# 6

# Shadows

A shadow is defined in the ~~2021~~2025 *City Environmental Quality Review (CEQR) Technical Manual* as the condition that results when a building or other built structure blocks sunlight that would otherwise directly reach a certain area, space, or feature. The purpose of this section is to assess whether new structures may cast shadows on sunlight-sensitive, publicly accessible resources or other resources of concern such as natural resources, and to assess the significance of their impact.

## Introduction

According to the *CEQR Technical Manual*, a shadows assessment is required for proposed actions ~~that would result in new structures greater than 50 feet in height or~~under two conditions:

1. If the project **is** located adjacent to, within, or across the street from~~,~~ a sunlight-sensitive resource and is at least 50 feet tall. Increments of as little as 10 feet of height may warrant an assessment.
2. If the project **is not** located adjacent to a sunlight-sensitive resource, but would result in with-action structures of 250 feet or more with at least 50 feet of incremental height change.

Such sunlight-sensitive resources include publicly accessible open spaces, important sunlight-sensitive natural features, or historic resources with sun-sensitive features. A significant adverse shadow impact can occur when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight exposure, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources.

The Proposed Actions would facilitate the development of three new buildings at the Development Site, the tallest of which would rise to approximately 640 feet tall (with bulkhead). This represents an incremental increase of roughly 616 feet compared to the existing NYCTA Facility, which is roughly 24 feet tall, that would remain on the Development Site in the future without the Proposed Actions. Additionally, the Proposed Actions would result in the development of a new building up to approximately 60 feet tall (plus a 20-foot bulkhead) at the NYCTA Relocation Site. This represents an increase of roughly 65 feet over the existing building that would remain on the site in the future without the Proposed Actions. Since the tallest with-action building ~~height~~ at the Development Site would ~~increase by more than 50~~exceed 250 feet in height, further assessment of project-generated shadows is warranted at the Development Site ~~and~~. Based on criteria in the *2025 CEQR Technical Manual*, assessment of shadows is not warranted for the NYCTA Relocation Site, however, because an assessment was included in the DEIS, as warranted under *2021 CEQR Technical Manual* criteria, the assessment is provided in this FEIS for informational purposes.

# Principal Conclusions

A preliminary assessment, including a Tier 1 screening, was conducted for the NYCTA Replacement Facility at the NYCTA Relocation Site and concluded that the Proposed Actions would not result in a significant adverse shadows impact.

A detailed shadows analysis was conducted for the Proposed Development at the Development Site based on the methodology set forth in the *CEQR Technical Manual* and determined that the Proposed Actions would not result in a significant adverse impact related to shadows. Tier 1 through Tier 3 and detailed shadows analyses were undertaken for the Proposed Actions, since future development on the Development Sites is expected to exceed the *CEQR Technical Manual* threshold for a shadows analysis of 50 feet in height. Several sunlight-sensitive resources were identified within the potential Tier 3 shadow sweep that were advanced to a detailed analysis. These resources consist of six open space resources, Transmitter Park (O3), American Playground (O4), 61 Franklin Street Garden (O5), Greenstreet at Franklin Street (O6), Calyer Place Open Space (O10), and Bushwick Inlet Park (O11); one historic resource, St. John's Lutheran Church (H3); and two natural resources, the East River (N1) and Bushwick Inlet (N2).

A detailed analysis was conducted for the resources that could receive incremental shadow on one or more of the analysis days. For the six open space resources studied in the detailed shadows assessment, incremental shadows would be of limited duration and would occur on spaces that receive uninterrupted sunlight during other periods of the analysis day. Thus, it was determined that incremental shadows would not adversely affect the public's enjoyment of the space or the viability of vegetation of these resources. Incremental shadows on St. John's Lutheran Church would be for a limited duration that would not affect the public's enjoyment of sunlight-sensitive features of the church building. Additionally, incremental shading would occur over limited portions of the East River and Bushwick Inlet (inclusive of the Bushwick Inlet Recognized Environmental Complex). Because the Development Site is located north of these resources, shadows on these resources would occur for brief periods of time during the morning hours. The effects of incremental shadows on habitats and resident organisms within these natural resources would be temporary and of limited duration. Based on the foregoing, no significant adverse impacts to sunlight sensitive resources would occur due to shadows from future development under the Proposed Actions.

# Methodology

According to the *CEQR Technical Manual*, the longest shadow a structure will cast in New York City, except for periods close to dawn or dusk, is 4.3 times its height. In accordance with the *CEQR Technical Manual*, a preliminary screening assessment is conducted to ascertain whether shadows resulting from a project could reach any sunlight-sensitive resource at any time of year; if the preliminary assessment indicates that, in the absence of intervening buildings, shadows from a project could reach sunlight-sensitive resources on any of the representative analysis days, a detailed analysis is typically warranted.

## Sunlight-Sensitive Resources

The *CEQR Technical Manual* defines sunlight-sensitive resources as those resources that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. The following are considered to be sunlight-sensitive resources[1]:

- Public open space (e.g., parks, beaches, playgrounds, plazas, schoolyards, greenways, and landscaped medians with seating). Planted areas within unused portions of roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources. The uses and vegetation in an open space establish its sensitivity to shadows. This sensitivity is assessed for both (1) warm-weather-dependent features like wading pools and sand boxes, or vegetation that could be affected by loss of sunlight during the growing season (i.e., March through October); and (2) features such as benches that could be affected by a loss of winter sunlight. Uses that rely on sunlight include passive uses, such as sitting or sunning; active uses, such as playfields or paved courts; and such activities as gardening, or children's wading pools and sprinklers. Where lawns are actively used, the turf requires extensive sunlight. Vegetation requiring direct sunlight includes the tree canopy, flowering plants, and plots in community gardens. Generally, 6 to 8 hours a day of sunlight, particularly in the growing season, is a minimum requirement for most vegetation. Some plantings and vegetation can tolerate partial sun, with a reduced minimum requirement of 4 to 6 hours of direct sunlight. Examples of areas that can tolerate partial sun are established tree canopies, shrubs or perennials. Consistent with *CEQR Technical Manual* methodology, private open spaces are not considered in a shadows analysis. Similarly, open spaces associated with residential buildings, are not considered. In addition, historic resources that do not have sunlight sensitive features are not considered in the shadows analysis.
- Features of historic architectural resources that depend on sunlight for their enjoyment by the public. Only the sunlight-sensitive features are considered, as opposed to the entire architectural resource. Sunlight-sensitive features include the following: design elements that are part of a recognized architectural style that depends on the contrast between light and dark (e.g., deep recesses or voids such as open galleries, arcades, recessed balconies, deep window reveals, and prominent rustication); elaborate, highly carved ornamentation; stained-glass windows; exterior building materials and color that depend on direct sunlight for visual character (e.g., the polychromy (multicolored) features found on Victorian Gothic Revival or Art Deco façades); historic landscapes, such as scenic landmarks including vegetation recognized as an historic

[1] According to the *2025 CEQR Technical Manual*, City streets, sidewalks, and private open spaces (such as private residential front and backyards, stoops, and vacant lots) are not considered to be sunlight-sensitive resources.

feature of the landscape; and structural features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as an historic landmark.

- Natural resources where the introduction of shadows could alter the resource's condition or microclimate. Such resources could include surface waterbodies, wetlands, or designated resources such as coastal fish and wildlife habitats.

## Preliminary Assessment

The preliminary screening assessment consists of three tiers of analysis:

- **Tier 1 Screening:** The first tier determines a simple radius around the proposed buildings representing the longest shadow that could be cast. If there are sunlight-sensitive resources within the radius, the analysis proceeds to the second tier;
- **Tier 2 Screening:** The second-tier analysis reduces the area that could be affected by project-generated shadows by accounting for a specific range of angles that can never receive shade in New York City due to the path of the sun in the northern hemisphere. According to the *CEQR Technical Manual*, shadows cannot be cast within New York City within 108 degrees from True North. Topographic lines are included to demonstrate the terrain of the area;
- **Tier 3 Screening:** If the second tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a third tier of screening analysis further refines the area that could be reached by new shadows by looking at specific representative days of the year and determining the maximum extent of shadow over the course of each representative day. For the Tier 3 screening, three-dimensional modeling software with the capacity to model shadows is used, and the Proposed Development is modeled and geo-located within the program. Terrain, which has been included in the Tier 1 and Tier 2 screenings, is also incorporated into the model to account for how changes in elevation throughout the study area can influence shadows that could be cast by the Proposed Development. The representative days are December 21 (winter solstice), June 21 (summer solstice), March 21/September 21 (vernal/autumnal equinox), and May 6/August 6 (halfway between summer solstice and the equinoxes). The modeling software is also used to approximate times that shadows cast from the Proposed Development could enter and exit a resource.

### Detailed Assessment

If the Tier 3 screening indicates that, in the absence of intervening buildings, shadows from the Proposed Development would reach a sunlight sensitive resource on any of the representative analysis days, a detailed shadow analysis would be warranted. Because existing buildings (or No-Action buildings) may already cast shadows on a sun-sensitive resource, the Proposed Actions may not result in additional (incremental) shadows upon that resource. The detailed shadow analysis models a baseline condition (future No-Action) that is compared to the future condition resulting from the Proposed Actions (future With-Action) to illustrate the shadows cast by the No-Action development and distinguish the additional (incremental) shadow cast by the project.

For the Proposed Actions, a preliminary assessment (Tiers 1 through 3) and a detailed analysis were undertaken for the Development Site. A preliminary assessment (Tier 1) was undertaken for the NYCTA Relocation Site, finding no sunlight-sensitive resources in the Tier 1 radius (see **Figure 6-1**).

## Determination of Significance

As described in the *CEQR Technical Manual*, an incremental shadow is generally not considered significant when its duration is no longer than 10 minutes at any time of year and the resource continues to receive substantial direct sunlight. A significant shadow impact can occur when an incremental shadow of 10 minutes or longer falls on a sunlight-sensitive resource and results in one of the following:

- **Vegetation**: a substantial reduction in sunlight available to a sunlight-sensitive feature of the resource to less than the minimum time necessary for its survival (when there was sufficient sunlight in the future without the project), or a reduction in direct sunlight exposure where the sensitive feature of the resource is already subject to substandard sunlight (i.e., less than the minimum time necessary for its survival).
- **Historic and cultural resources**: a substantial reduction in sunlight available for the enjoyment or appreciation of the sunlight-sensitive features of a historic or cultural resource.
- **Open space utilization**: a substantial reduction in the usability of open space as a result of increased shadow, with consideration given to anticipated new users and the open space's utilization rates throughout the affected time periods as well as to the inventory of available open space resources in the study area.
- **Any sunlight-sensitive feature of a resource**: complete elimination of all direct sunlight on the sunlight-sensitive feature of the resource, when the complete elimination results in substantial effects on the survival, enjoyment, or, in the case of open space or natural resources, the use of the resource.

In general, a significant adverse shadow impact occurs when the incremental shadow added by a proposed action falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight exposure, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources.

