Chapter 5: Shadows

5.1 Introduction

This chapter examines whether the Proposed Action would cast new shadows on any sunlight-sensitive resources and assesses the possible impacts of any such new shadows. Public open spaces, historic resources, and natural resources are all potentially sunlight-sensitive resources, and thus this chapter is closely linked to the information presented in other chapters of this environmental impact statement (EIS), particularly Chapter 4, "Open Space," and Chapter 6, "Historic and Cultural Resources."

According to the *2014 CEQR Technical Manual*, a shadows assessment is warranted if a proposed action would result in structures (or additions to existing structures) of 50 feet in height or greater, or those that would be located adjacent to, or across the street from, a sunlight-sensitive resource. As discussed in Chapter 1, "Project Description," the proposed rezoning area contains 16 Projected Development Sites and 14 Potential Development Sites. The redevelopment of the Projected Development Sites, and the less likely redevelopment of the Potential Development Sites, would all result in new buildings greater than 50 feet in height. Therefore, a shadows analysis is warranted to determine the potential of the Proposed Action to result in significant adverse impacts on sunlight-sensitive resources.

Principal Conclusions

The Proposed Action would result in one significant adverse shadows impact, to St. Bartholomew's Church and Community House (Resource H19, located on the block between East 51st and East 52nd Streets at Park Avenue). No publicly accessible open spaces would experience significant adverse shadow impacts as a result of the Proposed Action.

The sunlight-sensitive stained-glass windows of St. Bartholomew's Church and Community House would experience significant adverse shadows impacts on the May 6th and June 21st analysis days. Since the stained-glass windows are all experienced within a single large interior space, as opposed to multiple spaces where each individual space experiences only a portion of the windows, the assessment of the potential impact caused by the incremental shadows considered the cumulative effect on all of the windows together. On the May 6th / August 6th analysis day, between 1:54 PM and 4:41 PM, the effect of the incremental shadows—cast by Projected Development Site 7 (located at 300 Park Avenue on the western block front of Park Avenue, between East 49th and 50th Streets) —would be to completely eliminate all direct sunlight on the building's stained-glass windows. On June 21st, incremental shadows, also cast by Projected Development Site 7, would also affect stained-glass windows between 1:41 PM to 4:45 PM. Portions or the entirety of the majority of the stained glass windows on these facades would be covered in new incremental shadows for approximately 1 hour, 45 minutes, from 1:45 PM to 3:30 PM. During this time frame, sunlight to these stained glass windows would be completely eliminated, with the potential to affect the public's enjoyment of these features. The incremental shadows that would be cast on these two analysis days would result in a reduction in sunlight available for the enjoyment or appreciation of the building's stained glass windows, and thus the incremental shadows are being considered significant adverse shadows impacts.

The redevelopment of the 16 Projected Development Sites and the less likely redevelopment of the 14 Potential Development Sites would cast new shadows at times throughout the year on several open spaces and sunlight-sensitive features of historic architectural resources. Except for the shadows cast on St. Bartholomew's Church and Community House, none of the incremental shadows resulting from the Proposed Action would be considered significant, as the East Midtown area is densely developed with many mid- and high-rise buildings that already cast shadows on the majority of the area's sunlight-sensitive resources under Existing Conditions.

5.2 Methodology

According to the *CEQR Technical Manual*, the longest shadow a structure will cast in New York City, except for periods close to dawn or dusk, is 4.3 times its height. A preliminary screening assessment is conducted to ascertain whether new shadows resulting from a project or action could reach any sunlight-sensitive resource at any time of year. The *CEQR Technical Manual* defines sunlight-sensitive resources as those resources that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. The following are considered to be sunlight-sensitive resources:

- *Public open space* (e.g., parks, beaches, playgrounds, plazas, schoolyards, greenways, and landscaped medians with seating). Planted areas within unused portions of roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources. The uses and vegetation in an open space establish its sensitivity to shadows. This sensitivity is assessed for both (1) warm-weather-dependent features like wading pools and sand boxes, or vegetation that could be affected by loss of sunlight during the growing season (i.e., March through October); and (2) features, such as benches, that could be affected by a loss of winter sunlight. Uses that rely on sunlight include: passive use, such as sitting or sunning; active use, such as playfields or paved courts; and such activities as gardening, or children's wading pools and sprinklers. Where lawns are actively used, the turf requires extensive sunlight. Vegetation requiring direct sunlight includes the tree canopy, flowering plants, and plots in community gardens. Generally, four to six hours a day of sunlight, particularly in the growing season, is a minimum requirement.

- *Features of historic architectural resources that depend on sunlight for their enjoyment by the public*. Only the sunlight-sensitive features are considered, as opposed to the entire architectural resource. Sunlight-sensitive features include the following: design elements that are part of a recognized architectural style that depends on the contrast between light and dark (e.g., deep recesses or voids such as open galleries, arcades, recessed balconies, deep window reveals, and prominent rustication); elaborate, highly carved ornamentation; stained-glass windows; exterior building materials and color that depend on direct sunlight for visual character (e.g., the polychromy (multicolored) features found on Victorian Gothic Revival or Art Deco façades); historic landscapes, such as scenic landmarks including vegetation recognized as an historic feature of the landscape; and structural features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as an historic landmark.

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

The preliminary screening assessment consists of three tiers of analysis. The first tier determines a simple radius around the proposed buildings representing the longest shadow that could be cast. If there are sunlight-sensitive resources within this radius, the analysis proceeds to the second tier, which reduces the area that could be affected by new shadows by accounting for the fact that shadows can never be cast between a certain range of angles south of the proposed buildings 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 that possibility of new shadows on sunlight-sensitive resources, a third tier of screening analysis further refines the area that could be reached by new shadows by looking at specific representative days of the year and determining the maximum extent of shadow over the course of each representative day. If the third tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a detailed shadow analysis is warranted to determine the extent and duration of the incremental shadow resulting from the project or action.

Based on the results of the Tier 1 and Tier 2 screening assessments conducted for the Proposed Action (see Figure 5-1), a Tier 3 screening assessment is warranted to determine if, in the absence of intervening buildings, shadows resulting from a proposed action can reach a sunlight-sensitive resource, thereby warranting a detailed shadow analysis. However, given the presence and proximity of several sunlight-sensitive resources within the defined shadow radius (Figure 5-1), it is apparent that shadows from the Projected and Potential Development Sites would reach several resources on at least one of the representative analysis days. As such, a Tier 3 assessment is not presented, and the detailed analysis is presented in Section 5.4.

The detailed shadow analysis uses SketchUp 2016 3D modeling software in combination with other data sources, including New York City Geographic Information Systems (GIS) data and the United States Geological Survey (USGS).

In accordance with the *CEQR Technical Manual*, shadows on sunlight-sensitive resources of concern are modeled for four representative days of the year. For the New York City area, the months of interest for an open space resource encompass the growing season (i.e., March through October) and one month between November and February (usually December) representing a cold-weather month. Representative days for the growing season are generally the March 21st vernal equinox (or the September 21st autumnal equinox, which is approximately the same), the June 21st summer solstice, and a spring or summer day halfway between the summer solstice and equinoxes such as May 6th or August 6th (which are approximately the same). For the cold-weather months, the December 21st winter solstice is usually included to demonstrate conditions when open space users rely most heavily on available sunlight for warmth. As representative of the full range of possible shadows, these months and days are also used for assessing shadows on historic or natural sunlight-sensitive resources. The *CEQR Technical Manual* defines the temporal limits of a shadow analysis period to fall from an hour and a half after sunrise to an hour and a half before sunset.

The detailed shadows analysis provided in this chapter includes a description of the effects of incremental shadows on sunlight-sensitive resources within the maximum shadow radius, and determines whether those effects constitute significant adverse impacts under CEQR.

As described in the *CEQR Technical Manual*, an incremental shadow is generally not considered significant when its duration is no longer than 10 minutes at any time of year and the resource continues to receive substantial direct sunlight. A significant shadow impact 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 future without the project), or a reduction in direct sunlight exposure where the sensitive feature of the resource is already subject to substandard sunlight (i.e., less than the minimum time necessary for its survival).
- Historic and cultural resources: a substantial reduction in sunlight available for the enjoyment or appreciation of the sunlight-sensitive features of an historic or cultural resource.
- Open space utilization: a substantial reduction in the usability of open space as a result of increased shadow, including information regarding 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.

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

Due to the large number of resources in the shadows study area that are affected by incremental shadows over 10 minutes in duration (64 open spaces and/or historic resources), the analysis is presented in two parts. Section I, "Longer Shadow Durations," describes the resources that are affected by a more substantial shadow duration (above approximately 45 minutes for open spaces and 20 minutes for historic resources), and/or more substantial shadow coverage. Section II, "Shorter Shadow Durations," describes the resources that are only minimally affected by incremental shadow, generally between 10 and 45 minutes for open spaces (there were no sunlight sensitive historic resources which were affected by shadows for less than 20 minutes).

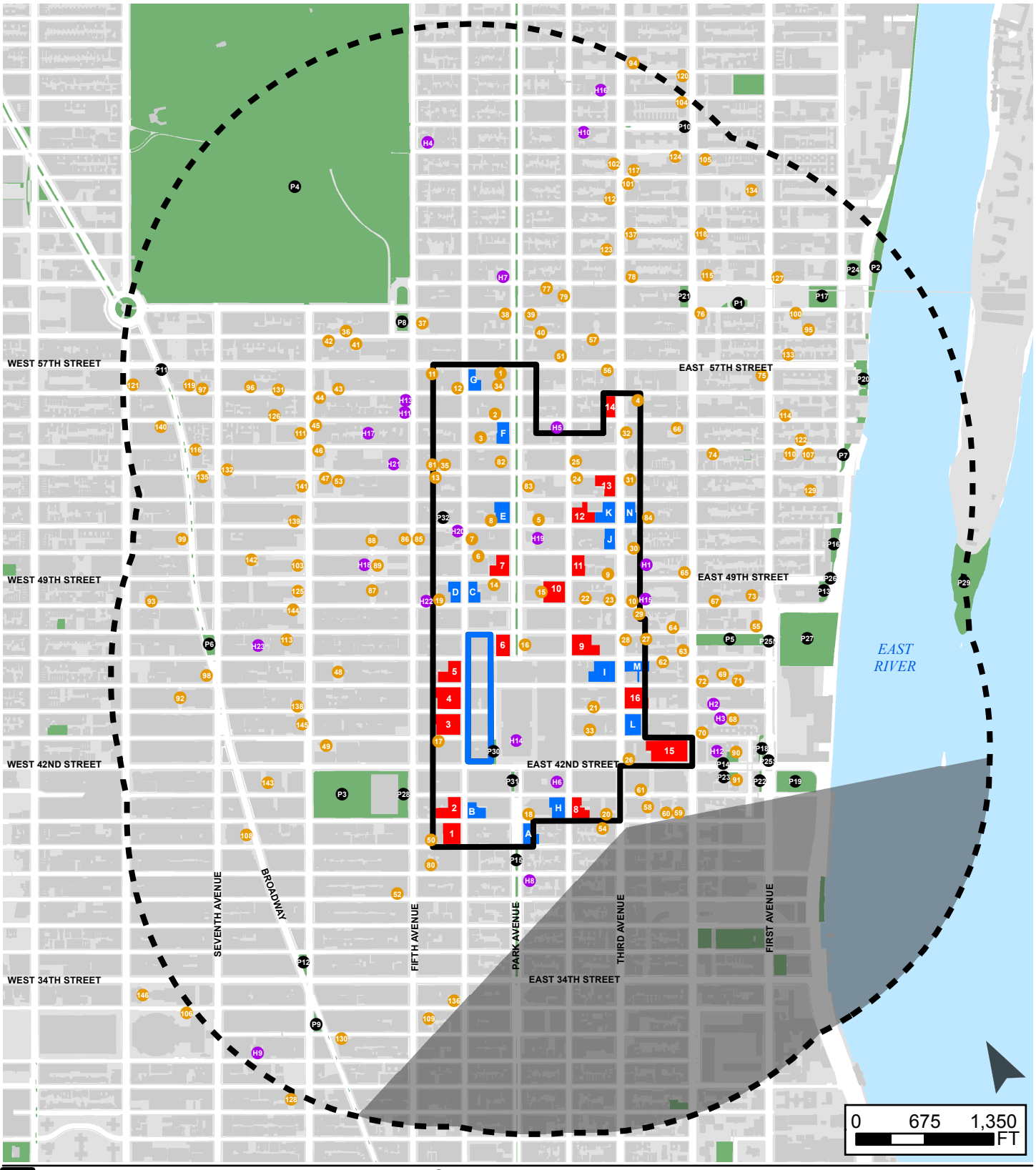
In addition to the analysis of the Proposed Action that follows, the special permit mechanisms and authorization that would be created through the Proposed Action are further analyzed in Chapter 21, "Conceptual Analysis."

Preliminary Screening Assessment

Tier 1 and Tier 2 Screening Assessments

The proposed rezoning area, including Projected and Potential Development Sites, is mapped on Figure 5-1. In concert with resources considered in Chapter 4, "Open Space," and Chapter 6, "Historic and Cultural Resources," sunlight-sensitive resources were identified and mapped on Figure 5-1.

A Tier 1 assessment was conducted for the 30 Projected and Potential Development Sites. For the Tier 1 assessment, the longest shadow that the maximum zoning envelope on each of the Development Sites could cast was calculated, and using this length as the radius, a perimeter was drawn around each site. Anything outside this perimeter representing the longest possible shadow could never be affected by project-generated shadows, while anything inside the perimeter would need additional assessment.



Proposed Greater East Midtown Rezoning Boundary

Vanderbilt Corridor (Existing Regulations Apply)

RWCDS Redevelopment Sites Combined Maximum Shadow Screening Radius

1 Projected Development Site (w/ I.D. Label)

A Projected Development Site (w/ I.D. Label)

Area that Cannot be Shaded by Projected Shadows

P1 Open Space and Recreation (w/ I.D. Label)

H1 Sunlight Sensitive Historic Resource (w/ I.D. Label)

1 Privately Owned Public Space (w/ I.D. Label)

Greater East Midtown Rezoning
Manhattan, New York

Tier 1 & Tier 2 Shadow Screening Assessment

Figure 5-1

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

Using GIS geoprocessing tools, a perimeter was generated around each development site by multiplying 4.3 times the maximum height of the Projected and Potential Development Sites, representing each site's longest shadow study area. The individual perimeters were merged into one encompassing perimeter around the Reasonable Worst-Case Development Scenario (RWCDS), representing the longest shadow study area; anything outside this perimeter could never be affected by shadows resulting from the Proposed Action (Figure 5-1). Since a number of sunlight-sensitive resources are located within the combined perimeter, a Tier 2 screening assessment was conducted.

As a result of the path that the sun travels in the northern hemisphere, no shadow can be cast in a triangular area south of any given development site. In New York City, this area lies between -108 degrees and 108 degrees from true north. Figure 5-1 illustrates this triangular area; the radius was adjusted to exclude the triangular area of the southernmost RWCDS sites. The complementing area to the north within the combined longest shadow study area represents the remaining area that could potentially experience new shadows resulting from the Proposed Action.

Tier 3 Screening Assessment

According to the *CEQR Technical Manual*, a Tier 3 screening assessment should be performed to determine if, in the absence of intervening buildings, shadows resulting from a proposed action can reach a sunlight-sensitive resource, thereby warranting a detailed shadow analysis. However, given the presence and proximity of several sunlight-sensitive resources within the defined shadow radius (Figure 5-1), it was apparent that shadows from the Projected and Potential Development Sites would reach several resources on at least one of the representative analysis days. As such, this intermediate step in the assessment (Tier 3) was skipped, and a detailed shadow analysis was conducted, as detailed in Sections 5.6 and 5.7.

Resources of Concern

In coordination with the analyses in Chapter 4, "Open Space," and Chapter 6, "Historic and Cultural Resources," all publicly-accessible open space resources and sunlight-sensitive historic architectural resources within the maximum shadow radius were screened as part of the shadow assessment. However, only those resources that would be affected by incremental shadows cast by a Projected or Potential Development Site were included in the detailed analysis.

Open Space Resources

As illustrated on Figure 5-1 and listed in Table 5.1, there are 54 open space resources within the maximum shadow radius for the Proposed Action that would be affected by incremental shadows, including two open space resources that would be created in the No-Action Condition. As listed in Table 5.2, many open space resources within the maximum shadow radius would not be affected by incremental shadows, either because of their location relative to the Projected and Potential Development Sites or because they are indoors or otherwise covered from direct sunlight exposure.

Historic Resources

As discussed in Section 5.3, historic resources within the maximum shadow radius were first evaluated to determine whether they contained features that depend on sunlight for their enjoyment by the public. All sunlight-sensitive historic resources within the maximum shadow radius are included on Figure 5-1. There are 14 historic resources that would be reached by incremental shadows, however as shown in the analysis that follows – not all of the sunlight sensitive features on these historic resources would be affected by shadows. As part of the assessment, the location of the resource in relation to Projected and Potential Development Sites was also evaluated; for example, it was noted that only those façades of a resource that face a Projected or Potential Development Site could be covered by incremental shadows due to the Proposed Action. Those sunlight-sensitive historic resources that would be affected by incremental shadows are listed in Table 5.3, while those that would not be affected by incremental shadows are listed in Table 5.4.

5.3 Detailed Shadow Analysis

The Future without the Proposed Action (No-Action Condition)

In the future without the Proposed Action, it is expected that the proposed rezoning area would experience limited overall growth, much of it being in non-office uses including hotels and residential buildings. As described in Chapter 2, "Land Use, Zoning, and Public Policy," 37 development projects within the proposed rezoning area would be completed in the future without the Proposed Action. Two of these developments would occur on Projected Development Sites identified in the RWCDS. Development expected to occur on the Projected Development Sites in the No-Action Condition would range in height from an estimated 130 to 150 feet tall. In addition, there are 14 development projects on other sites within the proposed rezoning area that are either planned or currently under construction, which would range in height from 120 to 1,400 feet tall.

In the future without the Proposed Action, five new sunlight-sensitive, publicly accessible open space resources would be added within the defined shadow radius by the 2036 analysis year. Two New York City Department of Transportation open space projects are within the defined shadow radius, as described below:

- A 0.37-acre plaza on both sides of Park Avenue between East 41st and East 42nd Streets, which would be created as part of the NYC Plaza Program, an initiative to transform underused streets into vibrant, social public spaces (#105 on Figure 5-1). This permanent year-round public plaza would be known as Pershing Square Plaza, taking the same name as the existing seasonal plaza that occupies only the west side of Park Avenue between East 41st and East 42nd Streets.
- A 0.28-acre plaza on Vanderbilt Avenue between East 42nd and East 43rd Streets (#104 on Figure 5-1). This planned plaza would comprise a 60-foot-wide by 200-foot-long area along Vanderbilt Avenue that will be closed to vehicular traffic and dedicated to pedestrian use.

Additionally, the New York City Department of Parks and Recreation would create a new open space resource—the Outer Detour Roadway (ODR) esplanade—along the East River within the defined

shadow radius. The ODR esplanade would be located 30 feet off the bulkhead, would be 40 feet wide, and would be accessed via a 12-foot access path at East 48th Street.[1]

Furthermore, two planned private developments would provide on-site, publicly accessible plazas within the defined shadow radius, as follows:

- A mixed commercial/residential development at 7-11 East 51st Street/12-16 East 52nd Street (#100 on Figure 5-1) would include a 0.07-acre plaza.
- A mixed commercial/residential development at 40-50 East 57th Street/434 Park Avenue (#99 on Figure 5-1) would include a 0.14-acre plaza.

The Future with the Proposed Action (With-Action Condition)

As described in Chapter 1, "Project Description," the RWCDS under the Proposed Action includes development on 16 Projected Development Sites and 14 Potential Development Sites. As noted in Tables 5.1 and 5.3 and discussed in the following sections, the Projected and Potential Developments resulting from the Proposed Action would cast incremental shadows on several sunlight-sensitive open spaces and historic resources in one or more of the analysis periods. An assessment of potential impacts due to incremental shadows on each of the identified resources of concern is provided below. Table 5.5 contains summary information regarding entry and exit times and estimated durations of the incremental shadows. The start times shown in the tables represent the time that the incremental shadows first hit any portion of the open space or sunlight-sensitive feature of the historic resource of concern, and the end time represents the time that the incremental shadows leave that element completely. As shown in Table 5.5, a sunlight-sensitive resource can be affected by incremental shadows from more than one site, yielding multiple entries and exits. All times referenced in this section are Eastern Standard Time (EST); daylight savings time is not considered. To complement the information contained in Table 5.5, Figures 5-2 through 5-65 depict the incremental shadows as cast on the affected sunlight-sensitive resources.

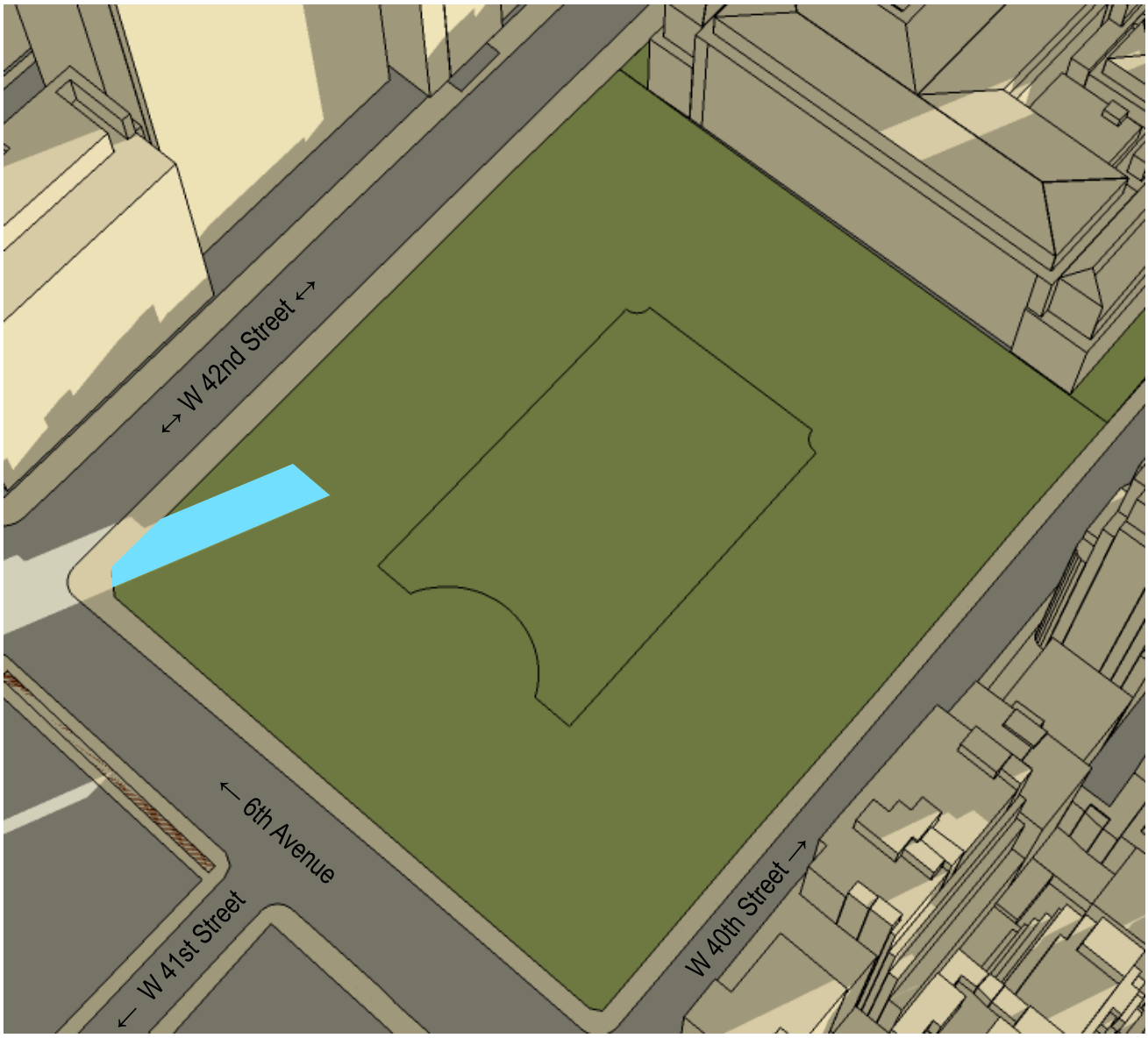
5.4 Assessment

Open Spaces

The assessment following presents the open space resources, both parks and privately owned public spaces, that could be affected in the future with the Proposed Action. New open spaces that would be in place in the future without the Proposed Action are identified and evaluated as well.

