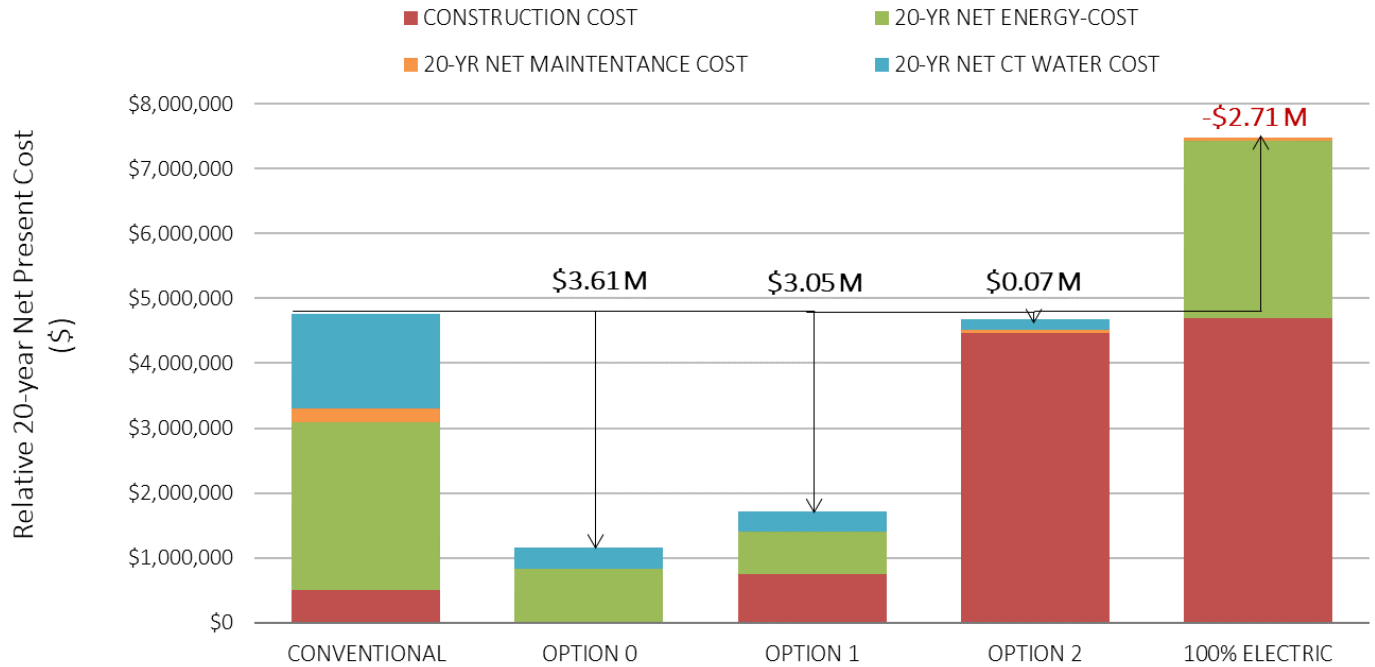
Discount Rate	5.5%	The expected rate of return (interest rate) from an alternative investment
Escalation Rate for all future costs	2%	The rate at which costs increase each year, accounting for inflation.
Equipment Life	20+ years	
Study Length	20 years	

Life Cycle Cost		Conventional Min. Compliant	Proposed Option 0 Double Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil	100% Electric Carbon Neutral
Net Premium yr 1	\$	lowest	-\$502,000	\$242,000	\$3,959,000	\$4,189,000
Annual Incentives yr 1-20	\$/yr	lowest	\$30,000	\$30,000	\$70,000	\$70,000
Energy Cost	\$/yr	\$152,000	\$57,000	\$44,000	lowest	\$135,000
Water+Sewer Cost	\$/yr	\$60,100	\$13,100	\$13,100	\$7,100	lowest
Maintenance Cost	\$/yr	\$22,100	lowest	\$3,000	\$4,100	\$4,000
Replacement Cost (none during 20-yrs)	\$/yr	-	-	-	-	-
Simple Payback	yrs	-	immediate	1 Year	15 Years	29 Years
Internal Rate of Return	%	-	infinite	78%	5%	-2%
Relative Net Present Savings	\$	-	\$3.61 M	\$3.05 M	\$0.07 M	- (\$1.50 M)

The following chart is a graphic representation of the relative 20-Year net present savings compared to the Conventional Option. Option 0 has a lower construction cost and operating cost than the Conventional Option, resulting in \$3.61 million in net present savings. Option 1 has a slightly higher construction cost than the Conventional Option, but the operating savings also result in a significant net present savings.

Option 2 has a nearly neutral net present value and the 100% Electric Option shows a net present cost increase compared to the Conventional Option. This is largely due to the increased construction cost of these two options. The 100% Electric Option is also impacted by the fact that the electric resistance boilers that supplement the geothermal system result in a high electric demand charge, which erodes most of the energy cost savings from the other efficiency measures.

