

7

Environmental Protection

This Chapter presents information on the existing environmental conditions in the vicinity of the Project Site and the potential changes that may occur as a result of the Project. In accordance with Article 80 of the Boston Zoning Code, this DPIR considers the potential for the project impacts in the following Large Project Review categories:

- Wind
- Shadow
- Daylight
- Solar Glare
- Noise
- Flood Hazard
- Water Quality
- Chapter 91
- Historic Resources
- Groundwater/Geotechnical
- Site Contamination and Hazardous Materials
- Post-Construction Rodent Control

Air quality and greenhouse gas emissions are addressed in Chapter 6; Stormwater is addressed in Chapter 8; Water and wastewater are addressed in Chapter 9; and construction period impacts are addressed in Chapter 10.

7.1 Key Findings

The following are the key findings related to Environmental Protection and potential Project impacts:

- **Wind** – The assessment concluded that wind conditions around the Project are generally expected to be comfortable for walking or standing throughout the year.
- **Shadow** – The shadow analysis indicated that impacts to areas outside of the Project Site are minimal.
- **Daylight** – The daylight analysis conducted for the Phase 1 Project found that Building M will increase skydome obstruction in two out of the three study locations, while Building F will increase obstruction at all four study locations.

- **Solar Glare** – The proposed Project will not include reflective glass or other reflective cladding materials on the building facades that would result in adverse solar glare impacts or create solar heat buildup in adjacent buildings.
- **Noise** – With the proposed equipment located on the rooftop, the sound levels associated with the Project’s mechanical equipment are expected to have no adverse noise impacts at nearby sensitive receptor locations. As a result of careful design, the Project’s operations will have no adverse noise impacts at nearby sensitive receptor locations and will adhere to the City of Boston’s requirements. The residential buildings will incorporate sufficient acoustical material with the appropriate sound transmission class rating to achieve HUD’s indoor noise goal of 45 decibels.
- **Flood Hazard** – The Project is not located in a designated FEMA Special Flood Hazard Area. The Site is anticipated to be subject to coastal flooding around 2070 with 36 inches of sea level rise. Chapter 6, Section 6.6 addresses anticipated flood adaptation measures.
- **Water Quality** – The Project will not affect the water quality of nearby water bodies during construction or after construction is completed. The Project will comply with Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, as described in Chapter 9, Infrastructure.
- **Chapter 91** – A portion of the Project Site is located within landlocked filled tidelands, exempt from licensing under the provisions of Chapter 91, Section 18(b) and 310 CMR 9.04(2). The Project requires a Public Benefit Determination Section 6.5 of the ENF/EPNF included detailed information describing the nature of the tidelands affected by the Project and its public benefits.
- **Historic Resources** – There are no designated or inventoried historic properties located on the Project Site, nor are there any previously identified archaeological sites or districts within the Project Site or in immediate adjacent areas. The MHC, in consultation with the City of Boston Department of Neighborhood Development, determined in 2016 that the existing Bunker Hill Public Housing development is not eligible for the National Register. Based on the key findings of the archaeological background and literature review and soil data, the likelihood of encountering intact, significant archaeological features or deposits in the Project Site is considered low because of prior disturbance to the Project’s landform.
- **Site Contamination and Hazardous Materials** – Response Action Outcome (RAO) Statements were filed with MassDEP for three on-site release locations confirming that a Permanent Solution was achieved, a Condition of No Significant Risk exists for current and future conditions, and that the implementation of an Activity and Use Limitation (AUL) was not required. Elevated concentrations of extractable petroleum hydrocarbon (EPH) fraction C11-C22 aromatics, as well as benzene and naphthalene, were identified in soil at one location, and benzene was also identified in groundwater associated with a former coal gas holder use. It is anticipated that vapor membrane or passive venting system may be required below the buildings slag on grade. An updated Phase I and Phase II ESA is currently being completed for the Phase 1 and 1B Project Site.
- **Groundwater** – The Project Site is not within a Groundwater Conservation Overlay District. Groundwater is anticipated to be present at depths of approximately 3.0 to 14.0 feet

below the existing ground surface. Construction of the Project is not expected to have adverse short or long-term impacts on groundwater conditions.

- **Geotech** – Excavation for spread footing foundations and/or pile caps and grade beams is anticipated to extend to depths of up to four to six feet below existing site grades. Installation of a temporary lateral earth support system is not anticipated.

7.2 Phase 1 Project Impacts

Anticipated environmental impacts resulting from the Phase 1 Project are summarized below.

7.2.1 Wind

The assessment concluded that wind conditions around the Phase 1 Project Site are generally expected to be comfortable for walking or standing throughout the year.

7.2.2 Shadow

A limited portion of the CharlesNEWtown Cooperative will be minimally impacted by shadows only in the late afternoon in the fall and at various times in the winter.

7.2.3 Daylight

The daylight analysis described in Section 7.6 found that Building M will increase skydome obstruction in two out of the three study locations, while Building F will increase obstruction at all four study locations.

7.2.4 Solar Glare

The Phase 1 Project will not include reflective glass or other reflective cladding materials on the building facades that would result in adverse solar glare impacts or create solar heat buildup in adjacent buildings.

7.2.5 Noise

With the proposed equipment located on the rooftop, the sound levels associated with the Project's mechanical equipment are expected to have no adverse noise impacts at nearby sensitive receptor locations. The Phase 1 Project will comply with HUD indoor noise goals and City of Boston noise regulations.

7.2.6 Wetlands and Water Resources

There are no floodplains on the Phase 1 Project Site. The Project will comply with Massachusetts Department of Environmental Protection Stormwater Management Standards, as described in Chapter 9. The Phase 1 Project Site is outside of Chapter 91 jurisdiction.

7.2.7 Historic Resources

There are no designated or inventoried historic properties located on the Phase 1 Project Site. The likelihood of encountering intact, significant archaeological features or deposits in the Phase 1 Project Site is considered low because of prior disturbance to the Project's landform. The Phase Project will result in an inviting environment and better circulation between the Project Site and the nearby historic properties.

7.2.8 Site Contamination and Hazardous Materials

An updated Phase I and Phase II ESA is currently being completed for the Phase 1 Project Site, the scope of which includes the completion of a subsurface exploration program consisting of borings, installation of groundwater monitoring wells, and soil and groundwater quality testing. The purpose of the Phase I/II ESA is to identify possible affects to the subsurface from historical site use and/or from off-site nearby MassDEP releases or uses identified as part of the previous Phase I ESA work.