As noted earlier, due to the large number of resources in the shadows study area that are affected by incremental shadows over 10 minutes in duration (approximately 54 open spaces and/or historic resources), the analysis is presented in two parts:

[1] The ODR Esplanade is included for shadow analysis purposes, but was not included in the Open Space analysis as it is located outside of the Open Space study area.



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

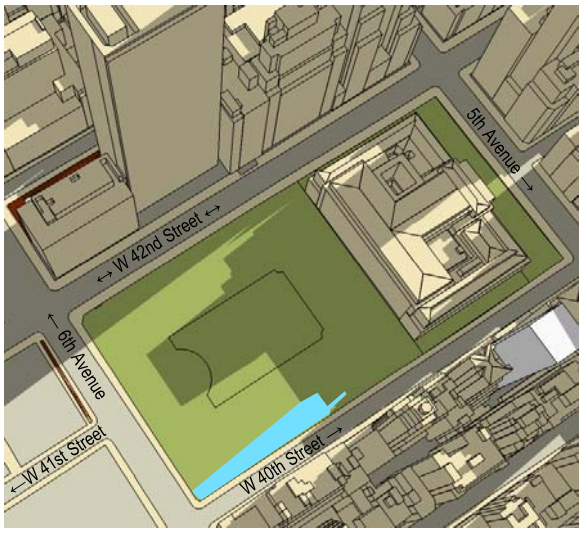
Greater East Midtown Rezoning
Manhattan, New York

P3 - Bryant Park
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 9:15 AM

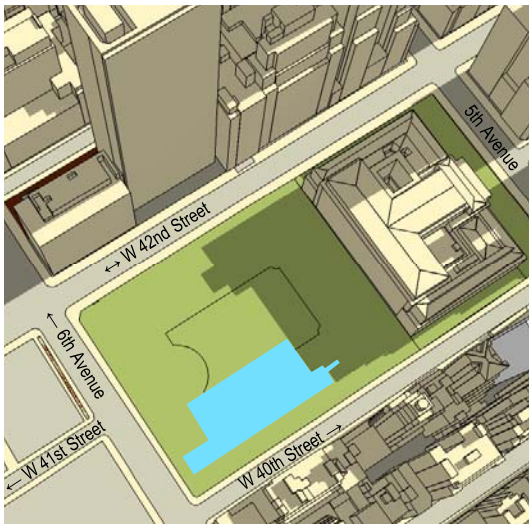
Figure 5-2a

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8:15 AM



8:45 AM



9:15 AM



9:45 AM



Projected Development Site	New Incremental Shadow
Potential Development Site	New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
Historic Resource	No-Action Shadow - Historic Resource
Open Space and Recreation	No-Action Shadow - Open Space and Recreation
Privately Owned Public Space (POPS)	No-Action Shadow - POPS

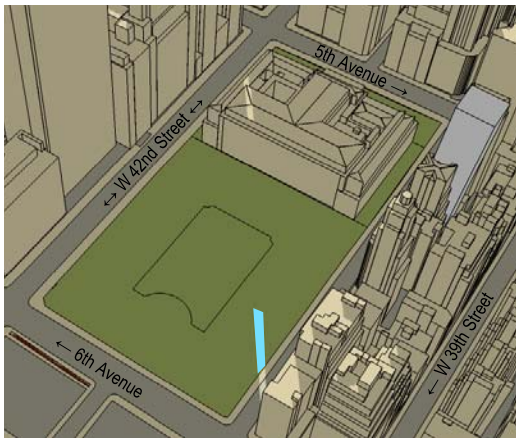
Greater East Midtown Rezoning
Manhattan, New York

P3 - Bryant Park
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day, 8:15 to 9:45 AM

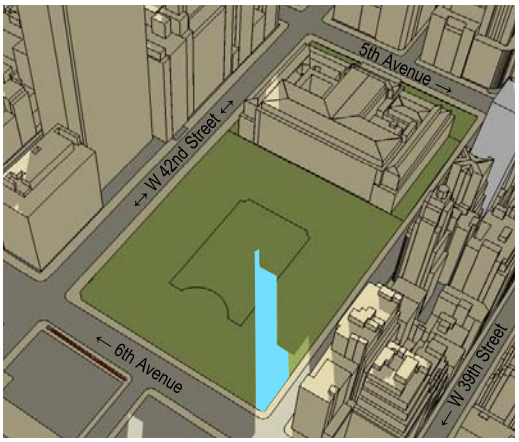
Figure 5-2b

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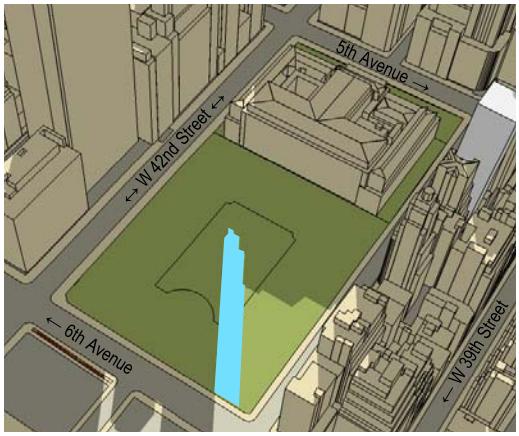
6:30 AM



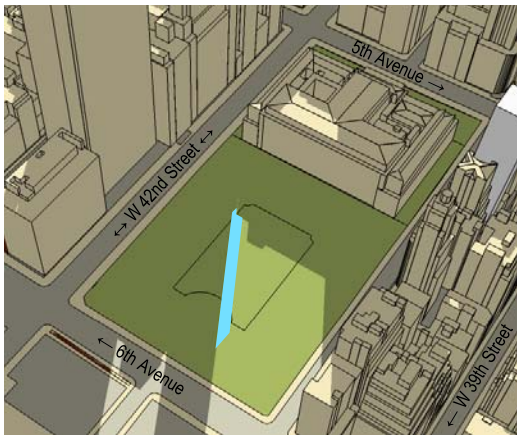
6:45 AM



7:00 AM



7:15 AM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

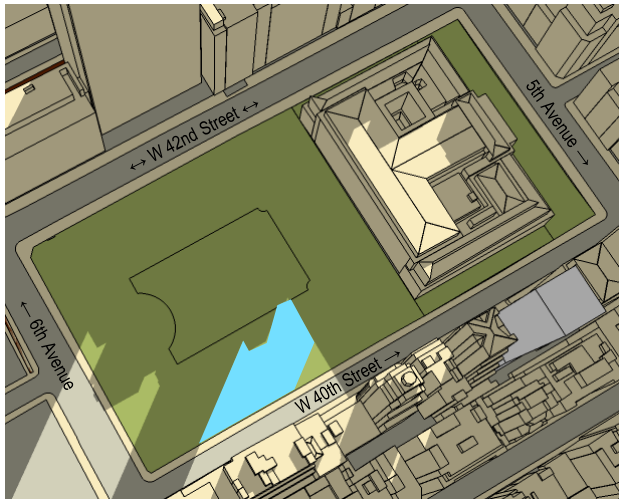
Greater East Midtown Rezoning
Manhattan, New York

P3 - Bryant Park
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day: 6:30 to 7:15 AM

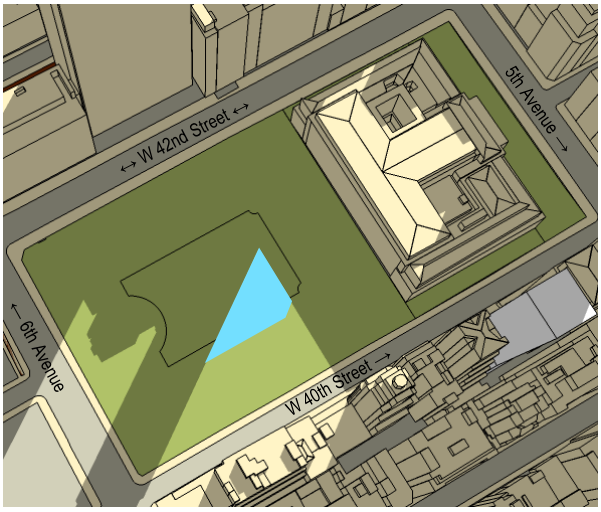
Figure 5-2c

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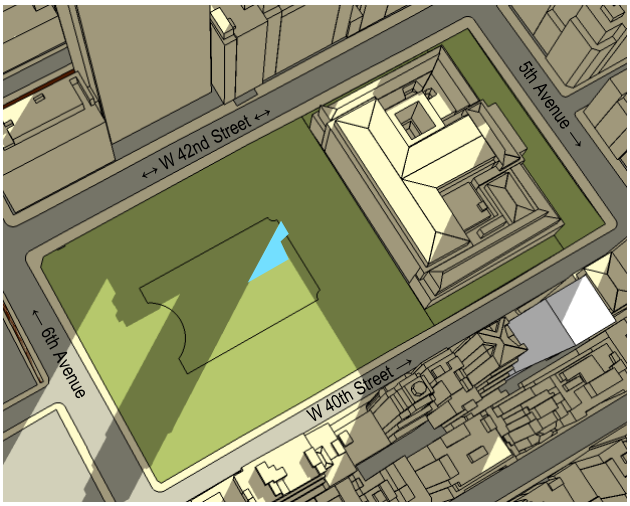
7:00 AM



7:15 AM



7:30 AM



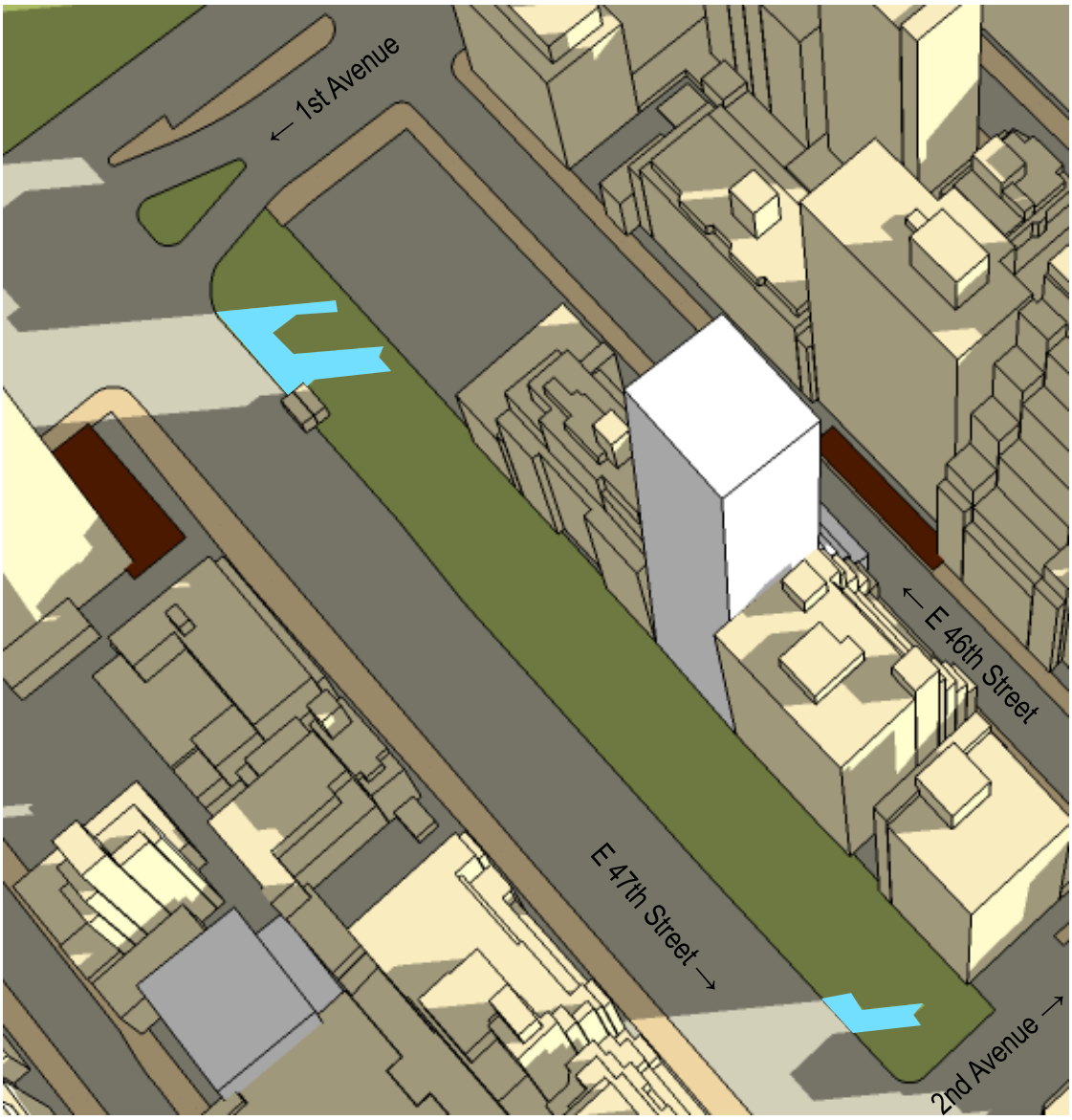
Projected Development Site	New Incremental Shadow
Potential Development Site	New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
Historic Resource	No-Action Shadow - Historic Resource
Open Space and Recreation	No-Action Shadow - Open Space and Recreation
Privately Owned Public Space (POPS)	No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P3 - Bryant Park
Representative Worst-Case Incremental Shadows
June 21 Analysis Day: 7:00 to 7:30 AM

Figure 5-2d

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Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

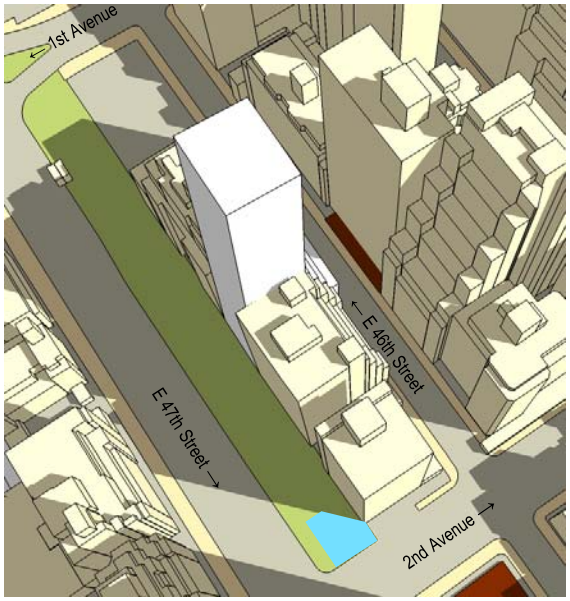
Greater East Midtown Rezoning
Manhattan, New York

P5 - Dag Hammarskjold Plaza
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day at 3:40 PM

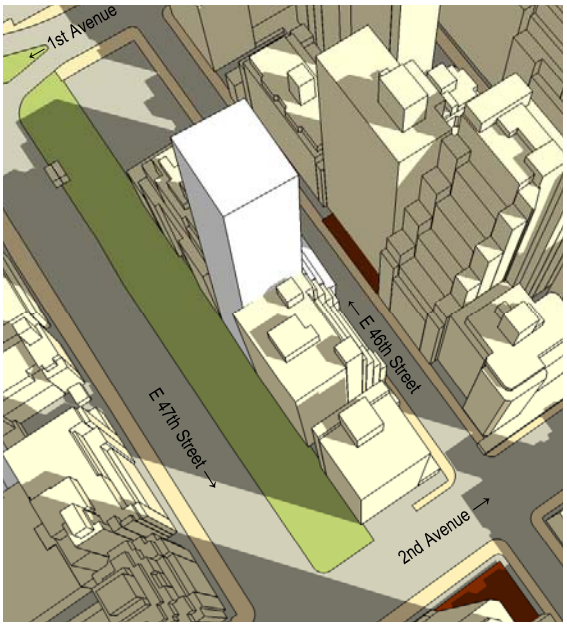
Figure 5-3a

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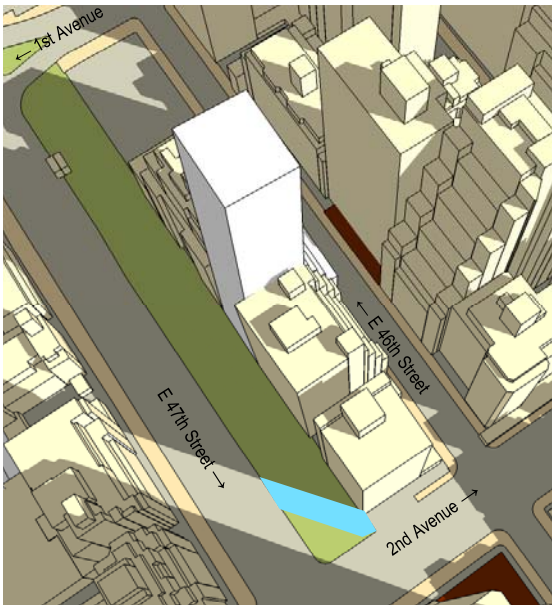
3:15 PM



3:30 PM



3:45 PM



Projected Development Site	New Incremental Shadow
Potential Development Site	New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
Historic Resource	No-Action Shadow - Historic Resource
Open Space and Recreation	No-Action Shadow - Open Space and Recreation
Privately Owned Public Space (POPS)	No-Action Shadow - POPS

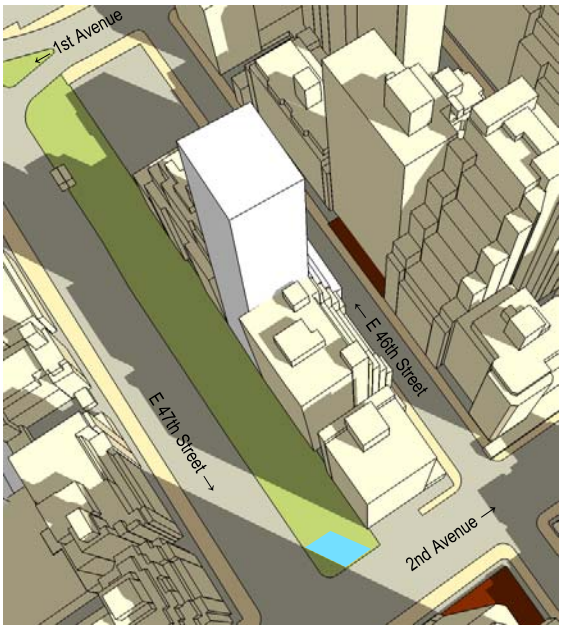
Greater East Midtown Rezoning
Manhattan, New York

P5 - Dag Hammarskjold Plaza
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day: 3:15 to 3:45 PM

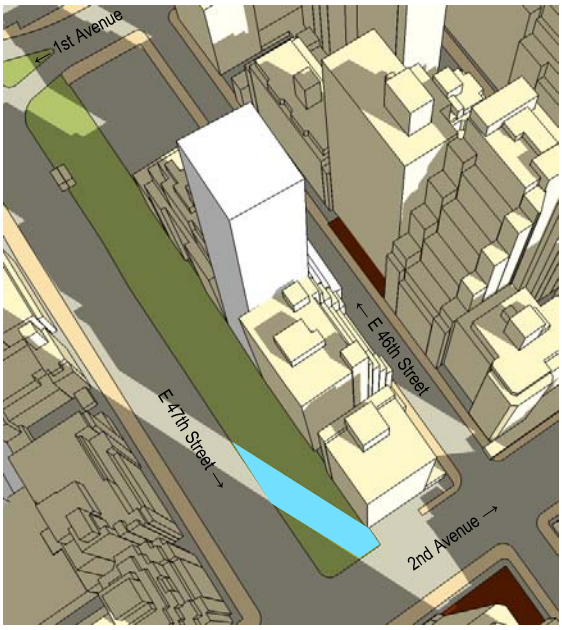
Figure 5-3b

vhb

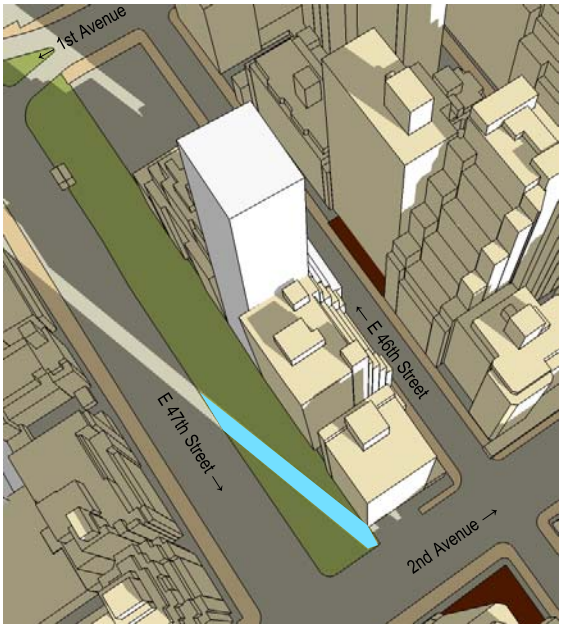
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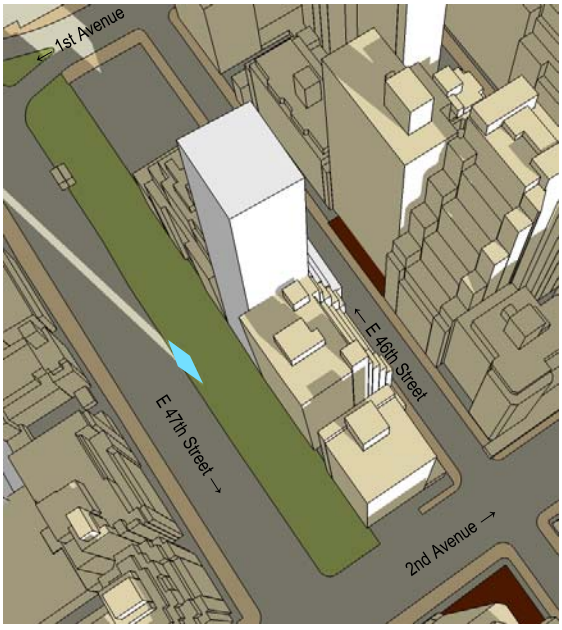
4:30 PM