RELATIVE 20-YEAR NET PRESENT COST



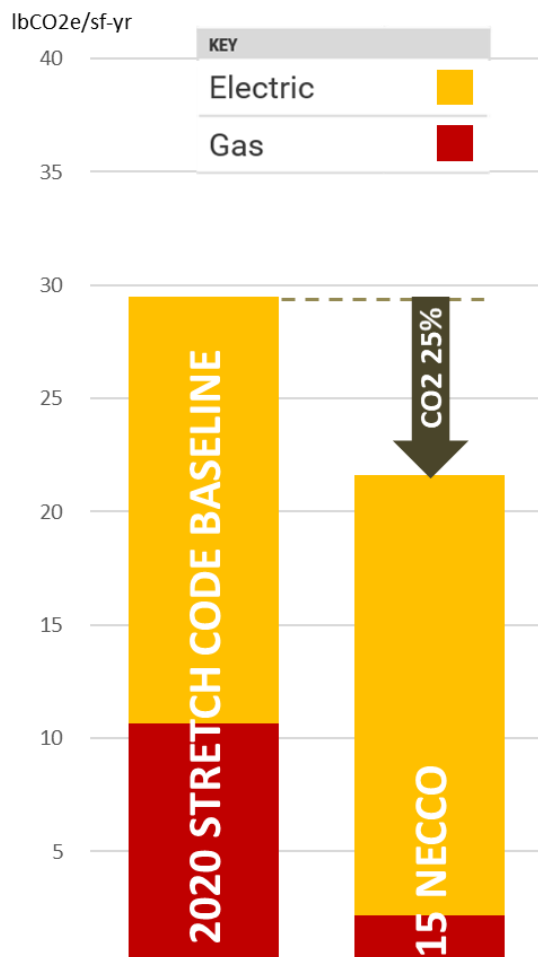
TARGETING CARBON NEUTRAL

Boston has set a goal of becoming carbon neutral by 2050, this climate action plan is known as Carbon Free Boston. In addition, the Massachusetts Global Warming Solutions Act targets 80% carbon neutral by 2050 for the entire state.

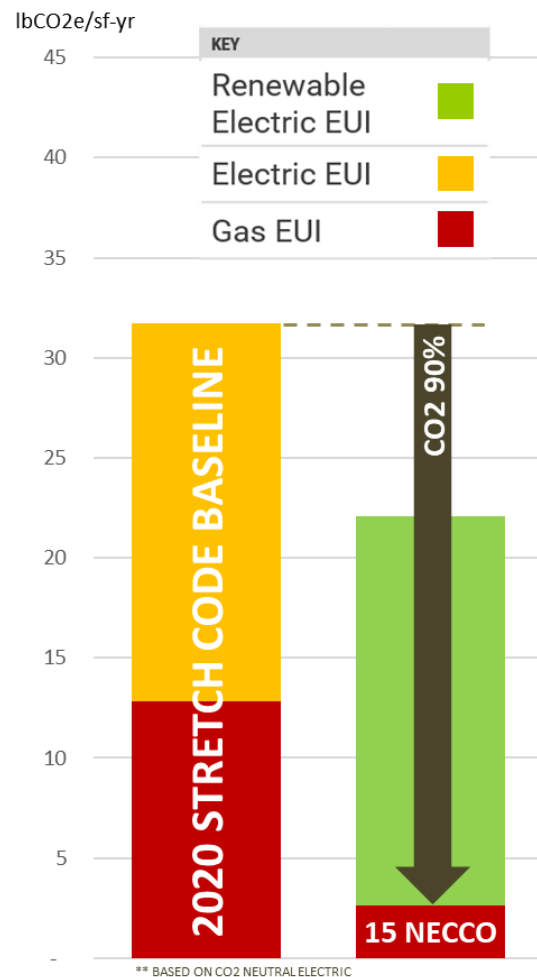
Anticipated carbon emissions from new buildings is reviewed by the BPDA and the MA DOER in comparison to the energy code baseline. These results are illustrated in the graphics below.

The charts show the energy model results for the MA 2020 Stretch Code Baseline in comparison to Proposed Option 0. The first chart "v1" on the left, is based on the current MEPA emissions factors for natural gas and grid electricity. This results in a 25% reduction in CO₂e emissions in the proposed design, compared to the baseline. The second chart "v2" on the right, is based on alternative emissions factors, including a higher emissions factor for natural gas (to account for upstream methane leakage) and assumes that the 15 Necco facility will purchase renewable electricity to offset 100% of the building's energy consumption. This results in a 90% reduction in CO₂e emissions in the proposed design, compared to the baseline.

v1 **15 NECCO**
vs. 2020 Stretch Code Baseline



v2 **15 NECCO**
vs. 2020 Stretch Code Baseline



It is also worth noting that LEED Zero Energy certification allows on-site fossil fuel consumption. It simply requires that on-site fossil fuel consumption be offset by an equivalent amount of renewable energy. Therefore, the team is considering pursuing LEED Zero Energy certification.

The table below provides the site energy and carbon emissions results (v1 and v2) for all of the options analyzed, compared to the MA 2020 Stretch Code Baseline.