Based on the results of the recent soil and groundwater testing completed as part of the ongoing Phase II ESA work, there was no evidence identified that the historic coal gas holder has impacted soil or groundwater at the Phase 1 or Phase 1B development sites. The results of testing of fill soil samples identified the presence of polynuclear aromatic hydrocarbons (PAH) and total lead at levels in excess of the applicable Reportable Concentrations as contained at the MCP and which are considered to be attributable to the presence of Urban Fill containing ash and cinders at the Project Site. Given the general absence of staining, odor, and elevated TVOC readings, the concentrations of the above referenced compounds are likely considered to be attributable to ash and cinders that were visually observed in the historically placed urban fill soil as opposed to a release to the environment.

7.2.9 Geotech

There is no below-grade space proposed for the Phase 1 Project Site.

7.3 Regulatory Context

Article 80, Section B-3(3) requires applicants to conduct studies that are necessary to determine the direct or indirect damage to the environmental reasonably attributable to the proposed Project. Elements for which environmental studies and mitigation measures may be required include wind, shadow, daylight, solar glare, air quality, water quality, flood hazard districts, wetlands, groundwater, geotechnical impacts, solid and hazardous waste, noise, construction impact, rodent control, wildlife habitat, and green building. With the exception of green building (which is addressed in Chapter 6), this chapter provides the applicable analyses. It also includes analysis of historic resources and tidelands, in compliance with Sections B-3(4) and B-3 (7).

7.4 Wind

An analytical assessment of pedestrian wind comfort conditions has been completed for the proposed development. BPDA's two standards for assessing the relative wind comfort of pedestrians - gust and mean wind speed criteria – were applied. Wind statistics at Boston Logan International Airport between 1990 and 2015 were analyzed. The wind flows around the proposed development with the existing surroundings were simulated using Urbawind, which is a software developed by Meteodyn Inc. The pedestrian level wind comfort conditions were also numerically assessed using RWDI's proprietary tool, WindEstimator. The assessment concluded that wind conditions around the Project are generally expected to be comfortable for walking or standing throughout the year. Uncomfortable wind conditions may occur around exposed corners of some of the buildings during the windier winter and spring months, but none were determined to be dangerous. Landscape treatments and use of screens or canopies will be considered to provide improved wind conditions in the areas that have been identified. The complete wind analysis can be found in Appendix D.

7.5 Shadow

A shadow analysis was conducted for the Project to ensure the proposed buildings would not create adverse shadow impacts. Table 7.1 identifies the dates and times for which shadow conditions have been simulated.

TABLE 7.1 SHADOW STUDY DATES AND TIMES

Date	Time
Vernal Equinox – March 21st	9:00 a.m, 12:00 p.m, 3:00 pm
Summer Solstice – June 21st	9:00 a.m, 12:00 p.m, 3:00 pm, 6:00 p.m
Autumnal Equinox – September 21st	9:00 a.m, 12:00 p.m, 3:00 pm, 6:00 p.m
Winter Solstice– December 21st	9:00 a.m, 12:00 p.m, 3:00 pm

The analysis is focused on the impact to the neighboring residential properties, public open spaces, parks, proposed pedestrian areas and sidewalks, and how the proposed buildings of the Project will affect each other. The analysis was completed using a general massing of the individual buildings. As the design of the individual building evolve it is anticipated that additional architectural features such as setbacks will result in a net decrease new shadow. Shadows have been determined using the applicable altitude and azimuth data for the City of Boston.

The Project's shadow impact to the surrounding residential neighborhood and existing parks and open spaces is generally minimal. On Polk Street, the residential buildings and the Charlestown High School will be marginally impacted with morning shadows. A limited portion of the CharlesNEWtown Cooperative, Charlestown High School Athletic fields and Barry Field on Medford Street will be minimally impacted by shadows only in the late afternoon in the fall and at various times in the winter. The height and massing of adjacent building of the new

public parks on Monument and Corey streets were designed to minimize shadow impact to ensure they are filled with daylight for most of the day throughout year. In summary, shadow impacts to surrounding areas outside the project area are minimal. Shadow diagrams are provided in Figures 7.1a-n.

7.6 Daylight Analysis

An analysis of the percentage of skydome obstructed under the No-Build and Build Conditions is a requirement of Article 80 (Section 80B-2(c)). This section describes the anticipated effect on daylight coverage at the Phase 1 Project Site only. Skydome obstruction for future Project phases will be analyzed during design review of each of those phases/buildings.

7.6.1 Methodology

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. The daylight analysis estimates the pedestrian's view of the skydome taking into account building massing and building materials used. The software approximates a pedestrian's view of a site based on input parameters such as: location of viewpoint; length and height of buildings and the relative reflectivity of the building façades. The model typically uses the midpoint of an adjacent right-of-way or sidewalk as the analysis viewpoint. Based on these data, the model calculates the perceived skydome obstruction and provides a graphic depicting the analysis conditions. The results of the analysis are presented in Figures 7.2a-g.

The model inputs used for the study presented herein were taken from an existing conditions survey, and 3d model prepared by the Project Architect. As described above, the BRADA software considers the relative reflectivity of building façades when calculating perceived daylight obstruction. Highly reflective materials are thought to reduce the perceived skydome obstruction when compared to non-reflective materials. For the purposes of this daylight analysis, the building façades are considered non-reflective, resulting in a conservative estimate of daylight obstruction.

Viewpoints

The following four viewpoints were studied in the daylight analysis for Building F:

- **Moulton Street** – This viewpoint is located on the centerline of Moulton Street, centered on the southern side of the Project Site.
- **Decatur Street** – This viewpoint is located on the centerline of Decatur Street centered on the eastern side of the Project Site.
- **Samuel Morse Way** – This viewpoint is located on the centerline of Samuel Morse Way centered on the northern side of the Project Site.
- **Corey Street** – This viewpoint is located on the centerline of Corey Street centered on the western side of the Project Site.

The following four viewpoints were studied in the daylight analysis for Building M:

- **Corey Street**– This viewpoint is located on the centerline of Corey Street, centered on the eastern side of the Project Site.
- **Medford Street** – This viewpoint is located on the centerline of Medford Street centered on the northern side of the Project Site.
- **Tufts Street** – This viewpoint is located on the centerline of Tufts Street centered on the western side of the Project Site.

These points represent the proposed building façades when viewed from the adjacent public ways.

7.6.2 Daylight Study Findings

Daylight Existing/No-Build Conditions

Under the Existing/No-Build Condition, the majority of the Project Site is developed with narrow and long low-rise buildings with open space in between them. The Parcel for Proposed Building F has three such existing buildings and the Parcel for Proposed Building M has two such buildings. The orientation of the existing buildings has a typical Daylight profile of narrow elevations on the southern and northern viewpoints and long elevations on the eastern and western viewpoints. The existing skydome obstructed based on the viewpoint varies but is generally lower along the northern and southern elevations due to the open space between the existing buildings.