5:15 PM



5:40 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

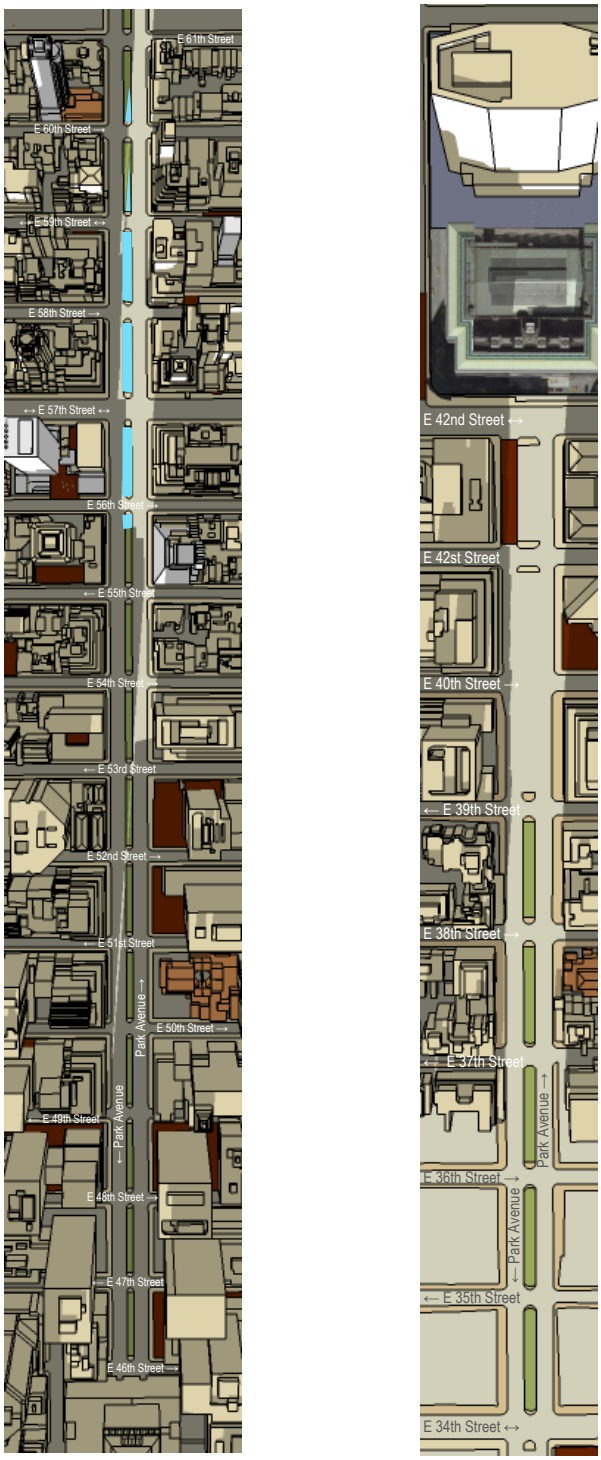
Greater East Midtown Rezoning
Manhattan, New York

P5 - Dag Hammarskjold Plaza
Representative Worst-Case Incremental Shadows
June 21 Analysis Day: 3:45 to 5:40 PM

Figure 5-3c

vhb

North of 46th Street **South of 42nd Street**



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

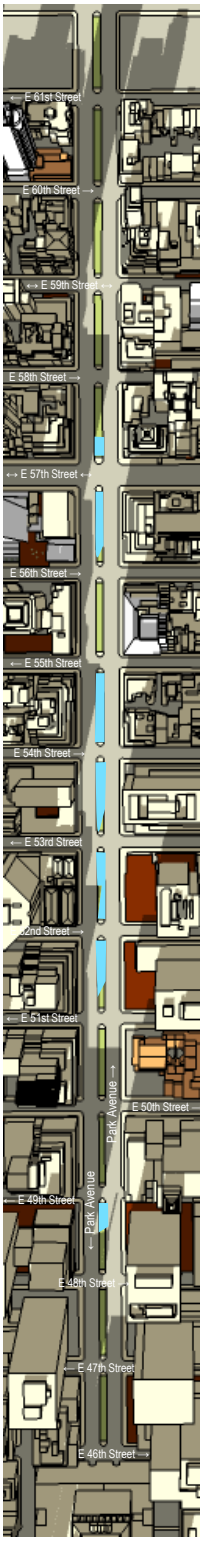
Greater East Midtown Rezoning
Manhattan, New York

P15 - Park Avenue Malls
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 2:10 PM

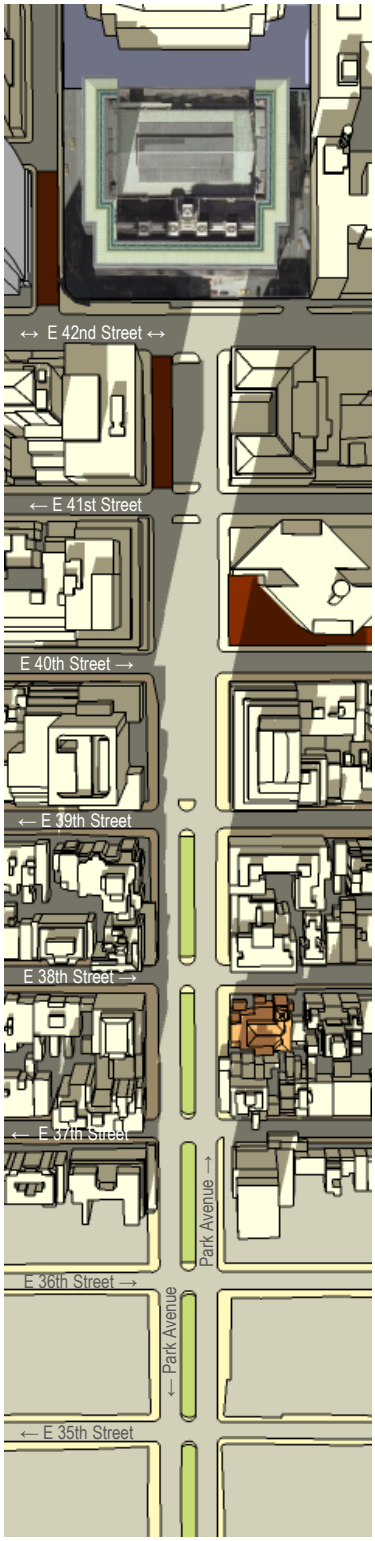
Figure 5-4a

vhb

North of 46th Street



South of 42nd Street



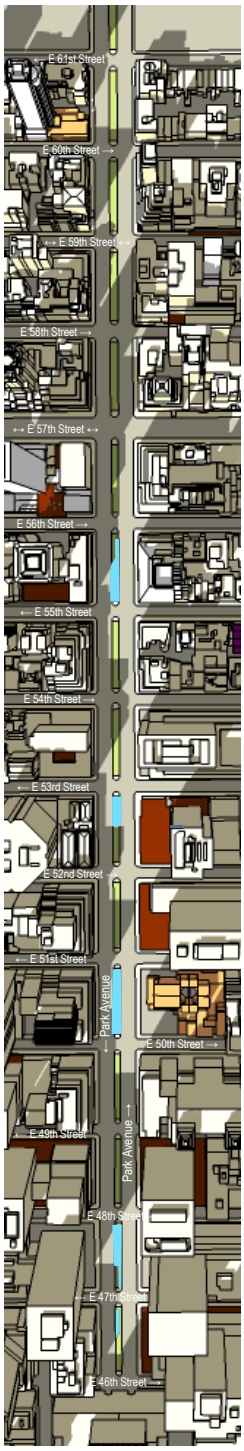
- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

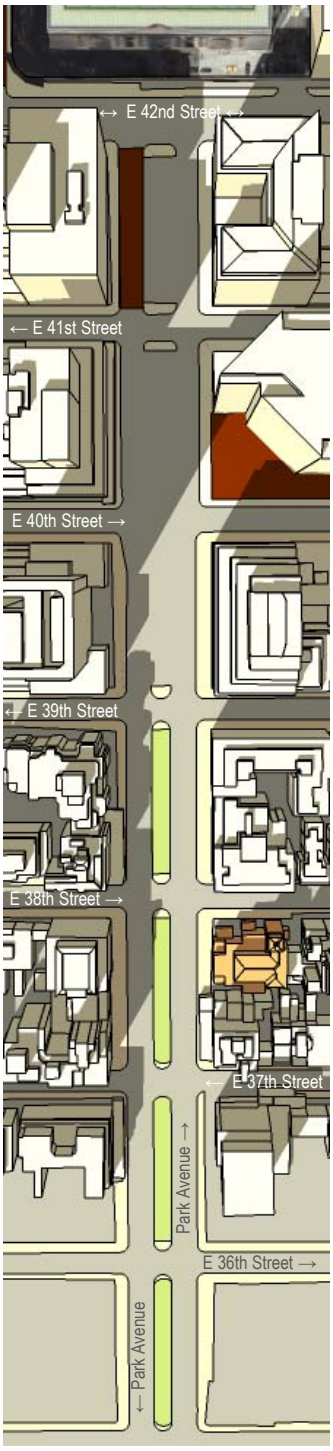
P15 - Park Avenue Malls
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day at 2:00 PM

Figure 5-4b

North of 46th Street



South of 42nd Street



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

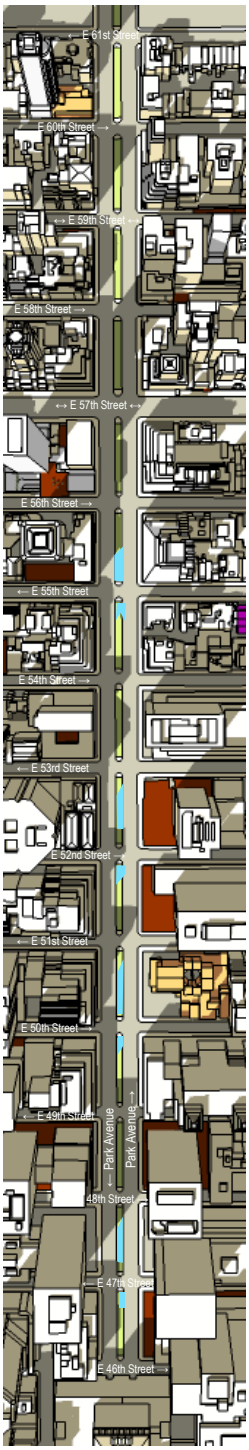
Greater East Midtown Rezoning
Manhattan, New York

P15 - Park Avenue Malls
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 2:00 PM

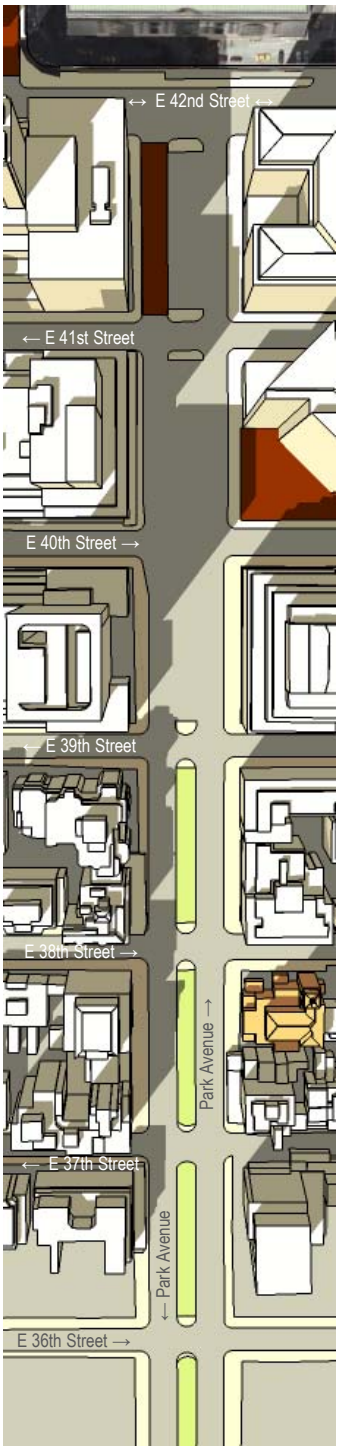
Figure 5-4c

vhb

North of 46th Street



South of 42nd Street



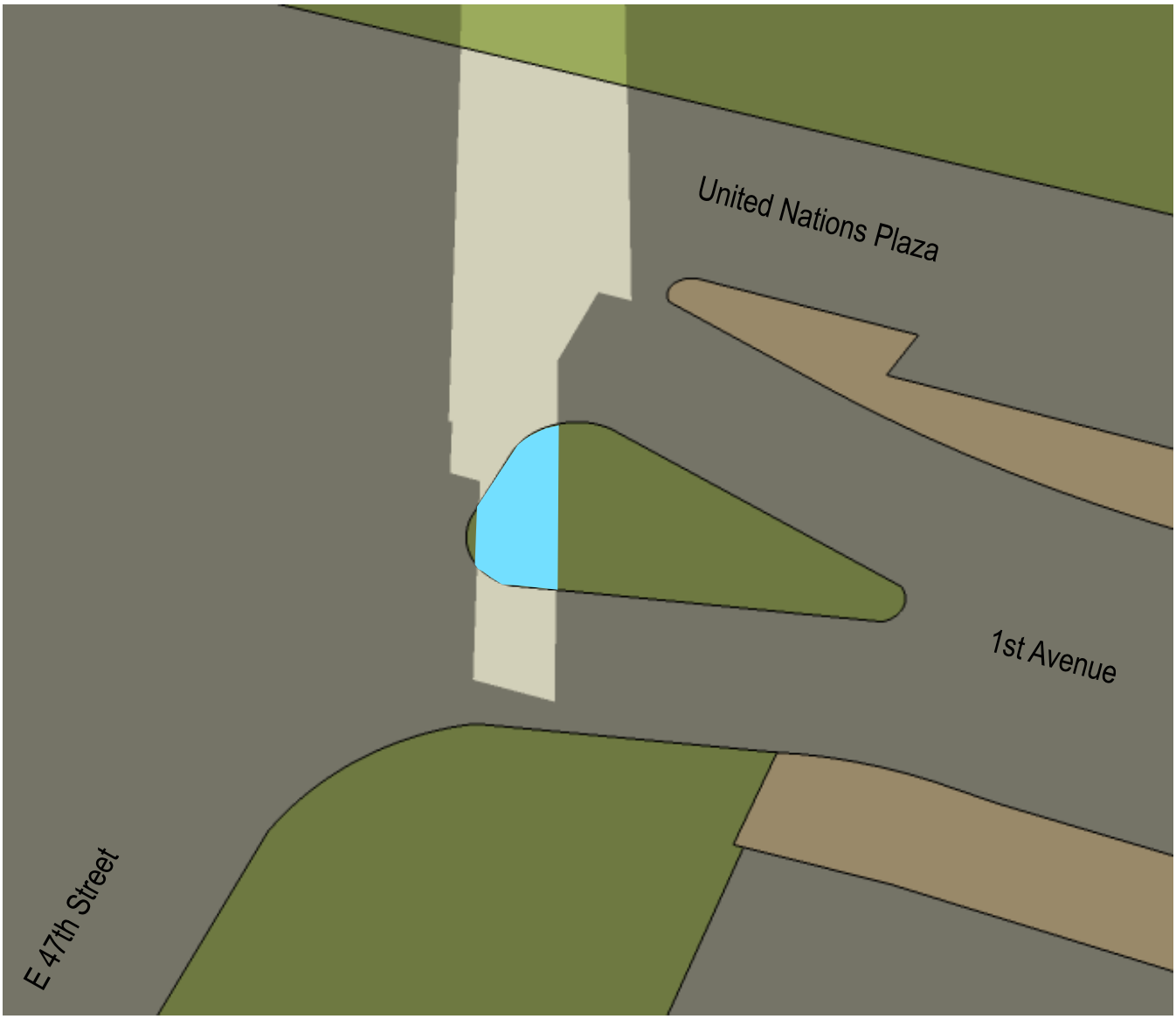
- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P15 - Park Avenue Malls
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 2:00 PM

Figure 5-4d

vhb



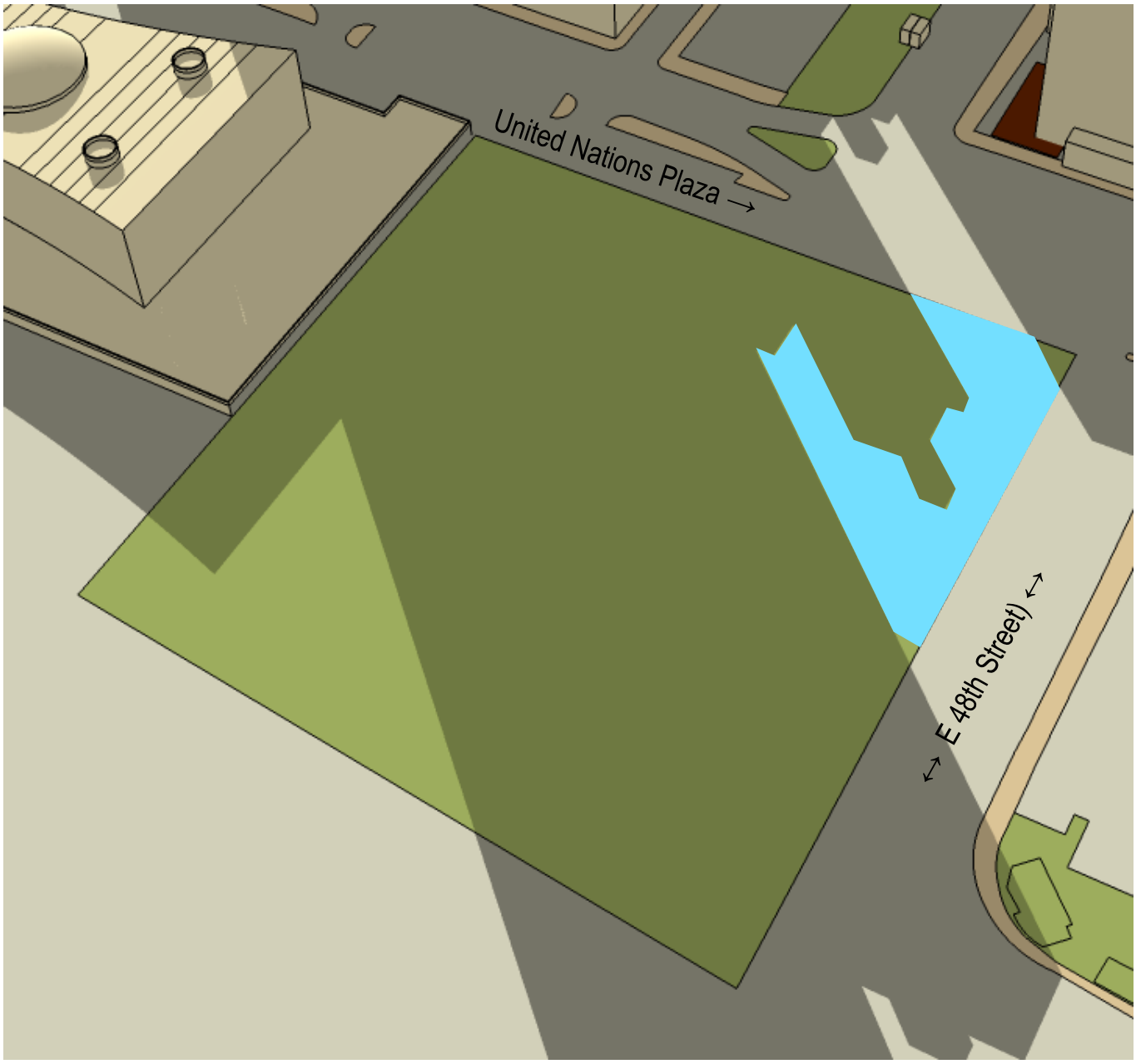
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P25N - Greenstreets: First Avenue (North)
Representative Worst-Case Incremental Shadows
May 6 / Agugust 6 Analysis Day at 9:15 AM

Figure 5-5

vhb



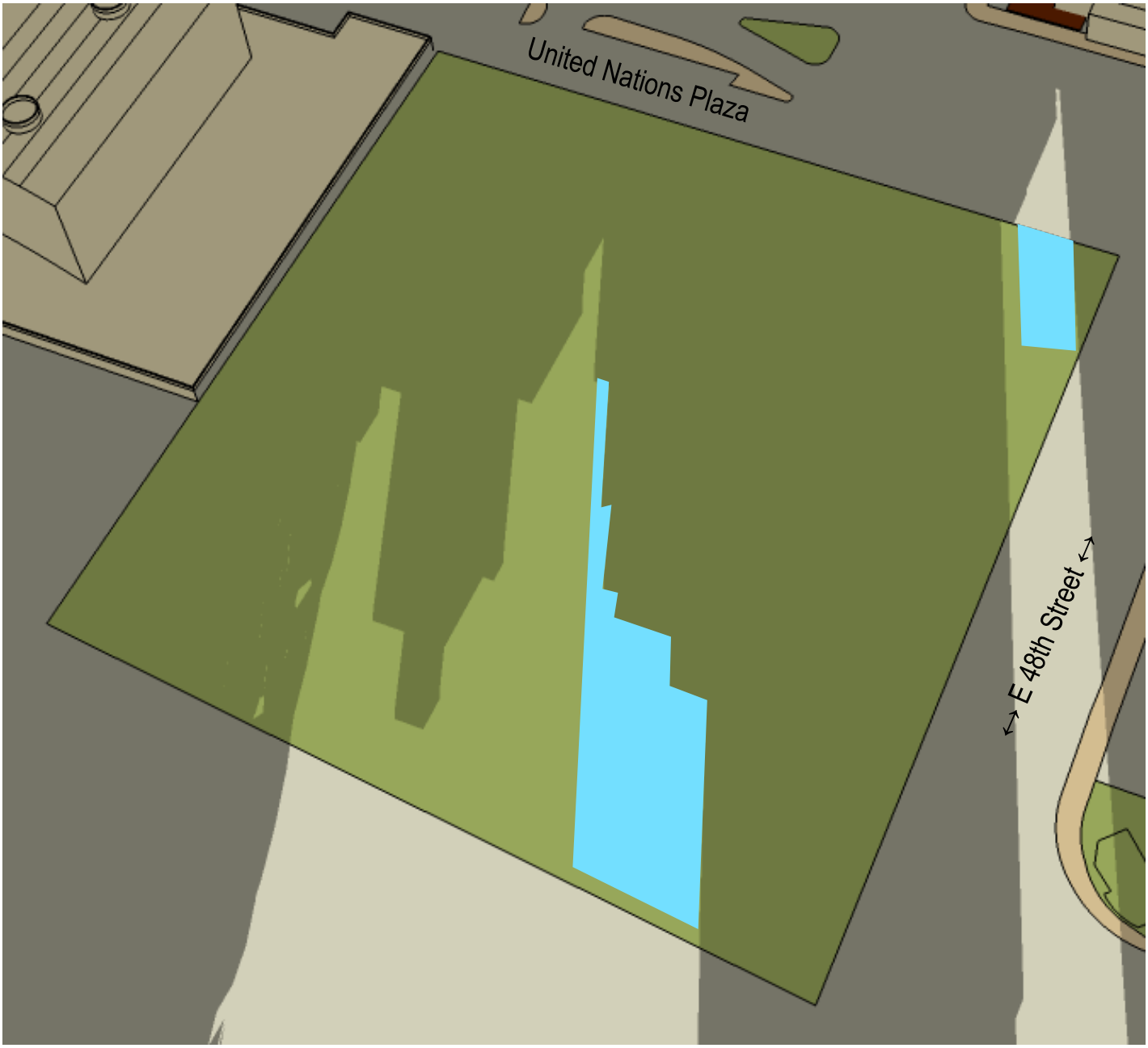
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P27 - United Nations Sculpture Garden
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day at 4:15 PM

Figure 5-6a

vhb



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P27 - United Nations Sculpture Garden
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 5:15 PM