ENERGY METRIC	UNIT	Baseline	Conventional	Proposed	Proposed	Proposed	100% Electric
		MA 2020 Stretch Code	Min. Compliant	Option 0 Double Low-e	Option 1 Low Fossil Fuel	Option 2 Ultra-Low Fossil	Carbon Neutral
Electricity EUI	kBtu/sf-yr	94	94	97	97	97	101
Natural Gas EUI	kBtu/sf-yr	91	67	22	19	7	0
Total Site EUI	kBtu/sf-yr	185	160	119	116	104	101
Total Site EUI Reduction	%	benchmark	14%	36%	37%	44%	46%
Carbon Footprint Intensity v1	lbCO2e/sf-yr	30	26	22	22	20	20
Carbon Footprint Reduction v1	%	benchmark	10%	25%	27%	31%	32%
Carbon Footprint Intensity v2	lbCO2e/sf-yr	32	9	3	3	1	0
Carbon Footprint Reduction v2	%	benchmark	70%	90%	92%	97%	100%

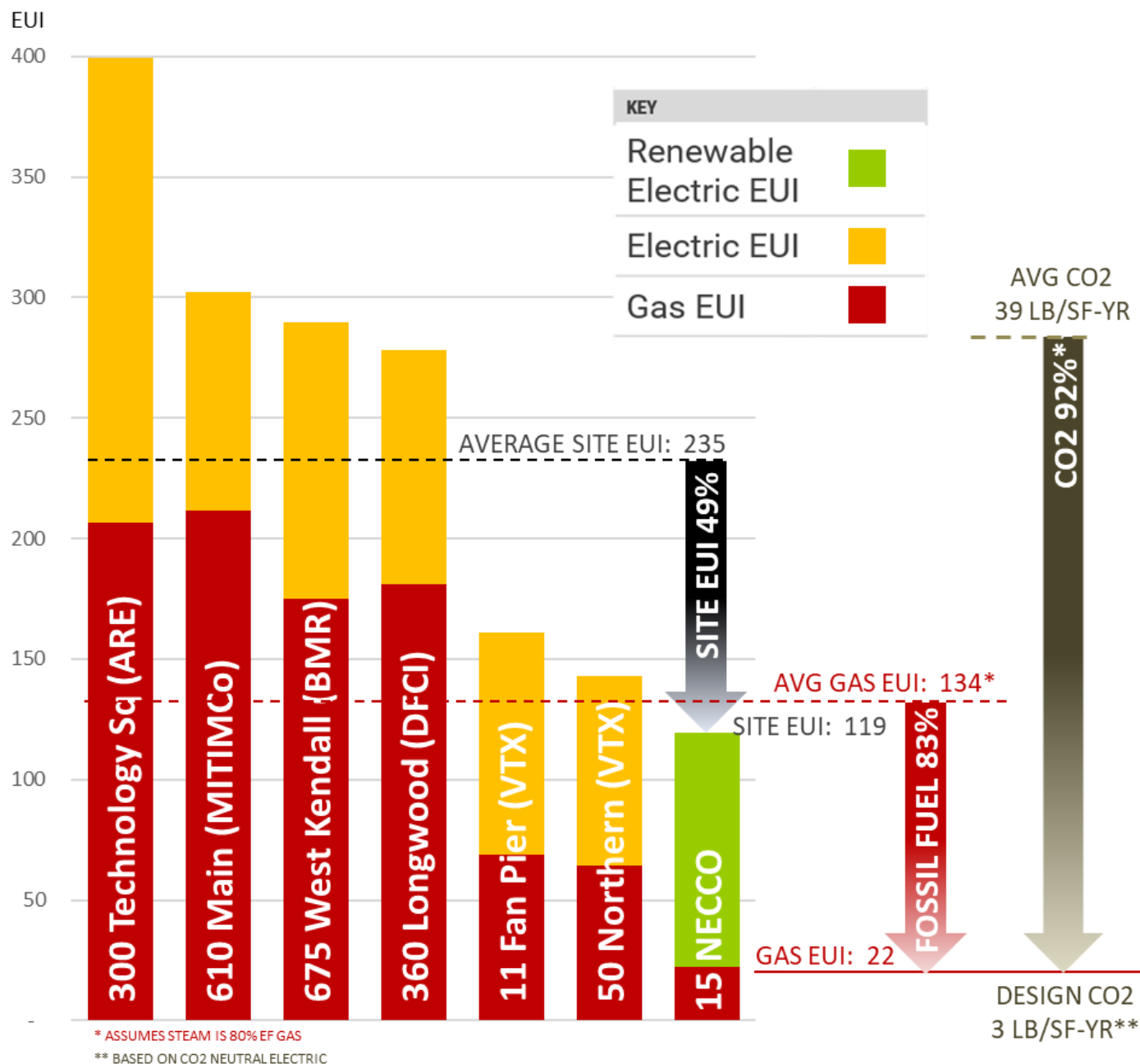
In addition to comparing the proposed design to the Stretch Code baseline, we believe it is useful to provide the results in comparison to measured data from similar existing buildings. Therefore, we have identified large lab buildings in Cambridge and Boston, built after 2012 (roughly within 10 years from the anticipated completion of 15 Necco). This data is gathered from 2015-2017 (average) Boston BERDO data and 2016 Cambridge BEUDO data for labs greater than 150,000 square feet, built after 2012.

These buildings have an average Site Energy Use Intensity (EUI) of 235 kBtu/sf-yr, an average gas EUI of 134 kBtu/sf-yr, and an average CO2 emissions intensity of 39 lb/sf-yr. This benchmark data is represented in the chart below, in comparison to the 15 Necco Proposed Option 0. Note that this chart illustrates the "v2" emissions factors only and that the y-axis represents site EUI (kBtu/sf-yr), whereas the previous charts used an emissions intensity scale on the y-axis.

The modeled results for Proposed Option 0 achieves a 49% reduction in site EUI compared to the benchmark data. The results for Proposed Option 0 also indicate a 92% reduction in CO2 emissions, based on the "v2" emissions factors.

BENCHMARK ANALYSIS: 15 NECCO vs. BOSTON + CAMBRIDGE LABS

(2015-2017 average BERDO & 2016 BEUDO data for Labs >150,000 SF and built after 2012)



The table below provides the site energy and carbon emissions results (v1 and v2) for all of the options analyzed, compared to the benchmark data.

