

A. INTRODUCTION

This chapter assesses the potential for the previously proposed project~~Proposed Actions~~ to cast new shadows that would adversely impact nearby sunlight-sensitive resources.¹ Following the guidelines of the 2020 *City Environmental Quality Review (CEQR) Technical Manual*, sunlight-sensitive resources include publicly accessible parks and open space, features of historic resources that depend on sunlight such as stained-glass windows or skylights, and natural resources that depend on sunlight. Therefore, this section is closely linked to the data and assessments presented in Chapter 4, “Open Space,” Chapter 6, “Historic and Cultural Resources,” and Chapter 8, “Natural Resources.” A significant adverse shadow impact occurs when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight, thereby significantly altering the public’s use of the resource or threatening the viability of vegetation or other resources. Each case must be considered on its own merits based on the extent and duration of new shadow, and an analysis of the resource’s sensitivity to reduced sunlight, and seasonal conditions.

Per CEQR guidelines, an assessment of shadows is required if the proposed project would result in new structures or additions 50 feet or greater in height, or of any height if the project site is located adjacent to, or across the street from, a sunlight-sensitive resource. As described in Chapter 1, “Project Description,” the ~~Proposed Project~~previously proposed project would facilitate the development of two new structures: an up to 395-foot-tall mixed-use building on the Development Site and an approximately 81-foot-tall potential expansion of the South Street Seaport Museum on the Museum Site.

PRINCIPAL CONCLUSIONS

The detailed shadows analysis presented in this chapter determined that the ~~Proposed Project~~previously proposed project would cause a significant adverse shadow impact to one sunlight-sensitive resource, the Southbridge Towers complex open spaces. While the ~~Proposed Project~~previously proposed project would cast incremental shadows on 14 sunlight-sensitive open spaces and one sunlight-sensitive natural resource in one or more seasons, in most cases the new shadow would be limited in extent and duration and would not substantially affect the use of the spaces or the health of trees and plantings. However, ~~the Proposed Project would cause a significant adverse shadow impacts to one resource,~~in the case of the Southbridge Towers complex open spaces, ~~The Development Site’s shadow would pass across portions of the Southbridge Towers complex open space areas in the complex~~ from early to late morning in the spring,

¹ Since the publication of the DEIS, the Applicant has withdrawn the application for the previously proposed project and submitted a modified application (Application Number C 210438(A) ZSM; the “A-Application”) with proposed changes to the project—this modified version of the project is described and considered in this FEIS as the Reduced Impact Alternative, as outlined in Chapter 18, “Alternatives.”

summer, and fall, covering large areas at times, and significantly altering the use of the spaces for users seeking sun, and potentially impacting the health of the trees and plantings in one limited area.

B. DEFINITIONS AND METHODOLOGY

This analysis has been prepared in accordance with the procedures and guidelines of the *CEQR Technical Manual*.

DEFINITIONS

Incremental shadow is the additional, or new, shadow that a structure resulting from a proposed project would cast on a sunlight-sensitive resource.

Sunlight-sensitive resources are those that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. Such resources generally include:

- *Public open space* such as parks, beaches, playgrounds, plazas, schoolyards and community gardens (if open to the public during non-school hours), 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.
- *Features of architectural resources that depend on sunlight for their enjoyment by the public.* Only the sunlight-sensitive features need be considered, as opposed to the entire resource. Such sunlight-sensitive features might include design elements that depend on the contrast between light and dark (e.g., recessed balconies, arcades, deep window reveals); elaborate, highly carved ornamentation; stained glass windows; historic landscapes and scenic landmarks; and features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as a historic landmark.
- *Natural resources* where the introduction of shadows could alter the resource's condition or microclimate. Such resources could include surface water bodies, wetlands, or designated resources such as coastal fish and wildlife habitats.

Non-sunlight-sensitive resources include the following, for the purposes of CEQR:

- *City streets and sidewalks* (except Greenstreets);
- *Private open space* (e.g., front and back yards, stoops, vacant lots, and any private, non-publicly accessible open space); and
- *Project-generated open space* cannot experience a significant adverse shadow impact from the project, according to CEQR, because without the project the open space would not exist. However, a discussion of how shadows would affect the new space may be warranted.

A significant adverse shadow impact occurs when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources. Each case must be considered on its own merits based on the extent and duration of new shadow, and an analysis of the resource's sensitivity to reduced sunlight, and seasonal conditions.

METHODOLOGY

Following the guidelines of the *CEQR Technical Manual*, a preliminary screening assessment must first be conducted to ascertain whether a project's shadow could reach any sunlight-sensitive resources at any time of year. The preliminary screening assessment consists of three tiers of analysis. The first tier determines a simple radius around the ~~Proposed Project~~previously proposed project representing the longest shadow that could be cast. If there are sunlight-sensitive resources within this radius, the analysis proceeds to the second tier, which reduces the area that could be affected by project shadow by accounting for the fact that shadows can never be cast between a certain range of angles south of the project site due to the path of the sun through the sky at the latitude of New York City.

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 project shadow by looking at specific representative days in each season and determining the maximum extent of shadow over the course of each representative day.

If the third tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a detailed shadow analysis is required to determine the extent and duration of the incremental shadow resulting from the project. The detailed analysis provides the data needed to assess the shadow impacts. The effects of the new shadows on the sunlight-sensitive resources are described, and their degree of significance is considered. The results of the analysis and assessment are documented with graphics, a table of incremental shadow durations, and narrative text.

C. PRELIMINARY SCREENING ASSESSMENT

A base map was developed using Geographic Information Systems (GIS)² showing the location of the ~~Proposed Project~~previously proposed project and the surrounding street layout. In coordination with the open space, historic and cultural resources, and natural resources assessments presented in other chapters of this EIS, potential sunlight-sensitive resources were identified and shown on the map.

TIER 1 SCREENING ASSESSMENT

For the Tier 1 assessment, the longest shadow that the ~~Proposed Project~~previously proposed project could cast is calculated, and, using this length as the radius, a perimeter is drawn around the ~~Proposed Project~~previously proposed project. Anything outside this perimeter representing the longest possible shadow could never be affected by project generated shadow, while anything inside the perimeter needs additional assessment.

According to the *CEQR Technical Manual*, the longest shadow that a structure can cast at the latitude of New York City occurs on December 21, the winter solstice, at the start of the analysis day (8:51 AM), and is equal to 4.3 times the height of the structure.

DEVELOPMENT SITE

At a maximum height of 395 feet above curb level, including rooftop mechanical structures, the proposed mixed-use building at 250 Water Street could cast a shadow up to 1,699 feet in length

² Software: Esri ArcGIS Pro; Data: New York City Department of Information Technology and Telecommunications (DoITT) and other City agencies, and AKRF site visits.

(395 x 4.3). Using this length as the radius, a perimeter was drawn around the Development Site (see **Figure 5-1**).

The assessment showed that a number of publicly accessible open spaces and historic resources with sunlight-sensitive features are located in the Tier 1 longest shadow study area, as well as one natural resource (a portion of the East River). Therefore, the next tier of assessment was required.

MUSEUM SITE

At a maximum height of 81.25 feet above curb level, including rooftop mechanical structures, the potential museum expansion building could cast a shadow up to 350 feet in length (81.25 x 4.3). Using this length as the radius, a perimeter was drawn around the Museum Site (see **Figure 5-2**).

The assessment showed that several additional sunlight-sensitive resources (i.e., beyond those identified in the Development Site longest shadow study area) are located in the Tier 1 longest shadow study area, requiring further assessment in the next tier.

TIER 2 SCREENING ASSESSMENT

Because of the path that the sun travels across the sky in the northern hemisphere, no shadow can be cast in a triangular area south of any given project site. In New York City this area lies between -108 and +108 degrees from true north. **Figures 5-1 and 5-2** illustrates this triangular area south of the Development Site and Museum Site, respectively. The complementary area to the north within each longest shadow study area represents the remaining areas that could potentially experience new project generated shadow.

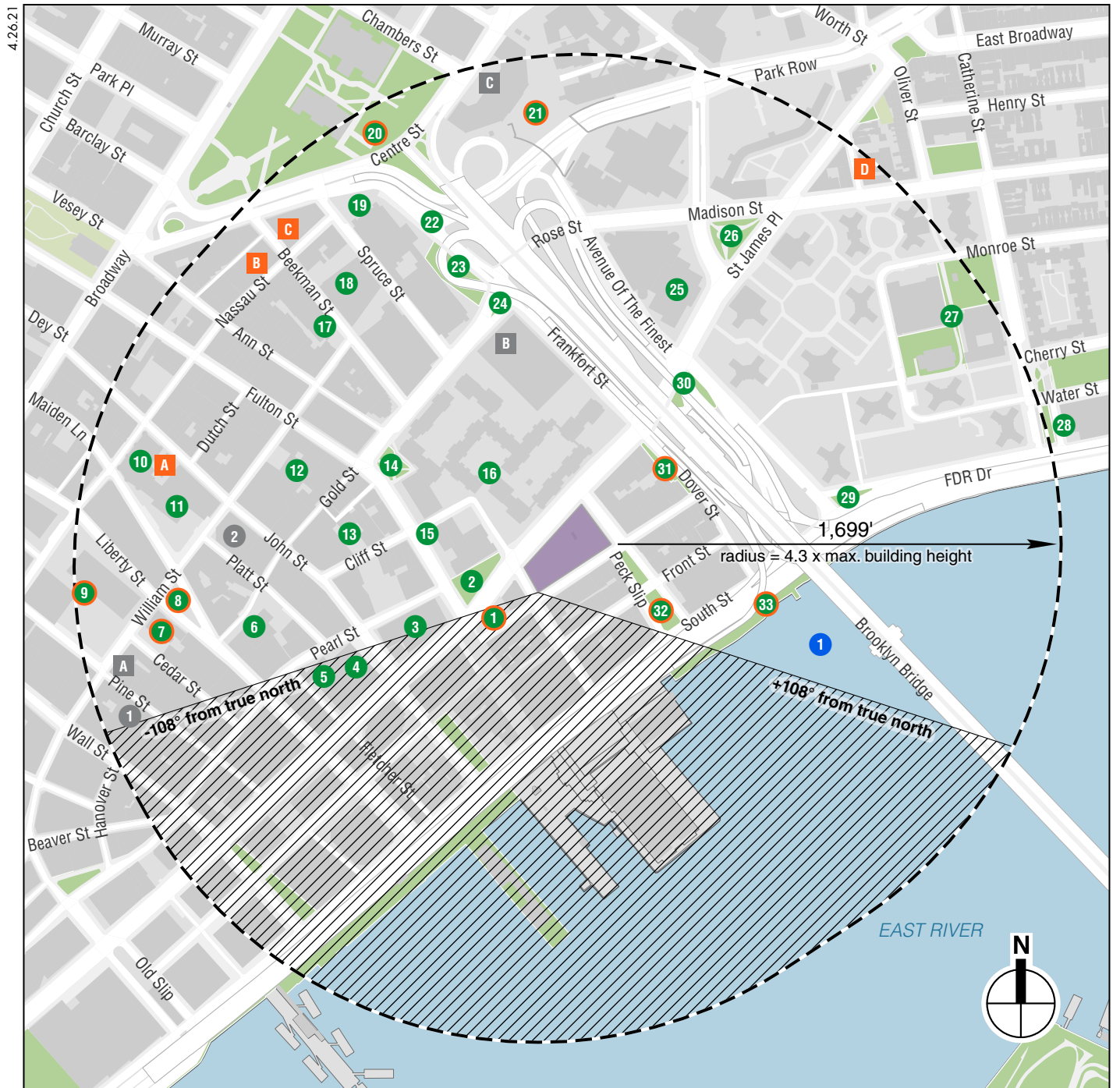
The Tier 2 assessment concluded that a total 36 publicly accessible open spaces are located in the remaining longest-shadow study area and require further assessment. Thirty-three of these open spaces are located in the Development Site's remaining longest shadow study area. A small portion of one of these, Titanic Park, is also within the Museum Site's remaining longest shadow study area, and three additional resources in the Museum Site's remaining study area bring the total to 36. Many of the 36 open spaces are privately owned plazas, courtyards, or other such spaces associated with office or residential buildings that are open to the public. Eleven of the open spaces are in historic districts or have individual landmark status.

In addition, four historic sites with sunlight-dependent architectural features are located in the Tier 2 remaining longest shadow study area of the Development Site and require further assessment to ascertain whether they could be affected by project-generated shadow.

A portion of the East River, an important natural resource, is also in the remaining longest shadow study area of the Development Site and requires further assessment.

Two other publicly accessible open spaces identified in the remaining study area were found to be interior spaces with minimal or no sky exposure. These consequently needed no further analysis for shadows, and they are listed in **Table 5-1**. Interior spaces with skylights, transparent roofs, or significant sky exposure through windows or open arcades remained in the inventory of 36 open spaces for further assessment.

In addition, three other historic resources with sunlight-sensitive features located in the remaining study area were eliminated from the next tier of assessment because their sunlight-sensitive features face away from the Development Site and could not be affected by project-generated shadow. These resources are listed in **Table 5-2**.