Daylight Build Conditions

The Project-related daylight impacts for the viewpoints are presented in Figure 7.2a-g. Under the Proposed Conditions, the viewpoints along all roadways are expected to experience an increase in skydome obstruction, as would be expected when increasing the height and massing on an urban site, except for Proposed Building M along Corey Street. The daylight impacts are reduced due to the fact that a portion of the proposed building massing is set further back than the existing building massing. Skydome obstruction impacts for Building F are as included in Table 7.2.

TABLE 7.2 EXISTING/NO-BUILD AND BUILD DAYLIGHT CONDITIONS – BUILDING F

Viewpoint	Existing/No-Build Condition Skydome Obstruction	Build Condition Skydome Obstruction
Moulton Way	26.1%	51.7%
Decatur Street	50.7%	83.1%
Samuel Morse Way	19.4%	82.2%
Corey Street	30.9%	94.9%

Skydome obstruction impacts for Building M are included in Table 7.3.

TABLE 7.3 EXISTING/NO-BUILD AND BUILD DAYLIGHT CONDITIONS – BUILDING M

Viewpoint	Existing/No-Build Condition Skydome Obstruction	Build Condition Skydome Obstruction
Corey Street	41.7%	33.2%
Medford Street	25.0%	37.7%
Tufts Street	41.5%	63.0%

7.7 Solar Glare

The proposed project will not include reflective glass or other reflective cladding materials on the building facades that would result in adverse solar glare impacts or create solar heat buildup in adjacent buildings. Site landscaping and street trees will further absorb sunlight and minimize reflection from buildings onto sidewalks, streets and adjacent buildings.

7.8 Noise

A noise analysis was previously conducted as part of the National Environmental Protection Agency (NEPA) Environmental Assessment (EA) process, and findings were included in the ENF/EPNF. That analysis included an assessment of potential impacts on the proposed residential use as per the U.S. Department of Housing and Urban Development (HUD) guidelines and procedures and concluded that the Project will comply with HUD indoor noise goals and City of Boston noise regulations. The full noise analysis is included in Appendix D of this report.

7.8.1 Methodology

The noise analysis evaluated the potential noise impacts associated with the Project's operations, which include mechanical equipment and loading/service activities. It included measurements of existing ambient background sound levels and a qualitative evaluation of potential noise impacts associated with the proposed mechanical equipment (e.g., HVAC units, emergency generators) and loading activities. The study area was evaluated and sensitive receptor locations in the vicinity of the Project were identified and examined. The Site layout and building design, as they relate to the loading area and management of deliveries at the Project Site, were also considered. The analysis considered sound level reductions due to distance, proposed building design, and obstructions from surrounding structures.

In addition, the noise study included an assessment of potential impacts on the proposed residential use. The assessment followed HUD guidelines and procedures outlined in The Noise Guidebook (Guidebook). The noise study utilized HUD's DNL Calculator, which is a model used to calculate the DNL associated with roadway traffic and rail sources. The DNL Calculator takes into consideration traffic volume, travel speed, and the distance between the receptor and noise source.

7.8.2 Conclusion

The noise analysis determined that the sensitive receptor locations in the vicinity of the Project Site currently experience sound levels exceeding the City of Boston's nighttime noise criteria. With the proposed equipment located on the rooftop, the sound levels associated with the Project's mechanical equipment are expected to have no adverse noise impacts at nearby sensitive receptor locations. While potential noise impacts associated with the emergency generators are also expected to be negligible, a separate MassDEP permitting process will allow for further review of this equipment at a later date. The Project will be designed such that many of the loading areas will largely be enclosed within the proposed building structures, therefore containing noise associated with the loading activities. For those buildings that include curbside loading, the loading areas will be located within the larger project site and will not have adverse impact on off-site sensitive receptors. As a result of the preliminary design, the Project's operations will have no adverse noise impacts at nearby sensitive receptor locations and will adhere to the City of Boston's requirements.

The noise evaluation demonstrates that the proposed residential buildings abutting major roadways will experience unacceptable exterior sound levels, according to HUD's goals. However, with the appropriate building material, the Project would meet the HUD indoor noise goals. During the design process, the residential buildings will incorporate sufficient acoustical material with the appropriate sound transmission class rating to achieve HUD's indoor noise goal of 45 decibels.

7.9 Flood Hazard

Based on the FEMA Flood Insurance Rate Map (FIRM), Map Number 25025C0018J, dated March 16, 2016, the Project is not located in a designated zone, noted as "Zone X" Areas determined to be outside the 0.2% annual chance floodplain, as shown in Figure 7.3.

The BPDA's Flood Hazard Area – Sea Level Rise maps indicate that the general area bound by Medford Street, Corey Street, Bunker Hill Street, and Tufts Street may be subject to short-term flooding. This area of the Project is generally below elevation 19.5. An evaluation of ways to prepare for potential flooding of the lowest portions of the site is included in Chapter 6, Section 6.6.

7.10 Water Quality

The Project will not affect the water quality of nearby water bodies during construction or after construction is completed. The Project will comply with Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, as described in Chapter 9, Infrastructure. The Project will comply with the Massachusetts Stormwater Handbook and stormwater best management practices will be used where applicable.

Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and the BWSC storm drain system. Existing catch basins will be protected with filter fabric, straw bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until the areas of disturbance have been stabilized through the placement of pavement, structure, or landscape cover.

The Project will strive to improve the water quality of stormwater runoff from the constructed site by incorporating on-site stormwater management and treatment systems that reduce runoff volumes and rates of discharge compared to the existing condition. Stormwater from building roofs will be collected and directed to on-site infiltration systems. Stormwater from site areas will be collected by catch basins with deep sumps and hoods for pre-treatment and then directed to infiltration systems. Stormwater treatment on-site will reduce the quantity of Total Suspended Solids (“TSS”), pathogens, and phosphorus in runoff. Excess stormwater runoff that is not contained on-site will overflow to the existing BWSC storm drain system but will have been treated by the on-site stormwater management and treatment systems. If it is determined that infiltration systems are infeasible due to Site constraints, the Proponent will treat the stormwater runoff to adequately capture Total Suspended Solids (TSS), pathogens, and phosphorus prior to discharging to the BWSC system. The existing Site has closed drainage systems that collect runoff but does not appear to provide treatment or storage of runoff. Therefore, the stormwater management and treatment systems part of the constructed Project will improve the quality of stormwater compared to the existing condition.

Drainage within garages will be directed to oil/water separator structures, then directed to the BWSC sanitary sewer system.

All necessary dewatering will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once construction is complete, the Project will be in compliance with local and state stormwater management policies, as described in Section 7.14 below.