ENERGY METRIC	UNIT	Benchmark Avg. Existing	Conventional Min. Compliant	Proposed Option 0 Double Low-e	Proposed Option 1 Low Fossil Fuel	Proposed Option 2 Ultra-Low Fossil	100% Electric Carbon Neutral
Electricity EUI	kBtu/sf-yr	102	94	97	97	97	101
Natural Gas EUI	kBtu/sf-yr	134	67	22	19	7	0
Total Site EUI	kBtu/sf-yr	235	160	119	116	104	101
Total Site EUI Reduction	%	benchmark	32%	49%	51%	56%	57%
Carbon Footprint Intensity v1	lbCO2e/sf-yr	36	26	22	22	20	20
Carbon Footprint Reduction v1	%	benchmark	26%	39%	40%	44%	44%
Carbon Footprint Intensity v2	lbCO2e/sf-yr	39	9	3	3	1	0
Carbon Footprint Reduction v2	%	benchmark	76%	92%	93%	98%	100%

The table below summarizes the standard MEPA (v1) and the Alternative (v2) emissions factors.

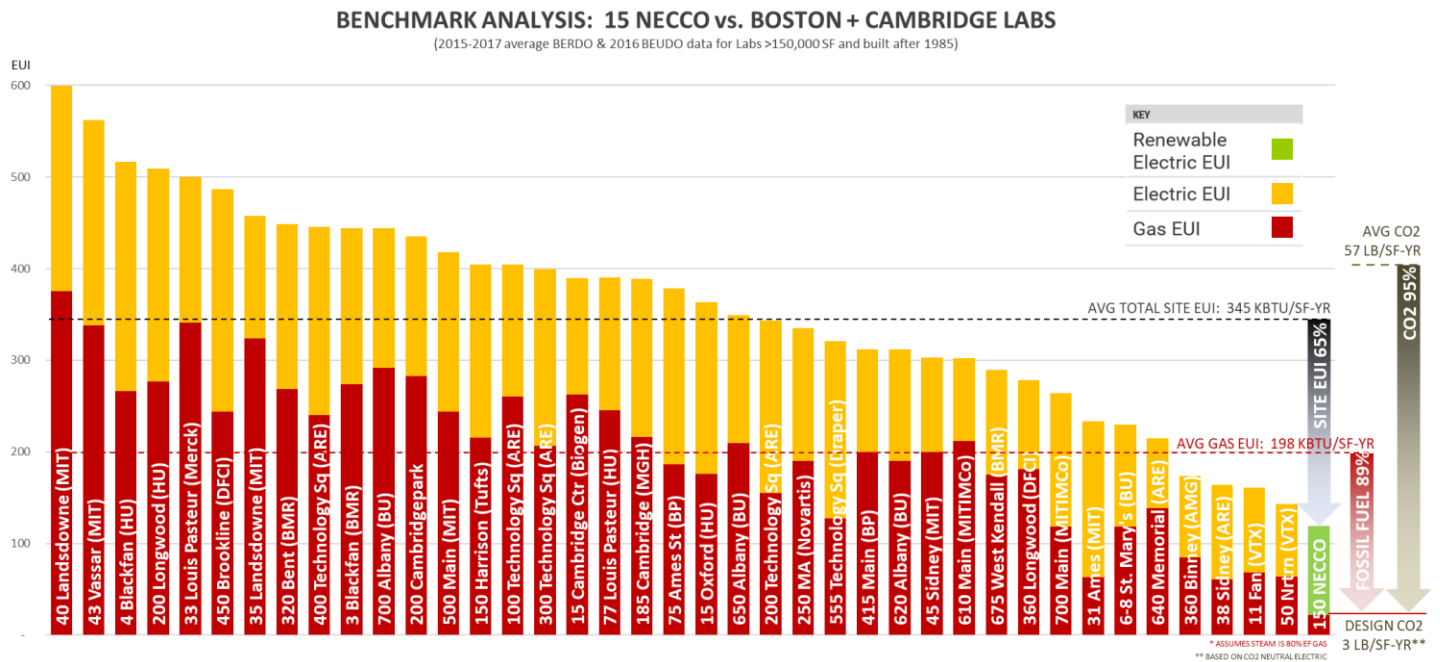
- The MEPA (v1) electric value is based on the ISO New England 2017 average annual emission rate.
- The MEPA (v1) natural gas value is based on the published national EPA value.
- The Alternative (v2) electric value is based on renewable electricity purchased for the building to meet the definition of additionality. It also represents the ideal future carbon neutral electric grid.
- The Alternative (v2) gas value is based on the gas emissions factor defined in ASHRAE Standard 105-2014 which accounts for a small portion of the methane leakage that occurs at the extraction sites and distribution systems (although independent studies indicate that the value is much greater). When released into the atmosphere, methane has a global warming potential 25 to 84 times higher than CO₂. Therefore, natural gas emissions factors (including the EPA and ASHRAE Standard 105 values) grossly underestimate the climate impact of natural gas.

EMISSION FACTORS	UNIT	MEPA (v1)	Alternative (v2)
Electricity	lb/MWh	682	0
Natural Gas	lb/MMBtu	117	141

Finally, for 2030 Challenge reporting purposes, it is necessary to develop a benchmark based on similar existing buildings, regardless of their construction date. Therefore, in the chart below, we have expanded the benchmarking data set to include lab buildings that meet the same criteria as the benchmarking above, but including all buildings built after 1985.