Development Site

Development Site: Tier 1: Longest Shadow Study Area Perimeter

Development Site: Tier 2: Area South of Site That Could Never Be Shaded by Proposed Building

Publicly Accessible Open Space (see Table 5-4)

Publicly Accessible Interior Open Space, No Sky Exposure: Eliminated from Further Analysis (see Table 5-1)

Historic Resource with Sunlight-Sensitive Features (see Table 5-3)

Historic Resource with Sunlight-Sensitive Features Facing Away from Project Site: Eliminated from Further Analysis (see Table 5-2)

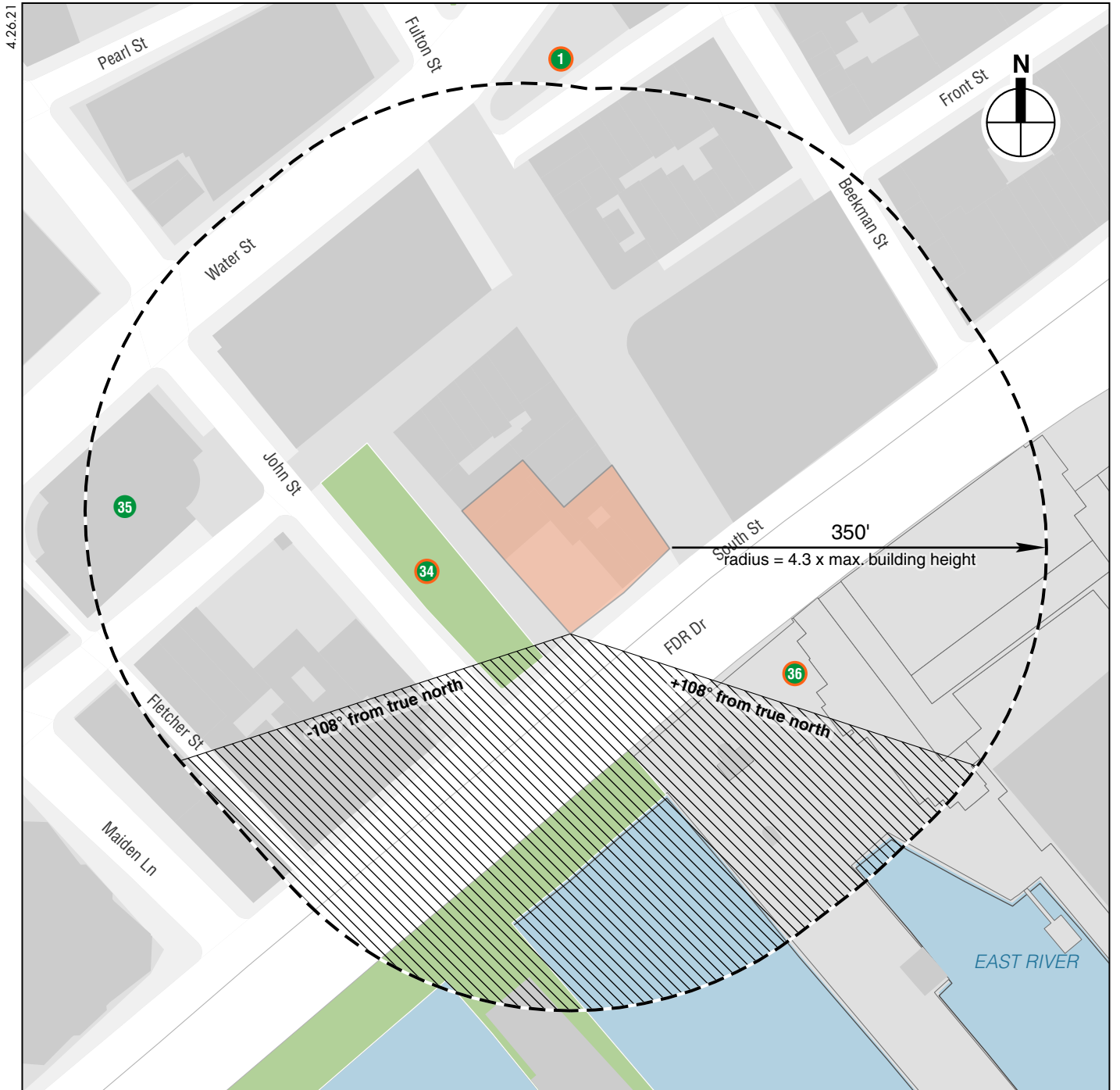
Public Open Space with Historic Status or in Historic District (see Table 5-4)

Natural Resource (see Table 5-3)

0 1,000 FEET

Development Site
Tier 1 and Tier 2 Assessments

Figure 5-1



- Museum Site
- Museum Site: Tier 1: Longest Shadow Study Area Perimeter
- Museum Site: Tier 2: Area South of Site That Could Never Be Shaded by Proposed Building
- # Publicly Accessible Open Space (see Table 5-4)
- # Public Open Space with Historic Status or in Historic District (see Table 5-4)

0 200 FEET

Museum Site
Tier 1 and Tier 2 Assessments
Figure 5-2

Table 5-1

Open Space Resources Eliminated from Further Analysis

| Map Reference | Resource |
|---|--------------------|
| 1 | 60 Wall Street |
| 2 | 100 William Street |
| Note: These open space resources are interior spaces with no significant sky exposure and therefore do not require assessment for shadows. | |

Table 5-2

Historic Resources Eliminated from Further Analysis

| Map Reference | Resource | Sunlight-Sensitive Features |
|--|----------------------------|---|
| A | Our Lady of Victory Church | Stained glass windows on west and south façades |
| B | 100 Gold Street | Recessed plaza on ground floor, west (Gold St) frontage |
| C | Municipal Building | Colonnade on west façade |
| Note: These historic resources have sunlight-sensitive features that face away from the Development Site and cannot receive project-generated shadow. | | |

The 36 publicly accessible open spaces and four historic resources requiring a Tier 3 assessment are listed in **Table 5-3** (for the Development Site) and **Table 5-4** (for the Museum Site), along with the Tier 3 analysis results.

TIER 3 SCREENING ASSESSMENT

The direction and length of shadows vary throughout the course of the day and differ depending on the season. In order to determine whether project-generated shadow could fall on a sunlight-sensitive resource, three-dimensional (3D) computer modeling software³ is used in the Tier 3 assessment to calculate and display the ~~proposed project~~previously proposed project's shadows on individual representative days of the year. A computer model was developed containing three-dimensional representations of the elements in the base map used in the preceding assessments, the topographic information of the study area, and a reasonable worst-case three-dimensional representation of the proposed buildings.

REPRESENTATIVE DAYS FOR ANALYSIS

Following the guidance of the *CEQR Technical Manual*, shadows on the summer solstice (June 21), winter solstice (December 21) and spring and fall equinoxes (March 21 and September 21, which are approximately the same in terms of shadow patterns) are modeled, to represent the range of shadows over the course of the year. An additional representative day during the growing season is also modeled, generally the day halfway between the summer solstice and the equinoxes, i.e., May 6 or August 6, which have approximately the same shadow patterns.

TIMEFRAME WINDOW OF ANALYSIS

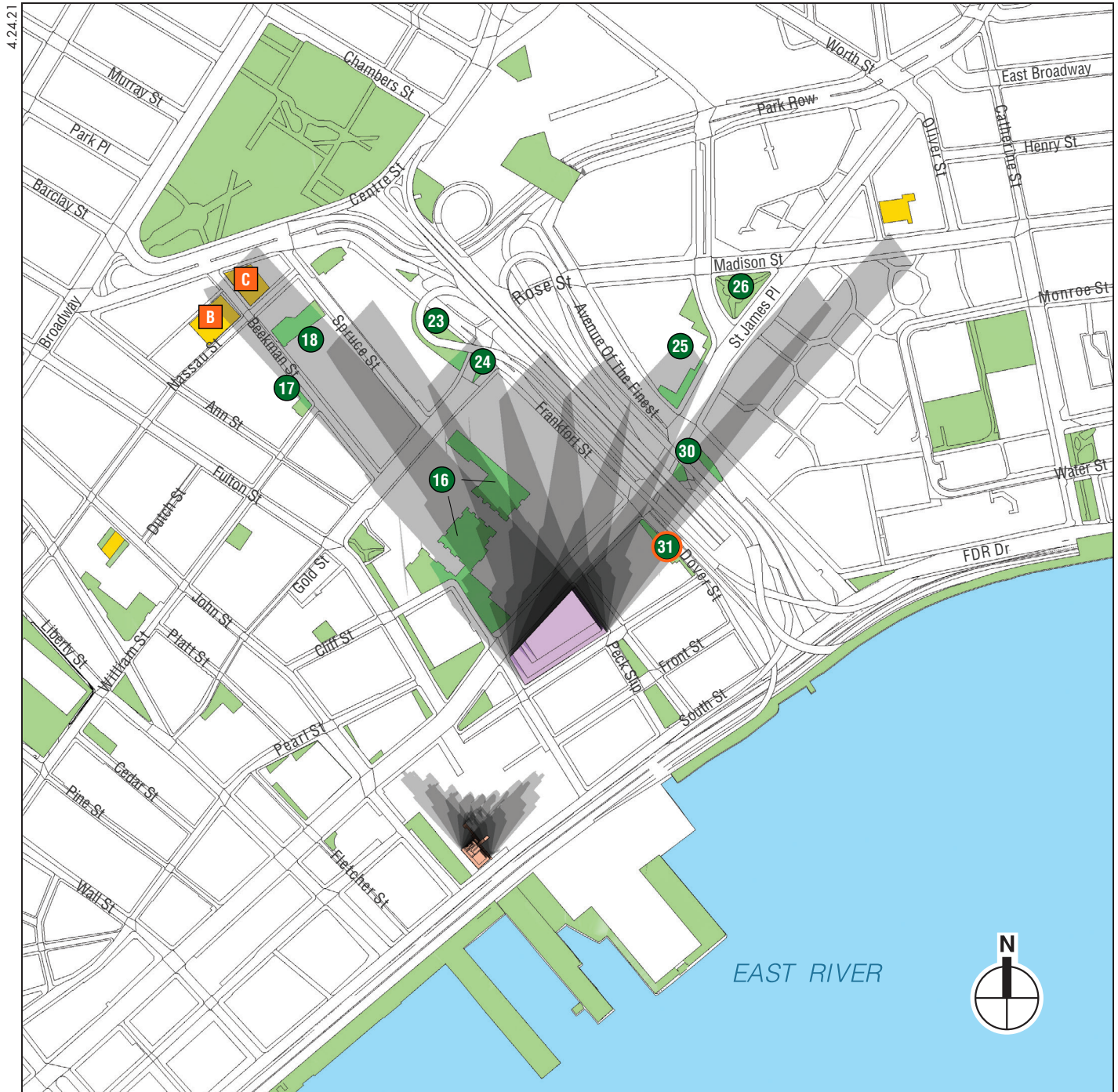
The shadow assessment considers shadows occurring between one and a half hours after sunrise and one and a half hours before sunset. At times earlier or later than this timeframe window of analysis, the sun is at or near the horizon and the sun's rays reach the Earth at very tangential

³ Bentley MicroStation.

angles, diminishing the amount of solar energy and producing shadows that are very long, move fast, and generally blend with shadows from existing structures. Consequently, shadows occurring outside the timeframe window of analysis are not considered significant under CEQR, and their assessment is not required.

TIER 3 SCREENING ASSESSMENT RESULTS

Figures 5-3 to 5-6 illustrate the range of shadows that would occur, in the absence of intervening buildings, from the ~~Proposed Project~~previously proposed project on the four representative days for analysis. As they move clockwise and generally west to east over the landscape, the shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). **Table 5-3** (Development Site) and **Table 5-4** (Museum Site) summarize which analysis day or days each resource could potentially receive project-generated shadow.



- Development Site
- Museum Site
- # Publicly Accessible Open Space (see Table 5-3)
- A Historic Resource with Sunlight-Sensitive Features (see Table 5-3)
- # Public Open Space with Historic Status or in Historic District (see Tables 5-3 and 5-4)

This figure illustrates the range of shadows that would occur from the Proposed Development on the analysis day representing the winter. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per CEQR Technical Manual guidelines.

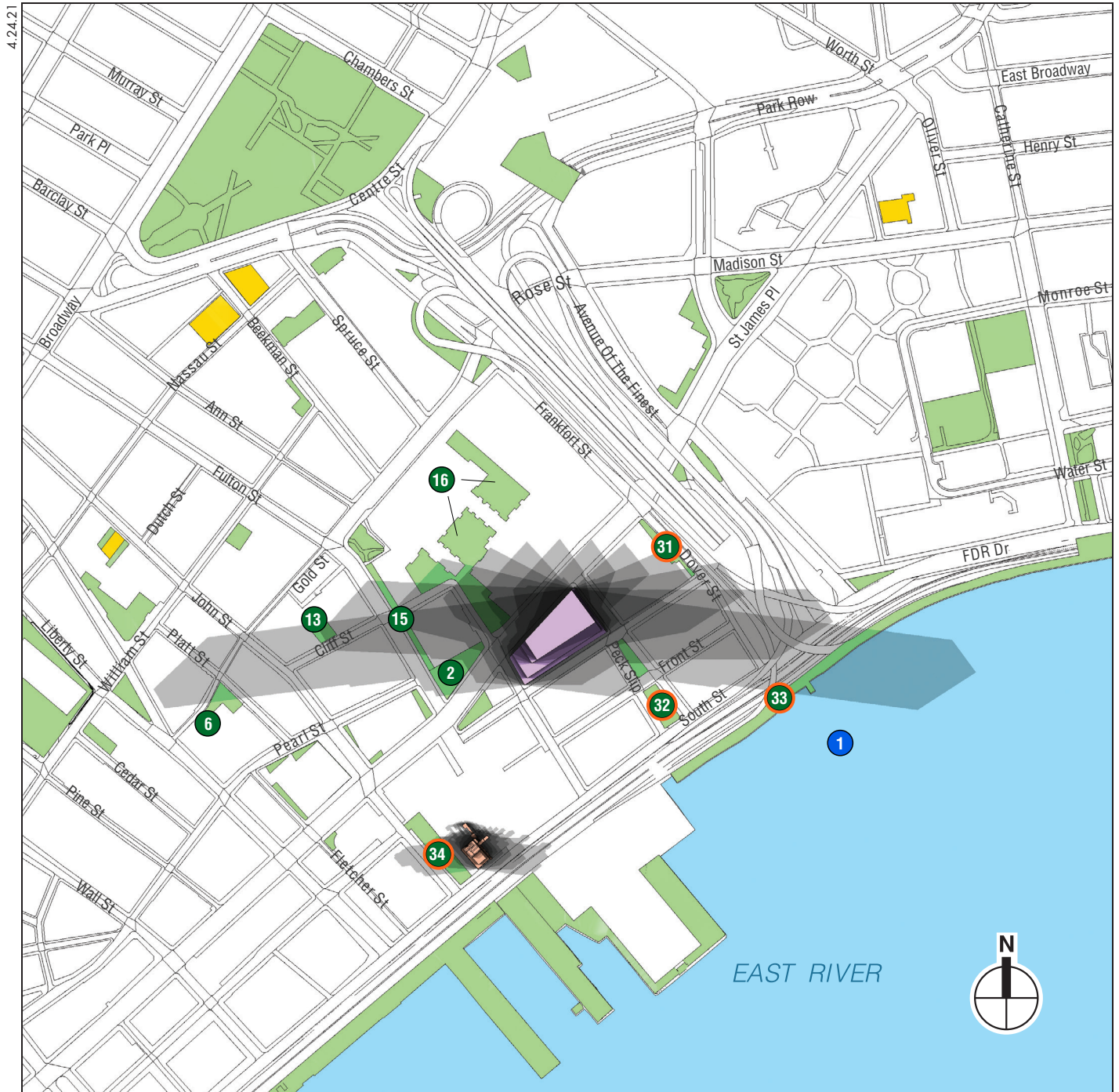
Tier 3 Assessment:
December 21
Figure 5-3