7.11 Chapter 91

A portion of the Project Site (approximately 6,600 sf) is located within landlocked filled tidelands, exempt from licensing under the provisions of Chapter 91, Section 18(b) and 310 CMR 9.04(2). As a non-water dependent use, the Project requires the Secretary of Energy and Environmental Affairs to issue a Public Benefit Determination under the provisions of Chapter 91, Section 18(b)(ii) and 301 CMR 13.00. Chapter 6, Section 6.5 of the ENF/EPNF included detailed information describing the nature of the tidelands affected by the Project and the public benefit of the Project, including:

- Purpose and effect of the development;
- The impact on abutters and the surrounding community;
- Enhancement of the property;

- Benefits to the public trust rights in tidelands or other associated rights;
- Community activities on the development Site;
- Environmental protection and preservation;
- Public health and safety; and
- General welfare.

7.12 Historic Resources

This chapter identifies properties located within and in the vicinity of the Project Site that are listed in the National and State Registers of Historic Places and/or are included in the Inventory of Historic and Archaeological Assets of the Commonwealth (Inventory) and evaluates potential Project effects on those properties.

7.12.1 Summary of Project Change

The Project has been re-designed since the ENF/PNF filing in response to community concerns about the scale of the Project and to accommodate a new financing approach. As described in Chapter 1, Section 1.4, and detailed in Table 1.1, the number of proposed residential units has been reduced from 3,200 to 2,699, and the height of the tallest buildings decreased by more than 50 percent from 21 stories to 10 stories. The massing along Bunker Hill Avenue and Monument Street has also been scaled back. Parking within the Project Site will consist of podium parking, with the ability to construct standalone parking structures within the development to meet future needs.

7.12.2 Regulatory Context

The Massachusetts Historical Commission (MHC) has advisory review over projects requiring any state or federal action, such as land transfers, funding, licensing, permitting, and/or approvals, in order to evaluate potential direct or indirect impacts to properties listed in, or eligible for listing in, the National and State Registers of Historic Places, in compliance with State Register Review requirements (M.G. L. Chapter 9, Sections 27-27c, as amended by Chapter 254 of the Acts of 1988) and Section 106 of the National Historic Preservation Act of 1966. The submittal of the ENF initiated MHC's review of the Project, under the State Register Review requirements. No comments were received from the MHC in response to the ENF. The MHC, in consultation with the City of Boston Department of Neighborhood Development, determined the existing Bunker Hill Public Housing development is not eligible for the National Register.¹



¹ MHC letter to City of Boston, February 12, 2016 (MHC RC #55944).

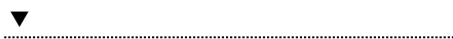
The submission of the PNF initiated review of the Project by the Boston Landmarks Commission (BLC) under the BPDA Article 80B, Large Project Review process, in association with the Boston Environment Department. The BLC's jurisdiction is focused on potential Project impacts to Boston Landmarks, including historic buildings and districts listed in the National and State Registers, which are located within or in the vicinity of the Project Site, and how those impacts will be mitigated or minimized. No comments were received from the BLC on the PNF filing.

Demolition of the existing Bunker Hill Public Housing Development will also be reviewed by the BLC, as demolition of buildings that are over 50 years old are subject to Article 85 of the Boston Zoning Code. The BLC reviews demolition applications to determine whether such buildings are historically significant and preferably preserved. If so, the BLC may impose a delay period of up to 90 days before a demolition permit can be issued by the City of Boston. An Article 85 application for the demolition of the existing housing complex is anticipated to be submitted later in the planning process.

7.12.3 Historic Context

Nancy S. Seasholes, in *Gaining Ground, A History of Landmaking in Boston*,² presents a detailed overview of landforming in Boston, including the Project Site loosely bounded by Breed's Hill, Bunker Hill, and the Little Mystic Channel in today's Charlestown. Highlights of the area's development history are summarized below.

- The Native American presence in about 1620 was focused upslope in the vicinity of Bunker Hill Community College, though certainly camps were present along the tidally influenced shores.
- The 1630 Charlestown shoreline corresponds closely to Medford Street in the Project vicinity.
- The 1818 Plan of Charlestown illustrates the presence of Bunker Hill Street and Tufts Street, with the intervening area illustrated as undivided farm tracts. The plan coincides with the conditions reported during the Revolutionary War.
- By 1848, the Map of Charlestown indicates that the first street grid covering the Project area was delineated. At this point, the Almshouse existed to the west of the Project Site and the area contained both residential and commercial/industrial enterprises.
- Between ca. 1840 and 1940, the Project Site building stock continued to provide residential and commercial/industrial functions. The area became known as the "Point" neighborhood, home to cold water flats that housed Charlestown's first Irish Catholic population. North of Medford Street were the wharves and recently filled land in the



² Nancy S. Seasholes. *Gaining Ground A History of Landmaking in Boston*, Cambridge, Massachusetts: The MIT Press, 2003.

Mystic River improvement area created north of the Mystic River Channel, which hosted railroad lines and other industrial and transportation related structures.

- This area was cleared in 1939 to build what is now the Bunker Hill Housing Development, constructed in 1941. Designed by the locally prominent John M. Gray Co., the brick and concrete buildings originally housed U.S. World War II veterans and their families. Today the development incorporates 1,100 low-income housing units.

In summary, the Project landform underwent two major periods of development, ca. 1840 to 1940 and 1940 to present. Both affected the pre-contact and historic landforms and likely eradicated much of the evidence of prior occupations.

7.12.4 Historic Resources

Historic resources were identified through the MHC's Massachusetts Cultural Resource Information System (MACRIS) database and mapping tool and are listed in Table 7.12-1. Figure 7.4 shows the location of these resources and their proximity to the Project Site.

On-site historic resources, historic resources within a quarter-mile radius of the Project Site, and archaeological resources are summarized below. For detailed descriptions of these historic resources refer to ENF/PNF Section 4.3, *Historic Resources*.

On-Site Resources

There are no designated or inventoried historic properties located on the Project Site. The site is currently developed with the Bunker Hill Public Housing complex, a multi-family housing development that opened in 1941. The MHC, in consultation with the City of Boston Department of Neighborhood Development, determined in 2016 that the existing Bunker Hill Public Housing development is not eligible for the National Register.

Historic Resources in Project Site Vicinity

The area surrounding the Project Site has been heavily documented, resulting in numerous listed and inventoried historic resources. Due to the high number of individually inventoried resources in the vicinity, the ENF/EPNF focused on inventoried areas; designated properties; and inventoried properties located directly adjacent to the Project Site. Within a one-quarter mile radius are five National Register and/or State Register-listed districts and properties and 12 inventoried areas. An additional individually inventoried property is located adjacent to the Project Site (Table 7.4 and Figure 7.4).