# Preliminary Assessment

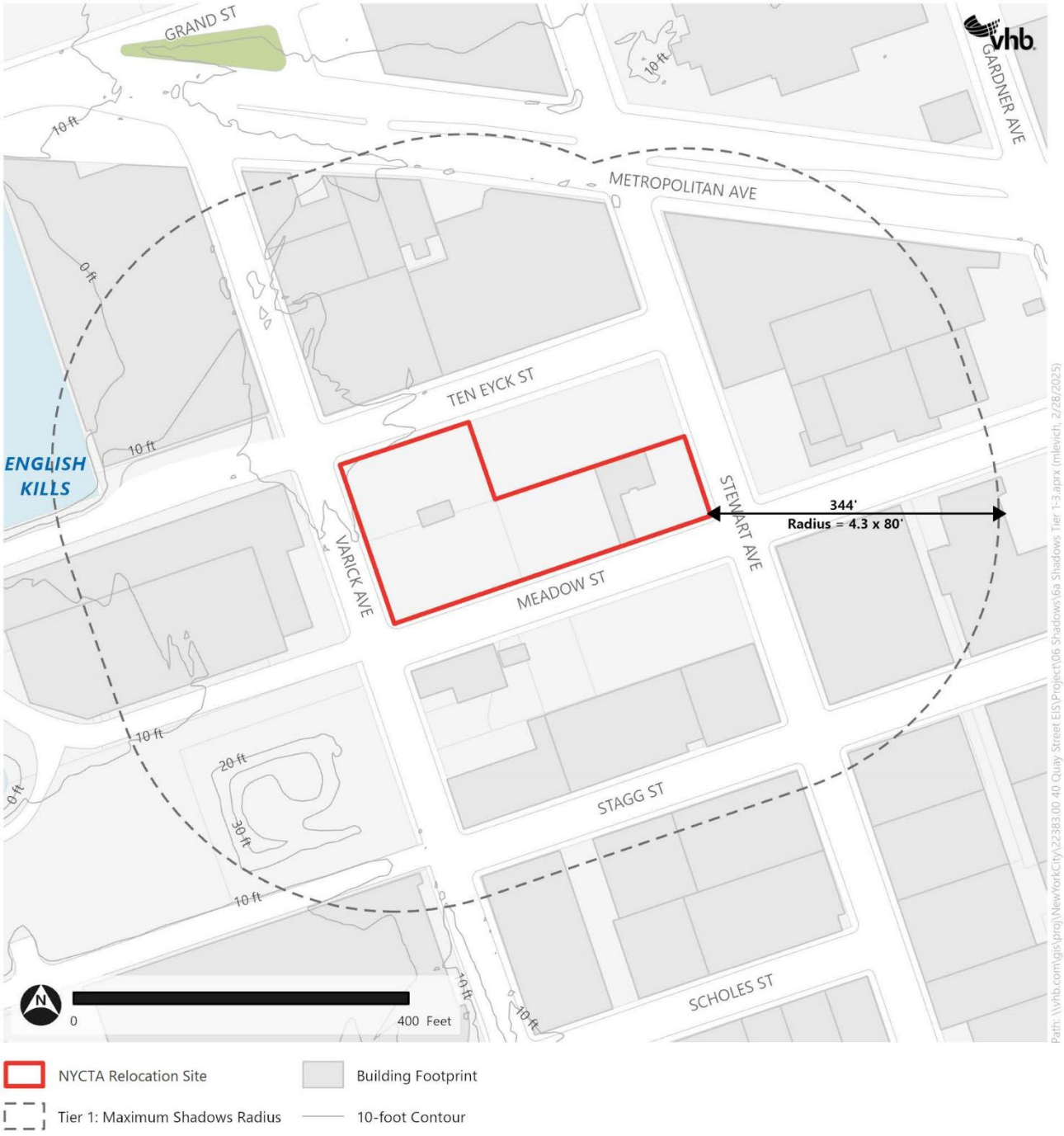
## NYCTA Relocation Site

### Tier 1 Screening

As described in **Chapter 1, Project Description**, the Proposed Actions would facilitate the development of a new three-story, 60-foot-tall (plus a 20-foot bulkhead) turnkey industrial facility at the NYCTA Relocation Site designed to accommodate the NYCTA uses currently present on the Development Site along with the existing NYCTA ERU Facility at 65 Commercial Street. The Tier 1 radius extends approximately 344 feet from the footprint of the proposed building. As shown in **Figure 6-1**, there are no open spaces or historic resources within the Tier 1 radius. In terms of natural resources, a small portion of English Kills falls within the Tier 1 radius. English Kills is a tributary to Newtown Creek located within a densely developed urban area that has been heavily impacted by over two centuries of commercial and industrial development along and beyond the waterfront, resulting in the elimination of vegetated wetland and shoreline communities, installation of bulkheads and other hardened shoreline structures, dredging, and alterations in natural tidal processes. Water quality within English Kills has been drastically impacted due to urban and industrial

development, stormwater runoff, sewage effluents, industrial point sources, and shipping. As a consequence, the overall ecosystem health of English Kills has been significantly impaired, including substantial declines in fish and wildlife habitat viability. Furthermore, based on review of New York State Department of Environmental Conservation (NYSDEC) and U.S. Fish and Wildlife Services (USFWS) databases, there are no records for Threatened or Endangered species, Critical Habitats, Significant Natural Communities, or Significant Coastal Fish and Wildlife Habitats for English Kills and the surrounding area. Based on the foregoing, significant adverse impacts to natural resources due to shadows on English Kills are not anticipated. Therefore, no significant adverse shadows impacts would occur due to development on the NYCTA Relocation Site, and no further analysis is warranted.

## Figure 6-1 NYCTA Relocation Site – Tier 1 Screening




Source: NYC DCP (2024);NYC Parks (2024); NYC LPC (2024); NYS OPRHP (2024)

# Development Site

## Tier 1 and 2 Screening

As described in **Chapter 1, Project Description,** the Proposed Actions would result in the development of three new buildings at the Development Site—the museum building on Lot 25, a 75-foot tall, approximately three- to four-story building serving as the permanent home of the Greenpoint Monitor Museum; the West Building on Lot 1, which would comprise a west tower rising approximately 56 stories and 600 feet tall (approximately 640 feet including bulkhead) and an east tower rising approximately 41 stories and 450 feet (approximately 490 feet including bulkhead); and the East Building on Lot 1, rising to approximately 21 stories and 230 feet tall (approximately 260 feet including bulkhead) on the eastern portion of the site.

The Tier 1 radius extends approximately 2,752 feet from the footprint of the proposed West Building. This radius encompasses the maximum area within which shadows could be cast by any of the three proposed buildings on the Development Site. The Tier 2 area cannot be shaded by development on the Development Site. **Table 6-1** and **Figure 6-1** show the potential sunlight-sensitive resources identified in the Tier 1 and Tier 2 screening assessment. The figure also shows the current topographic elevation of the Development Sites and surrounding area, which ranges from sea level to 30 feet (NAVD88). As shown in **Table 6-1**, there are 24 sunlight-sensitive resources wholly or partially within an area that can be shaded by the Proposed Development, including 15 open space resources, eight historic resources, and two natural resources. Five of the open space resources (O11, O12, O13, O14, and O15) and two of the historic resources (H7 and H8) are excluded from further assessment, as these resources are within the Tier 2 area that cannot receive shading from the Proposed Development.

**Table 6-1 Sunlight-Sensitive Resources in the Study Area**

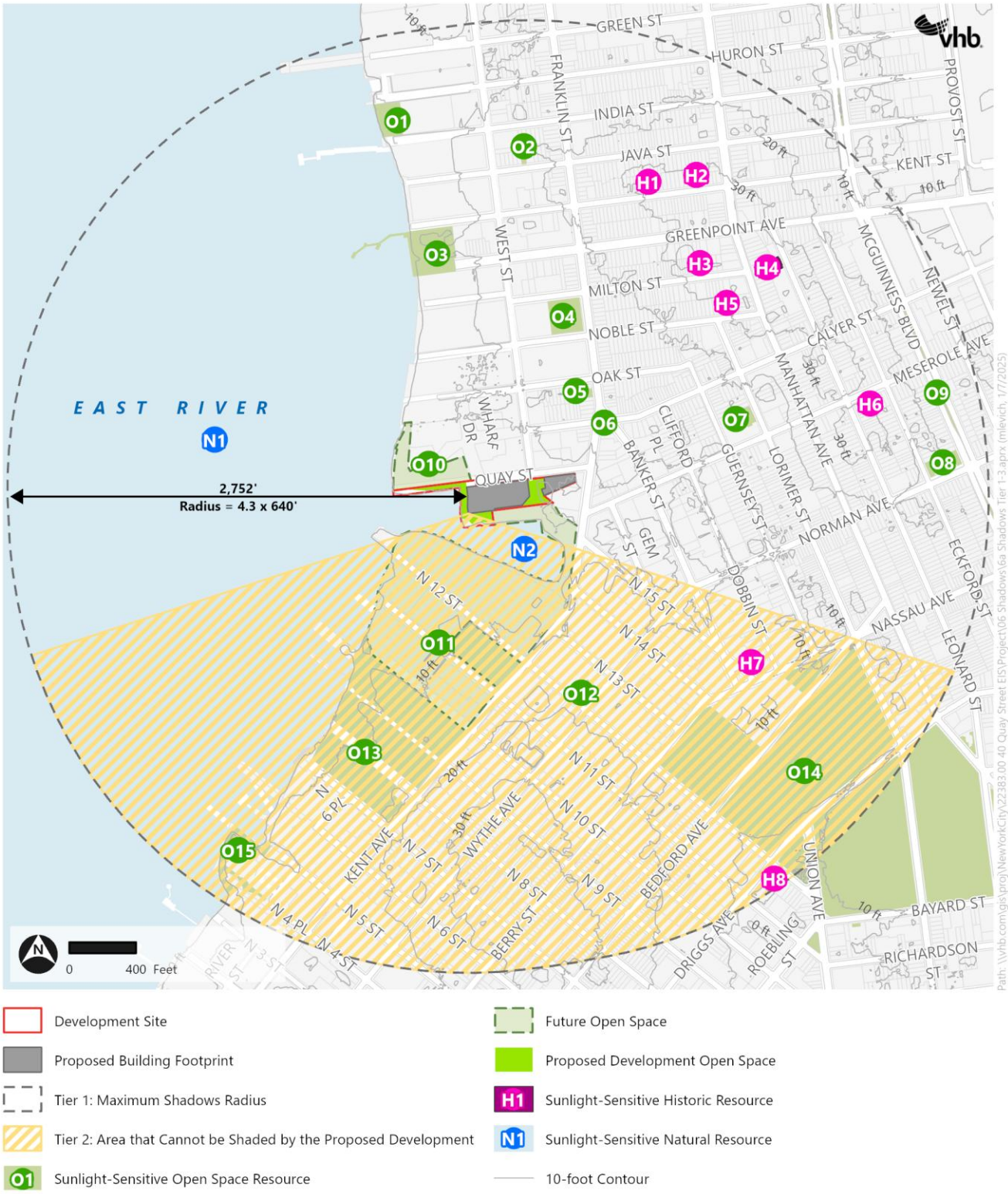
| Map ID | Resource Name | Resource Summary | Sunlight-Sensitive Elements |
|---|---|---|---|
| Open Space Resources | | | |
| O1 | 21 India Street Open Space | Publicly accessible waterfront open space with seating areas, landscaping, and a playground | Vegetation, Seating |
| O2 | Java Street Community Garden | Community garden with raised vegetable beds | Vegetation |
| O3 | Transmitter Park | Waterfront park with landscaping, seating areas, playground, and a scenic pier | Active recreation, Vegetation, Seating |
| O4 | American Playground | Local playground with play equipment, basketball and handball courts, spray showers, restrooms, seating areas, and landscaping | Active recreation, Vegetation, Seating |
| O5 | 61 Franklin Street Garden | Community garden with raised vegetable beds | Vegetation |
| O6 | Greenstreet at Franklin Street | Landscaped traffic island with shrubs | Vegetation |
| O7 | P.S. 31 Playground | Playground with play equipment and seating areas | Active recreation, Seating |
| O8 | P.S. 34 Playground | Playground with play equipment and seating areas | Active recreation, Seating |
| O9 | Greenstreet at McGuinness Boulevard | Landscaped median with trees | Vegetation |
| O10 | Calyer Place Open Space* | Planned (partially completed) open space with a waterfront esplanade and seating areas | Vegetation, Seating |