- Development Site
- Museum Site
- # Publicly Accessible Open Space (see Table 5-3)
- # Public Open Space with Historic Status or in Historic District (see Tables 5-3 and 5-4)

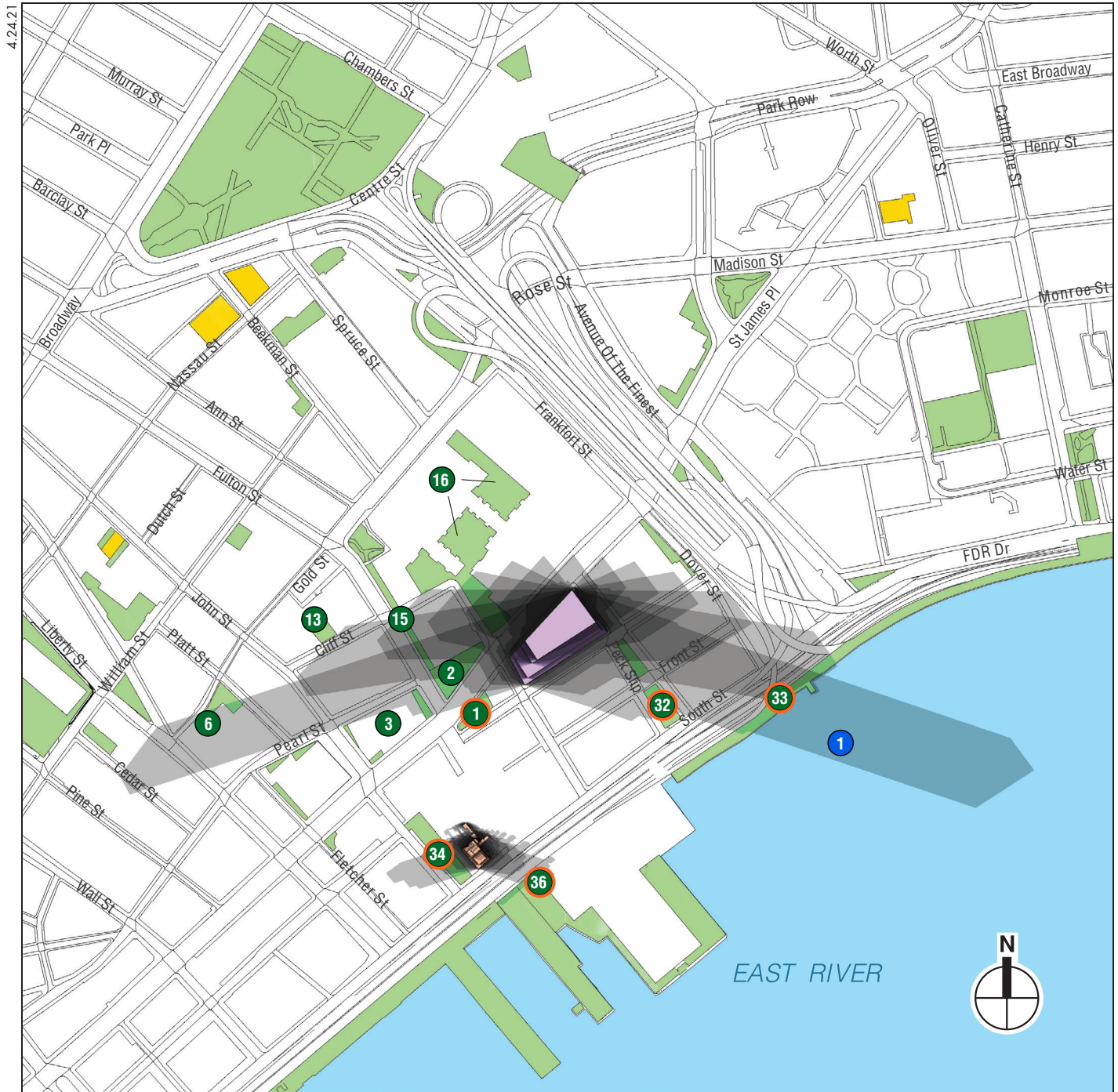
This figure illustrates the range of shadows that would occur from the Proposed Development on the analysis day representing the early spring and the fall. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per CEQR Technical Manual guidelines.

Tier 3 Assessment:
March 21 / September 21
Figure 5-4



This figure illustrates the range of shadows that would occur from the Proposed Development on the analysis day representing the spring and summer growing season period. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per CEQR Technical Manual guidelines.

Tier 3 Assessment:
May 6 / August 6
Figure 5-5



- Development Site
- Museum Site
- # Publicly Accessible Open Space (see Table 5-3)
- # Public Open Space with Historic Status or in Historic District (see Tables 5-3 and 5-4)
- # Natural Resource (see Table 5-3)

This figure illustrates the range of shadows that would occur from the Proposed Development on the analysis day representing summer. The shadows are shown occurring approximately every 60 minutes from the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset). The Tier 3 assessment does not account for future No Action shadows, and the shadows shown in this figure do not represent incremental shadows. The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed building's shadows across the landscape, indicating which resources could potentially be affected on that analysis day, absent intervening buildings, by project-generated shadow. Daylight Saving Time was not used, per CEQR Technical Manual guidelines.

Table 5-3
Tier 3 Assessment – Development Site

| Map Reference | Name | Potential Incremental Shadow | | | |
|---|--|------------------------------|---------------------------|--------------------|-----------|
| | | December 21 | March 21/ September 21 | May 6/ August 6 | June 21 |
| Publicly Accessible Open Spaces | | | | | |
| 1 | Titanic Park (Fulton Street Plaza) | No | No | No | Potential |
| 2 | Pearl Street Playground | No | Potential | Potential | Potential |
| 3 | 200 Water Street | No | No | No | Potential |
| 4 | 180 Water Street | No | No | No | No |
| 5 | 160 Water Street | No | No | No | No |
| 6 | 2 Gold Street | No | No | Potential | Potential |
| 7 | 10 Liberty Street | No | No | No | No |
| 8 | Louise Nevelson Plaza | No | No | No | No |
| 9 | 28 Liberty Street | No | No | No | No |
| 10 | 33 Maiden Lane | No | No | No | No |
| 11 | 59 Maiden Lane | No | No | No | No |
| 12 | 130 William Street | No | Potential | No | No |
| 13 | Cliff Street Plaza | No | No | Potential | Potential |
| 14 | DeLury Square | No | Potential | No | No |
| 15 | St. Margaret's House | No | Potential | Potential | Potential |
| 16 | Southbridge Towers complex open spaces | Potential | Potential | Potential | Potential |
| 17 | 33 Beekman Street | Potential | No | No | No |
| 18 | 8 Spruce Street | Potential | No | No | No |
| 19 | Pace Plaza | No | No | No | No |
| 20 | City Hall Park | No | No | No | No |
| 21 | Municipal Building Plazas | No | No | No | No |
| 22 | Greenstreets (Frankfort Street and Park Row) | No | No | No | No |
| 23 | Drumgoole Plaza | Potential | No | No | No |
| 24 | Greenstreets (Gold/Rose/Frankfort Streets) | Potential | No | No | No |
| 25 | 375 Pearl Street | Potential | No | No | No |
| 26 | James Madison Plaza | Potential | No | No | No |
| 27 | Alfred E. Smith Playground | No | No | No | No |
| 28 | Catherine Slip | No | No | No | No |
| 29 | Greenstreets (South Street and Robert F. Wagner Sr. Place) | No | No | No | No |
| 30 | Greenstreets (Pearl St and Brooklyn Bridge) | Potential | No | No | No |
| 31 | Fishbridge Park Garden | Potential | Potential | Potential | No |
| 32 | Peck Slip | No | Potential | Potential | Potential |
| 33 | East River Waterfront Esplanade | No | No | Potential | Potential |
| Historic Architectural Resources with Sunlight-Sensitive Features | | | | | |
| A | John Street Methodist Church | No | No | No | No |
| B | Temple Court Building | Potential | No | No | No |
| C | Potter Building | Potential | No | No | No |
| D | St. James Church | No | No | No | No |
| Natural Resources | | | | | |
| 1 | East River | No | No | Potential | Potential |
| Notes: See Figures 5-3 to 5-6 for corresponding resource locations and shadow sweeps. In the columns representing the representative analysis dates, "No" means project-generated shadow could not reach the resource, even without accounting for intervening buildings. "Potential" means project-generated shadow could potentially reach the resource on this date and requires further assessment. | | | | | |

Table 5-4
Tier 3 Assessment – Museum Site

| Map Reference | Name | Potential Incremental Shadow | | | |
|---|------------------------|------------------------------|-------------------|----------------|-----------|
| | | Dec. 21 | March 21/Sept. 21 | May 6/August 6 | June 21 |
| Publicly Accessible Open Spaces | | | | | |
| 1 | Titanic Memorial Park | No | No | No | No |
| 34 | Imagination Playground | No | Potential | Potential | Potential |
| 35 | 175 Water Street | No | No | No | No |
| 36 | Pier 17 | No | No | No | Potential |
| Notes: See Figures 5-3 to 5-6 for corresponding resource locations and shadow sweeps. In the columns representing the representative analysis dates, “No” means project-generated shadow could not reach the resource, even without accounting for intervening buildings. “Potential” means project-generated shadow could potentially reach the resource on this date and requires further assessment. | | | | | |

The Tier 3 assessment concluded that 21 of the 36 publicly accessible open spaces and 2 of the 4 historic resources could potentially receive incremental shadow on one or more of the representative analysis days, and these resources (indicated in **Tables 5-3 and 5-4**) required a detailed analysis. The other resources could not receive project-generated shadow on any representative day and do not require further assessment. A portion of the East River could also potentially receive incremental shadow and required additional assessment.

D. DETAILED SHADOW ANALYSIS

A detailed analysis is warranted when the screening analysis does not rule out the possibility that project-generated shadows would reach sunlight-sensitive resources. The detailed analysis establishes a baseline condition, the future without the ~~Proposed Project~~previously proposed project (the “No Action” condition) to illustrate the shadows cast by existing buildings (and other future planned buildings). This baseline is then compared to the future condition with the ~~Proposed Project~~previously proposed project (the “With Action” condition) to distinguish the additional (incremental) shadow cast by the ~~Proposed Project~~previously proposed project. The purpose of the detailed analysis is to determine the extent and duration of new incremental shadow that would be cast on a sunlight-sensitive resource as a result of the ~~Proposed Project~~previously proposed project. Because existing (or future No Action) buildings may already cast shadows on a sunlight-sensitive resource, the ~~Proposed Project~~previously proposed project may not result in additional, or incremental, shadows on that resource.

Following the analysis framework described in Chapter 1, “Project Description,” the detailed analysis was performed for the analysis year of 2026, comparing the ~~Proposed Project~~previously proposed project to the future No Action condition. In the No Action condition, absent the Proposed Actions, the Development Site is anticipated to be redeveloped with a new as-of-right building that would maximize potential development while not requiring any discretionary approvals. This as-of-right development was conservatively modeled to be 117 feet tall plus a 40-foot rooftop mechanical bulkhead (157 feet total maximum height), and was added to the 3D model as part of the baseline No Action condition. Future planned developments in the study area were added to the No Action baseline using best-available information from publicly available filings with the Department of Buildings and other sources.

Shadows are in constant movement. The computer simulation software utilized produces a minute-by-minute animation showing the movement of shadows over the course of each analysis period. The analysis determines the time when incremental shadow would enter each resource, and the time it would exit. Shadow analyses were performed for each of the representative days and analysis periods indicated in the Tier 3 assessment.

DETERMINATION OF IMPACT SIGNIFICANCE

The determination of significance of shadow impacts on a sunlight-sensitive resource is based on (1) the information resulting from the detailed shadow analysis describing the extent and duration of incremental shadows; and (2) an analysis of the resource's sensitivity to reduced sunlight. The goal of the assessment is to determine whether the effects of incremental shadows on a sunlight-sensitive resource are significant under CEQR.

A shadow impact occurs when the incremental shadow from a proposed project falls on a sunlight-sensitive resource or feature and reduces its direct sunlight exposure. Determining whether this impact is significant or not depends on the extent and duration of the incremental shadow and the specific context in which the impact occurs.

Per CEQR, a significant shadow impact generally occurs 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 No Action condition). In the growing season, four to six hours a day of sunlight is a minimum requirement.
 - 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 shadows, accounting for anticipated new users and the open space's utilization rates throughout the affected time periods.
- **For 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.

SUMMARY OF ANALYSIS RESULTS

Of the 21 open spaces that were analyzed, 15 would receive incremental shadows on one or more representative analysis days.

A number of other open spaces would receive limited incremental shadow, as shown in **Table 5-5**.

Neither of the two historic architectural resources that were analyzed would receive incremental shadows. A portion of the East River would receive incremental shadows on the late spring and summer analysis days.