TABLE 7.4 HISTORIC RESOURCES IN THE VICINITY OF THE PROJECT SITE

Map No.	Resource Name	Location	MHC Inventory No.	Designation
A	Bunker Hill Monument	N/A	BOS.9053/ NR #66000138	NHL/NRDIS
B	Charlestown Navy Yard (Boston Naval Ship Yard)	N/A	BOS.ACQ/ NR #66000134	NHL/NRDIS
C	Monument Square Historic District	N/A	BOS.CM/ NR #87001128	NRDIS
D	Terminal Storage Warehouse District	N/A	BOS.ZU/ NR #12000099	NRDIS
E	Francis B. Austin House	58 High Street	BOS.5037/ NR # 7001478	NRIND
1	1-8 Avon Place	1-8 Avon Place	BOS.CK	INV
2	3-15 Bolton Street	3-15 Bolton Street	BOS.AAV	INV
3	23-46 Green Street	23-46 Green Street	BOS.CF	INV
4	2-22 Hill Street – 1-5 Mystic Place	2-22 Hill Street - 1-5 Mystic Place	BOS.CE	INV
5	5-14 Lexington Avenue	5-14 Lexington Avenue	BOS.CQ	INV
6	7-58 Monument Avenue	7-58 Monument Avenue	BOS.AAX	INV
7	19-35 Russell Street	19-35 Russell Street	BOS.AAY	INV
8	Charlestown Valley – Town Hill	N/A	BOS.CD	INV
9	Saint Catherine of Siena Roman Catholic Church Complex	49 Vine Street	BOS.VK	INV
10	Saint Mary’s Roman Catholic Church Complex	55 Warren Street	BOS.VL	INV
11	William Henry Kent Primary School	234 Moulton Street	BOS.4734	INV
12	Winthrop Square	N/A	BOS.CB	INV
13	Charlestown Mystic River Industrial Area	N/A	BOS.RM	INV

NHL National Historic Landmark

NRDIS National Register of Historic Places, District

NRIND National Register of Historic Places, Individual Listing

INV Listed in the Inventory of Historic and Archaeological Assets of the Commonwealth; no current designation

Archaeological Resources

Review of MACRIS indicates there are no previously identified archaeological sites or districts within the Project Site or in immediate adjacent areas. Key findings from the archaeological

background and literature review and soil data were included in Section 4.4, *Archaeological Resources*, of the ENF/PNF, and are summarized below.

- The Project will be developed on fill soil classes as defined by the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS).³ The soil classes are 602 (Urban land, 0 to 15% slopes), 603 (Urban land, wet substratum, zero to three percent slopes), 627C (Newport-Urban land complex, three percent to 15% slopes), and 655 Udorthents, wet substratum. The parent materials for these classes are characterized as various fill and excavated materials. Actions associated in these soils apparently occurred in the historic period; geotechnical investigations are pending.
- The fill extends between three and 14 feet below existing ground surface.
- The Project will disturb to a depth of approximately 8 feet below ground surface, which may intersect with the ground water levels that are thought to be five to eight feet below the existing ground surface.
- The latest building stage in the Project Site dates from the 1940s, when the Bunker Hill Public Housing development was constructed.⁴ The residential housing constructed in that decade and into the 1950s followed mass urban redevelopment which removed much of the preceding building and structure stock. The depth of impact resulting from the redevelopment clearing and subsequent building is unknown.
- The Public Archaeology Laboratory, Inc. provided an overview of previous archaeological investigations on the Bunker Hill Monument in 2019.⁵ The investigations, conducted between 1979 and 2006, included monitoring, test excavations, and ground-penetrating radar (GPR) assessment, and suggest patterns of fill and development that likely apply to the Project Site as well. Archaeological evidence supported use of Breed's Hill for both public and military purposes. The archaeological investigations identified evidence of one of the Revolutionary War-era forts and found evidence that Breed's Hill has been subject to re-contouring and fill in the post-battle era, identified throughout the monument setting.^{6,7,8} There are no data in these reports suggesting that the fill episodes were pervasive over the monument grounds. Rather, they appear to represent the result of



3 USDA NCRS. 2016. Custom Soil Resource Report for Norfolk and Suffolk counties, Massachusetts for 13403. Report downloaded from USDA NCRS Web Soil Survey 20160316.

4 Kristen Heitert. 2009. Archaeological Overview and Assessment Bunker Hill Monument Charlestown, Massachusetts. PAL Report No. 2141. Submitted to Northeast Region Archaeology Program, National Park Service, Lowell, MA.

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episodic events including monument facility construction, utility trenching, pedestrian paths, and at least in one case, military activities. Similar disruptions, including building and structure construction, demolition, street location changes, and emplacement of utility lines, affected the Project Site as well.

Based on the key findings of the archaeological background and literature review and soil data, the likelihood of encountering intact, significant archaeological features or deposits in the Project Site is considered low because of prior disturbance to the Project's landform.

7.12.5 Potential Impacts to Historic Resources

Visual and Public Realm

As described in Chapter 1, the Project has been redesigned from the ENF/PNF Previously Proposed Alternative to reduce the scale of the Project. The reimagined project includes 2,699 residential units, a 16 percent reduction from the 3,200 units proposed in the ENF/PNF. The decreased quantity of residential units is accompanied by a 52 percent reduction in the maximum building height, from 21 to 10 stories for the tallest Project buildings, and an 0.4 percent reduction in the gross floor area (gfa). Additionally, while the Previously Proposed Alternative included underground parking, the refined Project utilizes podium parking with the opportunity to add parking structures as needed.

While the Project Site and much of the adjacent land has been subject to mid- to late twentieth century development, the area is firmly ensconced in an older residential neighborhood and the Project is located just a few blocks from the Monument Square Historic District and Bunker Hill Monument. Thus, the Project has been designed to respect nearby streetscapes by concentrating higher buildings toward the northeastern portion of the site, adjacent to the industrial and modern settings of the Little Mystic Channel and Route 1, and away from the Bunker Hill Monument which is characterized by its height over the surrounding Monument Square. Breaking up the building facades along Bunker Hill Street with differing materials and recesses/projections in the building face avoids a monolithic appearance, which would be out of character with nearby neighborhood streets.

The Master Plan Project will result in an inviting environment and better circulation between the Project Site and the nearby historic properties. New infrastructure, including an increased number of interconnected parks and public space, will better integrate the Project Site into the rest of the neighborhood. Furthermore, the Project Team has set aggressive energy efficiency goals since the Previously Proposed Alternative, including PHIUS+ Core Passive House Certification, and seeks to lead by example by meeting this rigorous building performance standard. The use of Passive House building principles not only benefits future users of the Project's buildings and open spaces, but also helps protect the surrounding neighborhood and its historic resources by cutting carbon emissions and energy consumption.

Geotechnical

As discussed in ENF/PNF Section 4.5, *Potential Impacts to Historic Resources*, there are minimal increased vibration levels anticipated during construction, which will not impact nearby historic properties. A geotechnical monitoring program will be implemented prior to and during construction and will likely consist of settlement monitoring of adjacent buildings. The Project's geotechnical team will install settlement points on the surrounding buildings. The team will survey/monitor those points prior to, during, and post construction.