**Table 6-1 Sunlight-Sensitive Resources in the Study Area**

| Map ID | Resource Name | Resource Summary | Sunlight-Sensitive Elements |
|---|---|---|---|
| O11 | Bushwick Inlet Park* | Large waterfront park with active and passive recreation amenities | Active recreation, Vegetation, Seating |
| O12 | 25 Kent Avenue Open Space | Privately-owned public space (POPS) with landscaping and seating areas | Vegetation, Seating |
| O13 | Marsha P. Johnson State Park | Large waterfront park with active and passive recreation amenities | Active recreation, Vegetation, Seating |
| O14 | McCarren Park | Large community park with active and passive recreation amenities | Active recreation, Vegetation, Seating |
| O15 | North 5th Street Pier and Park | Publicly accessible waterfront open space with seating areas, landscaping, and a scenic pier | Vegetation, Seating |
| **Historic Resources** | | | |
| H1 | Episcopal Church of the Ascension | Mid-19th-Century Gothic Revival stone church building | Stained-glass windows |
| H2 | Reformed Dutch Church of Greenpoint | Mid-19th-Century High Victorian and Romanesque Revival brick church building featuring polychromatic design elements | Stained-glass windows, polychromy |
| H3 | St. John's Lutheran Church | Late-19th-Century Neo-German Gothic brick church building with traditional Gothic features | Stained-glass windows |
| H4 | St. Anthony of Padua Roman Catholic Church | Late-19th-Century High Victorian Gothic brick and freestone church building with ornate details | Stained-glass windows |
| H5 | Union Baptist Church | Mid-19th-Century Romanesque Revival brick church building with stone trim and a simple, austere style | Stained-glass windows |
| H6 | Church of God of Greenpoint | Late-19th-Century Rundbogenstil and Romanesque Revival brick church building | Stained-glass windows |
| H7 | Church of the Holy Family | Early-20th-Century church complex significant in the evolution of the Eastern-European Catholic community in Greenpoint | Stained-glass windows |
| H8 | Russian Orthodox Cathedral of the Transfiguration of Our Lord | Early-20th-Century Russian Byzantine style church with onion domes | Stained-glass windows |
| **Natural Resources** | | | |
| N1 | East River | Water body; tidal estuary of the Atlantic Ocean | Resident organisms and habitat |
| N2 | Bushwick Inlet | Water body; inlet of the East River and mouth of former Bushwick Creek (includes the Bushwick Inlet Recognized Environmental Complex) | Resident organisms and habitat |

Source: New York City Department of Parks and Recreation, NYC Capital Planning Platform POPS map, New York Cultural Resource Information System (CRIS), New York City Landmarks Preservation Commission (LPC)
Notes:
* Indicates resource is partially or fully under construction in the existing conditions and is anticipated to be complete by the analysis year of 2031. The exact layout and location of recreational amenities and/or vegetation in these open spaces is not yet known.

## Figure 6-2 Development Site – Tier 1 and Tier 2 Screening




Source: NYC DCP (2024);NYC Parks (2024); NYC LPC (2024); NYS OPRHP (2024)

## Tier 3 Screening Assessment

In accordance with the *CEQR Technical Manual*, a Tier 3 screening assessment was performed because the Tier 1 and Tier 2 assessments identified several sunlight-sensitive resources within ±108 degrees of True North and within the area of the longest shadow that could be cast by the Proposed Development.

The Tier 3 screening assessment was performed for the four representative days of the year set forth in the *CEQR Technical Manual*—December 21, the winter solstice and shortest day of the year; March 21 / September 21, the equinoxes; May 6/August 6, the midpoints between the summer solstice and the equinoxes; and June 21, the summer solstice and the longest day of the year.

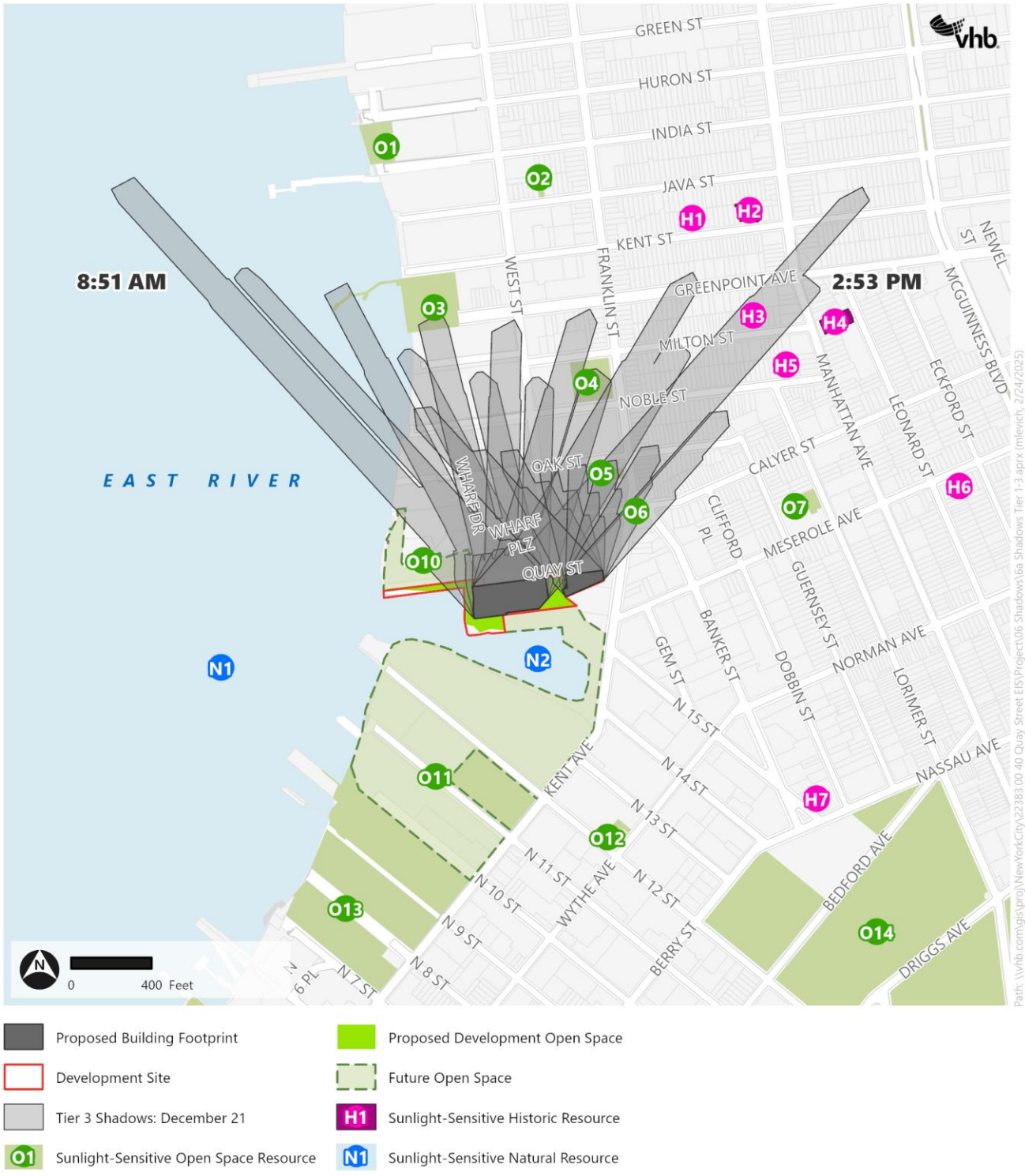
In accordance with the *CEQR Technical Manual*, a model of the buildings in the With-Action condition was developed in a three-dimensional computer program (Rhino). The model was geo-located, and the surrounding terrain was imported into the model to account for differences in topography. As noted above, the Tier 3 shadow screening shows the shadows that could be cast as a result of the Proposed Development but does not account for existing buildings and No-Action developments that may already cast shadows on the identified resources. **Figure 6-3** to **Figure 6-6** below show Tier 3 screening results.

The Tier 3 screening indicates that in the absence of intervening structures, the Proposed Development could cast shadows on:

- Transmitter Park (O3)
- American Playground (O4)
- 61 Franklin Street Garden (O5)
- Greenstreet at Franklin Street (O6)
- P.S. 31 Playground (O7)
- Calyer Place Open Space (O10)
- Bushwick Inlet Park (O11)
- St. John's Lutheran Church (H3)
- Church of God of Greenpoint (H6)
- East River (N1)
- Bushwick Inlet (N2)

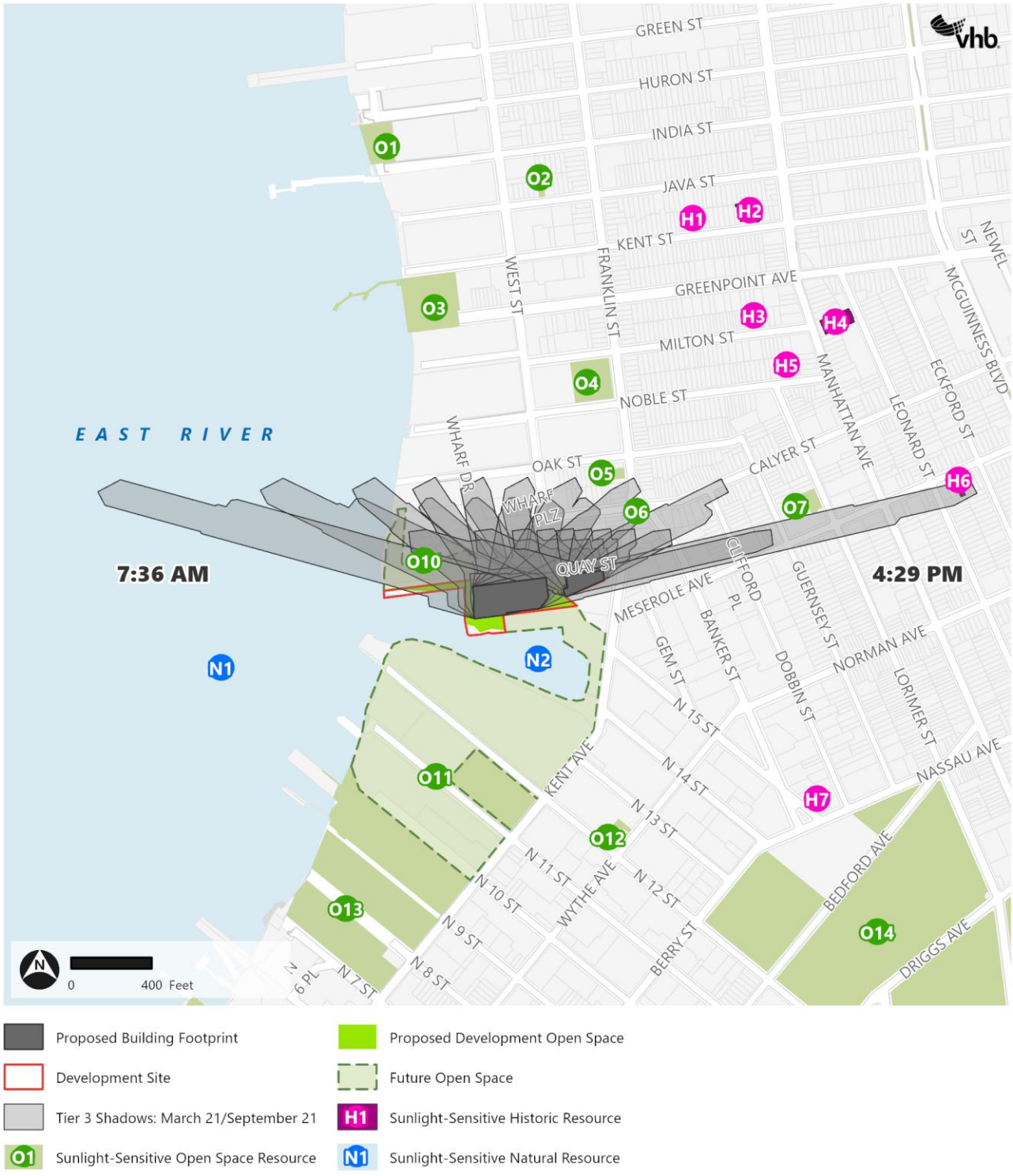
Therefore, a detailed shadows analysis for these resources is provided below. The remaining resources (O1, O2, O8, O9, O12, O13, O14, O15, H1, H2, H4, H5, H7, and H8) would not receive any shadow from the Proposed Development during any of the analysis days. Therefore, further analysis of these resources is not warranted. See **Table 6-2** for a summary of the Tier 1 to Tier 3 screening results.