**Table 5-5
Incremental Shadow Durations**

| Map Reference | Resource | December 21 | March 21/ September 21 | May 6/August 6 | June 21 |
|--|---|--|--|---|---|
| Publicly Accessible Open Spaces | | | | | |
| 2 | Pearl Street Playground | — | 7:55am to 8:30am; total 35 min | 7:15 am to 9:00am; total 1 hr 45 min* | 6:30am to 9:25am; total 2 hr 55 min |
| 3 | 200 Water Street | — | — | — | 6:20am to 6:30am; total 10 min* |
| 13 | 15 Cliff Street | — | — | 6:27am to 7:35am; total 1 hr 8 min | 6:45am to 6:55am; total 10 min |
| 14 | DeLury Square | — | 8:00am to 9:00am; total 1 hr | — | — |
| 15 | St. Margaret's House | — | 8:05am to 8:45am; total 40 min | 6:50am to 7:00am; 7:30am to 8:30am; total 1 hr 10 min | 6:20am to 8:20am; total 2 hr |
| 16 | Southbridge Towers complex open spaces | 9:30am to 11:25am; total 1 hr 40 min 30 min* | 7:36am to 11:05 am; total 3 hr 29 min | 7:36am to 10:50am; total 3 hr 14 min | 5:57am to 11:10am; total 5 hr 13 min |
| 17 | 33 Beekman Street | 8:51am to 8:56am; total 5 min | — | — | — |
| 23 | Drumgoole Plaza | 9:48am to 9:51am; total 3 min | — | — | — |
| 25 | 375 Pearl Street | 12:55am to 2:05pm; total 1 hr 10 min | — | — | — |
| 26 | James Madison Plaza | 1:58pm to 2:04pm; total 6 min | — | — | — |
| 30 | Greenstreets (Pearl Street and Brooklyn Bridge) | 1:50pm to 2:05pm; 2:20pm to 2:45pm; total 40 min | — | — | — |
| 31 | Fishbridge Park Garden | — | 1:55pm to 3:55pm; total 2 hr | 2:25pm to 2:40pm; total 15 min | — |
| 32 | Peck Slip | — | — | 3:20pm to 4:40pm; total 1 hr 20 min | 2:50pm to 5:05pm; 5:45pm to 5:50pm; total 2 hr 20 min |
| 33 | East River Waterfront Esplanade | — | — | — | 5:05pm to 5:20pm; total 15 min |
| 34 | Imagination Playground | — | 7:36am to 8:55am; total 1 hr 19 min | 6:27am to 8:50am; total 2 hr 23 min | 5:57am to 9:00am; total 3 hr 3 min |
| Natural Resources | | | | | |
| 1 | East River | — | — | 4:55pm to 5:18pm; total 23 min | 5:05pm to 6:01pm; total 56 min |

Notes:

Table indicates entry and exit times and total duration of incremental shadow for each sunlight-sensitive resource. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

* Reflects period when shadow from the ~~Proposed Project~~ previously proposed project would fall on an area that would be in sun in the No Action condition; however, overall there would be less shadow on the resources in the With Action condition than in the No Action condition, because the portion of the as-of-right building at the southern end of the Development Site would be slightly taller compared to the corresponding portion of the ~~Proposed Project~~ previously proposed project, despite being shorter overall.

The other six open space resources and the two historic resources that were analyzed would not receive any incremental shadows. This was generally due to the location of the ~~Proposed Project~~previously proposed project in an area densely developed with tall and in some cases bulky buildings, which limit the size and the reach of incremental shadow.

Table 5-5 summarizes the entry and exit times and total duration of incremental shadows on each affected sun-sensitive resource. **Figures 5-7 to 5-38** document the results of the analysis by providing graphic representations from the computer animation of times when incremental shadow would fall on a sun-sensitive resource. The figures illustrate the extent of additional, incremental shadow at that moment in time (highlighted in red), and also show existing shadow and remaining areas of sunlight.

- **Figures 5-7 to 5-11** depict the December 21 analysis day
- **Figures 5-12 to 5-19** depict the March 21/September 21 analysis day
- **Figures 5-20 to 5-27** depict the May 6/August 6 analysis day
- **Figures 5-28 to 5-38** depict the June 21 analysis day

ASSESSMENT OF SHADOW IMPACTS BY RESOURCE

The following section briefly describes each affected resource that would receive more than 10 minutes of incremental shadow;⁴ its sunlight sensitivity; and the extent, duration, and potential effects of incremental shadow. Descriptions of resource condition and utilization rates were taken from Chapter 4, “Open Space.” Map reference numbers are included with the name, for convenience

Times are given in Eastern Standard Time (EST) in all seasons, as mandated by the *CEQR Technical Manual*, but Eastern Daylight Time (EDT) is in effect for all representative analysis days except for December 21, and times are also provided parenthetically in EDT when relevant, for informational purposes.

Sunlight requirements for tree and herbaceous plant species discussed below are taken from the following sources:

- United States Department of Agriculture, National Resource Conservation Service PLANTS Database (<https://plants.sc.egov.usda.gov/>)
- University of Florida Institute of Food and Agricultural Sciences, Electronic Data Information Source (<https://edis.ifas.ufl.edu/>)
- North Carolina State University Extension Gardener Toolbox (<https://plants.ces.ncsu.edu/>)

OPEN SPACE RESOURCES

Pearl Street Playground (Map #2)

This playground, renovated in 2012, is primarily for younger children, with a water sprinkler play area, swings and other play equipment, and a sand lot. It is mostly paved and safety-surfaced, with

⁴ Per *CEQR Technical Manual* guidelines, incremental shadow is not considered significant when its duration is no more than 10 minutes and the resource otherwise continues to receive substantial sunlight. *CEQR Technical Manual*, 2020 edition, page 8-27.



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

December 21
9:30 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

December 21
10:15 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.

December 21
11:00 AM

| | | | |
|--|---------------------------------------|---|---|
|  | <i>Development Site</i> |  | <i>Publicly Accessible Open Space (see Table 5-5)</i> |
|  | <i>Museum Site</i> |  | <i>Public Open Space with Historic Status or in Historic District (see Table 5-5)</i> |
|  | <i>Publicly Accessible Open Space</i> |  | <i>Natural Resource (see Table 5-5)</i> |
|  | <i>Incremental Shadow</i> | | |
|  | <i>Reduced Shadow*</i> | | |

Detailed Analysis

Figure 5-10



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings.



March 21 / September 21
7:45 AM

- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- # Publicly Accessible Open Space (see Table 5-5)
- # Public Open Space with Historic Status or in Historic District (see Table 5-5)
- # Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

March 21 / September 21
8:30 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

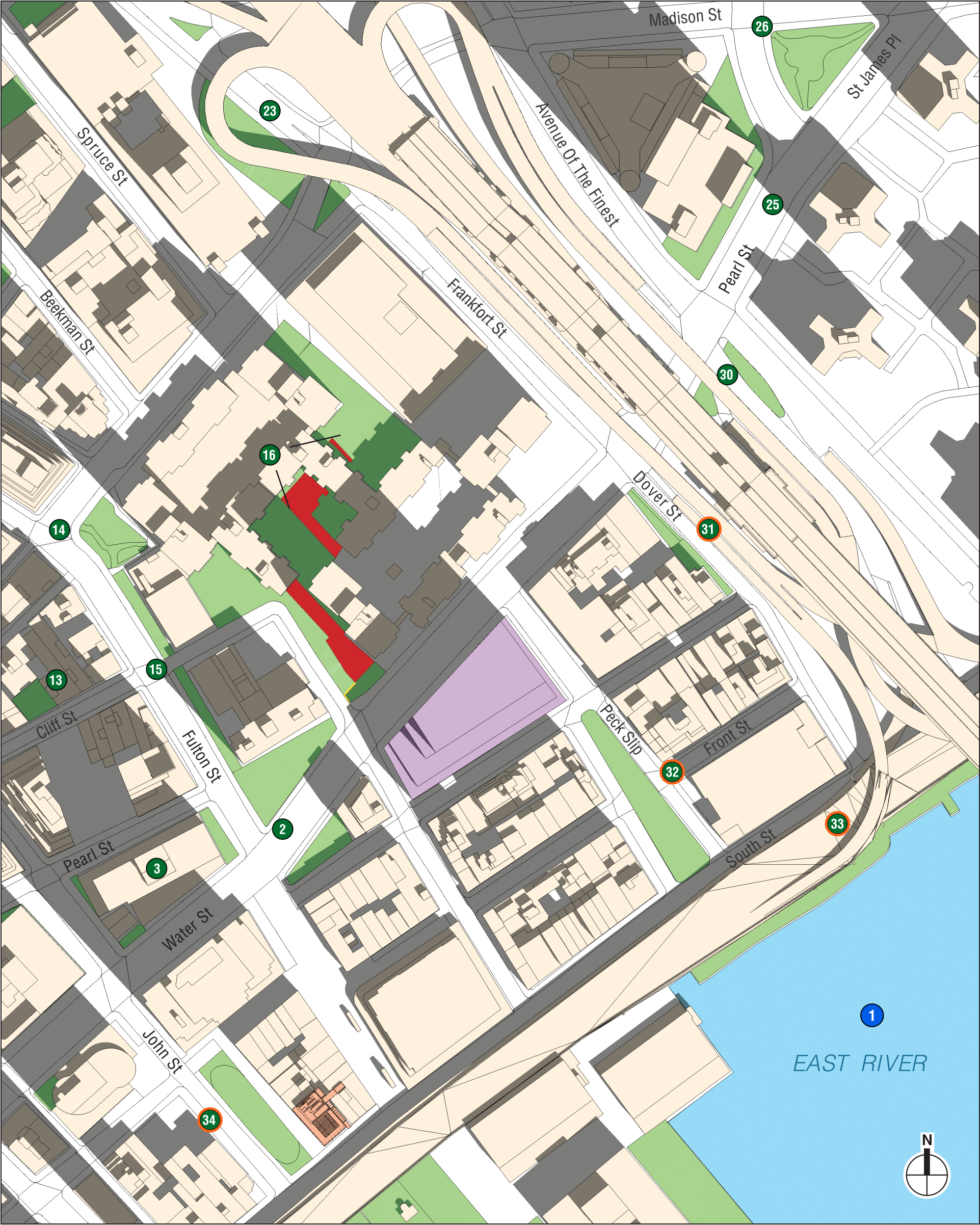
Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

March 21 / September 21
9:15 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