Figure 5-6b

vhb



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

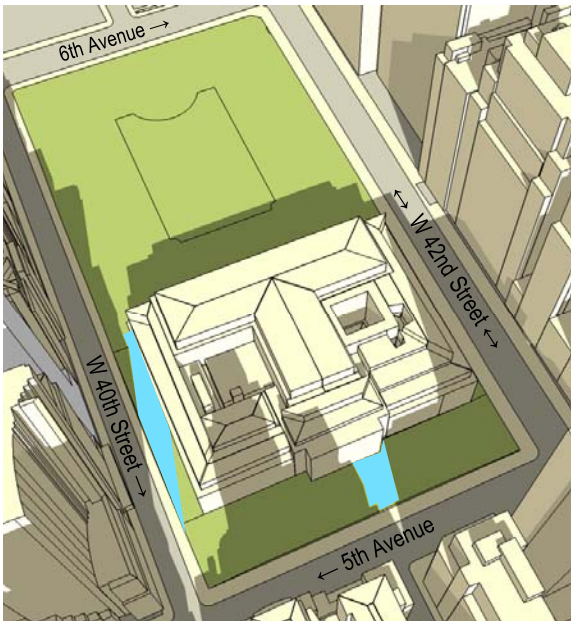
Greater East Midtown Rezoning
Manhattan, New York

P27 - United Nations Sculpture Garden
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 5:30 PM

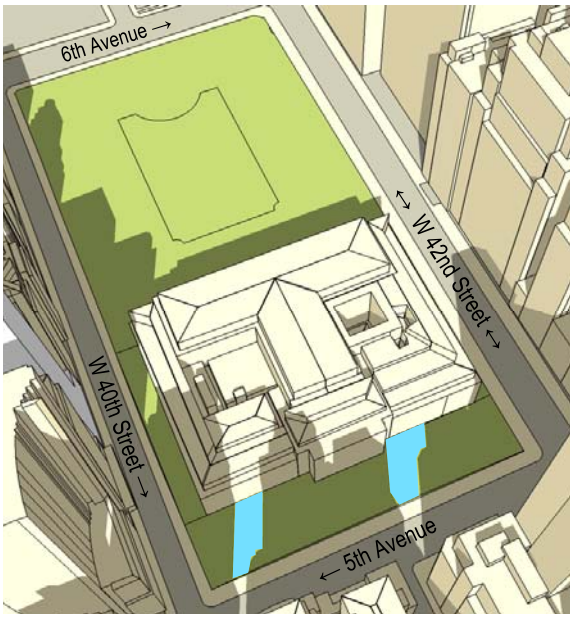
Figure 5-6c

vhb

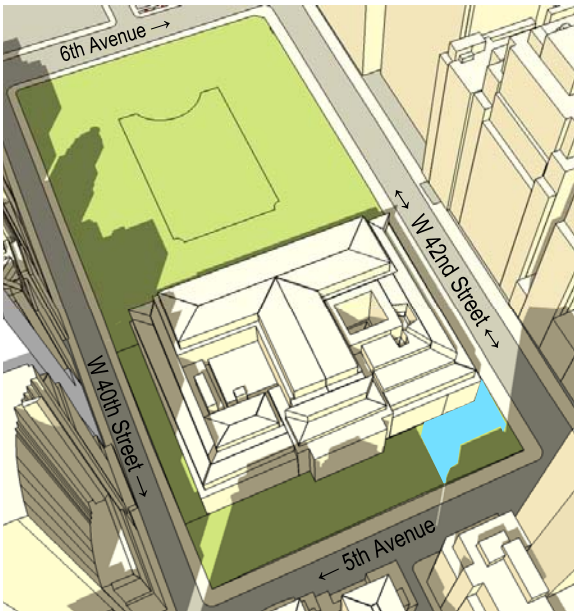
9:30 AM



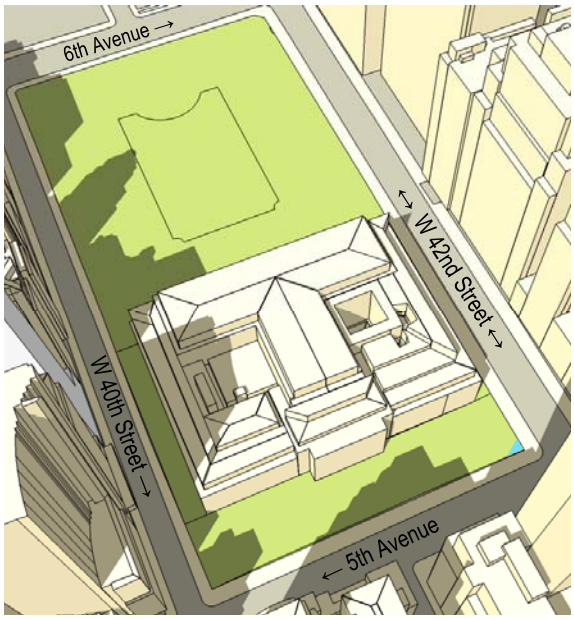
10:15 AM



11:00 AM



11:40 AM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P28 - Stephen A. Shwarzman Building - Steps and Terrace
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day: 9:30 to 11:40 AM

Figure 5-7a

vhb

9:15 AM



10:00 AM



10:45 AM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P28 - Stephen A. Shwarzman Building - Steps and Terrace
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day: 9:15 to 9:45 AM

Figure 5-7b

vhb

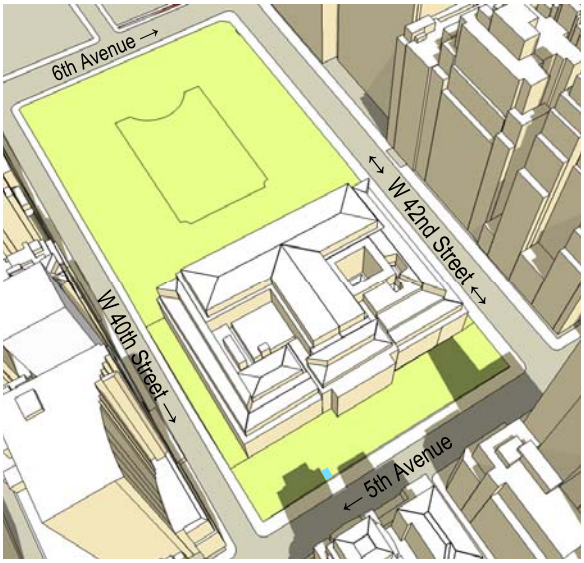
9:30 AM



10:00 AM



10:30 AM



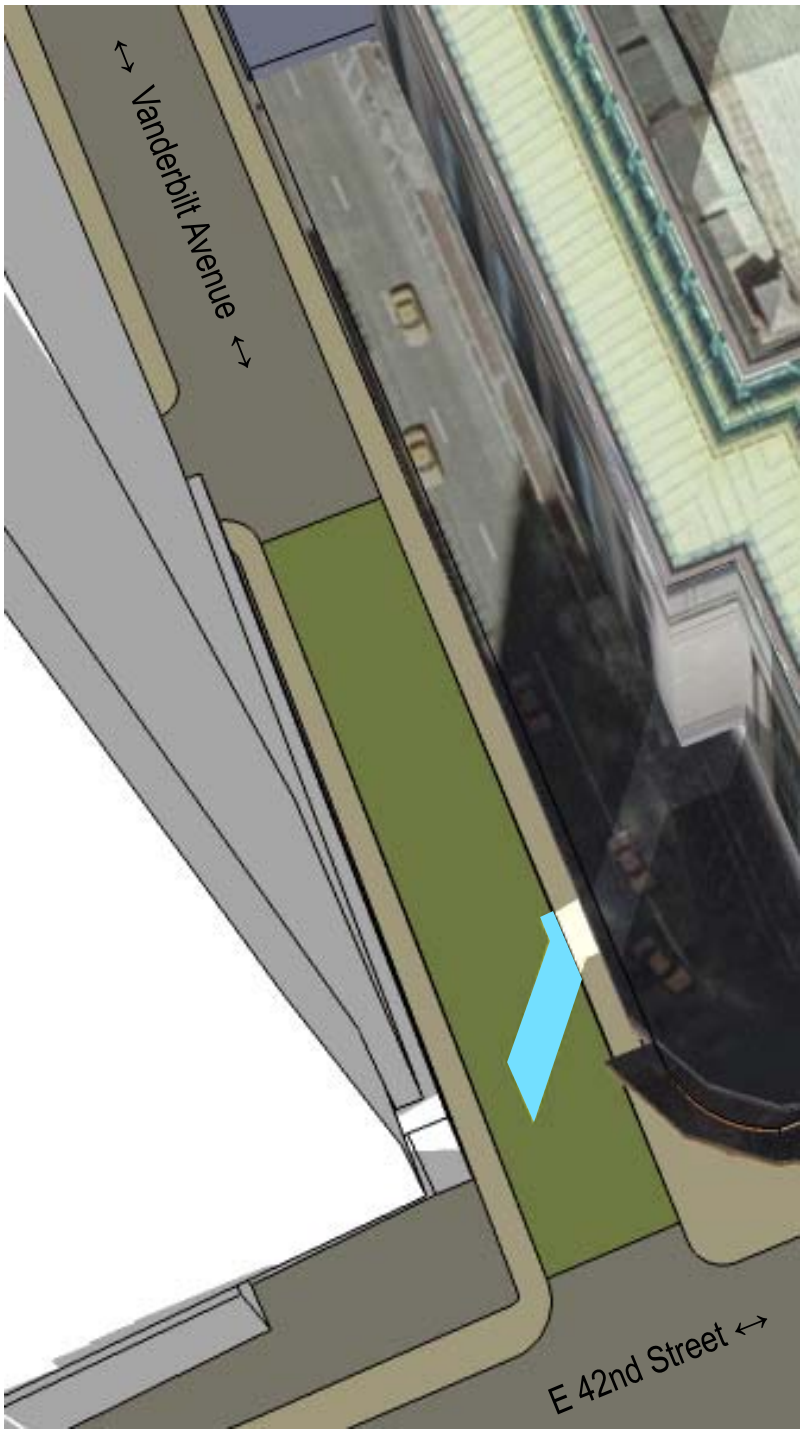
- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P28 - Stephen A. Shwarzman Building - Steps and Terrace
Representative Worst-Case Incremental Shadows
June 21 Analysis Day: 9:30 to 10:30 AM

Figure 5-7c

vhb



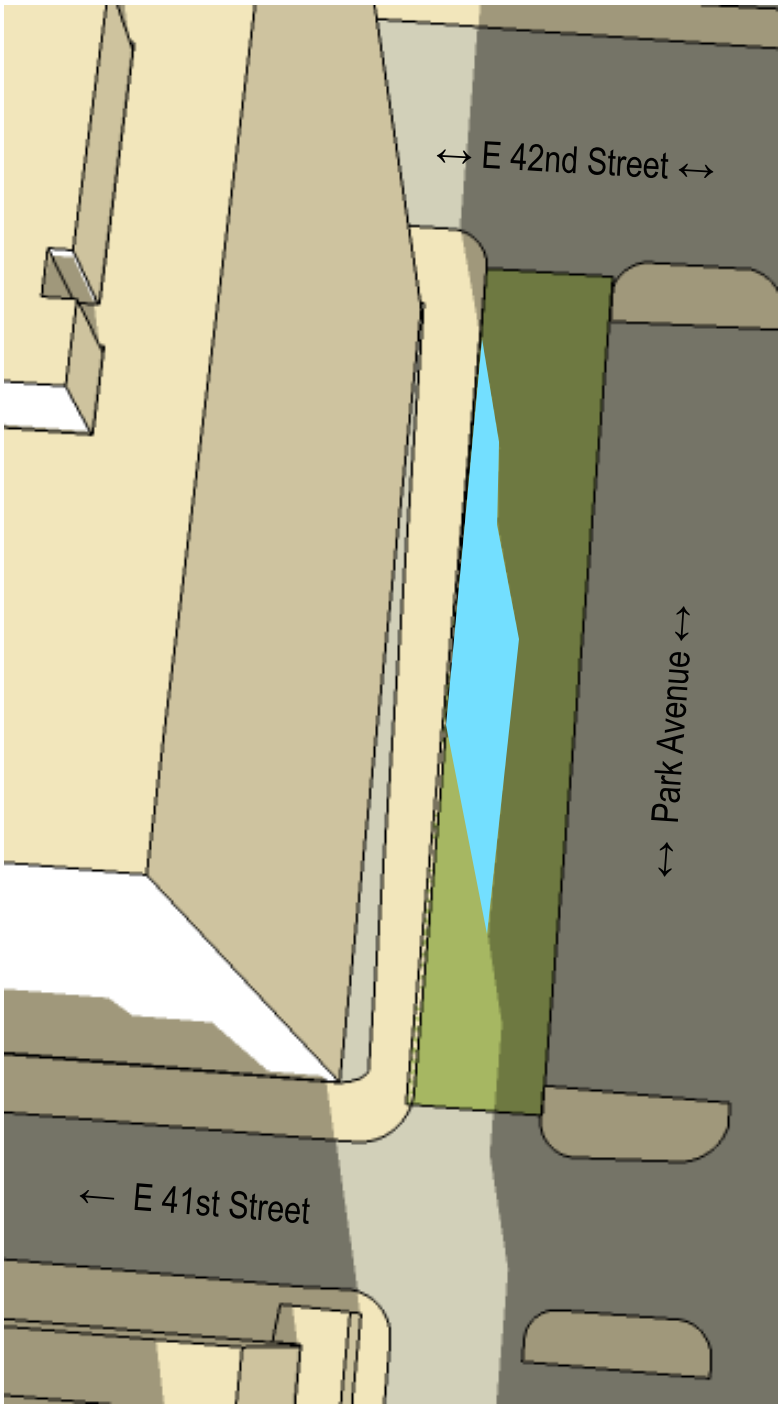
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P30 - One Vanderbilt Plaza (No-Action)
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 2:35 PM

Figure 5-8

vhb



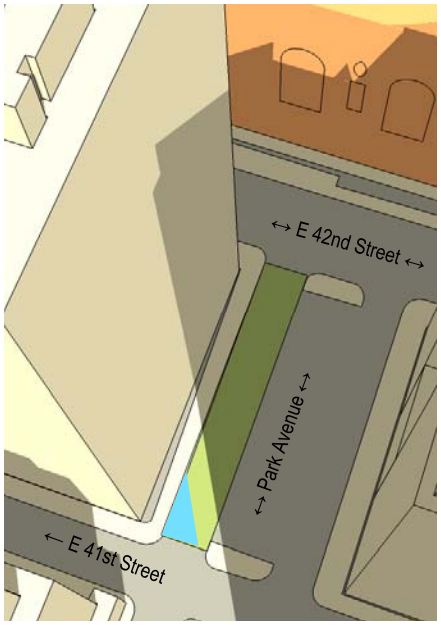
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

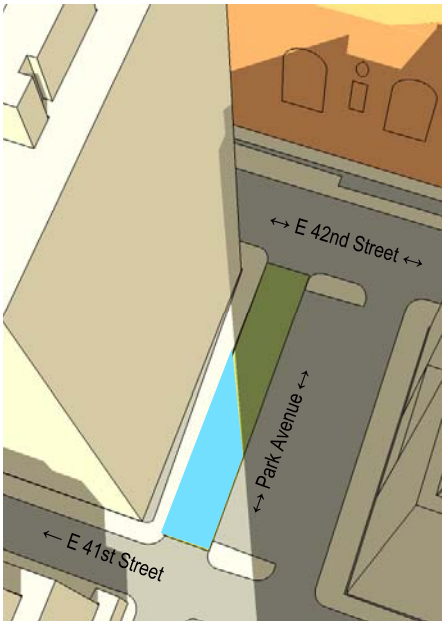
P31 - Pershing Square West (No-Action)
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 12:50 PM

Figure 5-9a

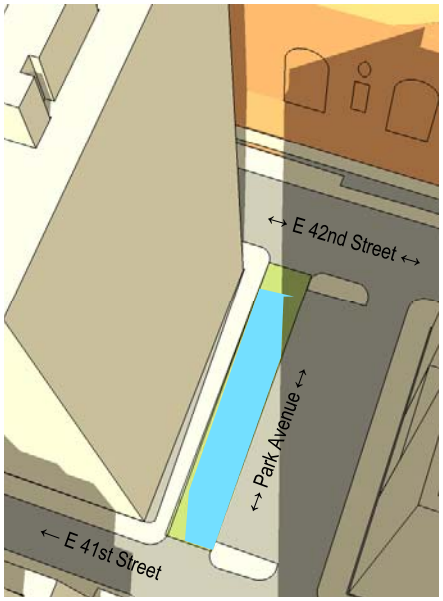
12:00 PM



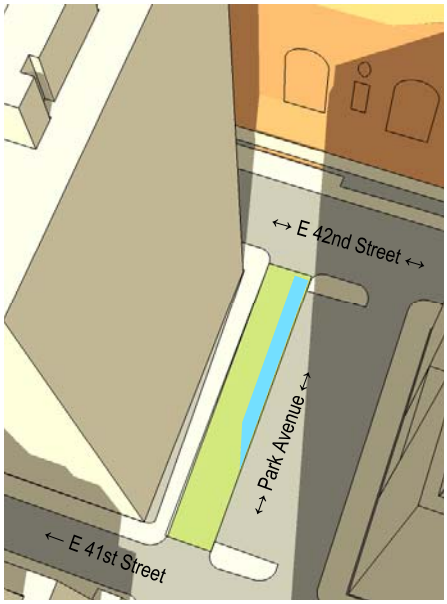
12:15 PM



12:30 PM



12:40 PM



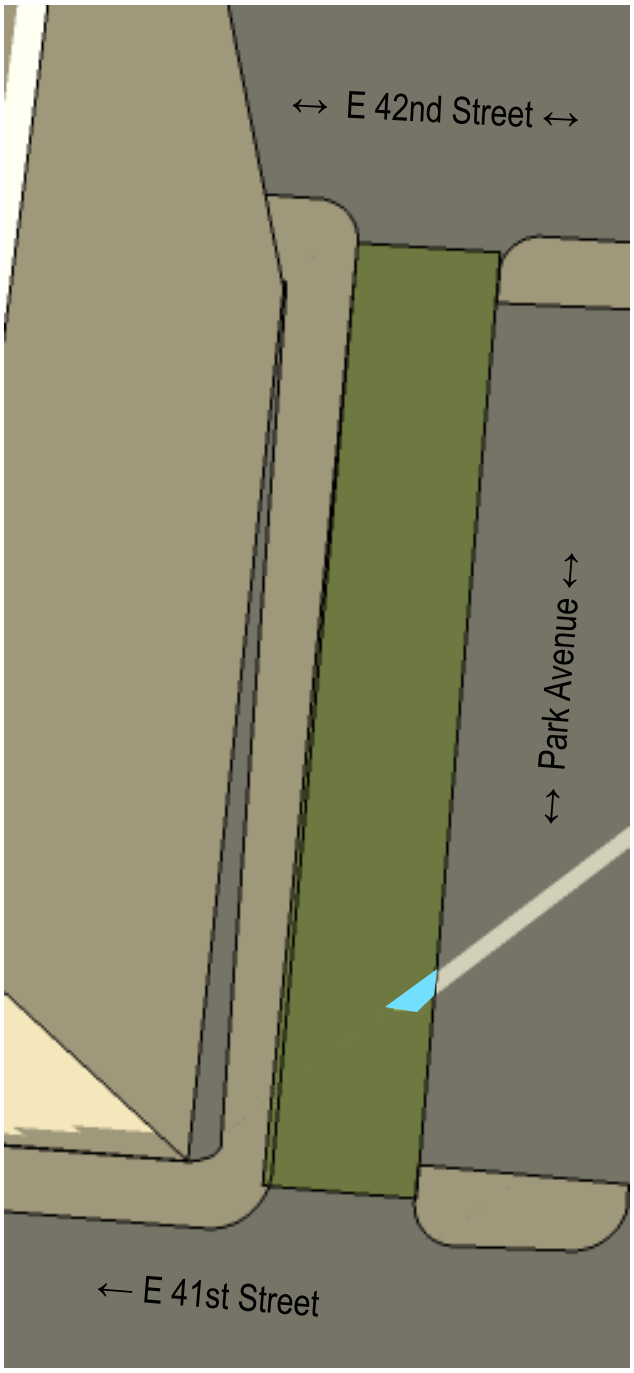
- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

P31 - Pershing Square West (No-Action)
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day: 12:00 to 12:40 PM

Figure 5-9b

vhb



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

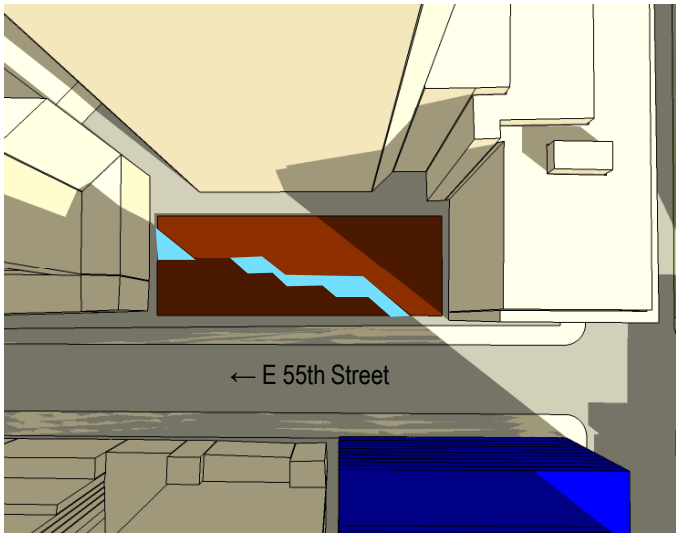
Greater East Midtown Rezoning
Manhattan, New York

P31 - Pershing Square West (No-Action)
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 2:45 PM