## Figure 6-3 Tier 3 Screening December 21 Analysis Day




Source: NYC DCP (2024);NYC Parks (2024); NYC LPC (2024); NYS OPRHP (2024)

## Figure 6-4 Tier 3 Screening March 21 Analysis Day



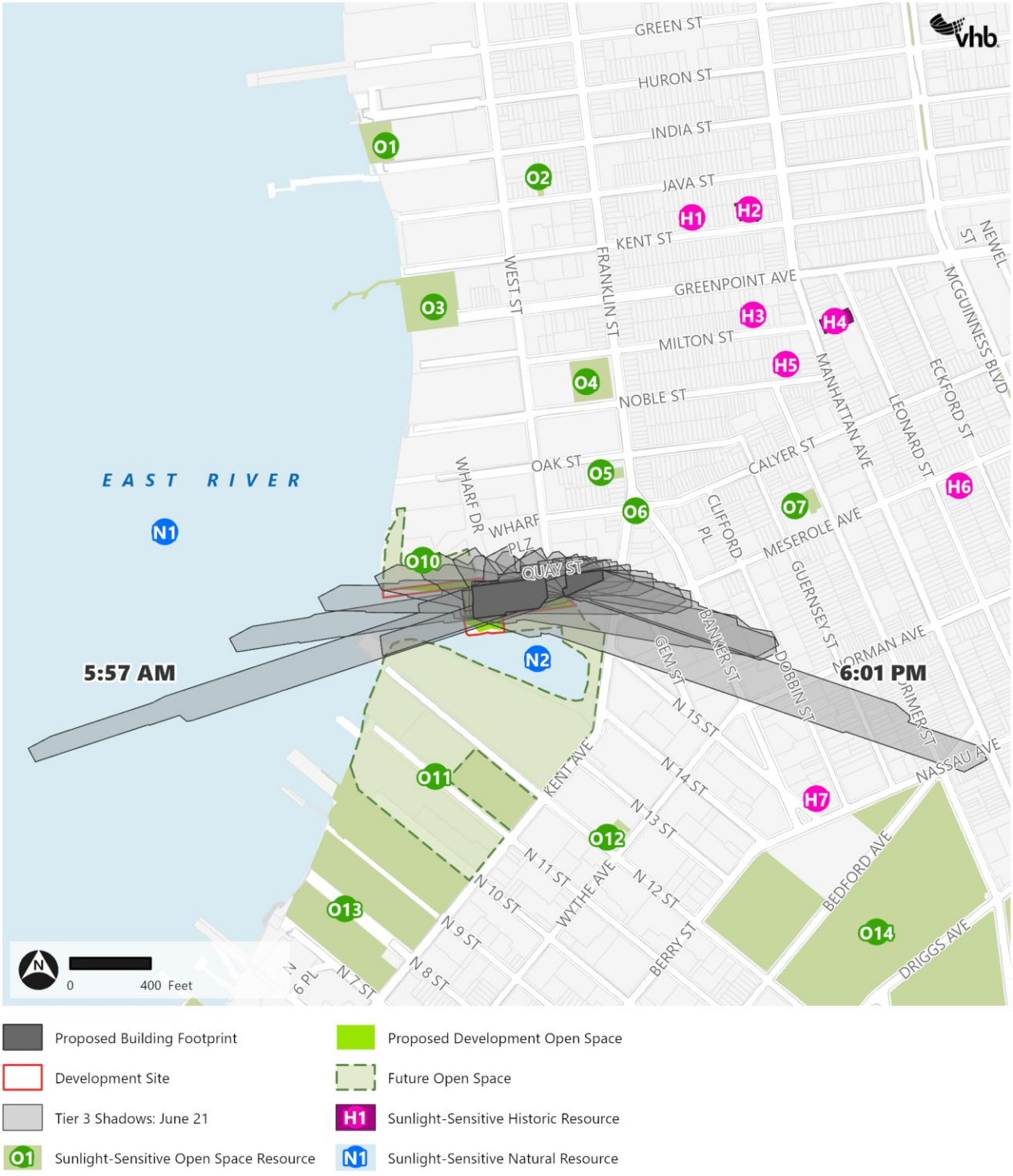

Source: NYC DCP (2024);NYC Parks (2024); NYC LPC (2024); NYS OPRHP (2024)

## Figure 6-5 Tier 3 Screening May 6 Analysis Day




Source: NYC DCP (2024);NYC Parks (2024); NYC LPC (2024); NYS OPRHP (2024)

## Figure 6-6 Tier 3 Screening June 21 Analysis Day




Source: NYC DCP (2024);NYC Parks (2024); NYC LPC (2024); NYS OPRHP (2024)

**Table 6-2 Tier 1 through 3 Shadows Screening Results**

| Map ID | Resource Name | Screening Results |
|---|---|---|
| **Open Space** | | |
| **O1** | 21 India Street Open Space | Screened at Tier 3 |
| **O2** | Java Street Community Garden | Screened at Tier 3 |
| **O3** | Transmitter Park | Detailed analysis |
| **O4** | American Playground | Detailed analysis |
| **O5** | 61 Franklin Street Garden | Detailed analysis |
| **O6** | Greenstreet at Franklin Street | Detailed analysis |
| **O7** | P.S. 31 Playground | Detailed analysis |
| **O8** | P.S. 34 Playground | Screened at Tier 3 |
| **O9** | Greenstreet at McGuinness Boulevard | Screened at Tier 3 |
| **O10** | Calyer Place Open Space | Detailed analysis |
| **O11** | Bushwick Inlet Park | Detailed analysis |
| **O12** | 25 Kent Avenue Open Space | Screened at Tier 2 |
| **O13** | Marsha P. Johnson State Park | Screened at Tier 2 |
| **O14** | McCarren Park | Screened at Tier 2 |
| **O15** | North 5th Street Pier and Park | Screened at Tier 2 |
| **Historic Resources** | | |
| **H1** | Episcopal Church of the Ascension | Screened at Tier 3 |
| **H2** | Reformed Dutch Church of Greenpoint | Screened at Tier 3 |
| **H3** | St. John's Lutheran Church | Detailed analysis |
| **H4** | St. Anthony of Padua Roman Catholic Church | Screened at Tier 3 |
| **H5** | Union Baptist Church | Screened at Tier 3 |
| **H6** | Church of God of Greenpoint | Detailed analysis |
| **H7** | Church of the Holy Family | Screened at Tier 2 |
| **H8** | Russian Orthodox Cathedral of the Transfiguration of Our Lord | Screened at Tier 2 |
| **Natural Resources** | | |
| **N1** | East River | Detailed analysis |
| **N2** | Bushwick Inlet | Detailed analysis |

# Detailed Analysis

## No-Action Condition

As discussed in detail in **Chapter 1, Project Description**, in the 2031 future without the Proposed Actions, the existing conditions would remain at the Development Site and the NYCTA Relocation Site. The NYCTA Facility located on Lot 1 at the Development Site would remain and the new facility would not be constructed on the NYCTA Relocation Site.

As noted above in **Table 6-1**, two open space resources are currently under construction and are expected to be complete before the 2031 Analysis Year. The Calyer Place Master Plan includes approximately 1.78 acres of publicly accessible waterfront open space (O10) located directly north of the Development Site. This open space is currently under construction; a site visit on January 18, 2025 found it to be partially open to the public. The exact dimensions of the open space and the location and type of recreational amenities are not yet known. NYC Parks is expanding Bushwick Inlet Park (O11) with the construction of new open space on the Motiva Parcel directly south of the Development Site. According to the NYC Parks Capital Projects Tracker,[2] the project is currently in the construction phase and is anticipated to be complete in late 2025.

The detailed analysis incorporates the approximate massings of several nearby No-Action development projects, including 3 West Street, 7 Wharf Drive, 30 Wharf Drive, and 29 Wharf Plaza (which are all associated with the Calyer Place Master Plan), as well as 79 Quay Street.

## With-Action Condition

In the future with the Proposed Actions, the Development Site would be improved with 50,000 sf of open space and a total of three buildings—the West Building, consisting of a 56-story, approximately 640-foot (with bulkhead) tower and a 40-story, approximately 490-foot (with bulkhead) tower; the East Building, at 21 stories and approximately 260 feet tall (with bulkhead); and the Monitor Museum building, at 3-4 stories and up to 75 feet tall (with bulkhead). Of the 50,000 sf of open space, 43,000 sf would be publicly accessible, including 34,000 sf of required Waterfront Public Access Area (WPAA), and 9,000 sf of Public Access Area (PAA). The remaining 7,000 sf of open space would be made up of space for museum visitors and landscaping and planting areas that would visually blend and physically connect with the WPAA and PAA spaces. As described in the preliminary assessment, in the With-Action condition, a new approximately 143,000-gsf, 80-foot-tall, turnkey facility would be constructed at the NYCTA Relocation Site. However, the Preliminary Assessment concluded that a detailed analysis of shadows at this site is not warranted.

The detailed shadow analysis builds on the three-dimensional modeling used in the Tier 3 analysis to identify whether development under the With-Action condition could cast shadows on the identified resources of concern. Any new shadows projected to be cast onto the identified resources from the proposed buildings are considered "incremental shadows."

**Table 6-3** provides the modeled incremental shadow entry/exit times for the sunlight sensitive resources. In terms of sunlight-sensitive open space resources, Transmitter Park (O3), American Playground (O4), 61 Franklin Street Garden (O5), the Greenstreet at Franklin Street (O6), the Calyer Place open space (O10), Bushwick Inlet Park (O11) would all receive incremental shadows on at least one analysis day. Regarding sunlight-sensitive historic resources, only St. John's Lutheran Church (H3) would receive incremental shadows from the Proposed Development. In terms of sunlight-sensitive natural resources, both the East River (N1) and Bushwick Inlet (N2) would receive incremental shadows as well. The detailed shadows modeling showed that P.S. 31 Playground (O7) and the Church of God of Greenpoint (H6) would not receive incremental shading from the Proposed Development due to existing shadows cast by intervening buildings. Therefore, these resources do not warrant further analysis.

[2] https://www.nycgovparks.org/planning-and-building/capital-project-tracker/project/8919 accessed January 2025

**Table 6-3 Detailed Analysis Summary of Incremental Shadow Entry/Exit Times**

| Resource | Analysis Day: December 21 8:51 AM - 2:53 PM | March 21/ September 21 7:36 AM - 4:29 PM | May 6/Aug 6 6:27 AM - 5:18 PM | June 21 5:57 AM - 6:01 PM |
|---|---|---|---|---|
| **Open Space Resources** | | | | |
| **O3 – Transmitter Park** | 9:40 AM – 10:15 AM (35 minutes); 10:28 AM – 11:02 AM (34 minutes, 1 hour 9 minutes total) | No incremental shading | No incremental shading | No incremental shading |
| **O4 – American Playground** | 12:27 PM – 2:05 PM (1 hour 38 minutes) | No incremental shading | No incremental shading | No incremental shading |
| **O5 – 61 Franklin Street Garden** | 12:55 PM – 2:53 PM (1 hour 58 minutes) | No incremental shading | No incremental shading | No incremental shading |
| **O6 – Greenstreet at Franklin Street** | 1:45 PM – 2:42 PM (57 minutes) | 2:27 PM – 3:07 PM (40 minutes) | No incremental shading | No incremental shading |
| **O7 – P.S. 31 Playground** | No incremental shading | No incremental shading[1] | No incremental shading | No incremental shading |
| **O10 – Calyer Place Open Space** | 8:51 AM – 1:15 PM (4 hours 24 minutes) | 7:36 AM – 1:20 PM (5 hours 44 minutes) | 7:10 AM – 11:22 PM (4 hours 12 minutes) | 8:38 AM – 12:33 PM (3 hours 55 minutes) |
| **O11 – Bushwick Inlet Park** | No incremental shading | No incremental shading | 4:03 PM – 5:18 PM (1 hour 15 minutes) | 3:30 PM – 6:01 PM (2 hours 31 minutes) |
| **Historic Resources** | | | | |
| **H3 – St. John's Lutheran Church** | 2:41 PM – 2:53 PM (12 minutes) | No incremental shading | No incremental shading | No incremental shading |
| **H6 – Church of God of Greenpoint** | No incremental shading | No incremental shading | No incremental shading | No incremental shading |
| **Natural Resources** | | | | |
| **N1 – East River** | 8:51 AM – 10:55 AM (2 hours 4 minutes) | 7:36 AM – 10:14 AM (2 hours 38 minutes) | 6:27 AM – 9:15 AM (2 hours 48 minutes) | 5:57 AM – 9:08 AM (3 hours 11 minutes) |
| **N2 – Bushwick Inlet** | 8:51 AM – 10:31 AM (1 hour 40 minutes) | 7:36 AM – 10:30 AM (2 hours 54 minutes) | 6:27 AM – 10:18 AM (3 hours 51 minutes) | 5:57 AM – 10:41 AM (4 hours 44 minutes) |

Notes:
Per the ~~2021~~2025 *CEQR Technical Manual*, the selected time zone for the analysis is Eastern Standard Time and daylight saving time was not used.
[1] There would be no incremental shadows on this resource due to intervening buildings

Detailed shadow analyses are discussed for each resource in the relevant sub-sections below.