These buildings have an average Site Energy Use Intensity (EUI) of 345 kBtu/sf-yr, an average gas EUI of 198 kBtu/sf-yr, and an average CO₂ emissions intensity of 52 lb/sf-yr. This benchmark data is represented in the chart below, in comparison to the 15 Necco Proposed Option 0. Note that this chart illustrates the "v2" emissions factors only and that the y-axis represents site EUI (kBtu/sf-yr).

The modeled results for Proposed Option 0 achieves a 65% reduction in site EUI compared to the benchmark data. The results for Proposed Option 0 also indicate a 95% reduction in CO2 emissions, based on the "v2" emissions factors.



Please note that all results are preliminary and only developed to a conceptual level. All results are subject to change as the design is refined. Assumptions are based on the latest basis of design, architectural drawings, and conversations with the project team.

CONCLUSION

Based on the current assumptions and the preliminary design documents for the 15 Necco Street building, the energy analysis results for Proposed Option 0 indicates:

- **29%** savings for LEEDv4 (**13** points)
- **36%** site energy savings for MA 2020 Stretch Code (complies)
- **25%** GHG emissions reduction compared to the Stretch Code baseline for the City of Boston and MEPA reporting purposes

The design has been optimized to target an Energy Use Intensity (EUI) of 116 kBtu/sf*yr. This is considered best in class energy performance for large laboratory buildings, targeting approximately **51%** reduction in energy compared to the average of existing large lab buildings in Boston and Cambridge built since 2012. In addition, the Energy Conservation Measures (ECMs) prioritize reduction in fossil fuel consumption. Shifting toward reliance on electricity, rather than fossil fuels is typically referred to as 'electrification'.

National Development and Alexandria Real Estate have also committed to purchase Renewable Energy Credits (RECs) to offset all electricity consumed by the building, including tenant end uses. If this renewable energy is purchased from sources that meet the definition of additionally, the electricity consumption will be carbon neutral. The combination of reduced fossil fuel consumption and reliance on renewable electricity position the building to achieve a uniquely low operating carbon footprint, targeting approximately **92%** reduction in GHG intensity compared to the Stretch Code Baseline, **93%** compared to existing large lab buildings in Boston and Cambridge built since 2012 and **95%** compared to existing large lab buildings in Boston and Cambridge built since 1985. The goal of 15 Necco is to become a beacon for future development of low emission lab buildings in the city.

To ensure the design of 15 Necco Street achieves the targeted energy goals, it is recommended that the design and owner team thoroughly review the assumptions listed in this report and provide any comments or revisions to BR+A. These parameters must be incorporated into the final design to maintain the targeted level of performance.

Beyond design and construction of the building, commissioning and occupant behavior play a significant role in the building's actual energy consumption. During commissioning, the contractors and commissioning agent should ensure the systems operate as indicated in the design documents. After occupancy, the operations staff and occupants should receive training to help ensure that the energy performance goals are met.

APPENDIX A: ENERGY MODELING PARAMETERS

General

Energy model program: eQuest v3.65 DOE 2.2

Weather data: ASHRAE climate zone 5A

Weather file: TMY3 weather file for Boston Logan Airport, MA

Gross floor area: approx. 368,515 square feet

Parking area: none

APPENDIX B: INTERNAL LOAD ASSUMPTIONS

The following tables summarizes the design occupancy and receptacle equipment values input into the energy model by space type.

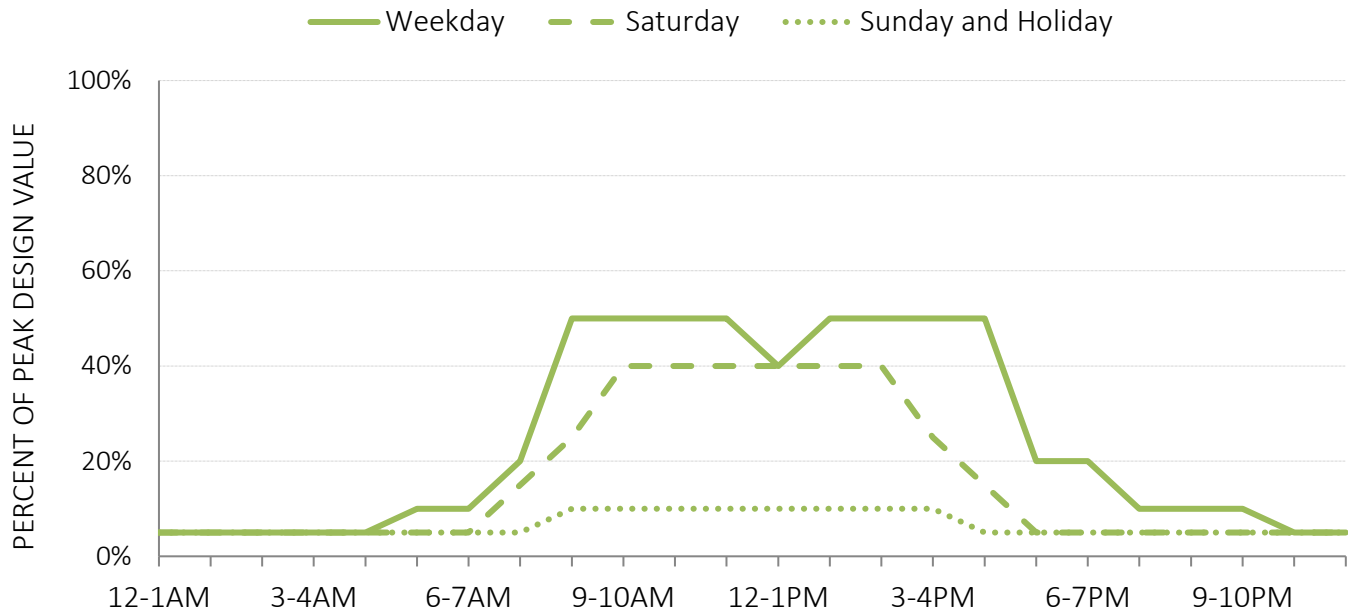
SPACE TYPE	PEOPLE (SF/PERSON)	EQUIPMENT (W/SF)
Office	100	1.8*
Open Lab	100	6
Lab Support	100	14
Corridor	250	0.1
Retail	65	0.5
Storage	200	0
Data Room	400	15
Electrical Room	400	15
Mechanical Room	400	0.5
Restroom	100	0