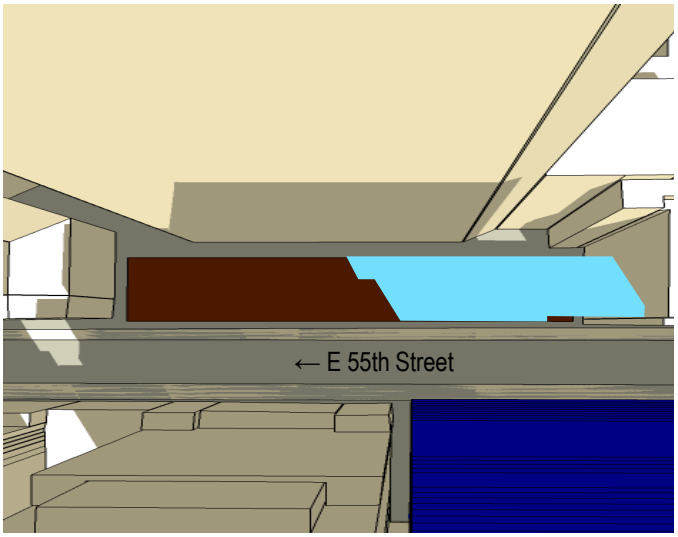
Figure 5-9c

vhb

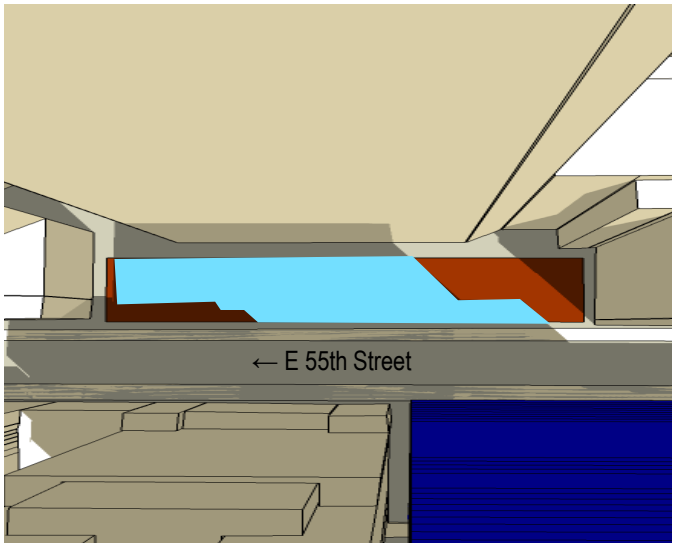
March 21 / September 21 at 11:00 AM



May 6 / August 6 at 12:15 PM



June 21 at 12:00 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

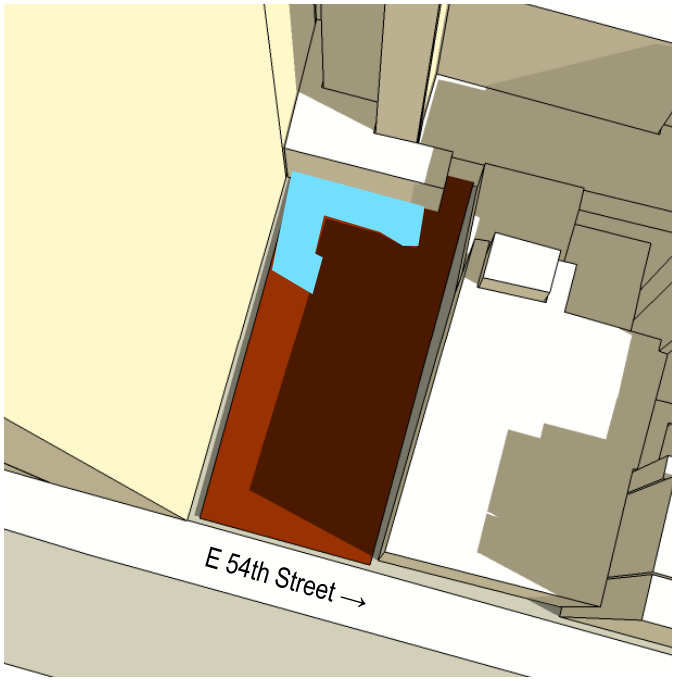
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 2:
65 East 55th Street
Representative Worst-Case Incremental Shadows

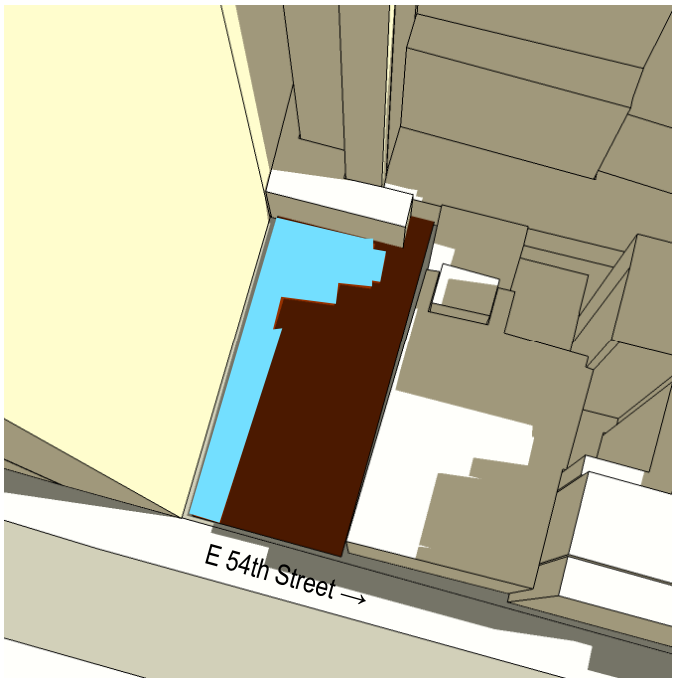
Figure 5-10

vhb

May 6 / August 6 at 9:15 AM



June 21 at 9:45 AM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

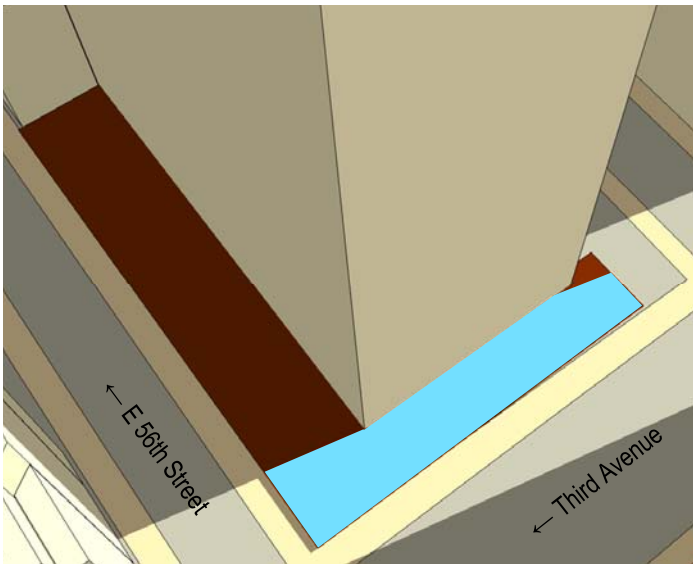
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 3:
535 Madison Avenue
Representative Worst-Case Incremental Shadows

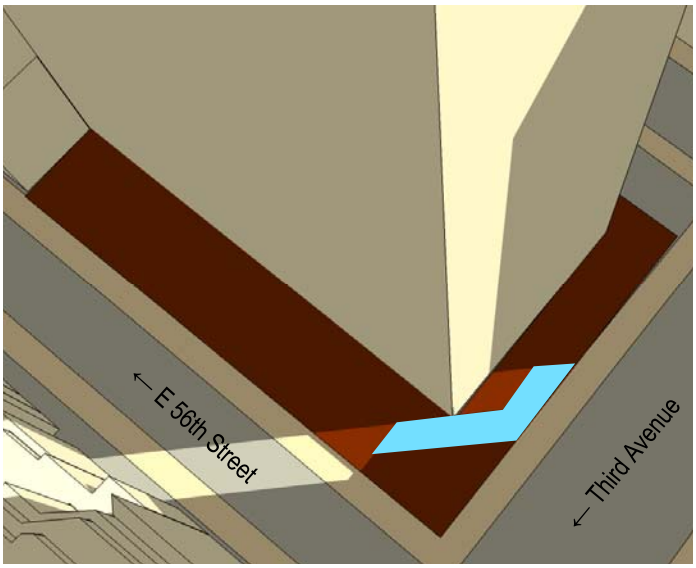
Figure 5-11

vhb

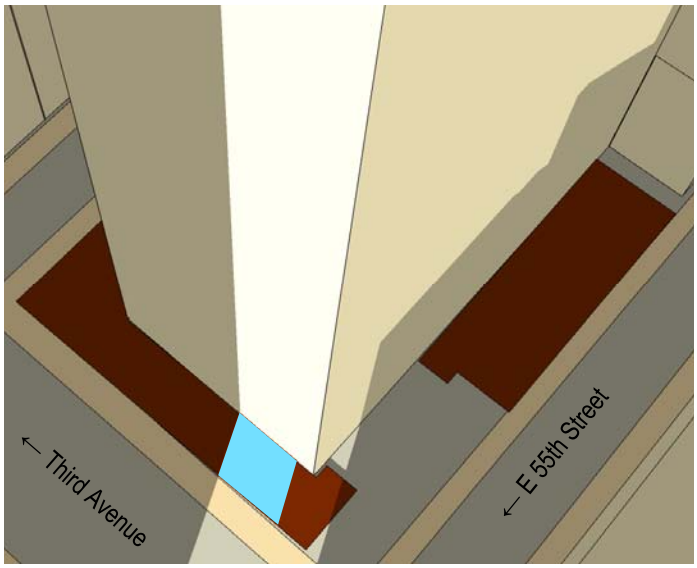
March 21 / September 21 at 2:00 PM



May 6 / August 6 at 3:00 PM



June 21 at 4:30 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

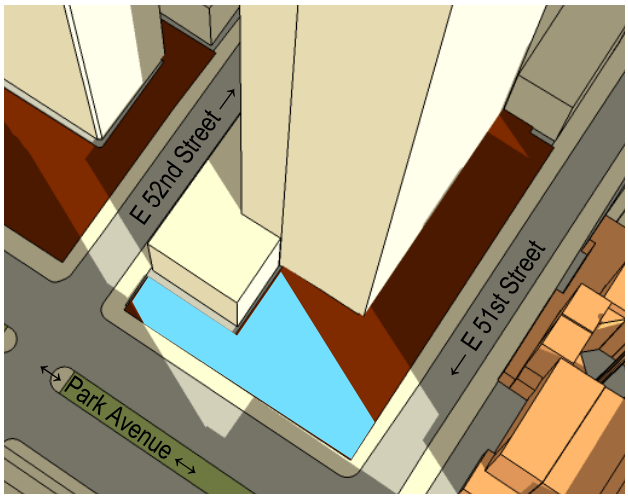
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 4:
919 Third Avenue
Representative Worst-Case Incremental Shadows

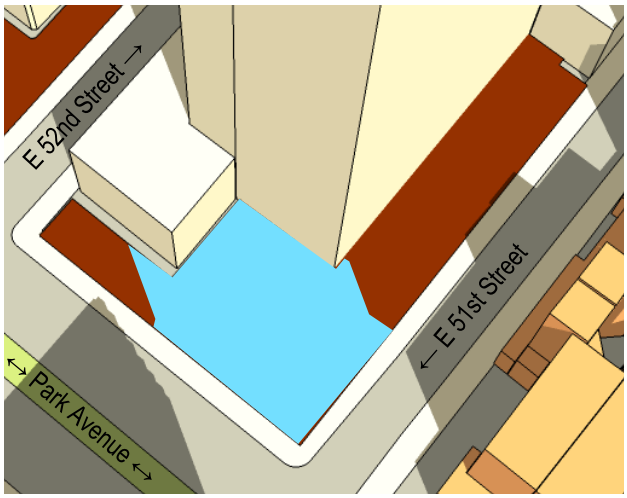
Figure 5-12

vhb

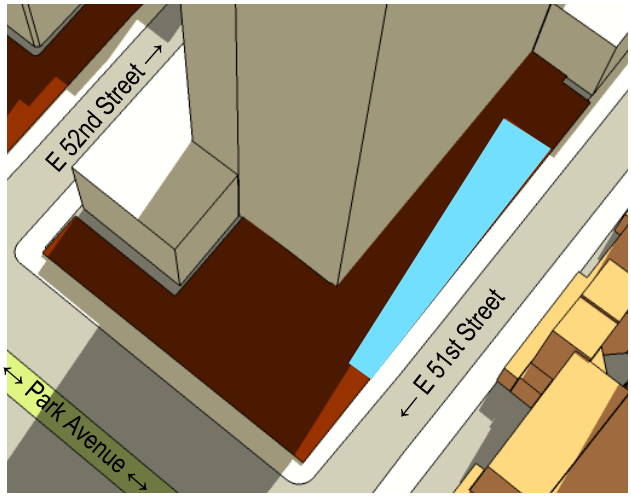
March 21 / September 21 at 2:45 PM



May 6 / August 6 at 2:00 PM



June 21 at 9:45 AM



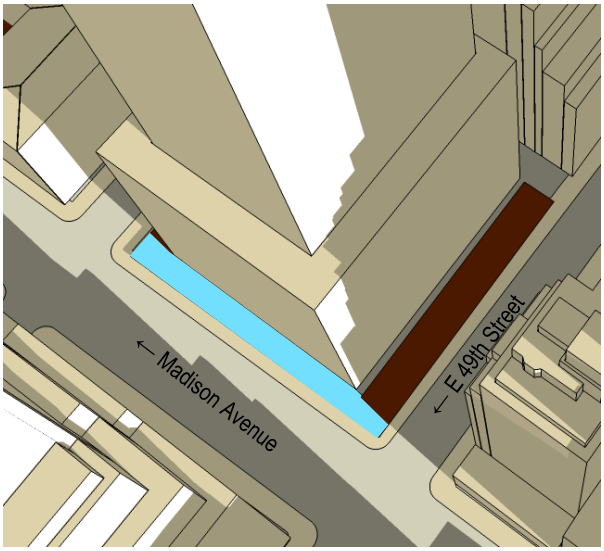
- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 5:
345 Park Avenue
Representative Worst-Case Incremental Shadows

Figure 5-13

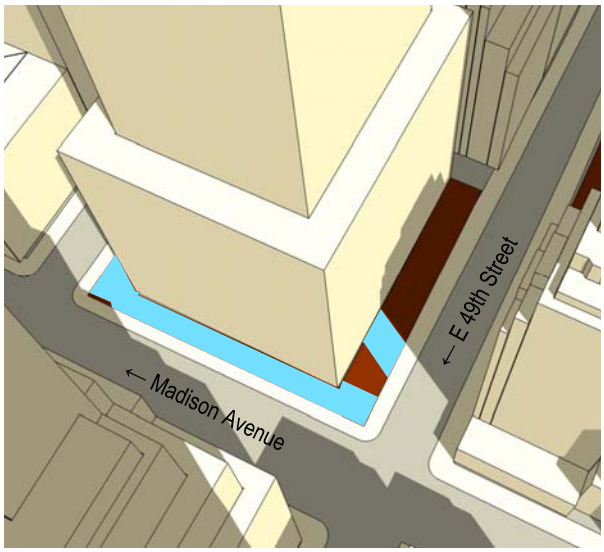
December 21 at 2:15 PM



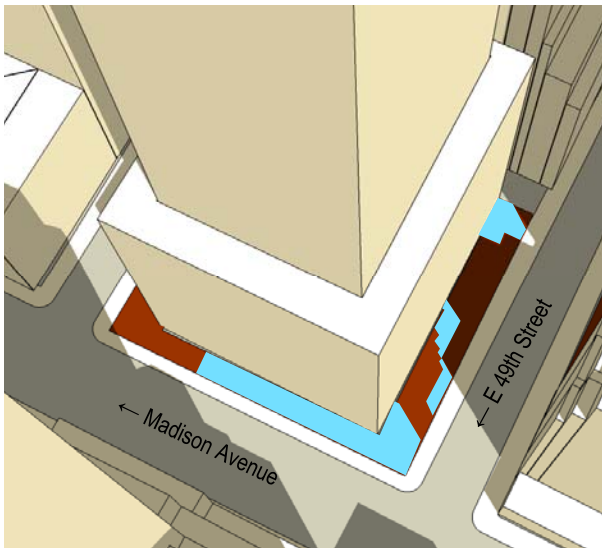
March 21 / September 21 at 2:30 PM



May 6 / August 6 at 2:00 PM



June 21 at 1:50 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 6:
437 Madison Avenue
Representative Worst-Case Incremental Shadows

Figure 5-14

vhb

10:35 AM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

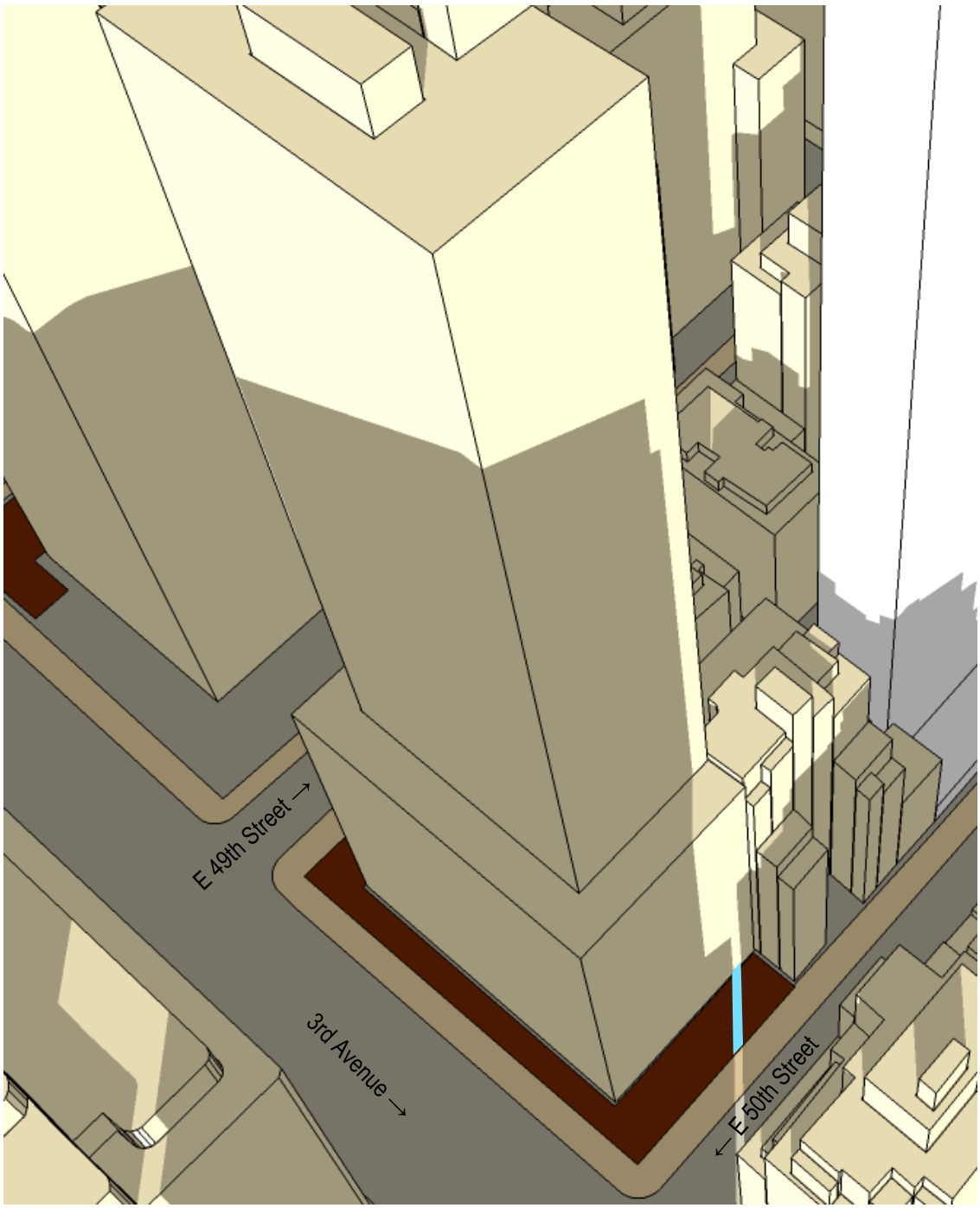
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 8:
40 East 52nd Street
Representative Worst-Case Incremental Shadows

Figure 5-15

vhb

June 21 at 6:30 AM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

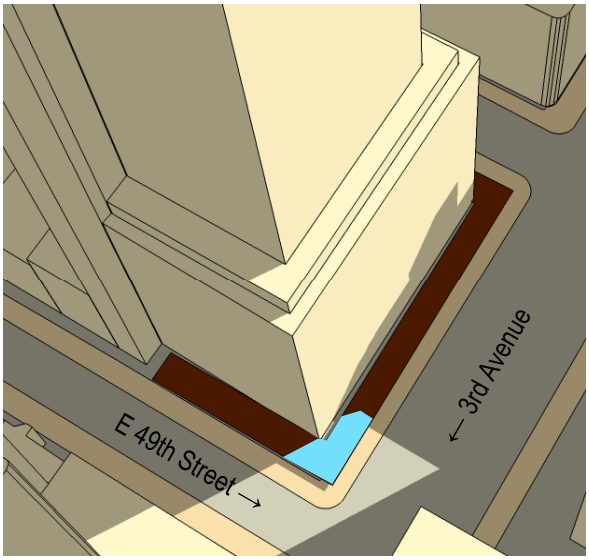
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 9:
800 Third Avenue
Representative Worst-Case Incremental Shadows

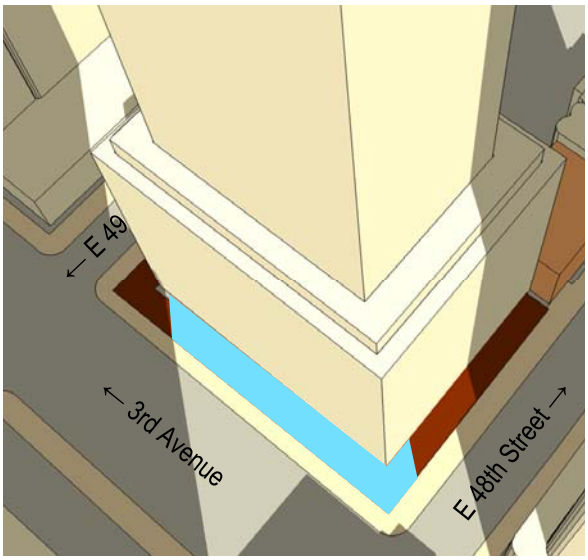
Figure 5-16

vhb

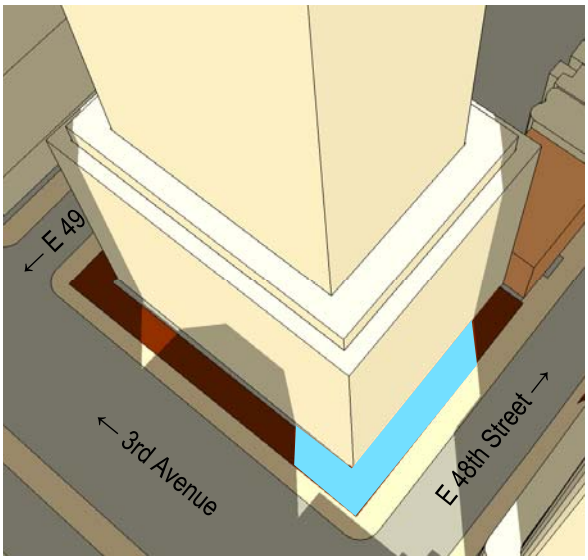
March 21 / September 21 at 3:15 PM



May 6 / August 6 at 2:30 PM



June 21at 2:45 PM



Projected Development Site	New Incremental Shadow
Potential Development Site	New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
Historic Resource	No-Action Shadow - Historic Resource
Open Space and Recreation	No-Action Shadow - Open Space and Recreation
Privately Owned Public Space (POPS)	No-Action Shadow - POPS

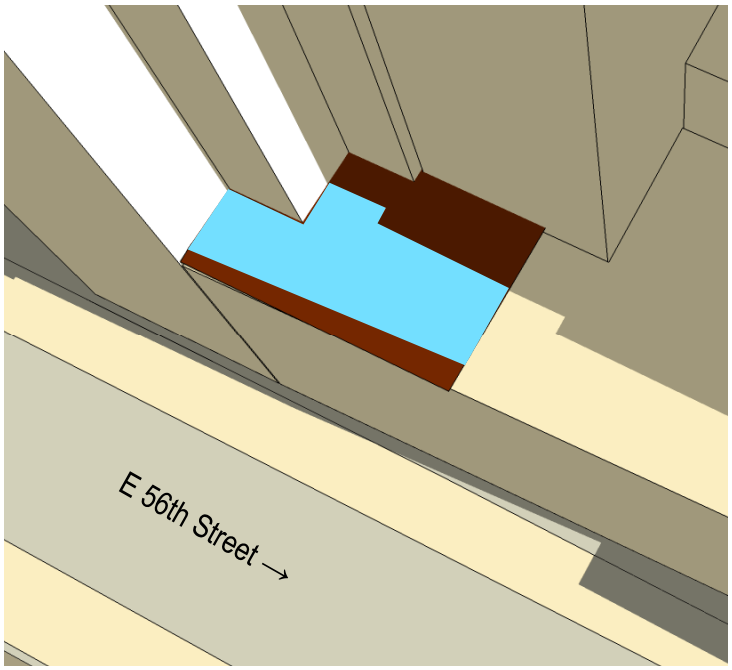
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 10:
777 Third Avenue
Representative Worst-Case Incremental Shadows