## Open Space Resources

### *O3 – Transmitter Park*

Transmitter Park, a.k.a. "WNYC Transmitter Park" is a public waterfront park on land that was once the home of the WNYC radio station tower. The park features active recreational amenities, including

a children's play area with spray showers. The park includes a large lawn and landscaped gardens as well as a recreational scenic pier with seating areas extending into the East River.

Incremental shadows from the Proposed Development would occur on the December 21 analysis day, and no incremental shadows would be cast on the March 21/September 21, May 6/August 6, or June 21 analysis days. Incremental shadows cast by the Proposed Development on the December 21 analysis day are described below and are shown in **Figure 6-7** and **Figure 6-8.**

### *December 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows on Transmitter Park for a total of 1 hour and 9 minutes. There would be two separate periods of shadow coverage in the morning. First, shadows would enter the recreational pier at 9:40 AM, moving west and exiting the pier by 10:15 AM. Later in the morning, shadows would enter the upland portion of the park at 10:28 AM, moving east across the southern half of the park before exiting the park at 11:02 AM.

The incremental shadow coverage introduced by the Proposed Development would mainly affect passive recreational areas (the pier, a portion of the landscaped lawn and pedestrian paths, and several benches at the southwest corner of the park). The duration of the shadow coverage would be relatively short, and because of the distance from the Proposed Development to the open space, shadows would move quickly from west to east during the morning. Incremental shadow coverage would not affect the usability of the open space by the public because it would occur briefly on one analysis day. Since December 21 is outside the growing season for vegetation, the shrubs and grass within the area of incremental shadow coverage would not be affected. Therefore, there would be no significant adverse impacts on Transmitter Park due to incremental shadows from the Proposed Development.

## *O4 – American Playground*

American Playground is a medium-sized local playground featuring play equipment as well as basketball and handball courts. There are also seating areas, and the playground is landscaped with shrubs and mature trees.

Incremental shadows from the Proposed Development would occur on the December 21 analysis day, and no incremental shadows would be cast on the March 21/September 21, May 6/August 6, or June 21 analysis days. Incremental shadows cast by the Proposed Development on the December 21 analysis day are described below and are shown in **Figure 6-9** through **Figure 6-11.**

### *December 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows on American Playground for a total of 1 hour and 38 minutes. Shadows would enter the park at the southwest corner at 12:27 PM and travel east, reaching their greatest extent at around 1:15 PM (see **Figure 6-10**) before exiting the park to the southwest at 2:05 PM. As discussed above regarding Transmitter Park, given the distance between the Development Site and this open space resource, shadows would move relatively quickly.

The incremental shadows would affect active recreation facilities (playground and basketball courts) and several benches along the southern and eastern edges of the playground. The reduction of sunlight on these facilities would occur for a limited duration in the afternoon during the winter,

when it is anticipated that usage of the open space would be low. Therefore, incremental shadows would not affect the use or enjoyment of the playground. Since December 21 is outside the growing season for vegetation, the shrubs and tree canopy within the area of incremental shadow coverage would not be affected. Therefore, there would be no significant adverse impacts on American Playground due to incremental shadows from the Proposed Development.

### *O5 – 61 Franklin Street Garden*

61 Franklin Street Garden is a local community garden which is part of NYC Parks' GreenThumb program. The garden includes native plantings along with raised fruits and vegetable beds. The garden is regularly open to the public on weekends but is closed from November 1 through March 31.

Incremental shadows from the Proposed Development would occur on the December 21 analysis day, and no incremental shadows would be cast on the March 21/September 21, May 6/August 6, or June 21 analysis days. Incremental shadows cast by the Proposed Development on the December 21 analysis day are described below and are shown in **Figure 6-12** through **Figure 6-15.**

#### *December 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows on the garden for a total of 1 hour and 58 minutes on the December 21 analysis day, from 12:55 PM to 2:53 PM. Shadows from the East Building would enter the garden from the west at 12:55 PM, moving east throughout the day and remaining until the end of the analysis day at 2:53 PM. From approximately 1:20 PM to 2:53 PM, shadows from the Proposed Development would eliminate sunlight on the garden. The incremental shadow coverage would occur outside the growing season, and for a relatively limited duration, so the growth of vegetation in the garden would not be inhibited by the Proposed Development. Public use of the garden would be at its lowest during the winter season, and the incremental shadows for less than two hours in the afternoon during winter would not affect the public use or enjoyment of the open space. Therefore, there would be no significant adverse impacts on 61 Franklin Street Garden due to incremental shadows from the Proposed Development.

### *O6 – Greenstreet at Franklin Street*

This Greenstreet, maintained by NYC Parks, comprises a triangular traffic island planted with several shrubs.

Incremental shadows from the Proposed Development would occur on the December 21 and March 21/September 21 analysis days. No incremental shadows would be cast on the May 6/August 6 or June 21 analysis days. Incremental shadows cast by the Proposed Development on the December 21 and March 21/September 21 analysis days are described below and are shown in **Figure 6-16** and **Figure 6-17**.

#### *December 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows on the Greenstreet for 22 minutes on the December 21 analysis day, from 1:45 PM to 2:42 PM. During this time, incremental shadows would completely eliminate sunlight from the Greenstreet for roughly 42 minutes beginning at 2:00 PM. However, since December 21 is outside the growing season, the

vegetation would not be affected. No significant adverse impacts would occur due to incremental shading on the Greenstreet during the December 21 analysis day.

### *March 21/September 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows on the Greenstreet for 40 minutes on the March 21/September 21 analysis day, from 2:27 PM to 3:07 PM. During this time, incremental shadows would completely eliminate sunlight from the Greenstreet for roughly 15 minutes. While March 21 and September 21 are part of the growing season for vegetation, the Greenstreet would continue to receive approximately 7.5 hours of direct sunlight on this analysis day, which meets the *CEQR Technical Manual* guideline of 4 to 6 hours of direct sunlight necessary for the growth of shrubs that can tolerate partial sunlight. No significant adverse impacts would occur due to incremental shading on the Greenstreet during the March 21/September 21 analysis day.

## *O10 – Calyer Place Open Space*

As discussed above under **No-Action Condition**, waterfront open space is in development as part of the Calyer Place Master Plan. Located directly north of the Development Site, this open space is partially complete—a portion associated with the West Wharf development is open to the public and includes seating areas, landscaping, and a pathway along the waterfront. A landscaped plaza connecting West Street and Wharf Drive is also complete and open to the public. While the exact layout of the remaining open space and the type and location of specific amenities are not fully known, it is assumed that landscaping, pedestrian paths, and passive recreational areas would be included in the remaining areas under construction.

Incremental shadow from the Proposed Development would reach this open space on all four analysis days, as discussed below and shown in **Figure 6-18** through **Figure 6-36**.

### *December 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows on this open space resource for a total of 4 hours and 24 minutes on the December 21 analysis day. At 8:51 AM, the beginning of the analysis day, incremental shadows would cover the central, upland portion of the open space before moving east and exiting the open space at 1:15 PM. After 11:00 AM, incremental shadows would be limited to a small strip along the eastern edge of the open space. It is anticipated that the area affected by incremental shadows would include passive recreation amenities such as pedestrian pathways and seating areas, as well as vegetation. The addition of sunlight to a portion of the open space would not affect the use or enjoyment of the walkways or seating areas as these features would continue to receive sunlight throughout most of the day. Since December 21 is outside the growing season, vegetation would not be affected. No significant adverse impacts would occur due to incremental shading on the Calyer Place open space during the December 21 analysis day.

### *March 21/September 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows on this open space for a total of 5 hours and 44 minutes on the March 21/September 21 analysis day, from 7:36 AM to 1:20 PM. In the early morning, incremental shadows would reach the upland and waterfront portion of the open space. By 11:30 PM, a portion of the upland plaza along West Street

would also be shaded. Shadows would move east before completely exiting the open space by 1:20 PM. The greatest extent of incremental shadows would occur at the beginning of the analysis day, and the extent of shadow coverage would decrease throughout the day. Similar to December 21, after 10:30 AM, incremental shadows would be limited to a small strip along the eastern edge of the open space. Incremental shadows would not eliminate sunlight from the open space at any point. It is anticipated that the area affected by incremental shadows would include passive recreation amenities such as pedestrian pathways and seating areas, and vegetation. The addition of shadow to a portion of the open space would not affect the use or enjoyment of pedestrian pathways or seating areas, as these features would continue to receive sunlight throughout most of the day. March 21 and September 21 are in the growing season for vegetation. As incremental shadows would quickly move east in the early morning, exposing much of the waterfront portion of the open space to sunlight, vegetation in this area would continue to receive over 8 hours of direct sunlight, sufficient for growth regardless of the type of plantings in this area. The eastern edge of the open space along Wharf Drive is partially complete. Plantings in this area include shrubs and perennials that can tolerate partial sunlight, i.e., 4 to 6 hours a day during the growing season. After approximately 11:30 AM, incremental shadows would be limited to marginal areas at the southeast and northeast corners of the open space (see **Figure 6-27** and **Figure 6-28**). While the landscape in this area of the open space is not complete, it is anticipated that any future vegetation in this area would still receive at least 4 to 6 hours of direct sunlight, while other areas to the north and west would receive more. Therefore, the growth of vegetation in this open space during the March 21/September 21 analysis day would not be affected by the Proposed Development, and no significant adverse impacts would occur.

### *May 6/August 6 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows on the May 6/August 6 analysis day for 4 hours and 12 minutes, from 7:10 AM to 11:22 AM. Shadows would enter the waterfront portion of the open space from the southwest at 7:10 AM, moving north and east throughout the morning and reaching their greatest extent around 9:00 AM (see **Figure 6-30**). It is anticipated that the incremental shadows would affect the waterfront walkway, pedestrian pathways and seating areas, and vegetation. Additional shading on these features for a brief period during the morning would not affect the use or enjoyment of pathways or seating areas, as these features would continue to receive sunlight throughout most of the day. May 6 and August 6 are in the growing season for vegetation. However, all current and future vegetation in the open space would continue to receive 6 to 8 hours of direct sunlight. Therefore, the growth of vegetation in this open space during the May 6/August 6 analysis day would not be affected by the Proposed Development, and no significant adverse impacts would occur.

### *June 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows on the June 21 analysis day for 3 hours and 55 minutes, from 8:38 AM to 11:22 AM. Shadows would enter the waterfront portion of the open space from the southwest at 8:38, moving north and east throughout the morning and reaching their greatest extent around 9:15 AM (see **Figure 6-34**). It is anticipated that the incremental shadows would affect the waterfront walkway, pedestrian pathways and seating areas, and vegetation. Compared to incremental shadows coverage on the March 21/September 21 or May 6/August 6 analysis days, incremental shadows on June 21 would not reach as far north, due to the angle of the sun. Additional shading on pathways or seating areas for a brief period during the morning would not affect the use or enjoyment of these features, as they would

continue to receive sunlight throughout most of the day. June 21 is in the growing season for vegetation. However, all current and future vegetation in the open space would continue to receive 6 to 8 hours of direct sunlight. Therefore, the growth of vegetation in the open space during the June 21 analysis day would not be affected by the Proposed Development, and no significant adverse impacts would occur.

### *O11 – Bushwick Inlet Park*

As discussed above under **No-Action Condition**, NYC Parks is expanding Bushwick Inlet Park by developing the parcel directly south of the Development Site, including the shoreline surrounding Bushwick Inlet itself, as new open space. According to the NYC Parks Capital Projects Tracker,[3] the Motiva Parcel of the larger park is under construction and is anticipated to be complete in ~~late 2025.~~the first half of 2026. A schematic design plan indicates the open space will feature pedestrian pathways, including a waterfront esplanade, a sand beach kayak launch, and a planted berm. Landscaping will feature native plantings typical of high and low marsh tidal wetlands.