March 21 / September 21
10:00 AM

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

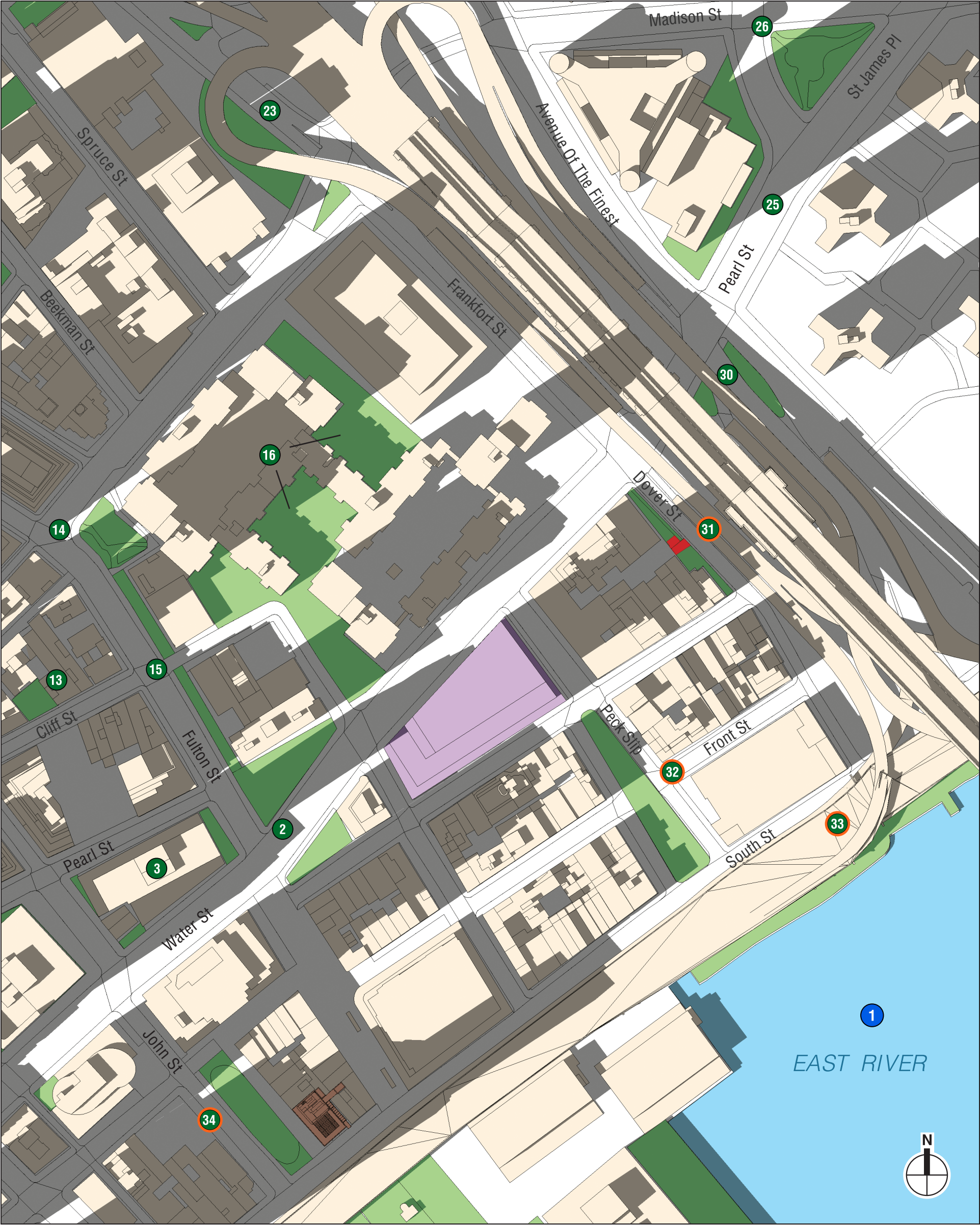


- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

March 21 / September 21
2:15 PM

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

March 21 / September 21
3:00 PM

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

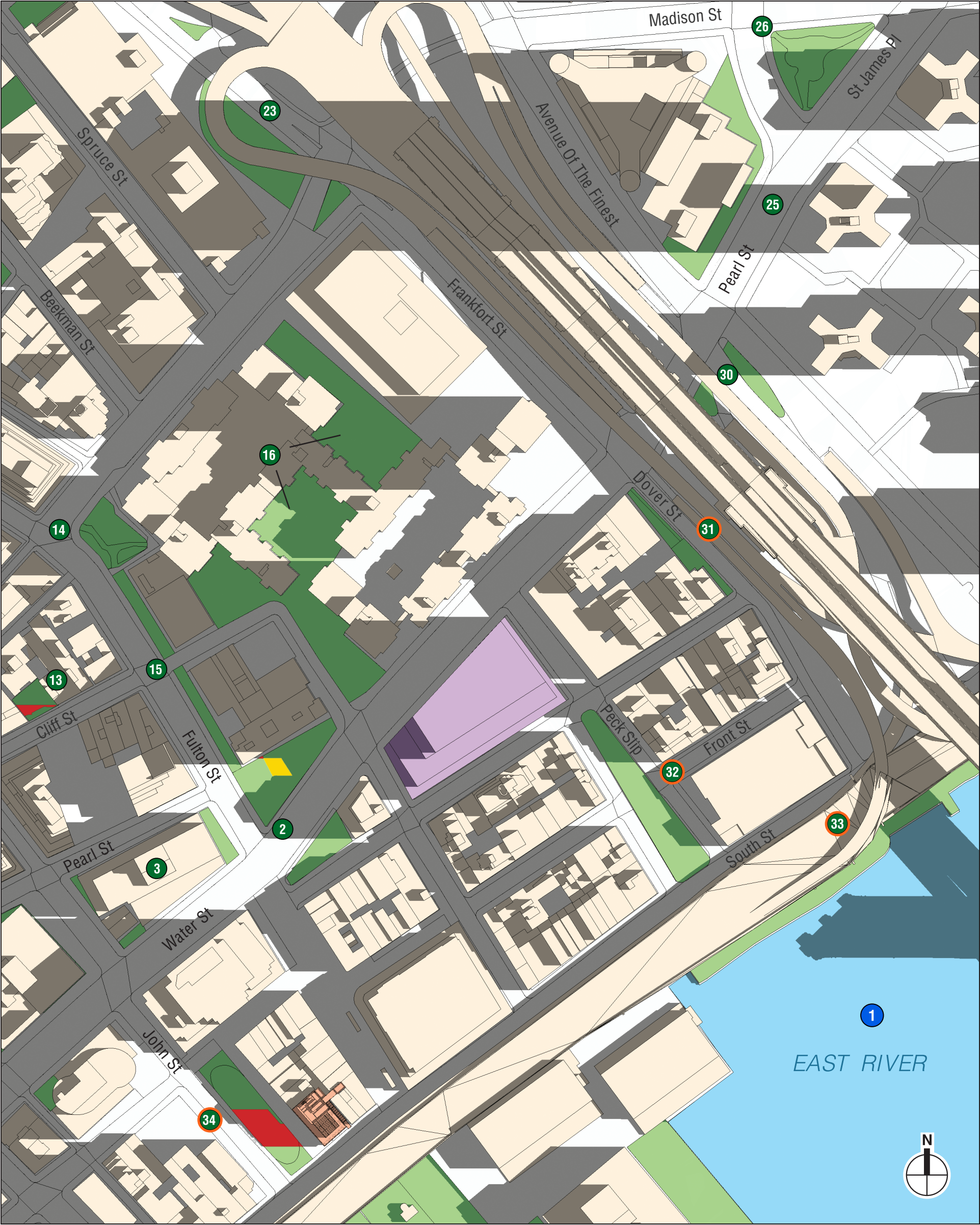


- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

March 21 / September 21
3:45 PM

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

May 6 / August 6
7:15 AM



- | | |
|---|--|
|  Development Site |  Publicly Accessible Open Space (see Table 5-5) |
|  Museum Site |  Public Open Space with Historic Status or in Historic District (see Table 5-5) |
|  Publicly Accessible Open Space |  Natural Resource (see Table 5-5) |
|  Incremental Shadow | |
|  Reduced Shadow* | |

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

May 6 / August 6
8:00 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

May 6 / August 6
8:45 AM

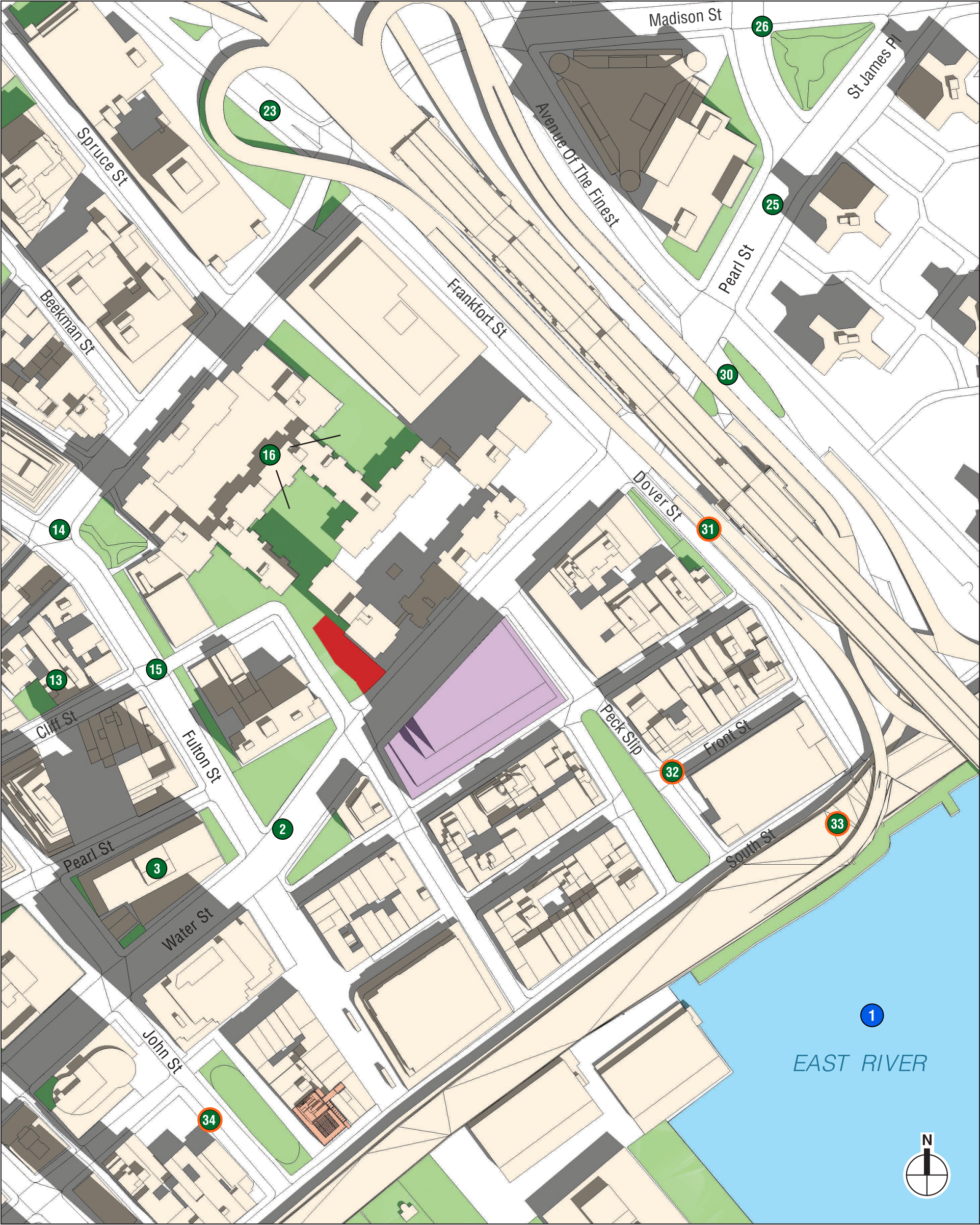


- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
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May 6 / August 6
9:30 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
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May 6 / August 6
10:15 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*

- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

May 6 / August 6
2:30 PM

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

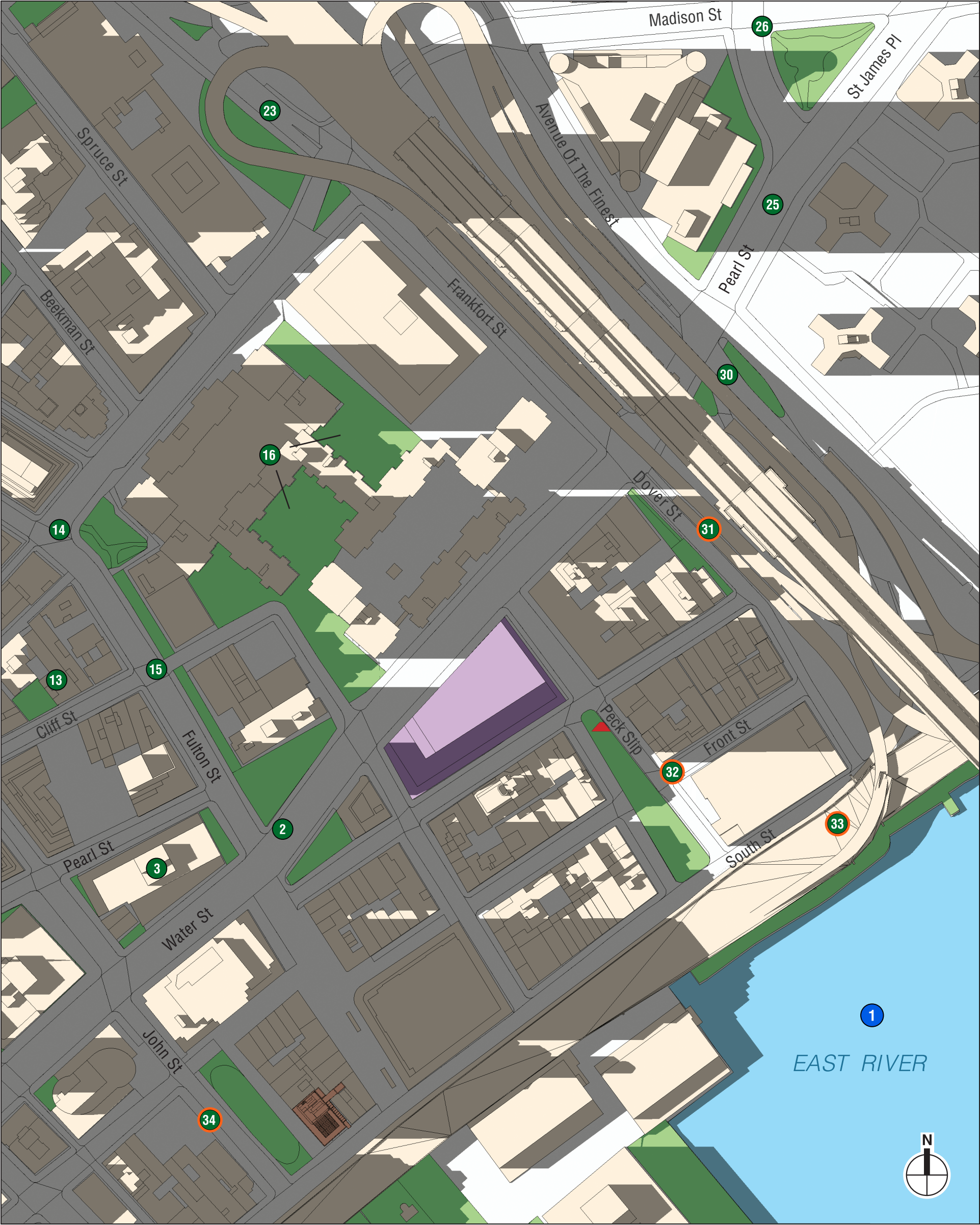
Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

May 6 / August 6
3:30 PM

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

May 6 / August 6
4:30 PM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
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- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

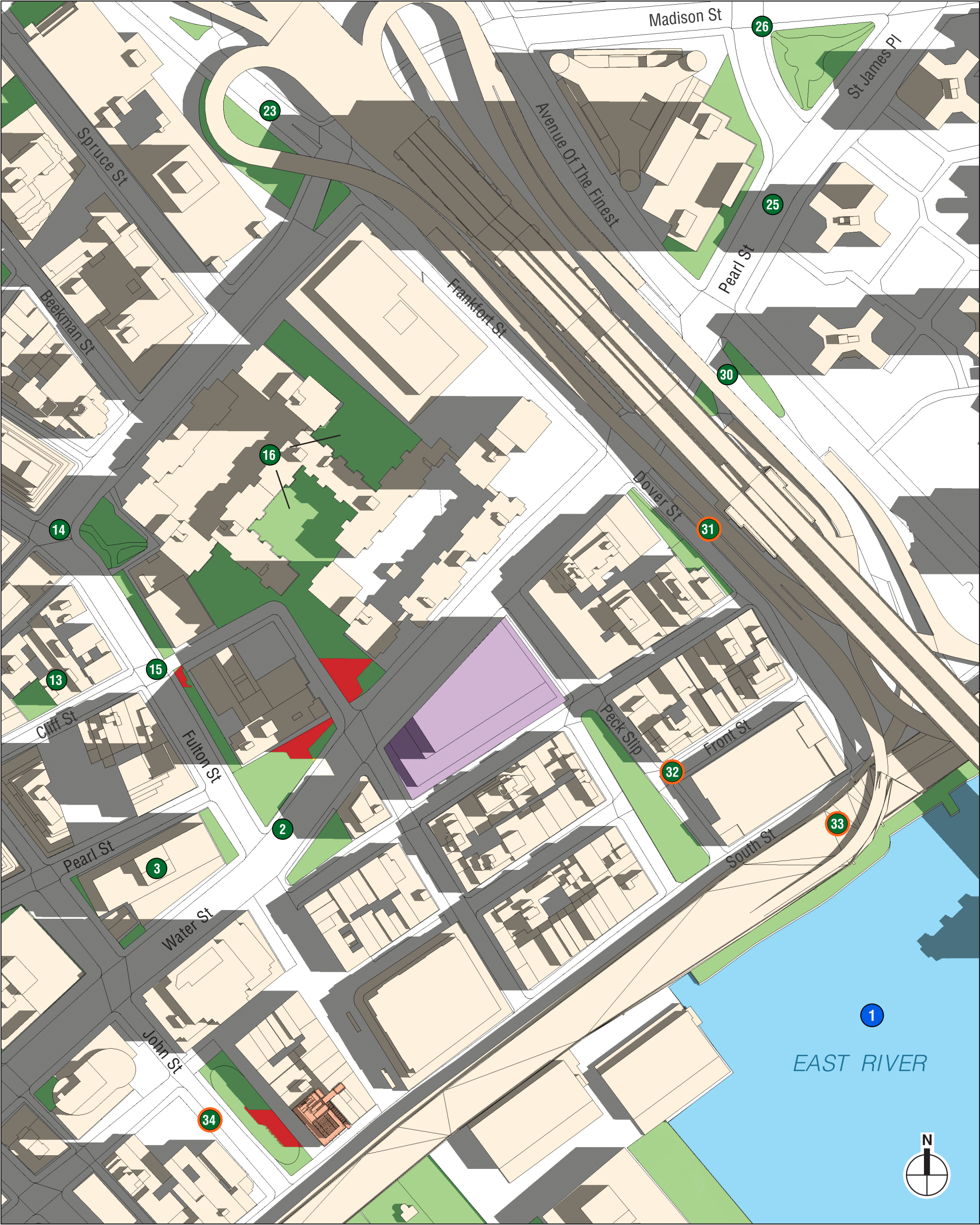
Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