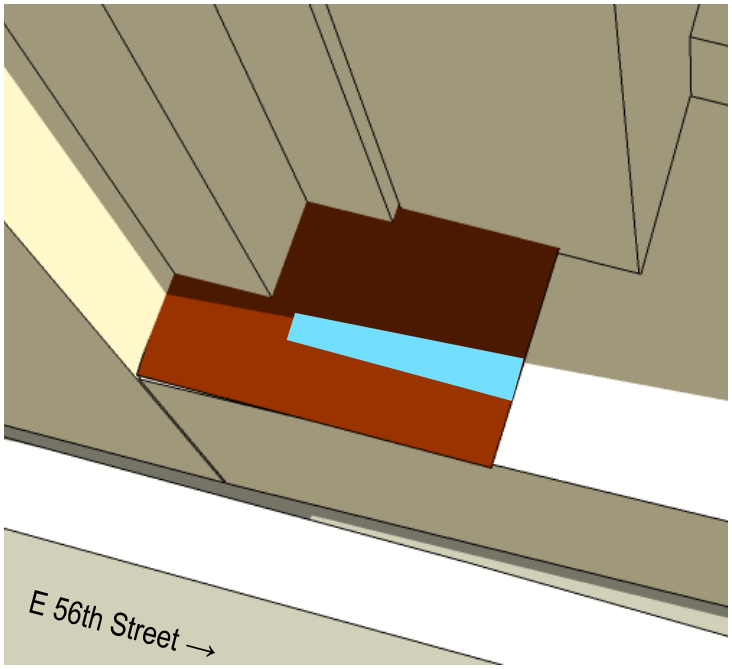
Figure 5-17

vhb

March 21 / September 21 at 8:30 AM



June 21 at 9:55 AM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

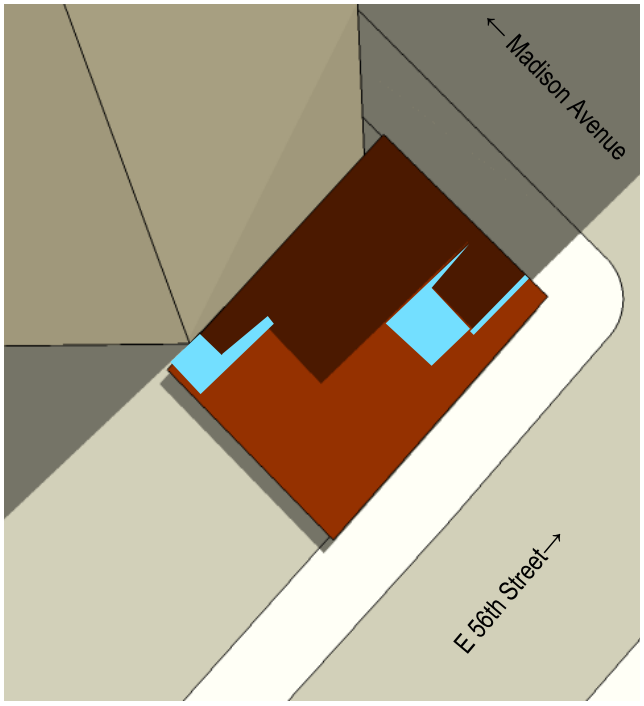
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 11:
725 Fifth Avenue
Representative Worst-Case Incremental Shadows

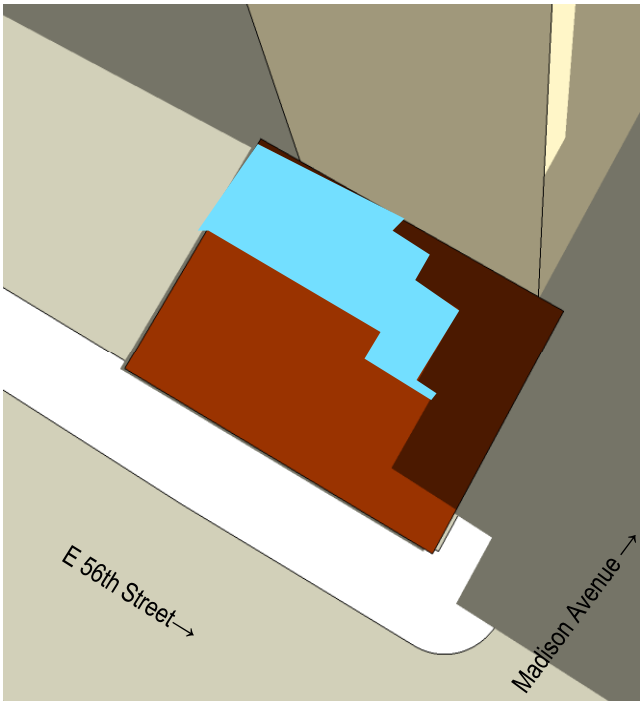
Figure 5-18

vhb

May 6 / August 6 at 9:45 AM



June 21at 10:00 AM



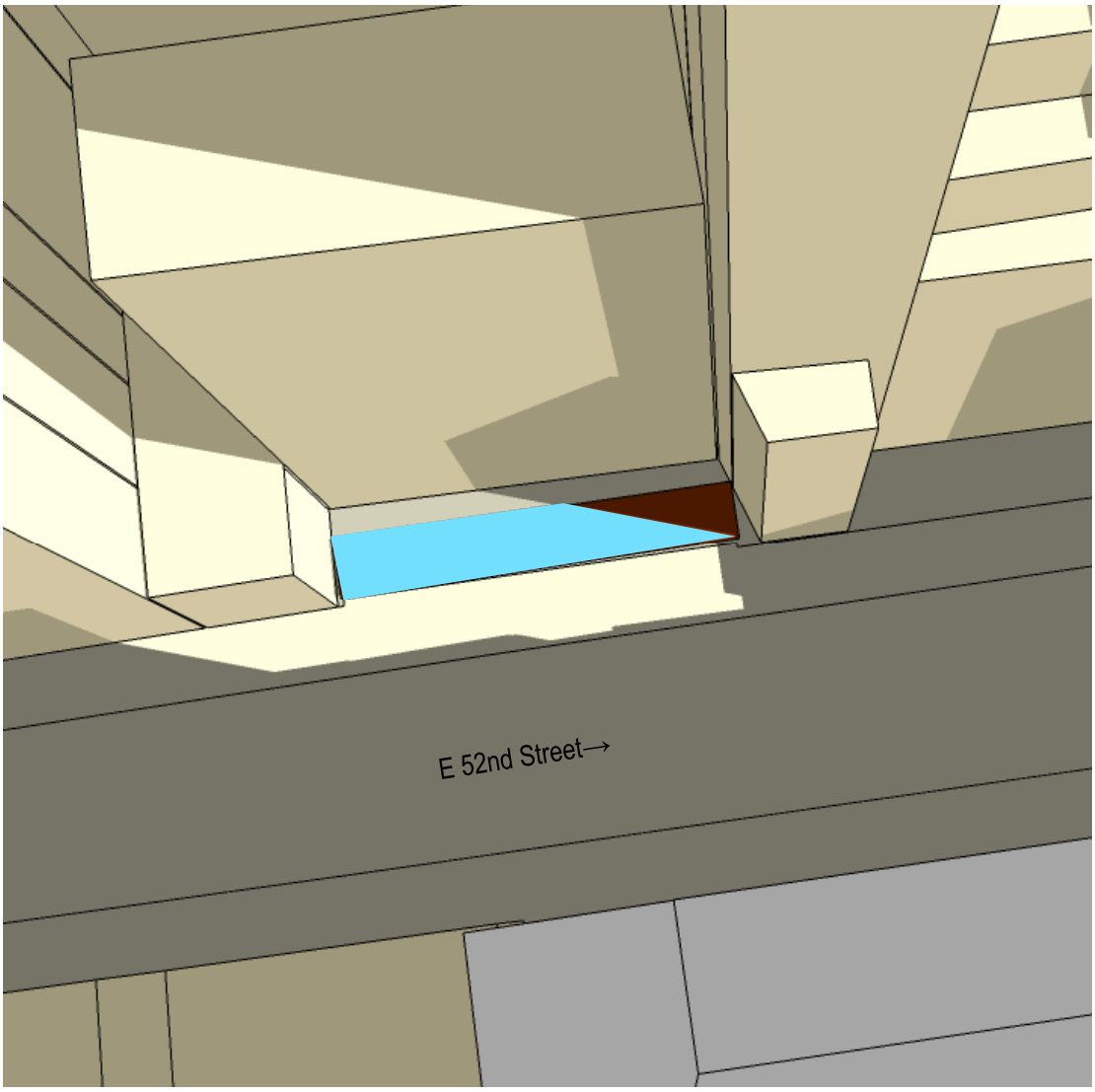
- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 12:
590 Madison Avenue
Representative Worst-Case Incremental Shadows

Figure 5-19

March 21 / September 21 at 10:00 AM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

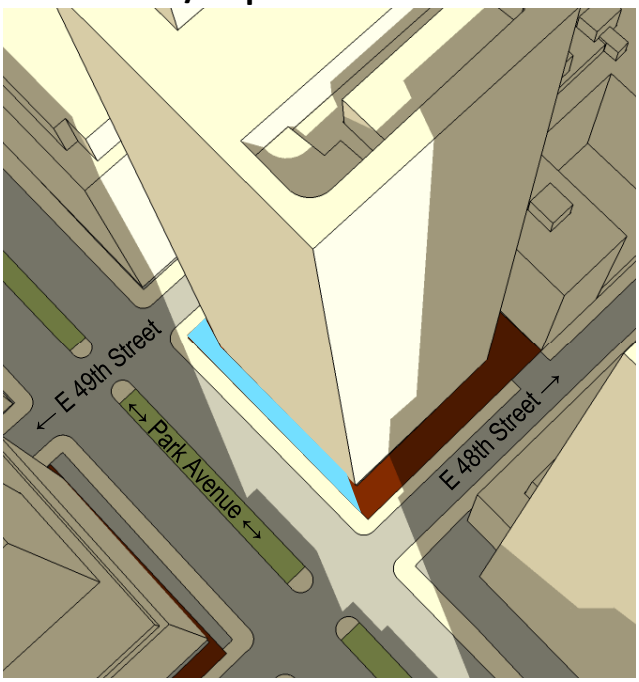
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 13:
10 East 53rd Street
Representative Worst-Case Incremental Shadows

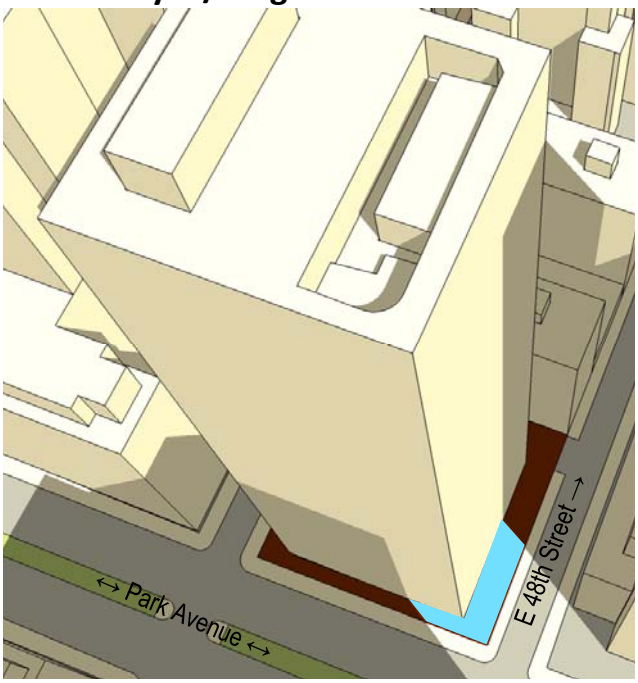
Figure 5-20

vhb

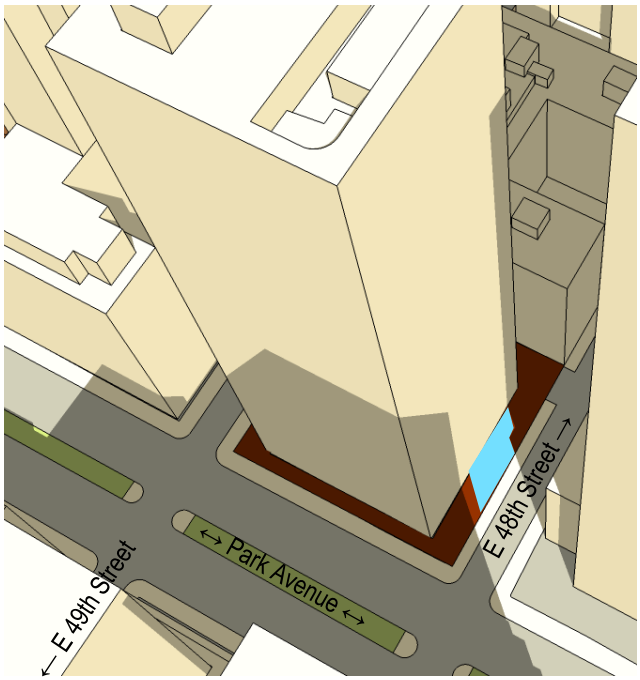
March 21 / September 21 at 2:30 PM



May 6 / August 6 at 2:05 PM



June 21 at 2:20 PM



Projected Development Site	New Incremental Shadow
Potential Development Site	New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
Historic Resource	No-Action Shadow - Historic Resource
Open Space and Recreation	No-Action Shadow - Open Space and Recreation
Privately Owned Public Space (POPS)	No-Action Shadow - POPS

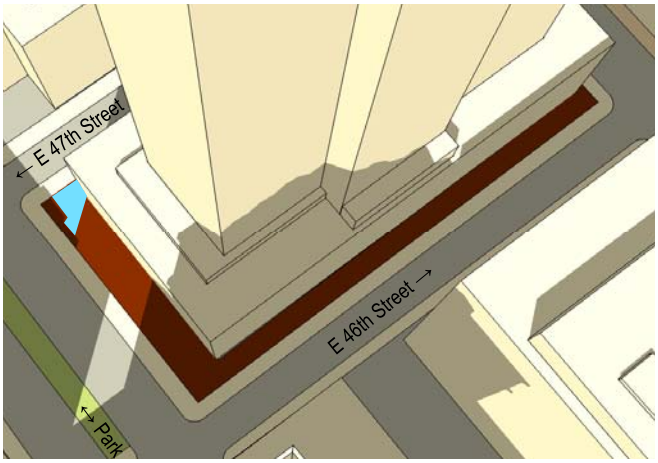
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 15:
299 Park Avenue
Representative Worst-Case Incremental Shadows

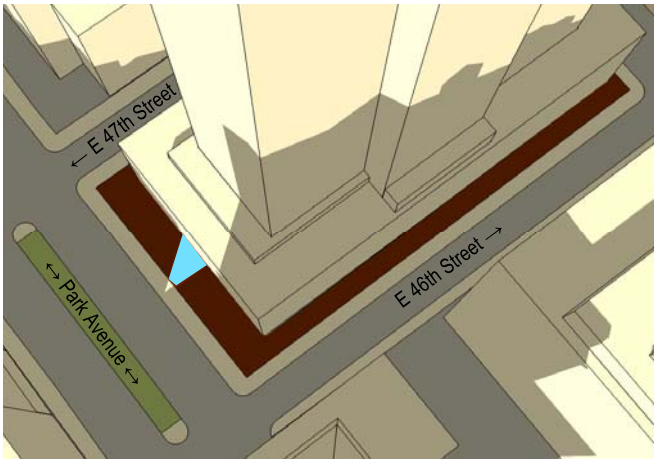
Figure 5-21

vhb

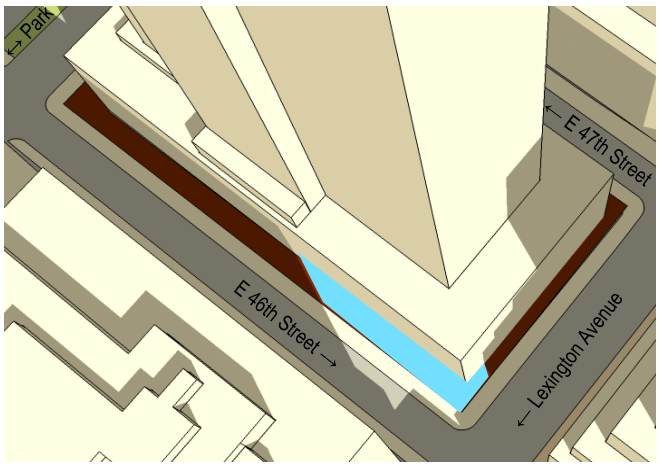
March 21 / September 21 at 10:15 AM



May 6 / August 6 at 3:45 PM



June 21 at 3:00 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

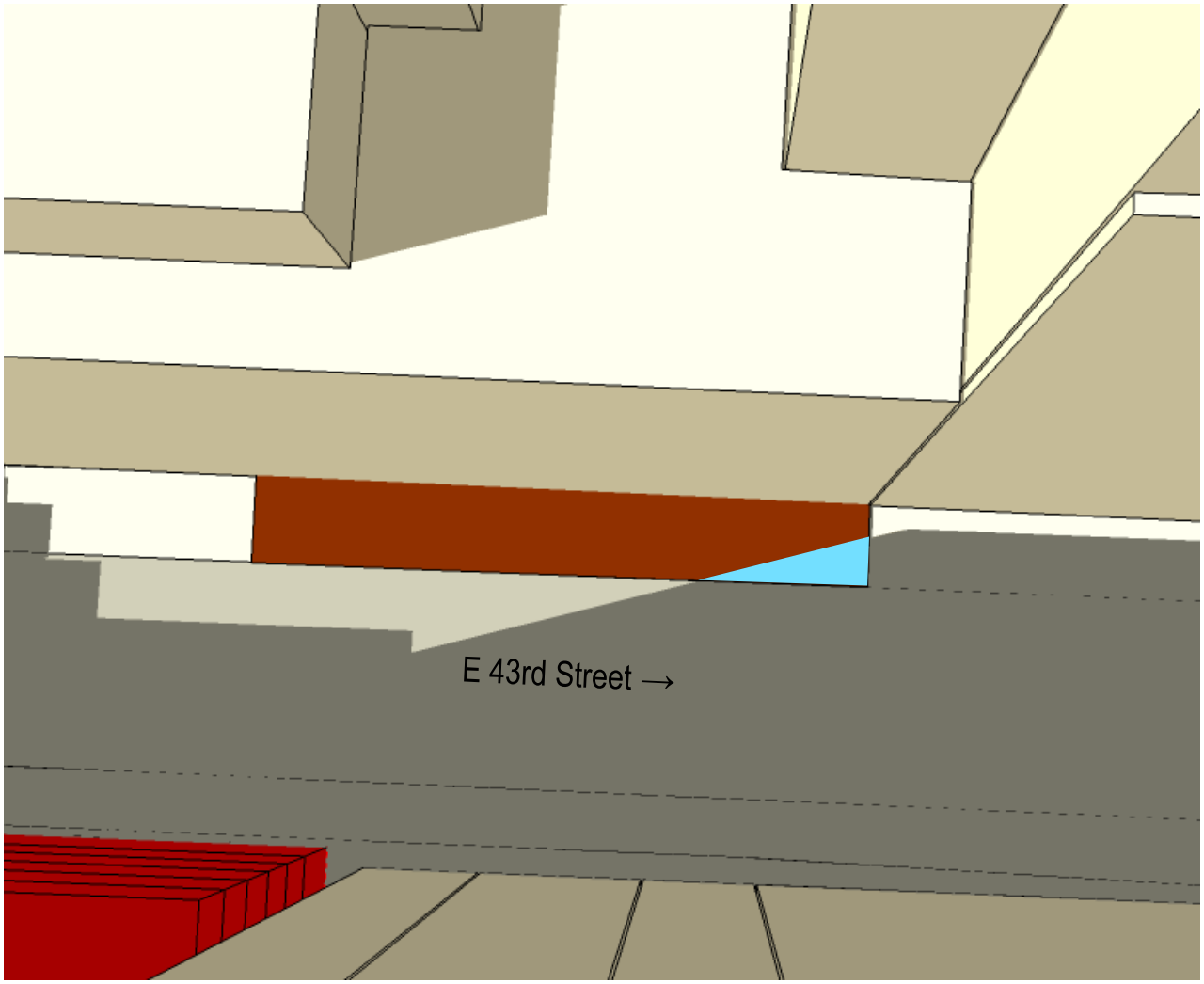
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 16:
245 Park Avenue
Representative Worst-Case Incremental Shadows

Figure 5-22

vhb

June 21 at 9:05 AM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

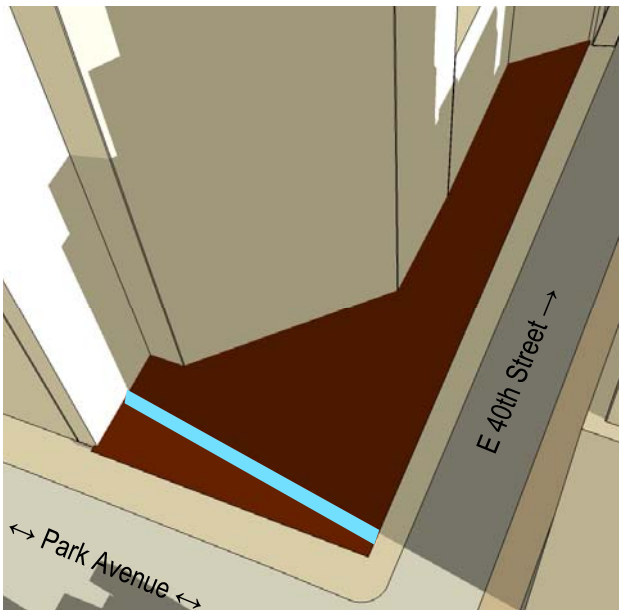
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 17:
6 East 43rd Street
Representative Worst-Case Incremental Shadows