Incremental shadows from the Proposed Development would occur on the May 6/August 6 and June 21 analysis days, and no incremental shadows would be cast on the December 21 and March 21/September 21 analysis days. Incremental shadows cast by the Proposed Development on May 6/August 6 and June 21 are described below and are shown in **Figure 6-37** through **Figure 6-41.**

#### *May 6/August 6 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows for one hour and 15 minutes in the late afternoon on May 6/August 6, from 4:03 PM to the end of the analysis day at 5:18 PM. These shadows would affect a strip of land at the northern end of the footprint of the open space, upland from the approximate location of the waterfront esplanade. Based on NYC Parks plans for the Motiva Parcel, this area is anticipated to be planted with grasses and deciduous and evergreen trees. There would also be a concrete pedestrian path running through this area. This would represent a marginal decrease in sunlight for future vegetation and passive recreational amenities in this small area. All vegetation would continue to receive 6 to 8 hours of direct sunlight, and the public use and enjoyment of recreational amenities would not be affected by the brief shadows. Therefore, no significant adverse impacts would occur due to incremental shadows from the Proposed Development on May 6 and August 6.

#### *June 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would cast incremental shadows for 2 hours and 31 minutes in the late afternoon on June 21, from 3:30 PM to the end of the analysis day at 6:01 PM. These shadows would be concentrated in the northern, upland portions of the open space, reaching their greatest extent at 6:01 PM (see **Figure 6-41**). Although the extent and duration of shadows would be greater compared to May 6/August 6, the park would also receive a greater amount of sunlight throughout the day on June 21, with most of the park receiving uninterrupted sunlight for over 8 hours. All vegetation would continue to receive 6 to 8 hours of direct sunlight, and the public use and enjoyment of recreational amenities would not be affected by the incremental shadows. Therefore, no significant adverse impacts would occur due to incremental shadows from the Proposed Development on June 21.

[3] https://www.nycgovparks.org/planning-and-building/capital-project-tracker/project/8919

## Historic Resources

### *H3 – St. John's Lutheran Church*

St. John's Lutheran Church at 153-157 Milton Street is a contributing resource within the LPC-Designated Greenpoint Historic District. The church was constructed in 1897 in the neo-German Gothic style and features stained-glass windows along its south-facing Milton Street frontage.

The church would receive incremental shadows from the Proposed Development on December 21. No incremental shadows would be cast on the March 21/September 21, May 6/August 6, or June 21 analysis days. Incremental shadows cast by the Proposed Development on the December 21 analysis day are described below and are shown in **Figure 6-42.**

#### *December 21 Analysis Day*

The Proposed Development would cast incremental shadows on the roof and southern frontage of the church for a total of 12 minutes, from 2:41 PM to the end of the analysis day at 2:53 PM. Given its distance from the Development Site, shadows on the church would move quickly from west to east. Per *CEQR Technical Manual* guidance, an incremental shadow with a duration of ten minutes or less would not have the potential to cause a significant adverse impact. Although the duration of incremental shadow would be slightly greater than ten minutes, it would represent a marginal change and would not affect public views of the historic and sunlight-sensitive features of the church. Therefore, no significant adverse impacts would occur.

## Natural Resources

### *N1 – East River*

The East River is a saltwater tidal estuary connecting Upper New York Bay to the south and Long Island Sound to the north. According to the NYSDEC, the lower East River is a Class I water. The best usages of Class I waters are secondary contact recreation and fishing. These waters are suitable for fish, shellfish, and wildlife propagation and survival.[4] According to NYSDEC's 2021 Consolidated Assessment and Listing Methodology (CALM), fishing and secondary contact recreation uses in the East River are impaired by pollutants including garbage, refuse, PCBs, and other toxics. The East River supports finfish habitat for a variety of species, including migratory anadromous and catadromous fish species. It also provides habitat for various shellfish, aquatic vegetation, and other aquatic life. The East River is an important habitats for waterfowl, shorebirds, and other migratory and non-migratory birds.

The Proposed Development would cast incremental shadows on the East River on all four analysis days in the early morning, as discussed below and shown in **Figure 6-43** through **Figure 6-56.**[5]

Overall, no significant adverse impacts would occur to the East River as a result of the Proposed Development. Incremental shadows would occur over limited portions of the river, and at no point during the period that it could receive incremental increased shading would sunlight be totally

[4] https://dec.ny.gov/environmental-protection/water/water-quality/standards-classifications

[5] Bushwick Inlet (N2) is a body of water connected to the East River. For visual clarity, **Figure 6-49** through **Figure 6-56** show incremental shadow coverage on both Bushwick Inlet and the East River, but Bushwick Inlet is discussed in a separate section below, and the results of the detailed analysis are shown in **Figure 6-57** to **Figure 6-73.**

eliminated. Relative to the overall size of the East River, the areal extent of shading would be limited to a minimal portion of the resource. Additionally, due to their dynamic (i.e., constantly moving) nature, shadows impact at individual locations within the overall affected area of the East River would be temporary and of limited duration. Because of the location of the Development Site relative to the East River, incremental shading would be limited to the morning hours during all analysis days and would not occur within the remaining sunlight hours of the respective analysis days, thereby allowing for substantial periods of direct sunlight to biological resources within the affected areas. By definition, surface waterbodies are not static; they are dynamic environments that are affected by natural processes such as currents, tides, wind, temperature gradients, etc. that move water. Therefore, most resident organisms within the water column are in a constant state of movement and would be carried through areas impacted by incremental shading, resulting in only temporary exposure to such organisms. Further, many biological organisms that inhabit waterbodies are capable of locomotion and therefore can move from shaded to sunlit areas (or vice versa) of their own volition. For those organisms that are not moved by natural processes or capable of locomotion, the effects of incremental shadows would be temporary and of limited duration.

### *December 21 Analysis Day*

The detailed analysis indicates that on December 21, incremental shadows from the Proposed Development would last for 2 hours and 4 minutes, from the beginning of the analysis day at 8:51 AM until 10:55 AM. Incremental shadows would begin at their greatest areal extent at 8:51 AM, rapidly moving east and contracting spatially during the morning before exiting the natural resource at 10:55 AM. Although shadows are at their longest on December 21, due to the tall and relatively narrow dimensions of the proposed buildings and the movement of the sun throughout the day, incremental shadows would not be concentrated on any particular area of the East River for a significant length of time. Since there would be no intervening structures to the west, areas shaded by the Proposed Development would still receive 4 to 6 hours of sunlight in the future with the Proposed Actions. Finally, because of the downstream movement, tidal forces, and wind effects of the East River, currents are generally sufficient to move organisms such as phytoplankton quickly through areas of shadow to areas with sufficient sunlight, precluding the potential for these organisms to be significantly affected by the fast-moving shadows from the Proposed Development. Therefore, no significant adverse impacts are expected.

### *March 21/September 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would introduce incremental shadows for 2 hours and 38 minutes, from the beginning of the analysis day at 7:36 AM until 10:14 AM. Incremental shadows would be at their greatest areal extent at the beginning of the analysis day, and by roughly 8:45 AM (see **Figure 6-47**) shadows cast by the Proposed Development would be largely blocked by shadows from existing and planned buildings to the north (the planned buildings are not part of the Proposed Actions), canceling out much of the incremental shadow coverage. From this point until 10:14 AM, incremental shadows would cover a marginal area, moving quickly to the east before exiting the resource. As on the December 21 analysis day, it is not anticipated that fast-moving shadows on the East River during the morning on the March 21/September 21 analysis day would significantly affect any resident flora, fauna, or habitats. Therefore, no significant adverse impacts are expected.

### *May 6/August 6 Analysis Day*

The detailed analysis indicates that the Proposed Development would introduce incremental shadows for 2 hours and 48 minutes, from 6:27 AM until 9:15 AM. Incremental shadows would begin the analysis day at their greatest areal extent, contracting and moving north and east until exiting the East River by 9:15 AM. Although the East River would receive larger shadows on this day than on December 21 and March 21/September 21, there would be a longer period of direct sunlight throughout the day, and areas shaded by the Proposed Development would still receive uninterrupted direct sunlight for the rest of the day (over 8 hours). Accordingly, the fast-moving and relatively narrow shadows introduced by the Proposed Development during the morning on the May 6/August 6 analysis day would not significantly impact any resident organisms or habitats in the East River. Therefore, no significant adverse impacts are expected.

### *June 21 Analysis Day*

The detailed analysis indicates that the Proposed Development would introduce incremental shadows for 3 hours and 11 minutes, from the beginning of the analysis day at 5:57 AM until 10:41 AM. Incremental shadows would begin the analysis day at their greatest areal extent, contracting and moving north and east until exiting the East River by 10:41 AM. Although the East River would receive larger shadows on this day than on the December 21 and March 21/September 21 analysis days, there would be a longer period of direct sunlight throughout the day, and areas shaded by the Proposed Development would still receive sufficient sunlight so as not to disrupt resident organisms or habitats. Accordingly, the fast-moving and relatively narrow shadows introduced by the Proposed Development in the morning on the May 6/August 6 analysis day would not significantly impact any resident organisms or habitats in the East River. Therefore, no significant adverse impacts are expected.

### ***N2 – Bushwick Inlet***

Bushwick Inlet is an inlet of the East River. It contains subtidal and rocky (riprap) intertidal habitats and is known as a source of avian diversity, particularly for waterfowl species. Bushwick Inlet and the East River support finfish habitat for a variety of species, including migratory anadromous and catadromous fish species. It also provides habitat for various shellfish, aquatic vegetation, and other aquatic life. Bushwick Inlet and the adjoining East River are also important habitats for waterfowl, shorebirds, and other migratory and non-migratory birds. Additionally, Bushwick Inlet and its adjacent shoreline areas are identified as a Recognized Ecological Complex (REC) by the New York City Department of City Planning (DCP). According to the DCP's Waterfront Revitalization Plan (WRP) guidance:

*"…RECs are clusters of valuable natural features which are more fragmented than those in the Significant Natural Waterfront Areas (SNWAs) and are often interspersed with developed sites. Many of these areas are protected parkland or sites identified as priority acquisition or restoration sites by local, state, and regional plans. Many are substantially environmentally deteriorated and require an active approach to restoration."*[6]

[6] New York City Department of City Planning. New York City Waterfront Revitalization Program Guidance for Applicants Available at: https://www.nyc.gov/assets/planning/downloads/pdf/applicants/special-processes/wrp-user-manual.pdf. Accessed May 2025.

Based on the above, the shadows analyses for N2 – Bushwick Inlet provided below are also applicable to the Bushwick Inlet REC.

Portions of Bushwick Inlet would receive incremental shadows from the Proposed Development on all four analysis days, as described below and shown in **Figure 6-57** through **Figure 6-73.**[7]

Overall, no significant adverse shadow impacts would occur to Bushwick Inlet (inclusive of the Bushwick Inlet WRP) as a result of the Proposed Development. At no point would incremental project-generated shadows result in the complete elimination of sunlight from the resource. Additionally, due to their dynamic (i.e., constantly moving) nature, shadows at individual locations within the overall affected area of Bushwick Inlet would be temporary and of limited duration. Because the Development Site is generally located north and east of Bushwick Inlet, incremental shading would be limited to the morning hours during all analysis days and would not occur within the remaining sunlight hours of the respective analysis days, thereby allowing for substantial periods of direct sunlight to biological resources within the affected areas. As discussed above, surface water bodies are dynamic environments that are affected by natural processes such as currents, tides, wind, temperature gradients, etc. that move water. Therefore, most resident organisms within the water column are in a constant state of movement and would be carried through areas impacted by incremental shading, resulting in only temporary exposure to such organisms. Further, many biological organisms that inhabit waterbodies are capable of locomotion and therefore can move from shaded to sunlit areas (or vice versa) of their own volition. For those organisms that are not moved by natural processes or capable of locomotion, the effects of incremental shadows would be temporary and of limited duration.