June 21
7:15 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
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June 21
8:00 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

June 21
8:45 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

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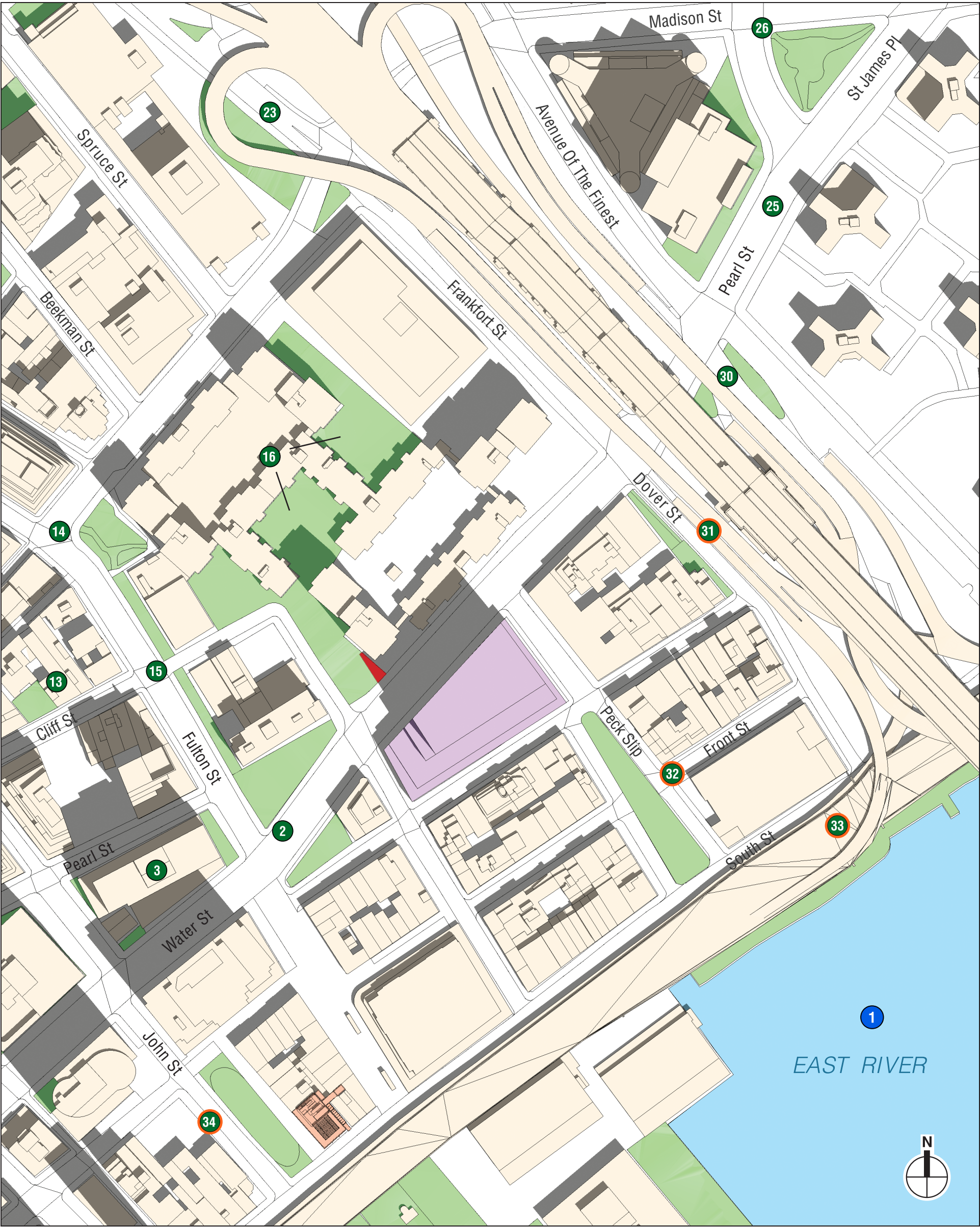
June 21
9:30 AM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- # Publicly Accessible Open Space (see Table 5-5)
- # Public Open Space with Historic Status or in Historic District (see Table 5-5)
- # Natural Resource (see Table 5-5)

NOTES:

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- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
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- Publicly Accessible Open Space (see Table 5-5)
- Public Open Space with Historic Status or in Historic District (see Table 5-5)
- Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
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- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

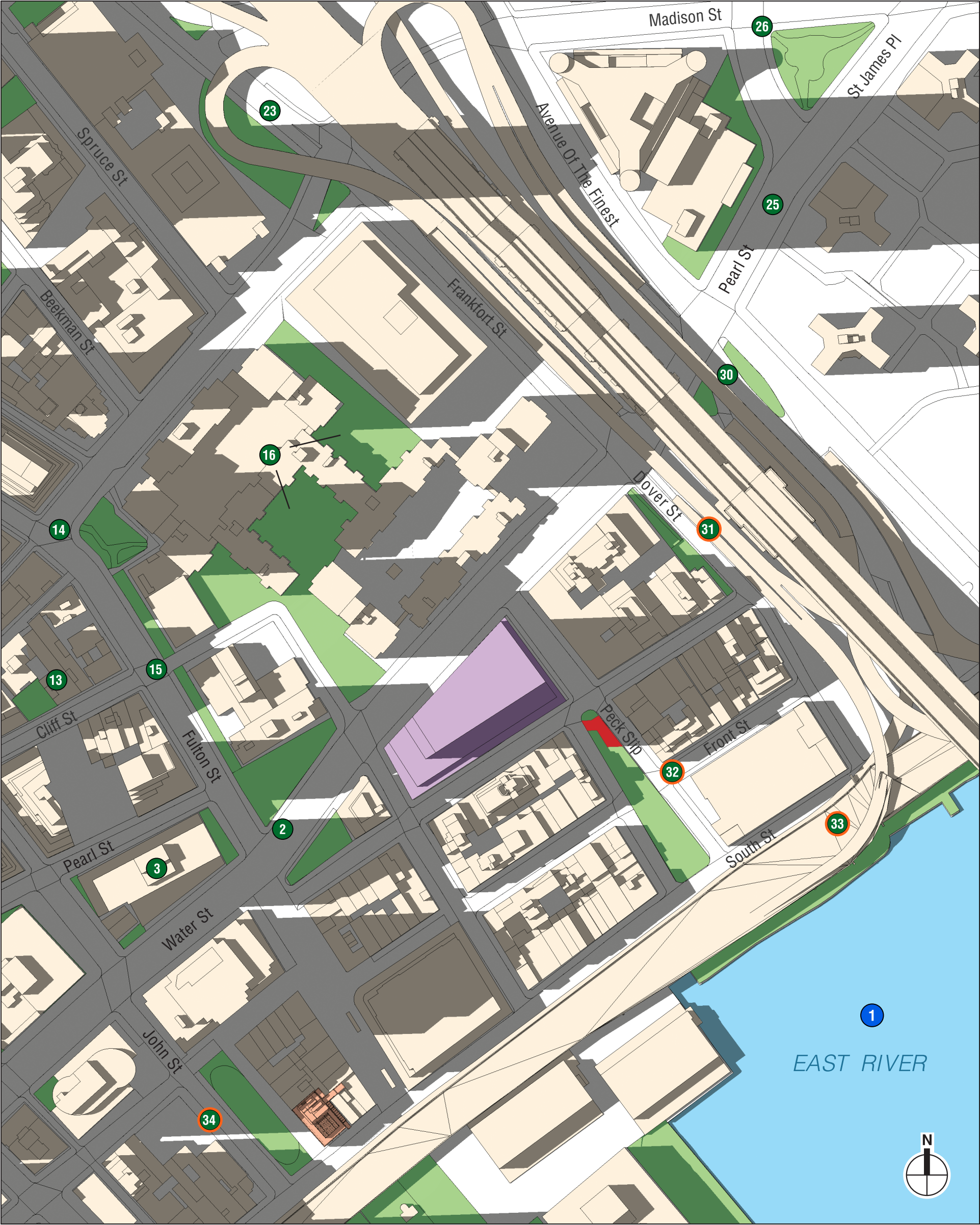
Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

June 21
3:00 PM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

June 21
3:45 PM

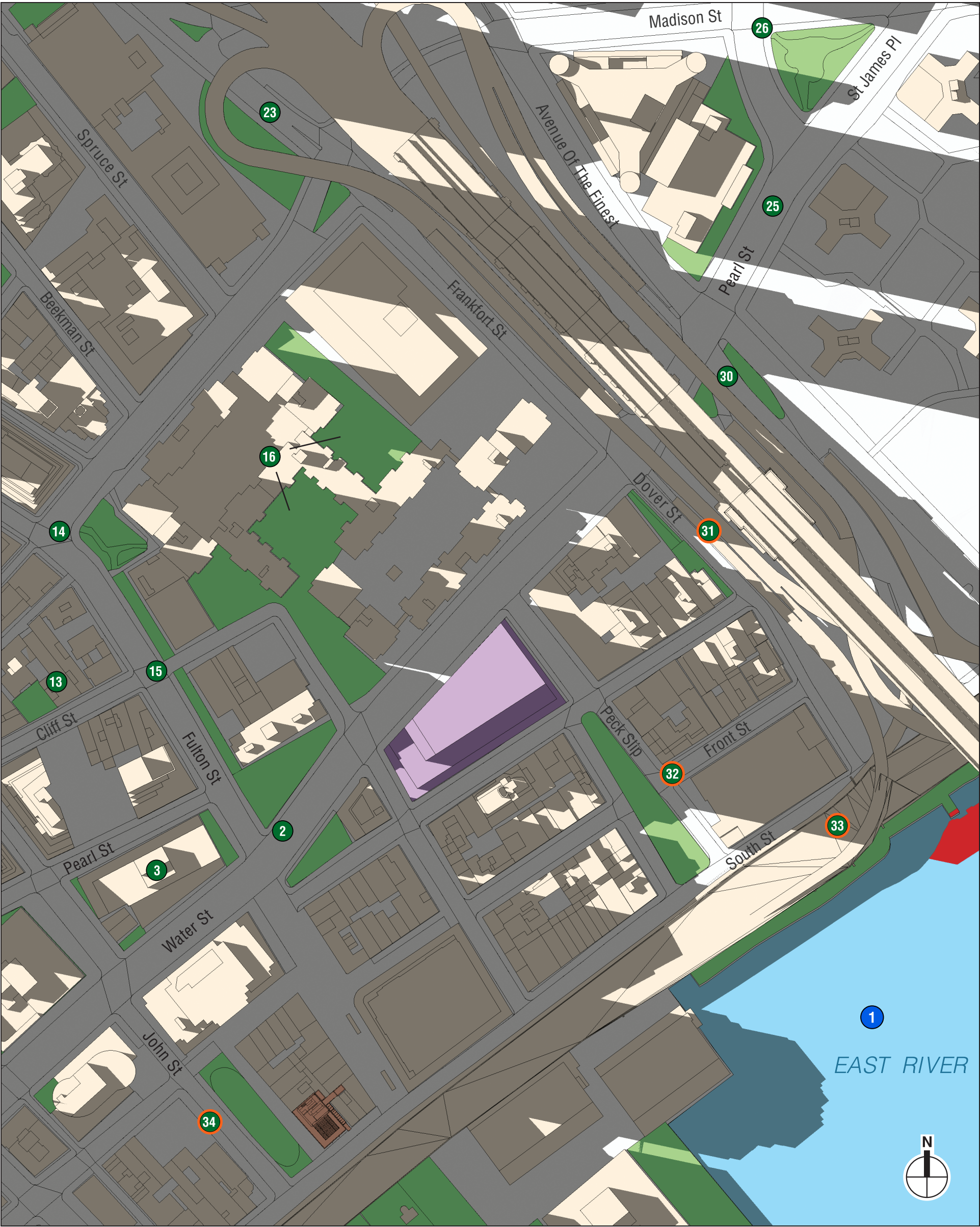


- | | | | |
|--|--------------------------------|---|--|
|  | Development Site |  | Publicly Accessible Open Space (see Table 5-5) |
|  | Museum Site |  | Public Open Space with Historic Status or in Historic District (see Table 5-5) |
|  | Publicly Accessible Open Space |  | Natural Resource (see Table 5-5) |
|  | Incremental Shadow | | |
|  | Reduced Shadow* | | |

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

June 21
4:30 PM



- Development Site
- Museum Site
- Publicly Accessible Open Space
- Incremental Shadow
- Reduced Shadow*
- #

Publicly Accessible Open Space (see Table 5-5)
- #

Public Open Space with Historic Status or in Historic District (see Table 5-5)
- #

Natural Resource (see Table 5-5)

NOTES:

- * "Reduced Shadow" refers to shadow that would be cast in the No Action condition, by the as-of-right building, but not in the With Action condition. See Table 5-5 Notes for additional explanation.
- Only the areas of shadow highlighted in red represent incremental shadow resulting from the Proposed Project. All other shadow is future No Action shadow, i.e. baseline shadow from existing and future No Action buildings. Daylight saving time is not used—times are Eastern Standard Time, per CEQR Technical Manual guidelines. However, as Eastern Daylight Time is in effect for the March/September, May/August, and June analysis periods, add one hour to the given times to determine the actual clock time.