In addition, seismographs will record vibrations during sheet pile wall installation (excavation support wall) and foundation pile installation to monitor vibrations. An engineer's representative will be on site full time during foundation pile installation to monitor these activities in accordance with the Building Code requirements.

Shadows

A shadow impact analysis was conducted for the Project, consistent with both Section 80B-2(c) and Section 41-16(1) of the Boston Building Code. The results of the shadow analysis are provided in *Section 7.5, Shadows*. Shadow studies were conducted for three-hour intervals on the dates of March 21, June 21, September 21, and December 21, representing the days in the year when the midday sun is at its highest (June 21) and lowest point (December 21), and dates when shadows are midway through a period of lengthening (March 21 and September 21).

The net new shadows sweep north in an arc from west to east over the course of the day, and largely avoid inventoried or designated historic properties. The Saint Catherine of Siena Roman Catholic Church Complex (BOS.VK) and the William Henry Kent Primary School (BOS.4734) are located adjacent to the Project Site, and shadows resulting from the Project are confined to the early evenings, at 5:00 PM on June 21, September 21, and December 21. These shadows overlap existing ones, resulting in no net new shadow resulting from the Project. The only exception is during the early morning at 9:00 AM on December 21, when a small portion of net new shadow appears briefly on the rear ell of the northernmost church complex building. Similarly, the Project will cause shadows on the western portion of the Charlestown Navy Yard, but these are entirely concurrent with existing shadow. Therefore, there are no impacts anticipated to historic properties from net new shadow resulting from the Project.

7.13 Site Contamination and Hazardous Materials

The Project Site is listed as a release site with the MassDEP, with two documented releases associated with leaking USTs (two of the five above-referenced 18,000-gallon USTs) that were present at the Site listed with MassDEP under Release Tracking Numbers (RTNs) 3-13392 and 3-16862, and a third release associated with a surficial release of 20 gallons of non-PCB containing mineral oil dielectric fluid (MODF) from a pad-mounted transformer listed with MassDEP under RTN 3-20970. Remedial response actions were completed for each of these releases, which included cleaning and removal of the tanks and excavation and off-site reuse

of contaminated soil. Class A-1 or A-2 Response Action Outcome (RAO) Statements were filed with MassDEP for each of these release locations. A Class A-1 or A-2 RAO Statement was filed with the MassDEP confirming that a Permanent Solution was achieved, a Condition of No Significant Risk exists for current and future conditions, and that the implementation of an Activity and Use Limitation (AUL) was not required to maintain that condition.

A Phase I Environmental Site Assessment (ESA) report was completed for this Project in June 2016. Historical records indicate that in the late 1800's the Site was occupied by a mixture of residential and commercial properties prior to its development in 1940/1941, at which point the existing buildings were constructed. The Sanborn Map dated 1900 indicates that a large gas holder, possibly associated with a nearby former coal and oil works facility, was present on the northeastern portion of the Site near the intersection of Medford Street and Decatur Street near existing Buildings 28 through 31 until few years prior to site development in 1940. Further, a Sanborn Map dated 1888 indicated that an asbestos rope and asbestos cement manufacturing facility was present on the northwestern portion of the Site near the intersection of Medford Street and Monument Street. The Phase I report also identified records of five (5) 18,000-gallon capacity fuel oil underground storage tanks (USTs) at the Site, which were all removed in 1999.

At the former asbestos rope and asbestos cement manufacturing facility (existing Buildings 6, 7, 10 and 11), six (6) machine excavated test pits were completed as part of a subsurface exploration program completed during November and December 2016 under contract with McPhail. McPhail also subcontracted to a Massachusetts licensed Project Monitor and Asbestos Inspector to monitor ambient air for possible asbestos fibers and observe and inspect possible suspect ACM that may be present in the fill. The certified asbestos inspector identified no evidence of suspect ACM observed in the six (6) excavated test pits and no detections of airborne asbestos fibers detected during ambient air sampling. Based on the above observations, additional testing of site soils for the presence of asbestos was not warranted. Accordingly, the historical presence of the asbestos manufacturing facility is not considered a REC with respect to the subject site.

At the former coal gas holder (existing Buildings 28 through 31), based on the results of soil and groundwater testing completed as part of due diligence work completed in November and December 2016, elevated concentrations of the extractable petroleum hydrocarbon (EPH) fraction C11-C22 aromatics, as well as benzene and naphthalene were identified in soil, and benzene was also identified in groundwater, at concentrations that exceeded the applicable DEP Reportable Concentrations as defined in the Massachusetts Contingency Plan 310 CMR 40.0000 (MCP). These constituents are considered to be associated with the above-referenced former coal gas holder. Given the results of the subsurface explorations in areas of the site surrounding these buildings, contamination that could be present at these locations is likely a localized condition. Further assessments to identify the nature and extent of contamination at the location of the former coal gas holder is warranted. Soils samples, which detected these constituents were found below the bottom of proposed building excavations and foundations.

It is anticipated that vapor membrane or passive venting system may be required below the buildings slag on grade.

Results of the November and December 2016 sampling and testing identified the presence of EPH and volatile petroleum hydrocarbons (VPH) in soil adjacent to the location of the former UST, adjacent to existing Building 23, that was removed and remediated under RTN 3-13392. Further, based on the results of the November and December 2016 Phase II exploration program, we identified no evidence of subsurface impacts within the vicinity of the remaining three 18,000-gallon No. 6 fuel oil USTs removed during 1999.

Polarized Light Microscopy (PLM)/Scanning Electron Microscopy (SEM) analysis will be used to analyze for the presence of ash, cinders, and/or lead paint in the fill and should the PLM/SEM analysis indicate that the presence of ash, cinders, and/or lead based paint in the fill soil, the detected concentrations of lead and PAHs which exceed the applicable RCS-1 reporting thresholds would be considered exempt from notification of the DEP pursuant to Section 40.0317(9)(12) of the MCP.

If ash, cinders and/or lead based paint are not identified in the fill soil, the detected concentrations of lead and PAHs which exceed the applicable RCS-1 reporting thresholds will require notification to the DEP and the release will be managed pursuant to the provisions of the MCP. Specifically, a Release Notification Form (RNF) is required to be submitted to the DEP within 120 days of when the site owner and/or operator obtains knowledge of the release, or from the effective date of transfer of the subject site to a new owner or operator who has knowledge of the release, whichever is sooner. Within 1-year from the date of notification, a Phase I Initial Site Investigation Report and Tier Classification submittal, a Temporary Solution Statement or Permanent Solution Statement must be filed with the DEP. A Release Abatement Measure (RAM) Plan will be filed with the DEP prior to site excavation. An initial RAM Status Report is required to be filed with DEP within 120 days of submitting the RAM Plan and then every 6 months thereafter until the RAM work is completed at which time a RAM Completion report must be filed. The RAM Plan describes procedures to manage handling and off-site re-use or disposal of excavated soils affected by a reportable release.