### *December 21 Analysis Day*

The detailed analysis indicates that incremental shadows from the Proposed Development would last for 1 hour and 40 minutes on December 21, from the beginning of the analysis day at 8:51 AM until 10:31 AM. Shadows would be limited to a small spatial area formed by the shoreline geography of Lot 25 along the northern shore of the inlet, as shown in **Figure 6-57** and **Figure 6-58**. Incremental shadows on December 21 would be limited in their areal extent and duration, and the shaded area would receive sunlight for the remainder of the day, over 4 hours. This level of sunlight would be of sufficient duration for the maintenance of resident aquatic organisms within the limited portion of Bushwick Inlet that would be affected by incremental morning shadows. Therefore, no significant adverse impacts are expected.

### *March 21/September 21 Analysis Day*

The detailed analysis indicates that incremental shadows from the Proposed Development would last for 2 hours and 54 minutes on March 21/September 21, from the beginning of the analysis day at 7:36 AM until 10:30 AM. Shadows would be located in a similar, limited spatial area as those on the December 21 analysis day, with a slightly larger footprint, and the shaded area would receive sunlight for the remainder of the day, roughly 6 hours or more. This level of sunlight would be of sufficient duration for the maintenance of resident aquatic organisms within the limited portion of Bushwick Inlet that would be affected by incremental morning shadows. Therefore, no significant adverse impacts are expected.

[7] As noted above, since the two bodies of water are connected, **Figure 6-57** through **Figure 6-73** also show incremental shadows on the East River, where applicable, for visual clarity.

### *May 6/August 6 Analysis Day*

The detailed analysis indicates that incremental shadows from the Proposed Development would last for 3 hours and 51 minutes on May 6/August 6, from the beginning of the analysis day at 6:27 AM until 10:18 AM. Shadows would initiate at their greatest areal extent at 6:27 AM, when they would extend west to the mouth of the inlet. During the subsequent morning hours, shadows would grow smaller and move eastward. The shaded area would receive sunlight for the remainder of the day, roughly 6 hours or more. This level of sunlight would be of sufficient duration for the maintenance of resident aquatic organisms within the limited portion of Bushwick Inlet that would be affected by incremental morning shadows. Therefore, no significant adverse impacts are expected.

### *June 21 Analysis Day*

The detailed analysis indicates that incremental shadows from the Proposed Development would last for 4 hours and 44 minutes on June 21, from the beginning of the analysis day at 5:57 AM until 10:41 AM. Shadows would initiate at their greatest extent at 5:57 AM, when they would extend west to the mouth of the inlet. During the subsequent morning hours, shadows would grow smaller and move eastward. The shaded area would receive sunlight for the remainder of the day, roughly 7 hours or more. This level of sunlight would be of sufficient duration for the maintenance of resident aquatic organisms within the limited portion of Bushwick Inlet that would be affected by incremental morning shadows. Therefore, no significant adverse impacts are expected.

# O3 – Transmitter Park

## Figure 6-7 December 21- 10:00 AM




## Figure 6-8 December 21- 10:45 AM



# O4 – American Playground

## Figure 6-9 December 21- 12:45 PM




## Figure 6-10 December 21- 1:15 PM



## Figure 6-11 December 21- 1:45 PM



# O5 – 61 Franklin Street Garden

## Figure 6-12 December 21- 1:15 PM




## Figure 6-13 December 21 – 1:45 PM



## Figure 6-14 December 21- 2:15 PM




## Figure 6-15 December 21 – 2:45 PM



# O6 – Greenstreet at Franklin Street

## Figure 6-16 December 21- 2:15 PM




## Figure 6-17 March 21/December 21- 2:45 PM



# O10 – Calyer Place Open Space

## Figure 6-18 December 21- 8:51 AM




## Figure 6-19 December 21- 10:00 AM



## Figure 6-20 December 21- 11:00 AM




## Figure 6-21 December 21- 12:00 PM



## Figure 6-22 December 21- 1:00 PM




## Figure 6-23 March 21/September 21- 7:36 AM



## Figure 6-24 March 21/September 21- 8:30 AM




## Figure 6-25 March 21/September 21- 9:30 AM



## Figure 6-26 March 21/September 21- 10:30 AM




## Figure 6-27 March 21/September 21- 11:30 AM



## Figure 6-28 March 21/September 21- 12:30 PM




## Figure 6-29 May 6/August 6- 8:00 AM



## Figure 6-30 May 6/August 6- 9:00 AM




## Figure 6-31 May 6/August 6- 10:00 AM



## Figure 6-32 May 6/August 6- 11:00 AM




## Figure 6-33 June 21- 8:15 AM



## Figure 6-34 June 21- 9:15 AM




## Figure 6-35 June 21- 10:15 AM



## Figure 6-36 June 21- 11:15 AM



# O11 – Bushwick Inlet Park

## Figure 6-37 May 6/August 6- 4:30 PM




## Figure 6-38 May 6/August 6- 5:00 PM



## Figure 6-39 June 21- 4:00 PM




## Figure 6-40 June 21- 5:00 PM



## Figure 6-41 June 21- 6:01 PM



# H3 – St. John's Lutheran Church

## Figure 6-42 December 21- 2:47 PM



# N1 – East River

## Figure 6-43 December 21- 8:51 AM




## Figure 6-44 December 21- 9:45 AM



## Figure 6-45 December 21- 10:45 AM



## Figure 6-46 March 21/September 21- 7:36 AM[8]



## Figure 6-47 March 21/September 21- 8:45 AM




[8] Figure 6-46 has been revised to correct an error in the DEIS. The revision is limited to the figure's presentation and does not alter the timing of the incremental shadows. Accordingly, the correction does not affect the analyses, findings, or conclusions previously presented in the DEIS.

## Figure 6-48 March 21/September 21- 9:45 AM




## Figure 6-49 May 6/August 6- 6:27 AM



## Figure 6-50 May 6/August 6- 7:00 AM




## Figure 6-51 May 6/August 6- 8:00 AM



## Figure 6-52 May 6/August 6- 9:00 AM




## Figure 6-53 June 21- 5:57 AM



## Figure 6-54 June 21- 7:00 AM




## Figure 6-55 June 21- 8:00 AM



**Figure 6-56 June 21- 9:00 AM**




# N2 – Bushwick Inlet

## Figure 6-57 December 21- 8:51 AM



## Figure 6-58 December 21-10:00 AM




## Figure 6-59 March 21/September 21- 7:36 AM



## Figure 6-60 March 21/September 21- 8:15 AM




## Figure 6-61 March 21/September 21- 9:15 AM



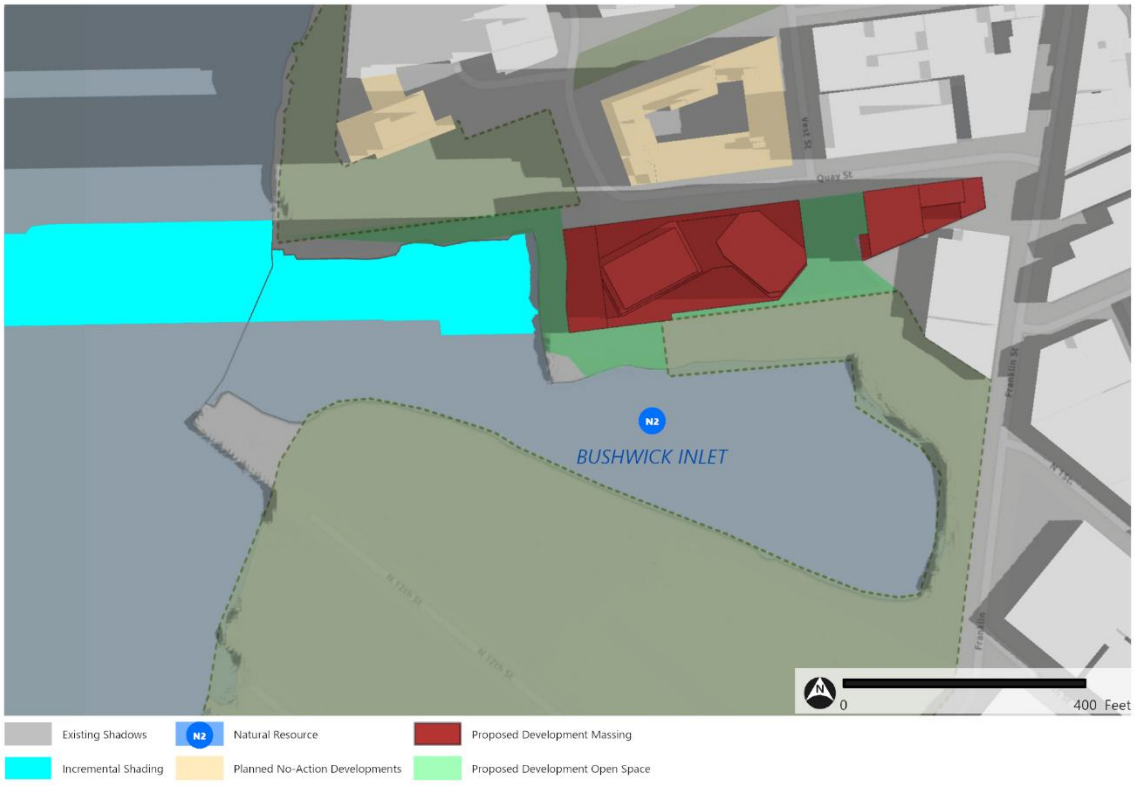
## Figure 6-62 March 21/September 21- 10:15 AM