June 21
5:15 PM

bench seating and landscaping around the perimeter and in the north corner, adjacent to the Southbridge Towers complex. It is in good condition and heavily used.

No incremental shadow would reach the playground on the winter analysis day.

On the analysis days representing the spring and fall, and the late summer, a very small area of incremental shadow from the Development Site would move across a portion of the playground, early in the morning, over a period of between 35 minutes (March 21/September 21) to an hour and 45 minutes (May 6/August 6). At roughly the same time, a generally equal or larger area would be in sun in the With Action condition but in shadow in the No Action condition (from the as-of-right building, a portion of which would be slightly taller at the southern end of the Development Site compared to the corresponding portion of ~~Proposed Project~~previously proposed project, despite being taller overall). The incremental shadow is small enough as to likely go unnoticed, and by 9:00 AM (10:00 AM EDT) both incremental shadow and the area of “reduced” shadow would be gone.

On the June 21 analysis day, a larger but still limited area of incremental shadow from the Development Site would move across the playground from 6:30 AM to 9:25 AM (7:30 AM to 10:25 AM EDT), along with a smaller area of “reduced” shadow. The incremental shadow would occur early, as in the other months, would never cover a large proportion of the space, and sunlit areas would remain in the playground throughout the affected period.

Given the negligible effect in most seasons, and the limited extent on June 21, occurring at a time of day when usage would likely be lighter than at other times, the ~~Proposed Project~~previously proposed project’s shadow would not cause a significant impact to the playground.

Cliff Street Plaza (15 Cliff Street) (Map #13)

This residential plaza contains seating, large planters with flower beds and other plantings, and a few individual trees in tree pits. It is in good condition but lightly used.

Incremental shadow would not reach this plaza on the fall, winter, and early spring analysis days.

On the May 6/August 6 analysis day, incremental shadow from the Development Site would fall on a portion of the plaza from the start of the analysis period at 6:27 AM until 7:35 AM (7:27 AM to 8:35 AM EDT), adding to existing shadows and eliminating the sun for all but the last 10 minutes of that period. The incremental shadow would cover about a quarter of the space at its greatest extent. On the June 21 analysis day there would be only 10 minutes of incremental shadow around the same time in the morning and it would not eliminate the sun.

The incremental shadow would eliminate the patch of remaining sunlight in the plaza for about an hour in the early morning. However, this would only occur at limited times of the year—the late spring and the late summer, but not the early summer in between, and not in the fall, winter, or early spring. Further, this plaza, like most in Lower and Midtown Manhattan, is typically shady for much of the day, especially in the early morning and later afternoon, and the morning incremental shadow would not substantially alter its character. Given this fact, as well as the limited size of the incremental shadow, the limited seasonal occurrence, the early hour when usage would likely be lighter than usual, and the light usage in general of the space, the incremental shadow from the ~~Proposed Project~~previously proposed project would not significantly impact the use or character of this plaza.

DeLury Square (Map #14)

Completed in 2010, Delury Square contains a large display fountain, a mix of mature and young trees and plantings, providing a lush, green landscape, and benches. It is in good condition, and moderately used.

No incremental shadow would fall on the square in winter or in the late spring and summer months.

On the March 21/September 21 analysis day representing the early spring and the fall, incremental shadow would move across the space from approximately 8:00 AM to 9:00 AM (9:00 AM to 10:00 AM EDT), overlapping with existing shadows from the intervening 27-story Southbridge Towers building, but eliminating the remaining sun for about the first half-hour of that one-hour period. The size of the incremental shadow would range from small to up to half the space at its maximum extent around 8:30 AM (9:30 AM EDT). From a user's perspective, the incremental shadow at any one particular location, such as a bench, would last 45 minutes at most. After the departure of incremental shadow, the space would be fully or mostly in sun until about 1:00 PM (2:00 PM EDT) and partially in sun until about 3:00 PM (4:00 PM EDT).

The incremental shadow would adversely impact the use of the park on early spring and fall mornings for about a half-hour to 45 minutes when it would be of substantial size and/or eliminate the remaining sun. However, this is a relatively brief period and the park would be entirely or partially in sun from mid-morning until late afternoon. Further, no incremental shadow would occur at all for most of the year. Consequently, the ~~Proposed Project~~ previously proposed project would not cause a significant impact to the use of this park.

With regard to the park's vegetation, in the No Action condition the portion of the park receiving incremental shadow on March 21/September 21—the south half—would receive four to six hours of sun, and with the ~~Proposed Project~~ previously proposed project, this area would continue to receive four to six hours, with the exception of a small area at the southwest edge that would receive between approximately three hours 40 minutes and four hours of direct sunlight. However, even this small area would receive five hours 40 minutes or more of direct sunlight throughout the heart of the growing season in New York City (May through August). A site visit on April 16, 2021 identified the following genera or species in this southwest section of the park: dogwood (*Cornus* sp.), sweet pepperbush (*Clethra alnifolia*), cherry laurel (*Prunus laurocerasus*), leatherleaf viburnum (*Viburnum rhytidophyllum*), and periwinkle (*Vinca* sp.). In terms of light requirements, all of these plants either prefer part shade or are tolerant of part shade conditions. Consequently, the incremental shadow would not be expected to significantly impact the health of the park's vegetation in the southwest section or in any other part of the open space.

St. Margaret's House (Map #15)

This linear space occupies consists of a widened sidewalk on the north side of Fulton Street, along most of the two blocks on either side of Cliff Street (i.e., between DeLury Square to the northwest and Pearl Street Playground to the southeast). It contains benches and planters with trees and other plantings at intervals along the blocks. It is in good condition and heavily used.

No incremental shadow would fall on this resource in the winter.

In spring, summer, and fall, incremental shadow from the Development Site would fall on small portions of this resource, ranging from 40 minutes in the early spring and fall to two hours in midsummer. The new shadow would occur in the mornings, no later than 8:45 AM (9:45 AM EDT). When shadow from the Development Site would fall toward this linear space, it would mostly overlap with shadow from intervening buildings in the Southbridge Towers complex, and

only a small area could be affected at any given time. Given the small size of the incremental shadow, even at its greatest extent, and the fact that it would not eliminate the remaining sun at any time, the ~~Proposed Project~~previously proposed project's shadow would not cause a significant impact to this open space.

Southbridge Towers Complex Open Spaces (Map #16)

This privately owned cooperative complex contains four 27-story residential towers, five other six-story buildings, and publicly accessible open space areas between many of the buildings. One such open space extends from Pearl Street, across the street from the Development Site, into the center of the complex, and contains rows of mature trees in small planting beds, bench seating, and a fenced landscaped area with a lawn and other plantings. Other areas farther from the Development Site similarly contain seating areas, trees and plantings. The features and amenities are generally in good condition but lightly used.

Incremental shadows would fall on Southbridge Towers complex open spaces in all seasons. In winter, however, the shadows would be minimal, overlapping almost entirely with existing shadows.

In early spring and fall, represented by the March 21/September 21 analysis day, when shadows are shorter than in winter but still of moderate length, incremental shadow would pass across several of the open space areas over the course of the morning, from the start of the analysis day until about 11:00 AM (12:00 PM EDT). The incremental shadow would eliminate large areas of sun at times, particularly from 8:30 AM to 10:00 AM (9:30 AM to 11:00 AM EDT). In the late spring and summer months, when shadows are shorter than in other months, incremental shadow would be limited to the triangle-shaped section of open space nearest to the Development Site. It would pass across this area or a large portion of it during the same morning period, until about 11:00 AM (12:00 PM EDT), eliminating the sun from this section from 7:30 AM to 9:30 AM (8:30 AM to 10:30 AM EDT).

Portions of the open spaces in this complex would remain in sun even during the periods of greatest incremental shadow coverage, throughout the spring, summer, and fall, particularly in the late spring and summer. Nevertheless, the ~~Proposed Project~~previously proposed project would result in long durations and at times large areas of incremental shadow on these spaces in these seasons, and sunlit areas would be eliminated entirely from fairly discrete sections of the complex for periods up to two hours. Consequently, the ~~Proposed Project~~previously proposed project's shadow would significantly impact the use of these spaces for users seeking sun.

With regard to the trees and other plantings, portions of the triangle-shaped section of open space nearest the Development Site would lose up to an hour and a half of sun in the March 21/September 21 "shoulders" of the growing season, limiting their direct sun to as little as two and a half to three and a half hours. These areas would generally receive five or more hours of sun through the heart of the growing season, May through August, but near Pearl Street the trees and plantings would receive up to two hours less sun and, on May 6 and August 6, a total of three and a half to four and a half hours of direct sun. The reduction in sunlight in this area would adversely impact the trees and plantings and depending on the species and their existing health and condition the impact could potentially be significant.

375 Pearl Street (Map #25)

The office plaza located primarily on the Pearl Street frontage of this building remains under reconstruction as of this writing, but it will contain seating, landscaping, and young trees. The portion that is open on the south side is in good condition but lightly used.

In winter, incremental shadow from the Development Site would move across this plaza over the course of about an hour, approximately 1:00 PM to 2:00 PM. It would be small at first, but gradually increase in size and eliminate the remaining sun from 1:45 PM to 2:00 PM before existing five minutes later.

Incremental shadow would not reach the plaza in spring, summer, or fall.

Given the limited size and duration of incremental shadow, and the fact that it would occur only in winter when existing shadows are long and usage, already generally light, would be at its lightest, the ~~Proposed Project~~previously proposed project's shadow would not cause a significant impact to this open space.

Greenstreets (Pearl Street and Brooklyn Bridge) (Map #30)

These two large planted traffic medians contain trees and other plantings, but no seating or other amenities.

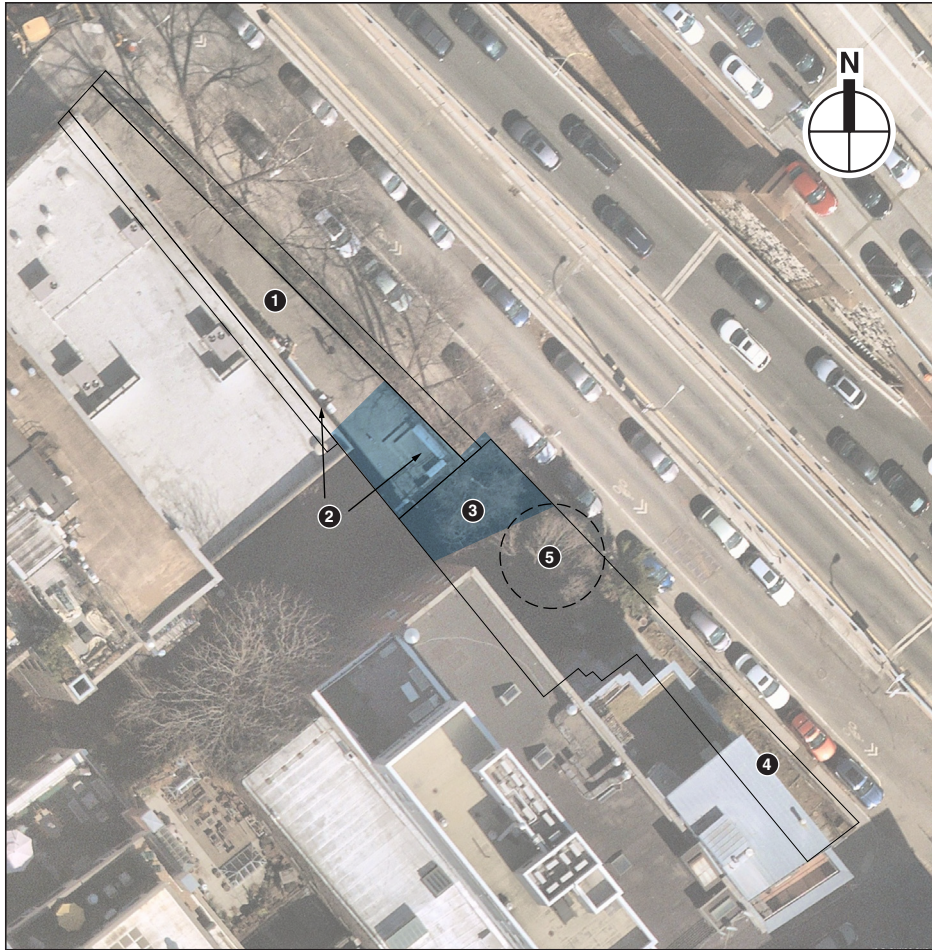
Incremental shadow would fall on these planted medians for a total of about 40 minutes in the early afternoon of the winter analysis day. The plantings are minimally sensitive at most to shadows in winter, outside the growing season. No incremental shadow would occur in the growing season months and therefore the ~~Proposed Project~~previously proposed project's shadow would not cause a significant impact to these resources.

Fishbridge Park Garden (Map #31)

This linear community garden occupies a narrow, block-long lot on the north end of the block bounded by Dover Street and the Brooklyn Bridge to the north, Pearl and Water Streets to the east and west, and Peck Slip to the south. In the early 1990s, local volunteers cleaned up the then-vacant property and built a garden, children's play area, barbecue, and dog run. In 1996, the garden was designated as City parkland. The resource is split into two sections; the upper (western) half of Fishbridge Park contains a dog run with some benches, and the narrower lower (eastern) section contains a garden with flowers and other plantings and may also be used to grow vegetables or other food. (see **Figure 5-39**). A small seating area is in the middle of the block, at the west end of the garden abutting the dog run. The dog run is at grade at the western Pearl Street entrance and maintains that grade as it extends east to the middle of the block. The eastern end of the dog run is consequently roughly 5 to 6 feet above the small sitting area and is accessible from it via steps. This park is located within the South Street Seaport Historic District Extension (S/NR-listed, NYCL). The upper portion containing the dog run is open year-round, every day from 6:00 AM to 1:00 AM. The lower portion containing the garden and sitting area is open to the public Saturdays and Sundays, dawn to dusk, from April to October.