The results of the chemical testing of soil samples obtained after completion of the RAM would be used as part of the preparation of a Method 1 Risk Characterization that will be incorporated into Permanent Solution to be filed with the DEP for this disposal site.

Following completion of the RAM, it is anticipated that that a cap be constructed and maintained across the redevelopment to limit potential exposure to contaminated urban fill soil. The cap would be defined as an existing and/or new building, asphalt pavement, concrete or brick surface treatments, or a one-foot thickness of clean soil that is placed over a geotextile marker barrier in all landscaped areas of the subject site not covered by buildings, pavement or concrete.

7.14 Groundwater/Geotech

Available subsurface information indicates that the Site is covered by a surficial deposit of miscellaneous fill material extending to depths of approximately 7 to 17.5 feet below the existing ground surface. A natural marine deposit predominantly consisting of marine clay, which varies in consistency from hard to soft with depth, is located directly beneath the fill across the majority of the site. A discontinuous sand layer is located within the upper portion of the marine deposit. A glaciomarine deposit generally observed to vary from a compact to very dense, gray to brown, well-graded mixture of sand, silt, clay, and gravel was encountered beneath the fill at the remaining portions of the site and/or beneath the marine clay deposit. Where penetrated, the marine clay and/or glaciomarine was indicated to extend to depths of up to about 67 feet below ground surface. A discontinuous deposit of very dense glacial till overlying the bedrock surface was encountered at depths generally increasing from west to east across the site ranging from about 3.5 to 42 feet below the existing ground surface. Groundwater is anticipated to be present at depths of approximately 3 to 14 feet below the existing ground surface and ranging in elevation from east to west from Elevation +6 to Elevation +26 BCB.

Based upon the proposed scope of development and the anticipated subsurface conditions, preliminary foundation design of the proposed buildings is anticipated to consist of conventional spread footing foundations bearing on aggregate pier improved soil or on pile foundations designed to transfer the building loads through the unsuitable fill to the underlying natural bearing soils. Excavation for spread footing foundations and/or pile caps and grade beams is generally anticipated to extend to depths of up to 4 to 6 feet below existing site grades. Excavation within the below-grade parking area of proposed Building F is anticipated to extend to depths of approximately 12 feet below existing grades. Installation of a temporary lateral earth support system is anticipated to be required to support the excavation of the below-grade parking area.

Ground vibrations will be produced as a result of the aggregate pier and/or pile foundation installation procedures. Based on our experience, impacts from these vibrations are not anticipated to result in structural damage to existing, adjacent structures. Vibration monitoring with seismographs will be performed by the construction team during the aggregate pier and/or pile foundation installation activities.

Dewatering during excavation for site utilities and new foundations is anticipated to be accomplished through use of localized sumping methods and on-site groundwater recharge. If on-site recharge of pumped groundwater is not feasible, groundwater testing will be performed to facilitate filing of a temporary construction dewatering discharge permit application with the Massachusetts Water Resource Authority (MWRA) or through the US EPA under the Construction General Permit (CGP) or Remediation General Permit (RGP) as well as with the Boston Water and Sewer Commission (BWSC). The project site is not located within the Groundwater Conservation Overlay District (GCOD) as outlined in Article 32 of the City of Boston Zoning Code.

7.15 Post Construction Rodent Control

Trash and solid waste removal will be handled by the building maintenance staff. The Proponent will maintain a service contract with a professional pest control firm to address rodent/pest control during the operational phase of the Project. In addition, no open top dumpsters will be allowed as an additional precaution to deter infestation.

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Chapter from Final Environmental Impact Report dated 7-31-20

4

Environmental Impacts

This chapter addresses the public benefits associated with Chapter 91 jurisdiction and measures that are planned to comply with applicable regulatory requirements related to noise mitigation.

4.1 Request for a Public Benefit Determination

A portion of the Project Site (approximately 6,600 sf) is located within landlocked filled tidelands, exempt from licensing under the provisions of Chapter 91, Section 18(b) and 310 CMR 9.04(2). As a non-water dependent use, the Project requires the Secretary of Energy and Environmental Affairs to issue a Public Benefit Determination under the provisions of Chapter 91, Section 18(b)(ii) and 301 CMR 13.00. Approximately 0.09 acres (4,000 sf) of these landlocked tidelines are located within the Phase 1 Project Site. A Public Benefit Determination was issued for that area on May 29, 2020. An additional Public Benefit Determination must be issued for the remaining 0.06 acres (2,600 sf) of filled tidelands.

The regulations at 301 CMR 13.00 requires the Secretary to consider the following when making a Public Benefit Determination:

- › Purpose and effect of the development;
- › The impact on abutters and the surrounding community;
- › Enhancement of the property;
- › Benefits to the public trust rights in tidelands or other associated rights;
- › Community activities on the development Site;
- › Environmental protection and preservation;
- › Public health and safety; and
- › General welfare.

The following sections describe how the Project provides appropriate public benefits and is adequately protective of the Public Trust rights inherent in tidelands.

4.1.1 Purpose and effect of the development

The purpose of the Project is to redevelop the Bunker Hill Apartments, an existing affordable housing development, into a mixed-use, mixed-income community that is connected to the Charlestown neighborhood.

The anticipated effects of the development include increased quality of life for residents; architecture and landscape architecture that is sensitive to the surrounding historic context; an activated streetscape; new public spaces and amenities; an improved transportation grid; and increased accessibility.

4.1.2 Impact on Abutters and Community

The Project will result in a substantial net benefit to the community by converting an aging, isolated public housing development into a vibrant mixed-income, mixed-use urban development that will be fully integrated into the surrounding community. The Project's planning principles and design goals fundamentally focus on building community among the existing and future resident population and the surrounding Charlestown community by knitting the neighborhood back together, creating a vibrant and safe walkable environment, introducing new public spaces and amenities, reflecting Charlestown's character and telling its story through design and programming, and other related strategies.

Approximately 6.7 acres of landscaped open space will be provided, approximately 2.5 acres of which will be concentrated in large, publicly accessible, landscaped areas that will feature both active and passive recreation amenities.

Beneficial impacts on the community will be realized through a comprehensive package of transportation demand management strategies, to be finalized in close consultation with the City of Boston Transportation Department, that will encourage alternatives to single occupancy vehicle use, and improve vehicular circulation and pedestrian safety.

4.1.3 Enhancement of the Property

The Project will enhance the property by providing improvements in the street network, streetscape, landscaping, appearance, functionality, and stormwater management system. The planned improvements will result in a neighborhood with a pedestrian scale and a welcoming, vibrant atmosphere. The Site will be visually attractive, safe, clean and well-kept, enhancing all of these elements when compared to the existing conditions.