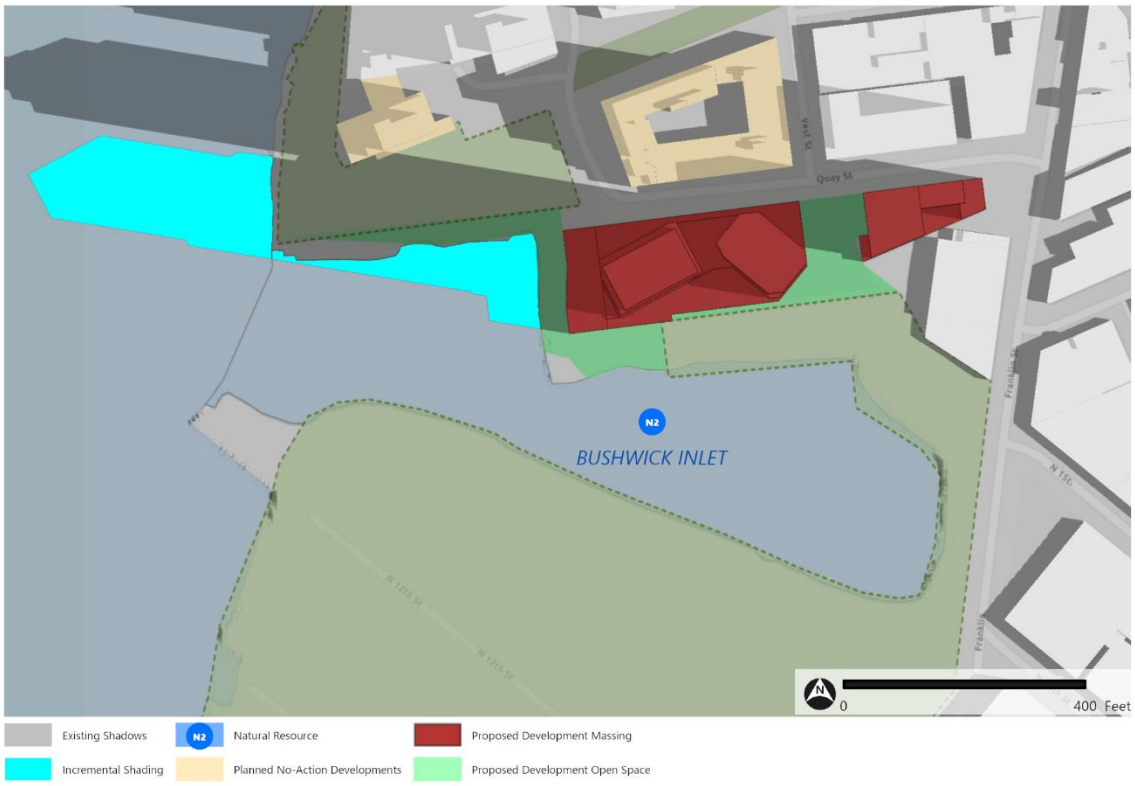

## Figure 6-63 May 6/August 6- 6:27 AM



## Figure 6-64 May 6/August 6- 7:15 AM




## Figure 6-65 May 6/August 6- 8:15 AM



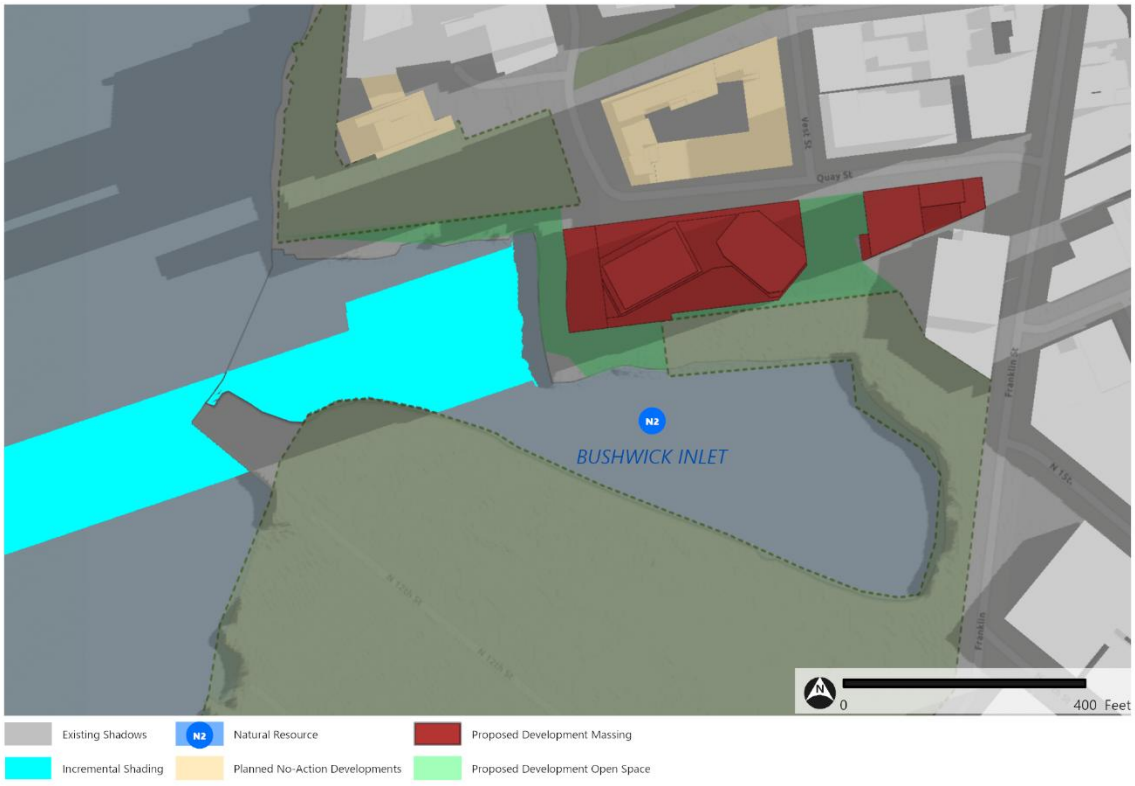
## Figure 6-66 May 6/August 6- 9:15 AM




## Figure 6-67 May 6/August 6- 10:15 AM



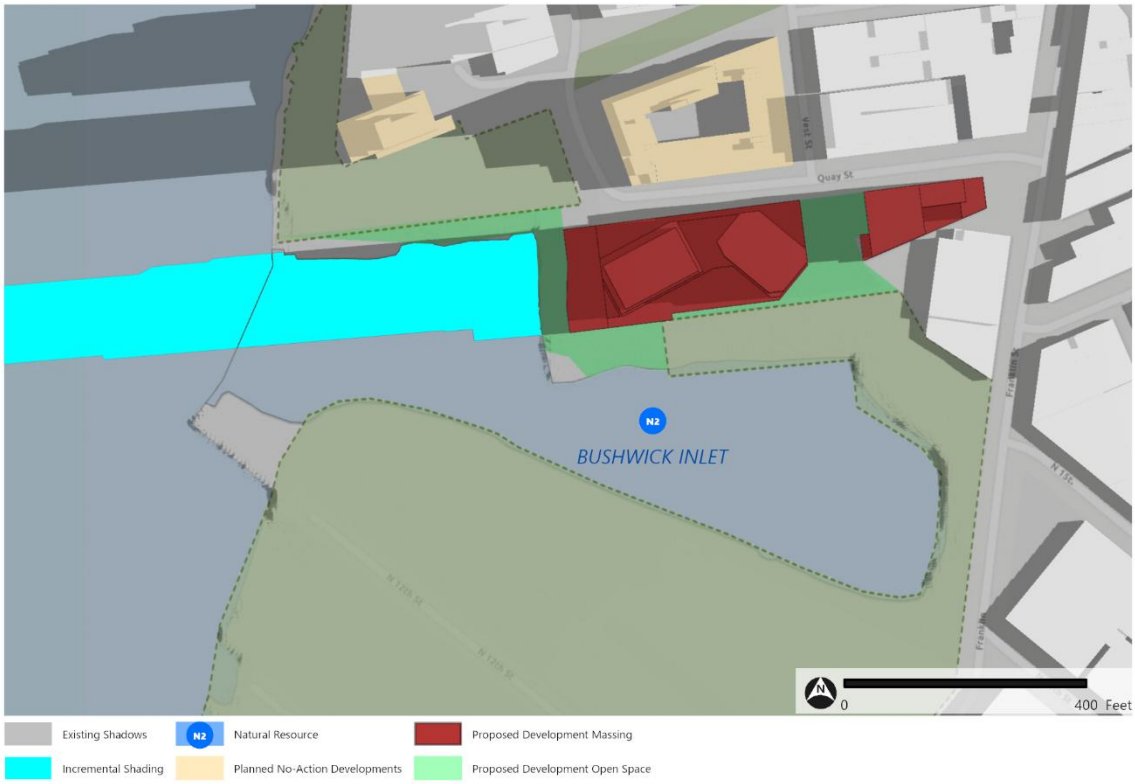
## Figure 6-68 June 21- 5:57 AM



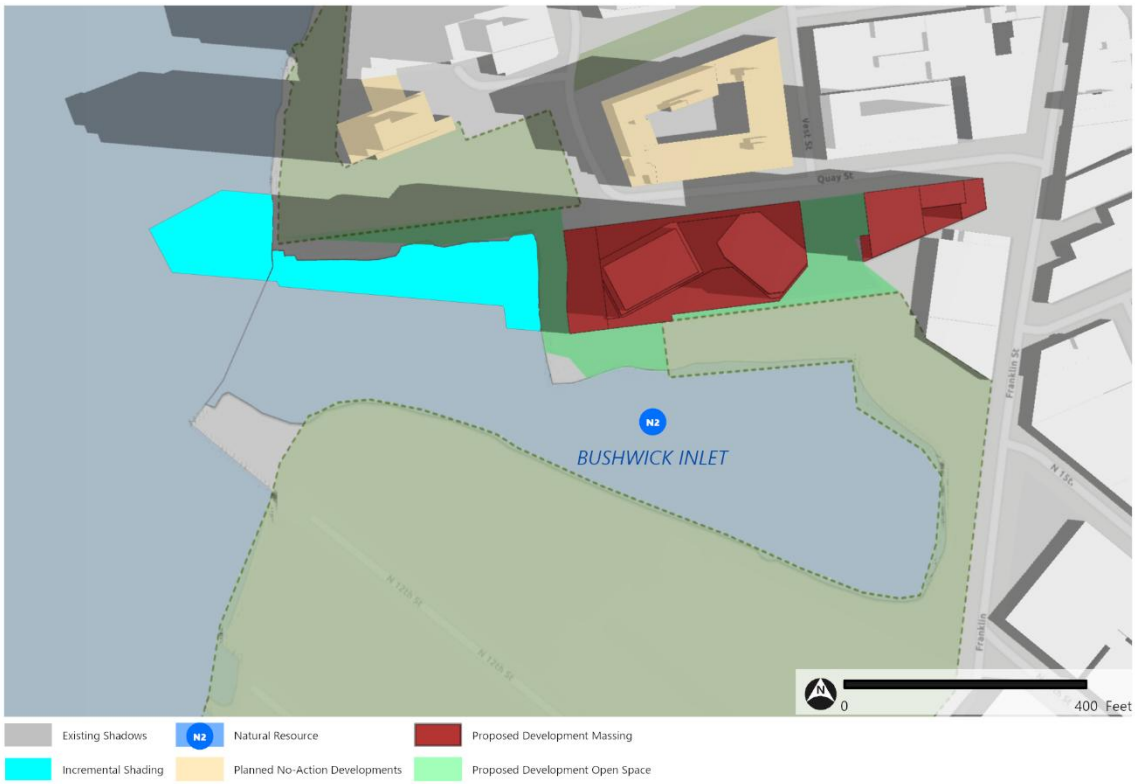

## Figure 6-69 June 21- 6:30 AM



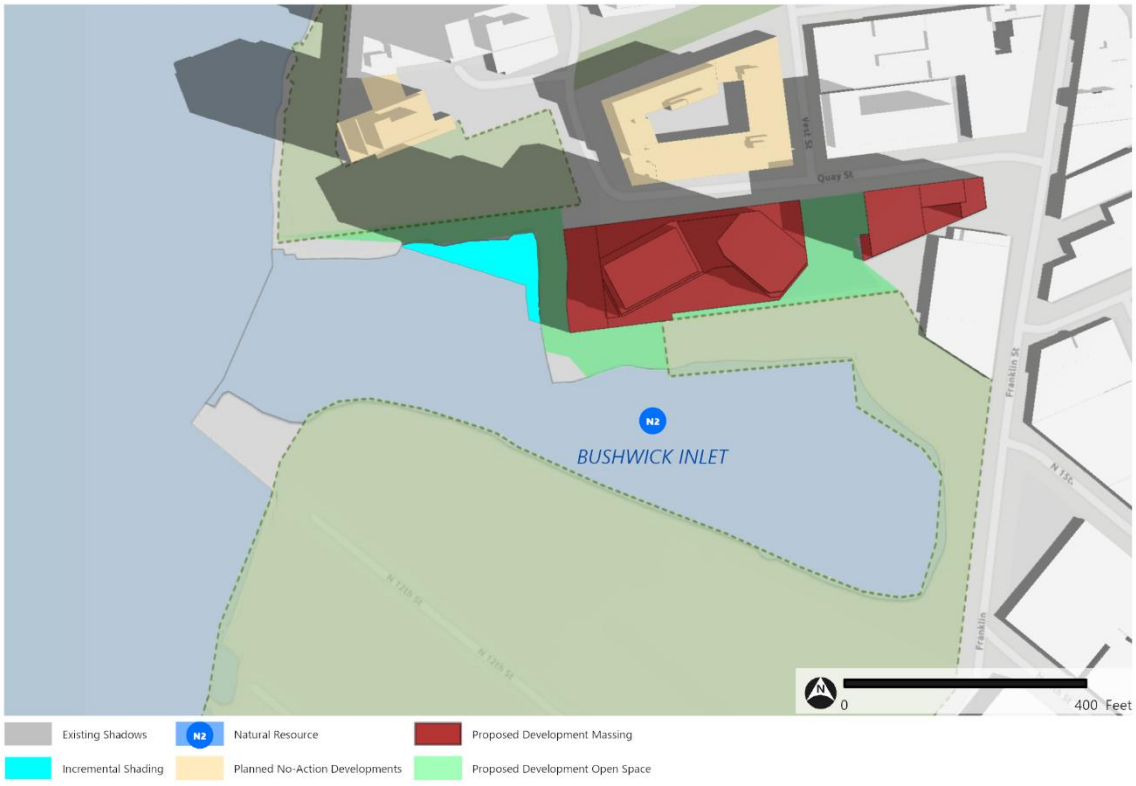
## Figure 6-70 June 21- 7:30 AM




## Figure 6-71 June 21- 8:30 AM



## Figure 6-72 June 21- 9:30 AM




## Figure 6-73 June 21- 10:30 AM