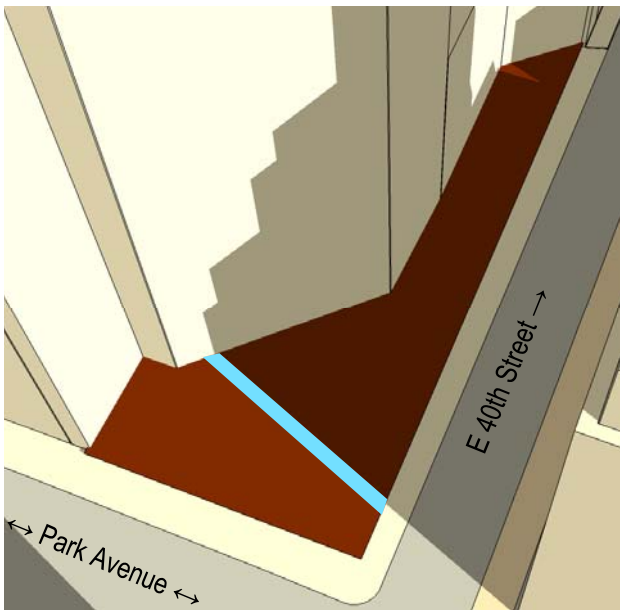
Figure 5-23

vhb

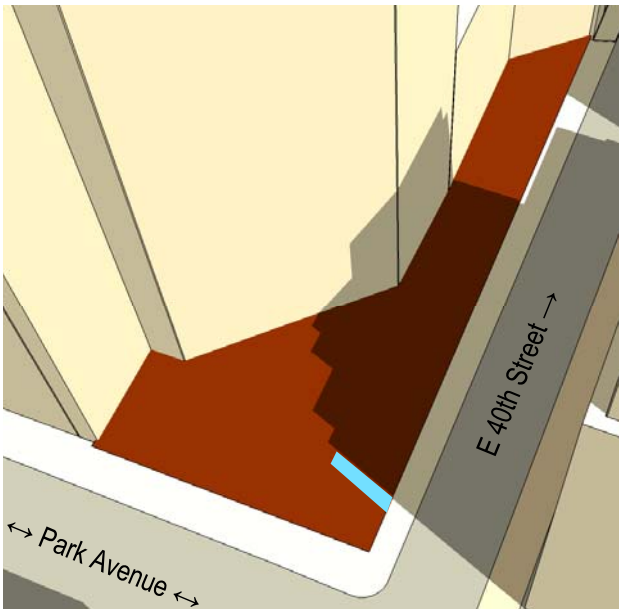
December 21 at 2:30 PM



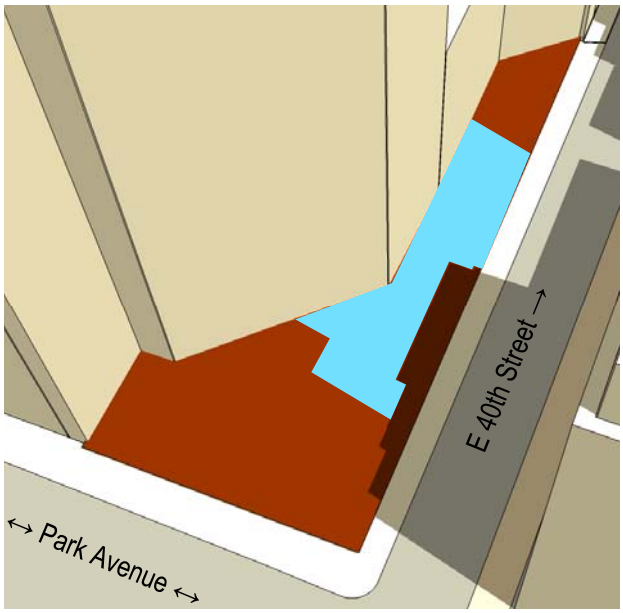
March 21 / September 21 at 2:30 PM



May 6 / August 6 at 1:30 PM



June 21 at 1:00 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

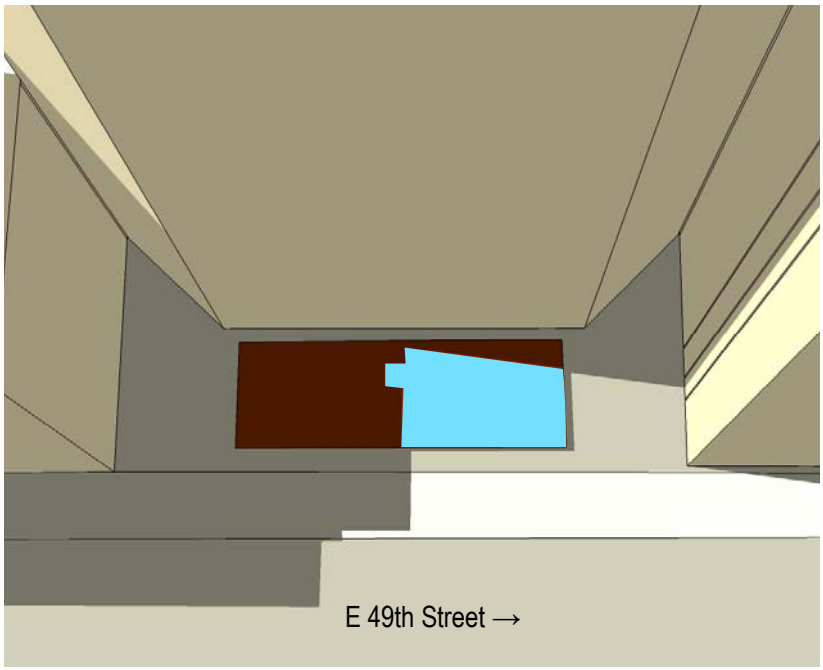
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 18:
101 Park Avenue
Representative Worst-Case Incremental Shadows

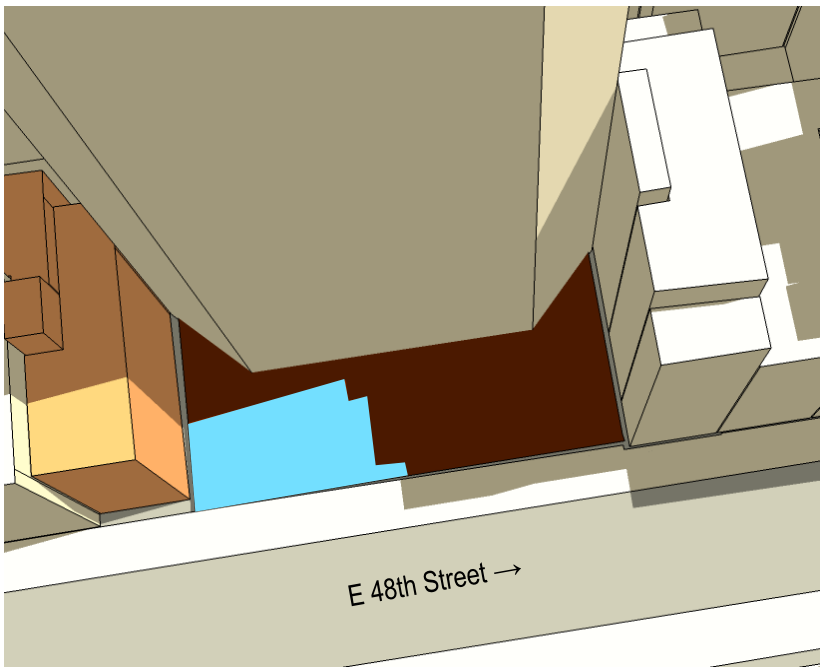
Figure 5-24

vhb

May 6 / August 6 at 10:00 AM



June 21 at 10:00 AM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

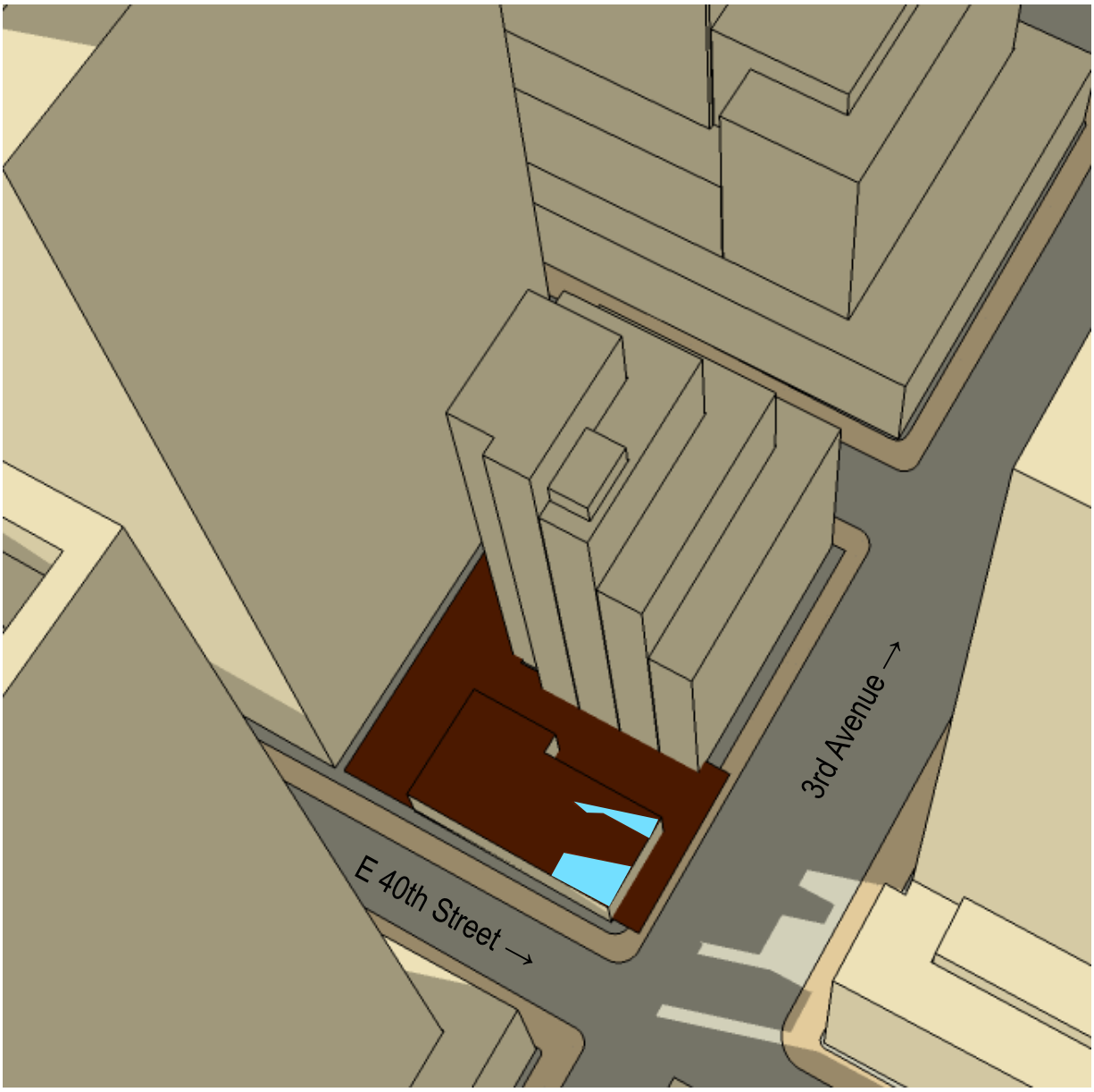
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 19:
12 East 49th Street
Representative Worst-Case Incremental Shadows

Figure 5-25

vhb

June 21 at 5:15 PM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

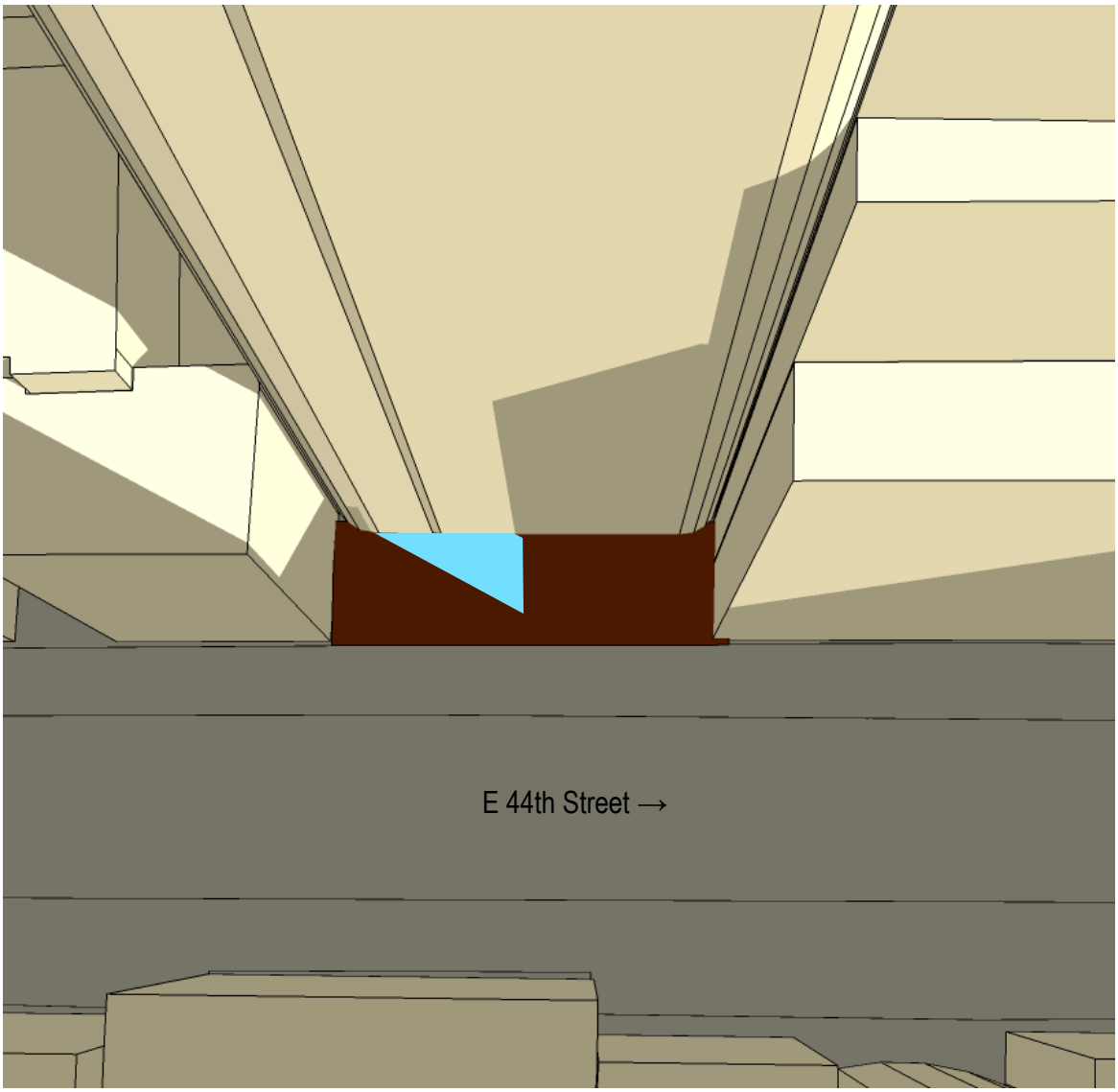
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 20:
622 Third Avenue
Representative Worst-Case Incremental Shadows

Figure 5-26

vhb

March 21 / September 21 at 10:30 AM



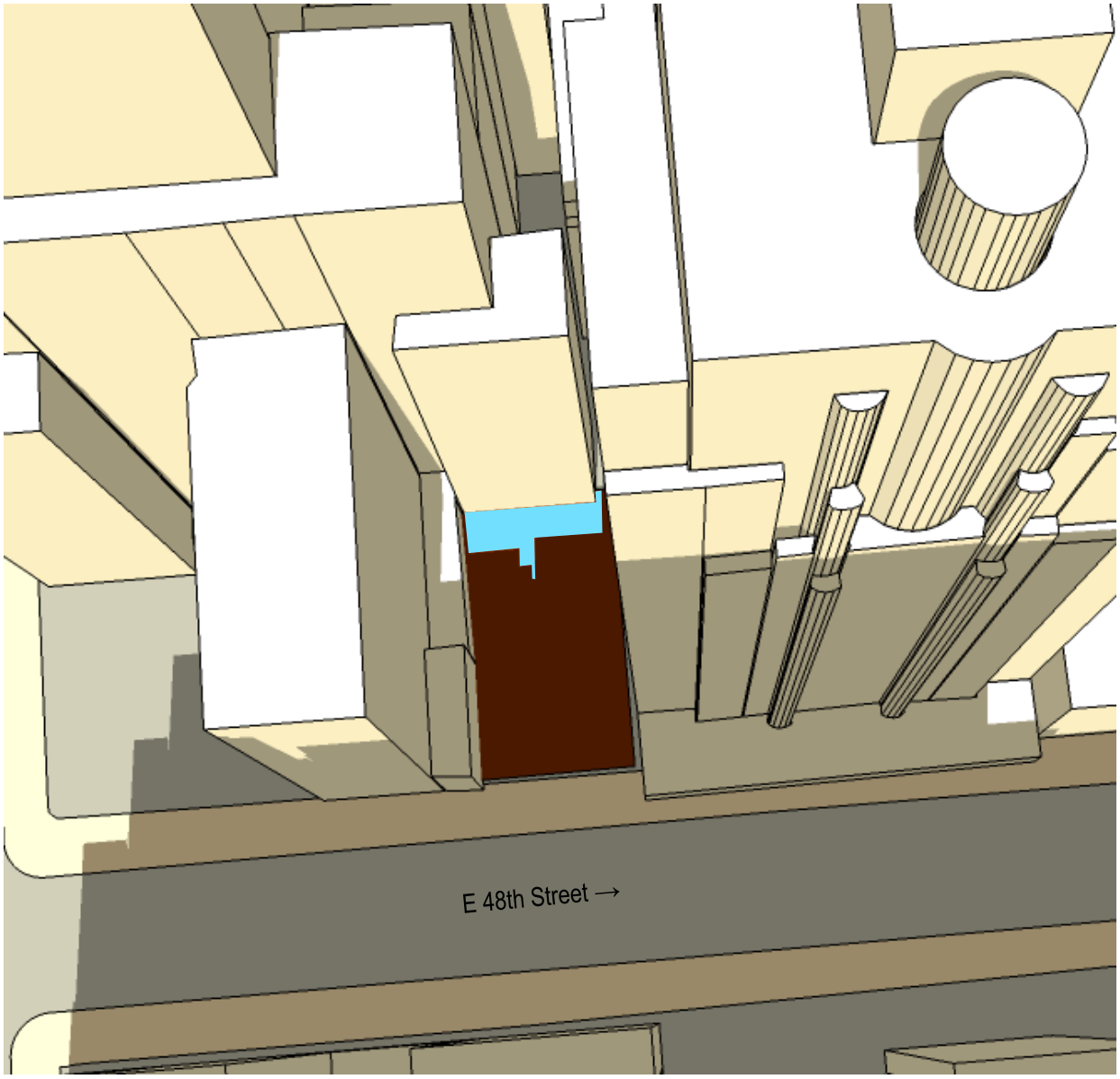
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 21:
140 East 45th Street
Representative Worst-Case Incremental Shadows

Figure 5-27

May 6 / August 6 at 12:55 PM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

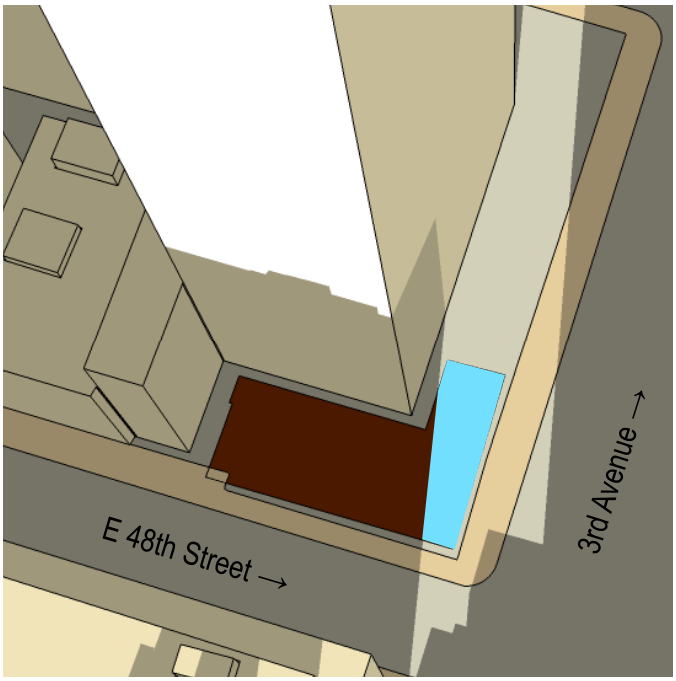
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 22:
141 East 48th Street
Representative Worst-Case Incremental Shadows

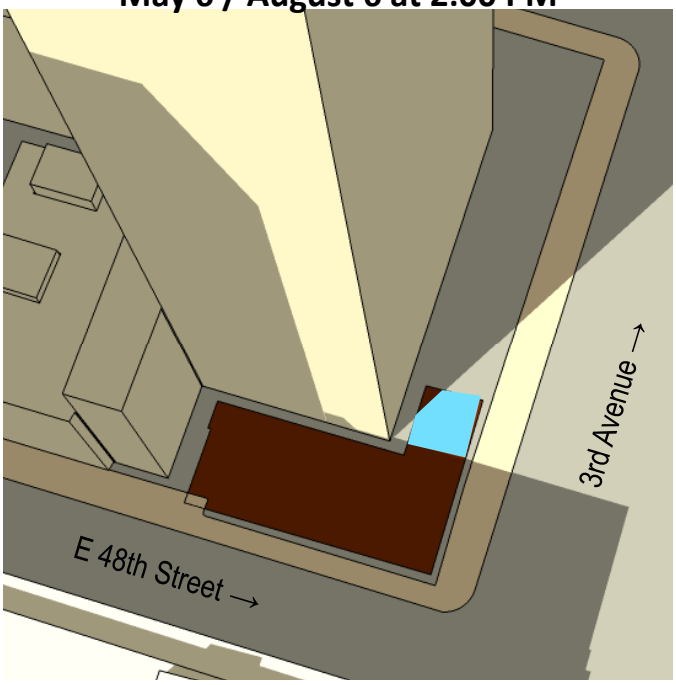
Figure 5-28

vhb

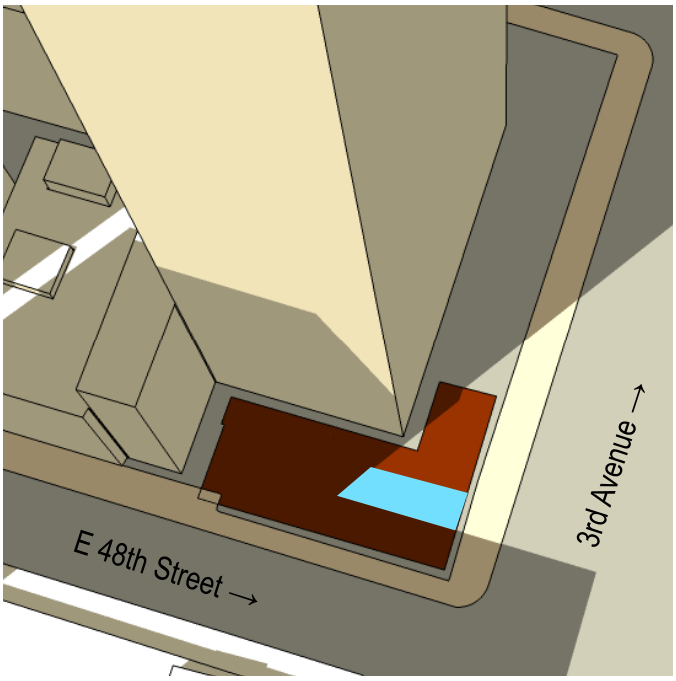
December 21 at 1:00 PM



May 6 / August 6 at 2:00 PM



June 21 at 1:50 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

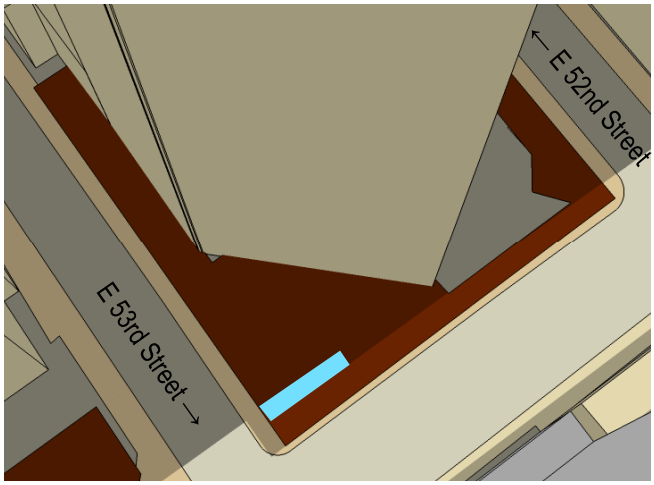
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 23:
780 Third Avenue
Representative Worst-Case Incremental Shadows