4.1.4 Benefits to the Public Trust Rights in Tidelands or Other Associated Rights

The Project will replace affordable housing within the area containing filled tidelands, continuing to encourage public use. The traditional public trust rights in tidelands, the right to fish fowl and navigate, have long been precluded at the Site by the historic filling and development of Charlestown. However, the modern expression of these traditional public trust rights on filled land isolated from the existing water sheet will be realized by improving public access to and enjoyment of the Site.

4.1.5 Community Activities on the Site

The Project will result in a substantial net improvement to community activities at the Project Site by converting the prior public housing use to a mixed-use development with strong civic and open space components. The planned 2,699 residential units in multiple buildings will create a new vibrant community and encourage passive and active community use of the approximately 27-acre Site. The 70,000 SF of retail and community spaces located throughout the Site, including a new 14,000 SF community center, will serve the residents and the surrounding neighborhood, creating new opportunities for community use of the Site.

4.1.6 Environmental Protection/Preservation

The Proponent is committed to redeveloping the Project Site in accordance with all applicable local, state and federal environmental protection regulations. Chapter 7 of the DEIR examined the potential for the Project to result in environmental impacts to the Project area and includes detailed description of how the Project avoids, minimizes or mitigates potential impacts related to air quality, water quality, flood hazards, wetlands, noise, historic resources, solid and hazardous waste, groundwater, and geotechnical conditions. Sustainability, green building, and climate change impacts were addressed in DEIR Chapter 6.

4.1.7 Public Health and Safety

The Project will promote public health and safety through implementing a site design which provides safe and accessible facilities. Improvements include additional open space, landscaping, accessible ramps and crosswalks, and appropriate lighting to provide a safe well-lit environment for residents, visitors, and patrons.

4.1.8 General Welfare

The Project will protect the general welfare by replacing the existing public housing development with a modern pedestrian scale mixed use neighborhood. The Project will comply with all applicable local, state, and federal environmental protection standards and will be constructed in accordance with a Construction Management Plan subject to review and approval by the City of Boston Transportation Department.

4.1.9 Protection of Groundwater

The Project Site is not located in the Boston Groundwater Conservation Overlay District and is therefore not subject City of Boston Zoning Code Article 32. Construction of the Project is not expected to have adverse short or long-term impacts on groundwater conditions.

4.2 Noise Mitigation

The noise analysis conducted for the ENF determined that the sensitive receptor locations in the vicinity of the Project Site currently experience sound levels exceeding the City of Boston's nighttime noise criteria. With much of the proposed building equipment to be

located within rooftop mechanical penthouses, the sound levels associated with the Project's mechanical equipment are expected to have no adverse noise impacts at nearby sensitive receptor locations. While potential noise impacts associated with the emergency generators are also expected to be negligible, a separate MassDEP permitting process will allow for further review of this equipment as individual buildings go through the design process. The Project will be designed such that many of the loading areas will be enclosed within the proposed building structures, therefore containing noise associated with the loading activities. As a result of the preliminary design, the Project's operations will have no adverse noise impacts at nearby sensitive receptor locations and will adhere to the City of Boston's noise standards.

The HUD standard is intended to protect residential receptor locations from noise sources, such as highways, rail lines, and airports, which may cause interference with normal activities, such as sleep and conversation. The HUD Guidebook states that a noise assessment is required if a proposed residential development is located within 15 miles of an airport, within 3,000 feet of a railway, or within 1,000 feet of a major roadway. The Project is located approximately 2 miles from Logan International Airport; 125 feet from Route 1 (the Tobin Bridge); 30 feet from Bunker Hill Avenue; and 2,895 feet from the MBTA Orange Line. Therefore, a noise analysis was conducted to evaluate noise associated with these facilities.

The assessment found that buildings at the northeast (Bunker Hill Avenue and Polk Street) and southwest (Medford and Decatur streets) corners of the development would experience Day-Night Noise Levels (DNL) greater than HUD's exterior goal of 65 decibels. With levels greater than HUD's threshold, the Project will require noise attenuation measures to minimize the impacts. This is addressed through the robust air sealing and super insulation detailing, which also controls the transmission of noise from outside to inside.

The Project will employ three primary strategies to reduce interior sound levels below HUD's interior goal of 45 dB(A): air sealing, better windows, and appropriate insulation materials.

- › **Air Sealing** – In Chapter 4 of HUD's Noise Guidebook, air sealing is identified as critical to achieving sound control, noting that even small gaps can lead to undesirable sound transmission. The HUD Guidebook references an analysis which found that a 1/16-inch crack in a 13.5-foot wall will reduce the Sound Transmission Class (STC) rating by 20% (from 50 to 40). Such a reduction is a significant deterioration in acoustic performance in that a 10-point reduction in a STC rating results in a noise sounding twice as loud to an occupant.

Because of the Project's commitment to the Passive House certification, the Project must meet an air tightness requirement that is five times more stringent than the Massachusetts energy code requirement (0.08 versus 0.40 cfm75/square foot of shell area). As a result of this rigorous airtightness metric, BHH's attention to air sealing will ensure that sound transmission through gaps and holes is minimized.

- › **Better Windows** – To meet the energy requirements of the Passive House program, the Project will employ a high performance, double-pane window, which will also provide superior sound control. The final window unit has yet to be selected, so the STC ratings cannot be directly compared, but the Project will have lower sound transmission around the windows than a typical multifamily residential building.

- › **Insulation Material** – All the buildings in the Project will be designed to meet the NFPA 285 fire propagation standard for exterior wall assemblies containing combustible components. Given this design criteria, and the value of installing exterior insulation for several durability and constructability reasons, the design was limited to two insulation material options: mineral wool boards or rigid board polyisocyanurate. Mineral wool is better at dampening sound than polyisocyanurate. Polyisocyanurate is a closed cell polymer that does not absorb sound, whereas mineral wool has more mass and allows air to pass into the material, where it can be absorbed. For a range of motivations, including acoustic control, the Project will utilize mineral wool boards.

The construction activity associated with the Project may temporarily increase nearby sound levels due to the use of heavy machinery. Heavy machinery is expected to be used intermittently throughout the Project's construction phases, typically during daytime periods. The construction activities that will generate the highest sound levels may include demolition, site excavation and grading, and construction of the foundation for the proposed building. A construction management plan will be developed with the local governing agency to ensure that the applicable noise regulation is met.

The Project will implement mitigation measures to reduce or minimize noise from construction activities. Construction vehicles and equipment would be required to maintain their original engine noise control equipment. Specific mitigation measures may include the following:

- › Construction equipment would be required to have installed and properly operating appropriate noise muffler systems.
- › Appropriate traffic management techniques would be implemented during the construction period would mitigate roadway traffic noise impact.
- › Proper operation and maintenance, and prohibition of excessive idling of construction equipment engines, would be required.

Therefore, construction noise levels are proposed to be mitigated to the greatest extent possible.