Incremental shadow would not reach the park on the winter or midsummer (June 21) analysis days.

Generally, in existing and future No Action conditions, in the mid- to late afternoons of the spring, summer, and fall, the buildings south-adjacent to the Fishbridge Park cast their shadows across the narrow park, with the exception of a portion of the small sitting area in the middle of the block, and the end of the dog run, elevated above the sitting area. This small section containing the end

**Leaf-off****Leaf-on**

Approximate total potential area affected by incremental shadow (see Figures 5-17 to 5-19)

- 1 Dog run
- 2 Two benches at east raised end/ benches and ledge seating along most of south edge
- 3 Sitting Area (picnic table, benches, 3 or 4 mature trees and other herbaceous plants and shrubs)
- 4 Garden
- 5 Cherry Tree

of the dog run (where there is a bench for sitting) and a portion of the sitting area in the garden below are generally under a heavy tree canopy, but receive sunlight until nearly the end of the afternoon.

On the May 6/August 6 analysis day, a small incremental shadow from the Development Site passes across this sunlit section in the middle of the park for about 15 minutes around 2:30 PM (3:30 PM EDT). At its greatest extent the incremental shadow would cover no more than approximately four percent of the park. Much of the section would remain sunlit during this 15-minute period.

However, on the March 21/September 21 analysis day, incremental shadow would eliminate the small portion of remaining sunlight for an hour and 40 minutes, and partially for another 20 minutes, in the late afternoon, between approximately 2:00 PM to 4:00 PM (3:00 PM to 5:00 PM EDT). While the garden portion of the park is closed on March 21—it doesn't open until April—it is open on September 21 and shadows in the first week or two of April would be similar to March 21. Given the small extent of remaining available sunlight that would be eliminated and that these areas are often already in shadows from adjacent buildings and the tree canopy in many seasons, the incremental shadow would not substantially change the usability and character of sitting area in the garden on this analysis day, on the limited days it is open. Consequently, the incremental shadows would not result in significant impact on the use of the garden portion of the park. The usability of the dog run section of the park would be affected by the incremental shadow to a lesser degree. Although the look and feel of the dog run at the eastern end of the park and the passive use of the bench there would be adversely affected to some extent, the extent of additional shadows is small and these areas generally characterized by shading from adjacent buildings and the tree canopy. As such, the incremental shadows would not result in significant impacts on the use of the dog run either; therefore, incremental shadows would not result in significant adverse impacts to the usability of any portion of Fishbridge Park.

With regard to trees and other plantings, a portion of the section affected by incremental shadow receives substandard direct sunlight (less than four hours) in the existing/future No Action condition on the March 21/September 21 analysis day, and would receive even less as a result of the With Action condition. However, this area receives over five hours of direct sun through the heart of the growing season, May through August, in the With Action condition. For the portion of the park that could be affected by incremental shadow, a site visit on April 16, 2021 identified the following genera or species: river birch (*Betula nigra*), English ivy (*Hedera helix*), wintercreeper (*euonymus fortunei*), cherry (*Prunus* sp.), and daffodil (*Narcissus* sp.). All of these plants either prefer, or are tolerant of, part shade conditions, with the exception of certain species of cherry tree that generally require full sun. The cherry tree in the park was only identified to the genus level. However, only a small part of the tree canopy is located in the area where incremental shadow could fall. Consequently, given all these factors, the ~~Proposed Project~~previously proposed project's shadow would not be expected to significantly impact the overall health of any trees or plantings in that section.

Peck Slip (Map #32)

Extending two blocks between Water and South Streets, this resource is currently being reconstructed. It will be mostly open and paved, with several large planters. It is located in the South Street Seaport Historic District Extension (S/NR-listed) and the South Street Seaport

Historic District (NYCL). It will be in good condition when completed and was lightly used before reconstruction.⁵

Incremental shadow would not reach this plaza on the fall, winter, and early spring analysis days.

On the May 6/August 6 analysis day, incremental shadow would fall on a small area in the northern half of the open space from 3:20 PM to 4:40 PM (4:20 PM to 5:40 PM EDT). The incremental shadow would remain small and sunlit areas would remain in the space. The affected area of the space would continue to get six or more hours of sun, earlier in the day. Similarly, on the June 21 analysis day incremental shadow would fall on a portion of the space from 2:50 PM to 5:05 PM (3:50 PM to 6:05 PM EDT), would remain small in size, and plenty of sunlit area would remain during this period. The affected area would receive six or more hours of direct sun, earlier in the day.

Given the limited size of the incremental shadows, and the areas of remaining sun, the ~~Proposed Project~~previously proposed project's shadow would not cause a significant impact to this open space.

East River Waterfront Esplanade (Map #33)

The portion of the East River Esplanade located in the longest-shadow study area is part of an extended bike and pedestrian path which includes seating and landscaping and offers both active and passive recreational open space. The portion of concern is located within the South Street Seaport Historic District Extension (S/NR-listed).

Incremental shadow would reach a very small portion of the Esplanade—the end of a small lookout pier under/immediately south of the Brooklyn Bridge—from 5:05 PM to 5:20 PM (6:05 PM to 6:20 PM EDT). No incremental shadow would reach any part of the Esplanade later in the summer or in the fall, winter, or spring. The incremental shadow would be too brief and too small to significantly impact the Esplanade

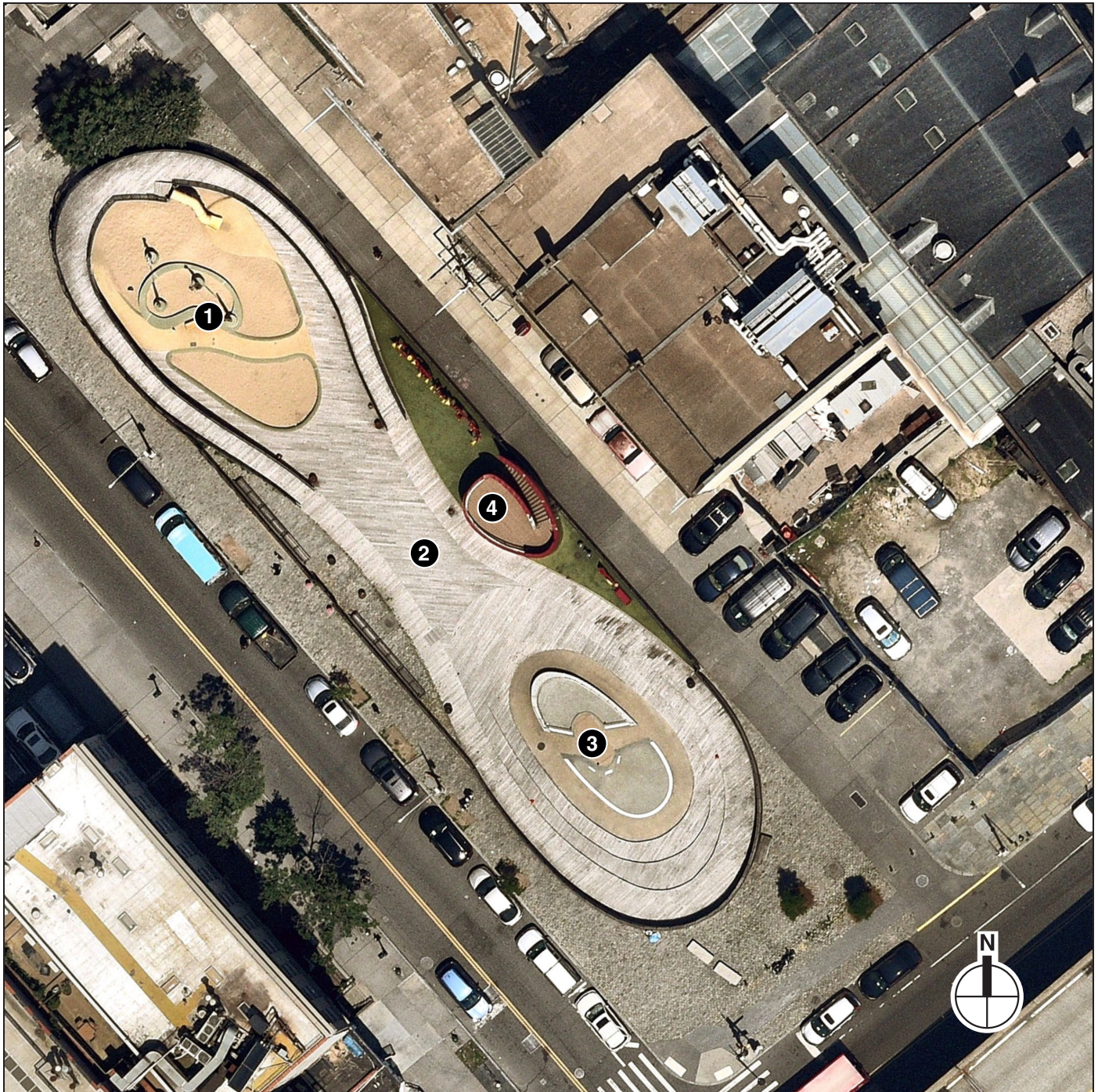
Imagination Playground (Map #34)

Imagination Playground at Burling Slip is a destination playground, an interactive, transformable space with sand, water, giant foam blocks, mats, wagons, crates, etc. that encourages children to manipulate their environment and be creative. This is the first permanent Imagination Playground, and others have since opened in locations around the world. A figure-eight shaped wooden boardwalk loops around the space, and there is a water feature at the east end. There is seating around the perimeter (see **Figure 5-40**). It is located in the South Street Seaport Historic District Extension (S/NR-listed) and the South Street Seaport Historic District (NYCL). It is in good condition and heavily used. The playground is open every day from 9:00 AM to 5:00 PM.

No incremental shadow would fall on the playground in the winter.

In the spring, summer, and fall, incremental shadow from the Museum Site would fall on a portion of the playground in the early mornings, beginning at the start of the analysis day, and ranging in duration from approximately an hour and 20 minutes up to three hours. However, much of the incremental shadow would occur before the playground opens at 9:00 AM EDT (8:00 AM EST). Fifty minutes to an hour of incremental shadow would occur after 9:00 AM in each season, and

⁵ See Chapter 4, “Open Space,” for source.



- ① Sand feature play area with slide and climbing ropes
- ② Open play area for loose foam blocks and tools
- ③ Water feature play area with surrounding seating
- ④ Bathroom/block storage/"crow's nest"

would be limited to a portion of the playground, and sunlit areas would remain in most of the playground at these times.

With regard to the playground's hours of operation, on the March 21/September 21 analysis day, at 8:00 AM (9:00 AM EDT), most of the water feature play area and surrounding seating would be in sun, the middle play area would be mostly in incremental shadow and partly in sun, the bathroom/crow's nest would be in incremental shadow, and the sand play area would be mostly in a combination of existing and incremental shadow. Thirty minutes later, the water feature play area would be entirely in sun, and most of the other areas would be in sun, with incremental shadow limited to a portion of the crow's nest area. Incremental shadow would exit 25 minutes after that, at 8:55 AM (9:55 AM EDT).

On the May 6/August 6 and June 21 analysis days, at 8:00 AM (9:00 AM EDT) most of the water feature play area and surrounding seating would be in sun and about half the middle and sand play areas would be in sun, with incremental shadow limited to a portion of the water feature play area/seating and the bathroom/crow's nest area. Incremental (and existing) shadow would continue to decrease as more and more of the playground would be in sun so that by 8:45 AM (9:45 AM EDT) both existing and incremental shadow would be minimal at the northern edge and would exist completely 10 minutes later.

Given the limited size of the incremental shadow, particularly after 9:00 AM EDT when the playground opens, the remaining sunlight during the affected period, and the early hour of occurrence when usage would almost certainly be light, and the many hours of full sunlight on the playground for the remainder of the day in these seasons, the ~~Proposed Project~~previously proposed project's shadow would not significantly impact the use of this open space.

NATURAL RESOURCES

East River (Map #1)

The East River is a tidally influenced water body supporting a diverse and productive aquatic community of primary producers (phytoplankton, zooplankton, submerged aquatic vegetation (SAV) and benthic algae and invertebrates) and fish. Sunlight penetration is an important factor in determining phytoplankton, SAV, and benthic algae productivity and biomass.

An area of incremental shadow would fall on a portion of the East River for about 20 minutes at the end of the May 6/August 6 analysis day and for about an hour at the end of the June 21 analysis day, generally under and adjacent to the Brooklyn Bridge, near the waterfront. The affected area of the river would receive direct sun for most of the day before this, on both analysis days.

The current flows swiftly in the river, near the Upper New York Bay and the confluence of the Hudson and East Rivers and would move phytoplankton and other natural elements quickly through the shaded areas. Therefore, project-generated shadows would not be expected to affect primary productivity. Incremental shadows would therefore not be likely to significantly affect aquatic resources (plankton or fish) in these areas of the river. Consequently, project-generated shadows would not cause significant adverse impacts to the East River.

E. CONCLUSIONS

The ~~Proposed Project~~previously proposed project would cast incremental shadows on 14 sunlight-sensitive open spaces and one sunlight-sensitive natural resource, in one or more seasons. In most cases the new shadow would be limited in extent and duration and would not substantially affect

the use of the spaces or the health of their trees and plantings. However, the ~~Proposed Project~~previously proposed project would result in a significant adverse shadow impact to the Southbridge Towers complex open spaces. The Development Site's shadow would pass across portions of these spaces from early to late morning in the spring, summer, and fall, covering large areas at times, and significantly altering the use of the spaces for users seeking sun, and potentially adversely impacting the health of the trees and plantings in one limited area. See Chapter 19, "Mitigation," for potential mitigation measures ~~for this significant adverse shadows impact that are being explored by the Applicant in consultation with DCP and NYC Parks~~proposed. *