*Includes 10% savings for energy-star office equipment, per typical BPDA request.

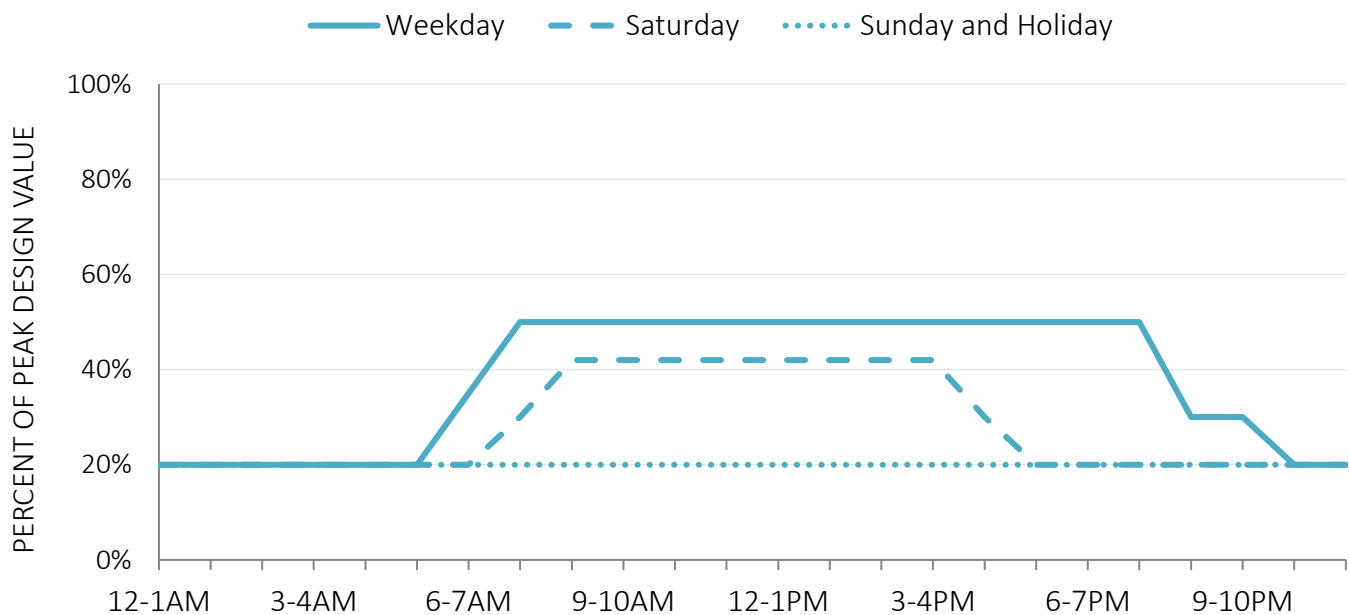
APPENDIX C: USAGE SCHEDULE ASSUMPTIONS

The following charts summarize the design occupancy, equipment and lighting usage schedule input into the energy model for the office and lab spaces.

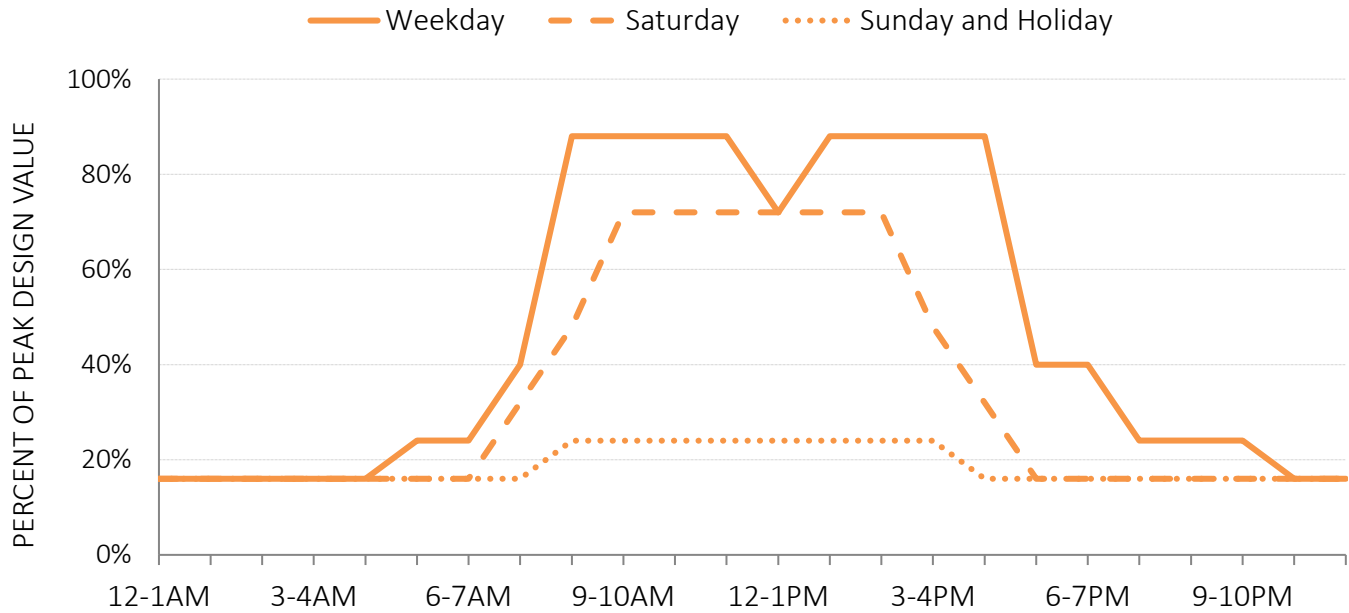
Lab Occupancy



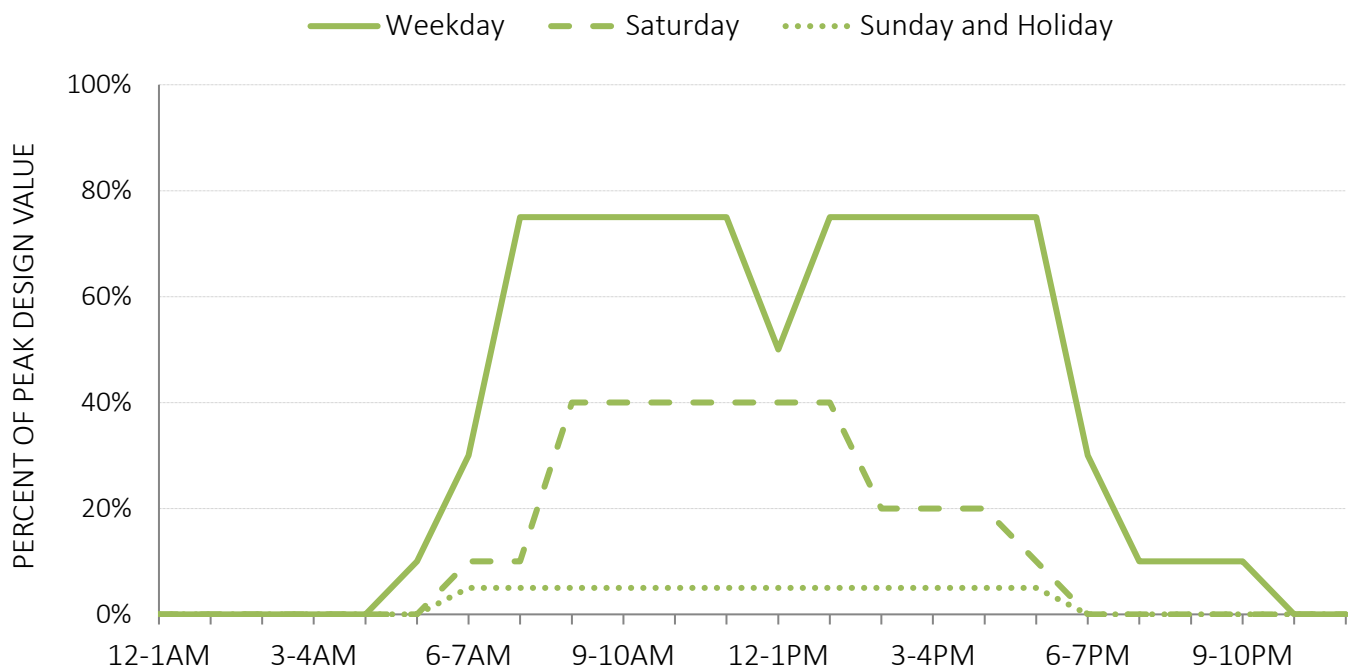
Lab Equipment Usage



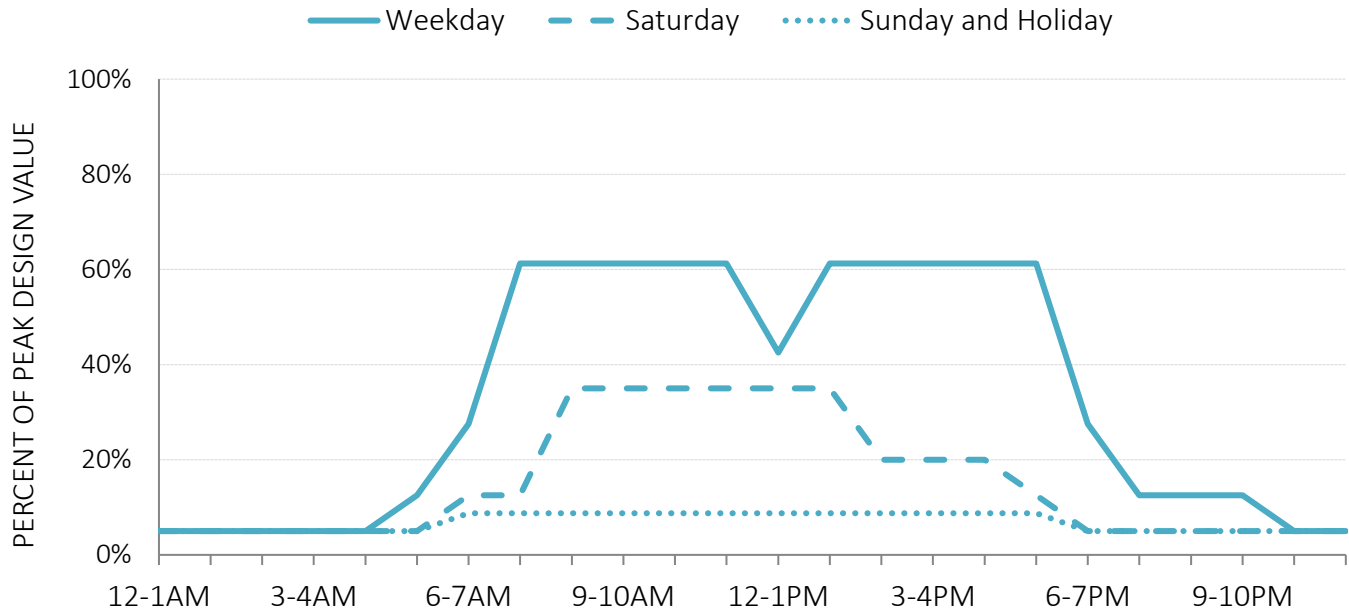
Lab Lighting Usage



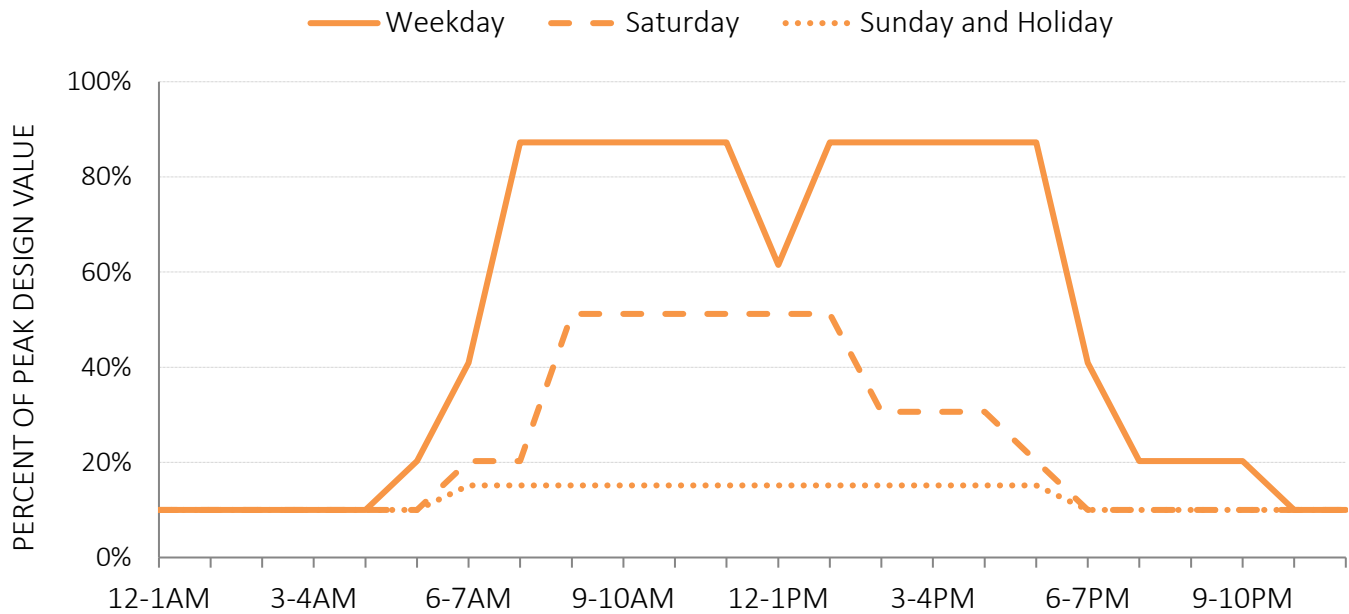
Office Occupancy



Office Equipment Usage



Office Lighting Usage



15 Necco NPC				
Energy Consumption and GHG Emissions				
Energy Consumption				
Results	Units	Base Case	Design Case	All-Electric
Total Electricity	MWh/yr	10,200	10,500	10,900
Total Electricity	MMBTU/yr	34,800	35,800	37,200
Total Natural Gas	MMBtu/yr	33,500	8,200	0
Total Energy	MMBtu/yr	68,300	44,000	37,200
		Savings over Baseline	35.6%	45.5%

GHG Emissions				
Results	Units	Base Case	Design Case	All-Electric
Total Electricity ¹	Tons/yr	3,478	3,581	3,717
Total Natural Gas ²	Tons/yr	1,960	480	0
Total Energy	Tons/yr	5,438	4,060	3,717
		Savings over Baseline	25.3%	31.6%

1. Using 682 lbs/MWh for Electricity (2017 ISO New England Marginal Emissions Report)

2. Using 117 lbs/MMBtu for Natural Gas (US EIA)