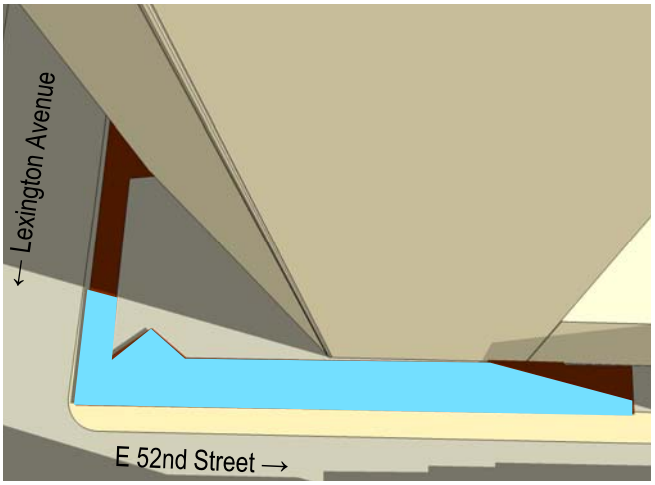
Figure 5-29

vhb

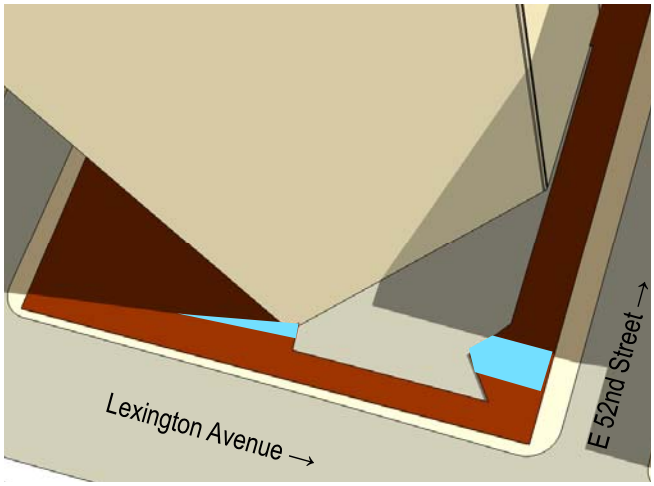
December 21 at 1:55 PM



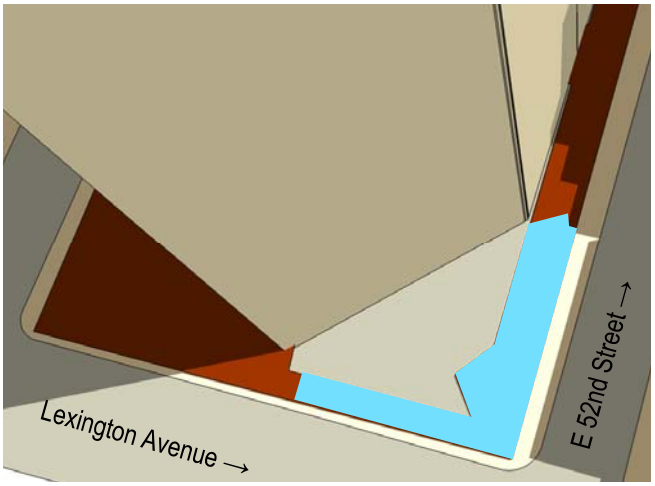
March 21 / September 21 at 9:45 AM



May 6 / August 6 at 12:30 PM



June 21 at 12:30 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

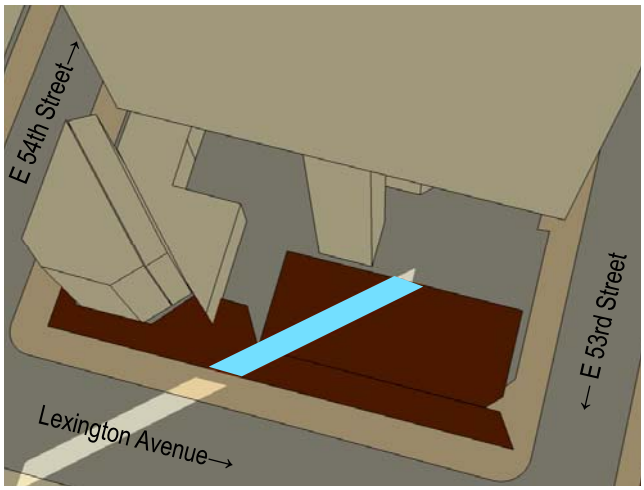
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 24:
599 Lexington Avenue
Representative Worst-Case Incremental Shadows

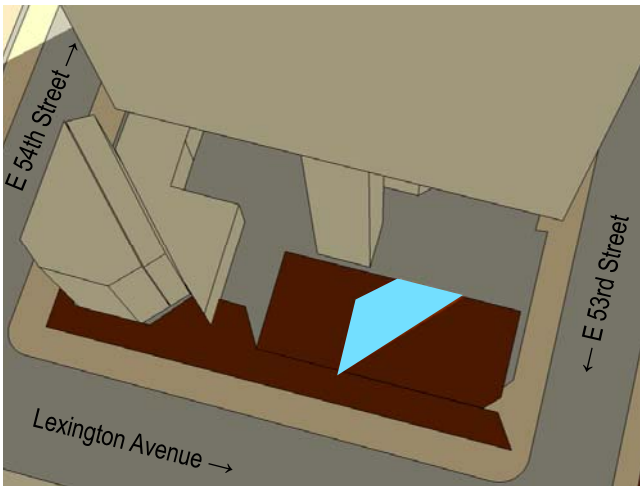
Figure 5-30

vhb

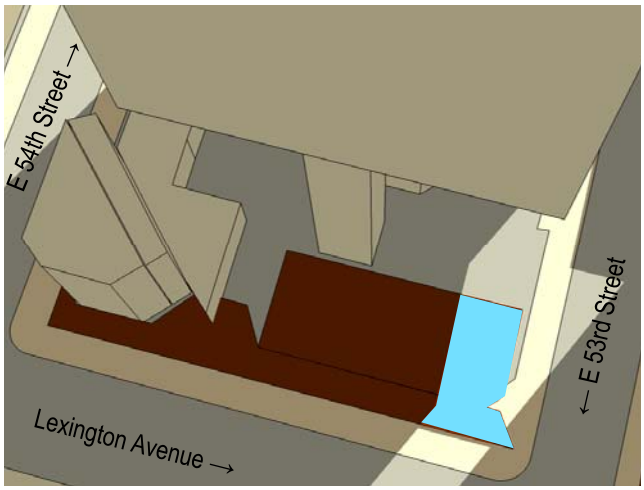
December 21 at 11:00 AM



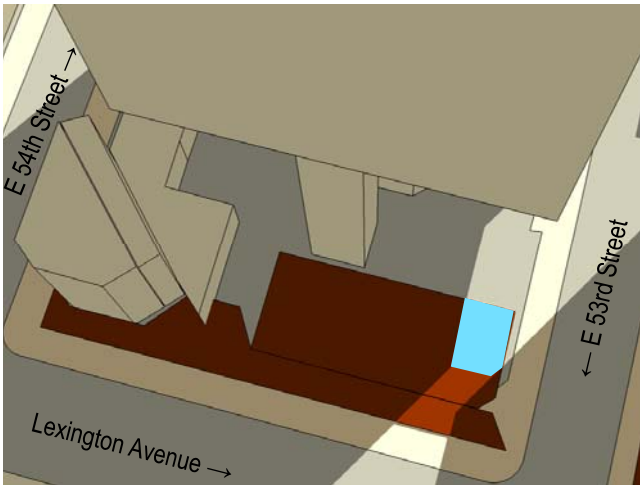
March 21 / September 21 at 11:15 AM



May 6 / August 6 at 10:45 AM



June 21 at 11:15 AM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

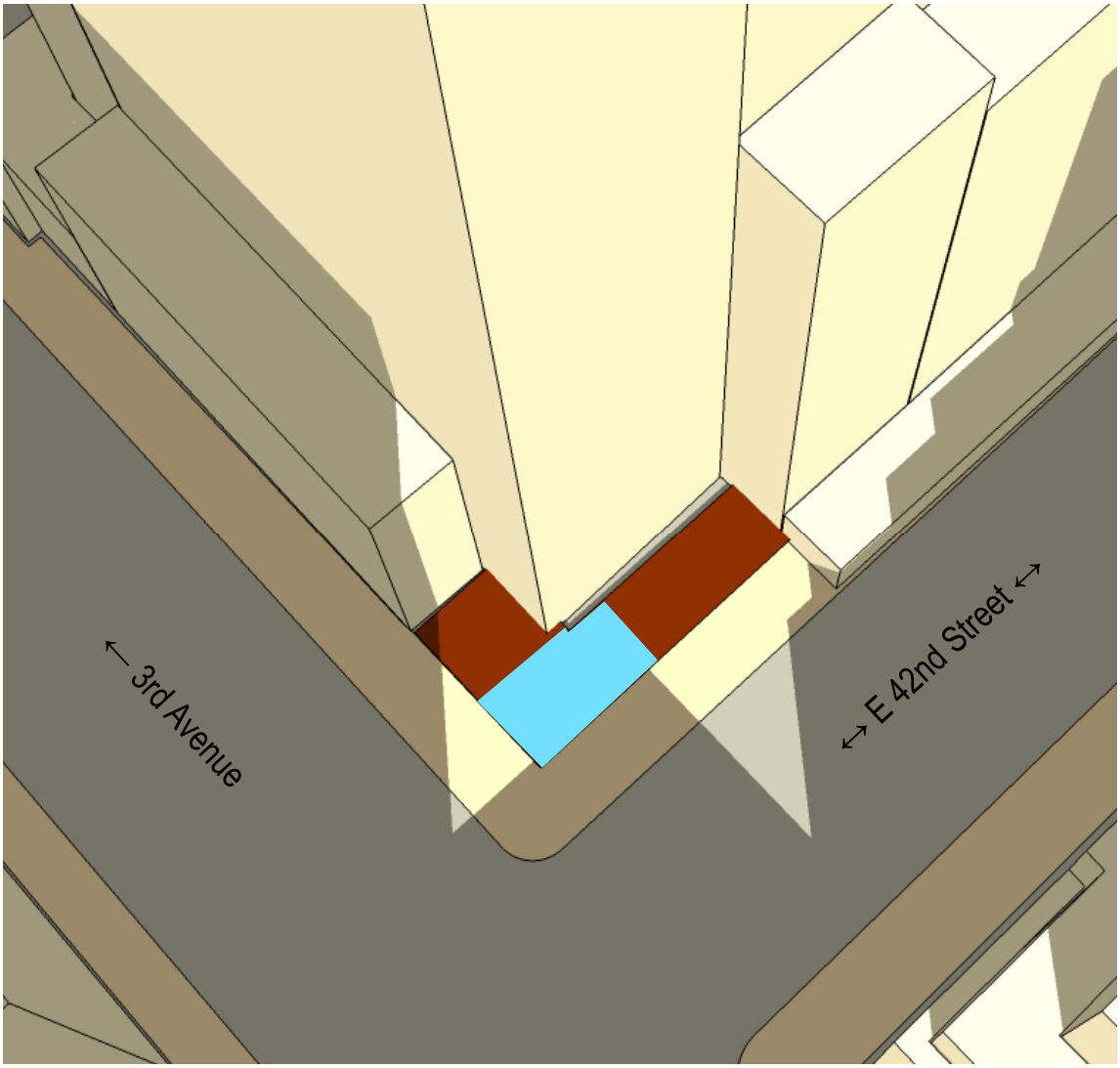
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 25:
153 East 53rd Street
Represenative Worst-Case Incremental Shadows

Figure 5-31

vhb

May 6 / August 6 at 2:30 PM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

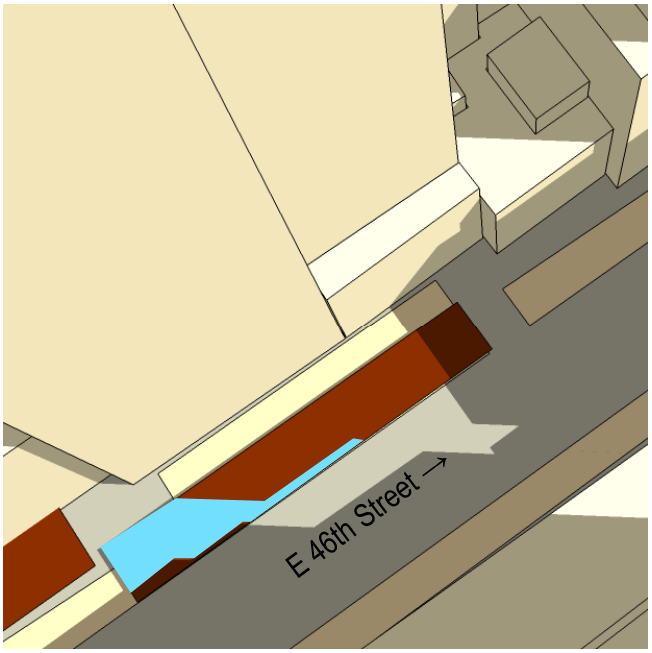
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 26:
201 East 42nd Street
Representative Worst-Case Incremental Shadows

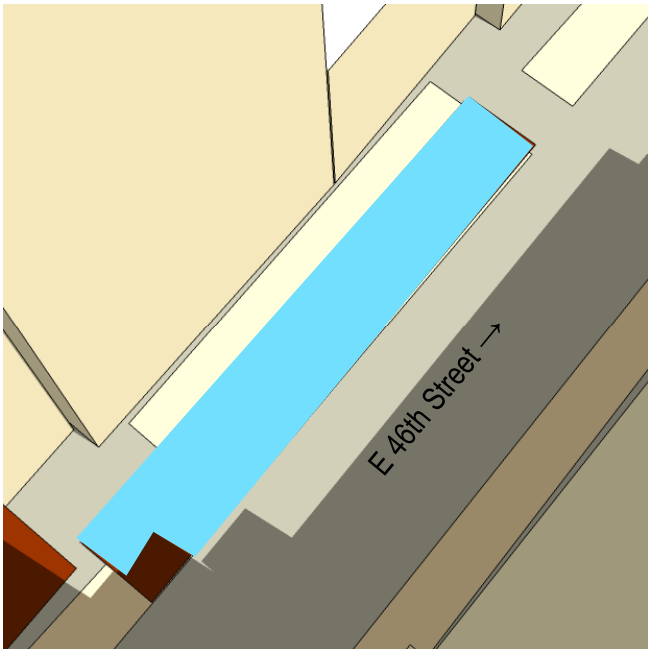
Figure 5-32

vhb

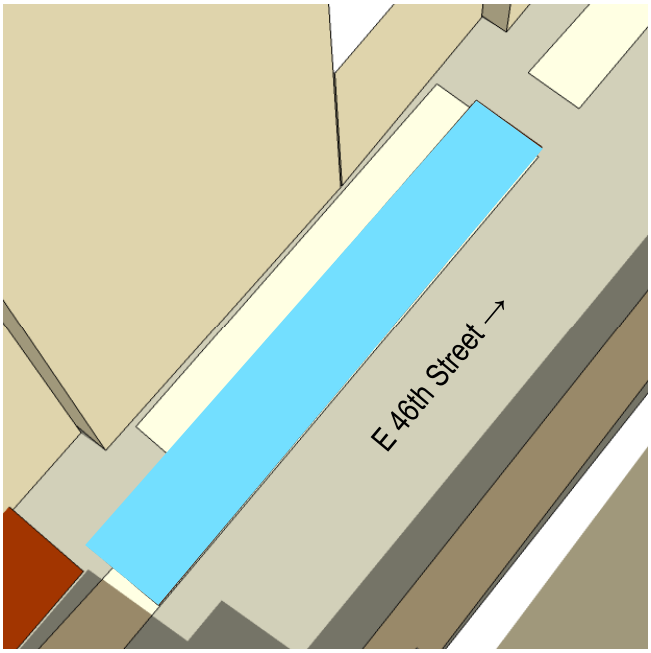
March 21 / September 21 at 11:00 AM



May 6 / August 6 at 12:30 PM



June 21 at 12:30 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

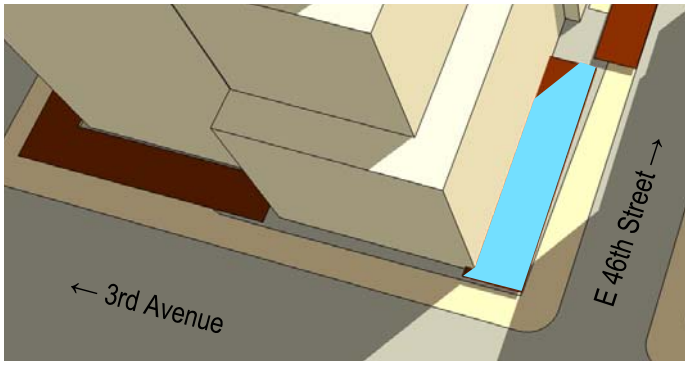
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 27:
212 East 47th Street
Representative Worst-Case Incremental Shadows

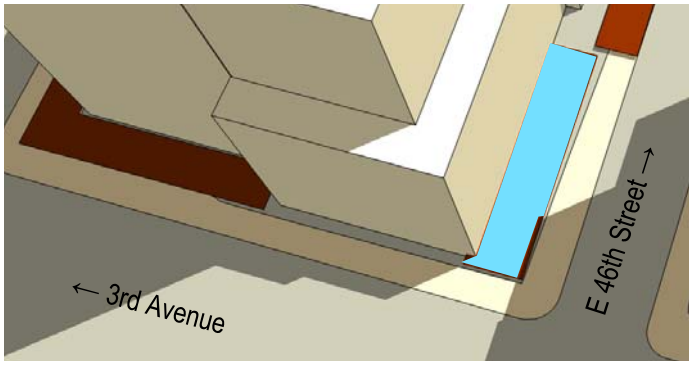
Figure 5-33

vhb

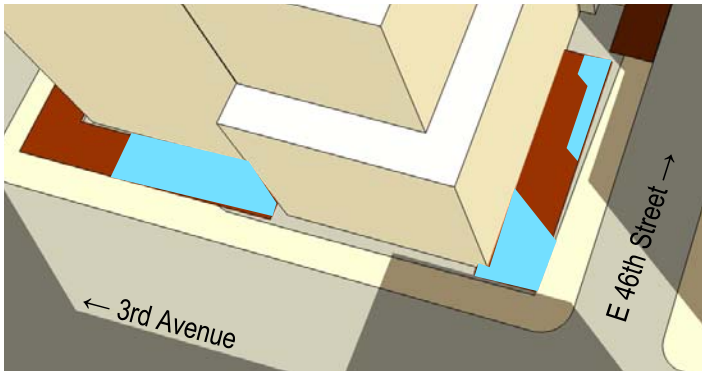
March 21 / September 21 at 10:45 AM



May 6 / August 6 at 11:30 AM



June 21 at 2:00 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

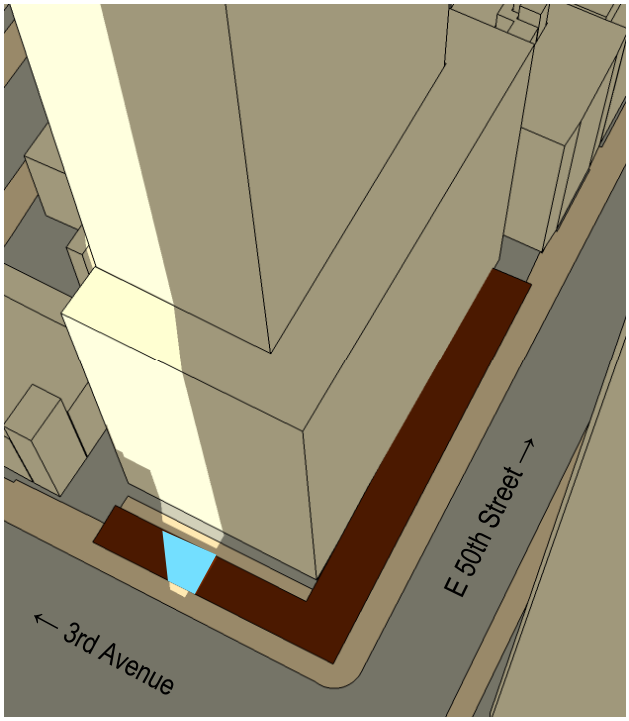
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 28:
747 Third Avenue
Representative Worst-Case Incremental Shadows

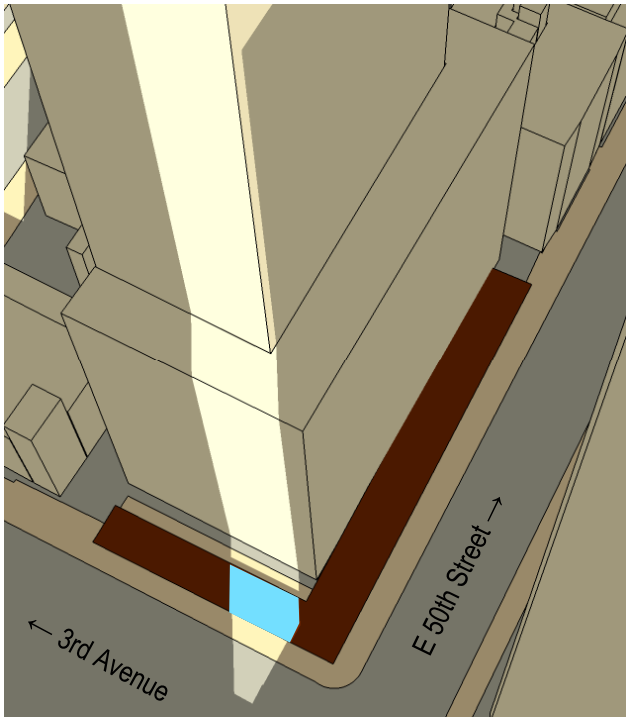
Figure 5-34

vhb

May 6 / August 6 at 3:45 PM



June 21at 3:45 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

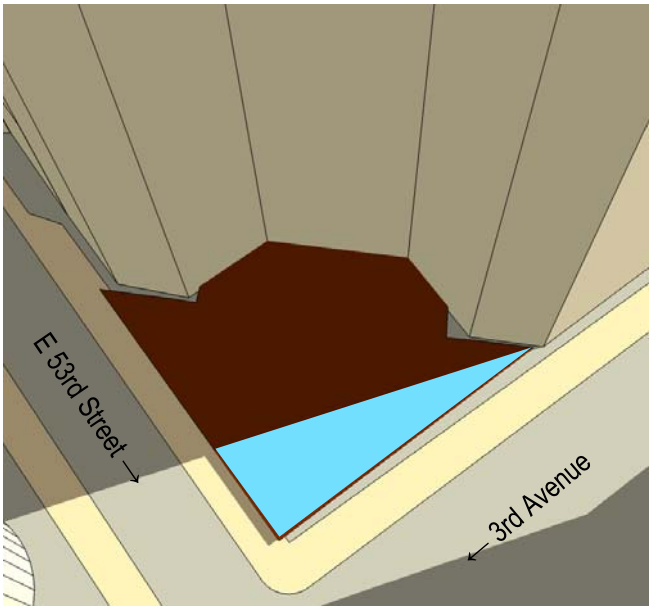
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 30:
825 Third Avenue
Representative Worst-Case Incremental Shadows

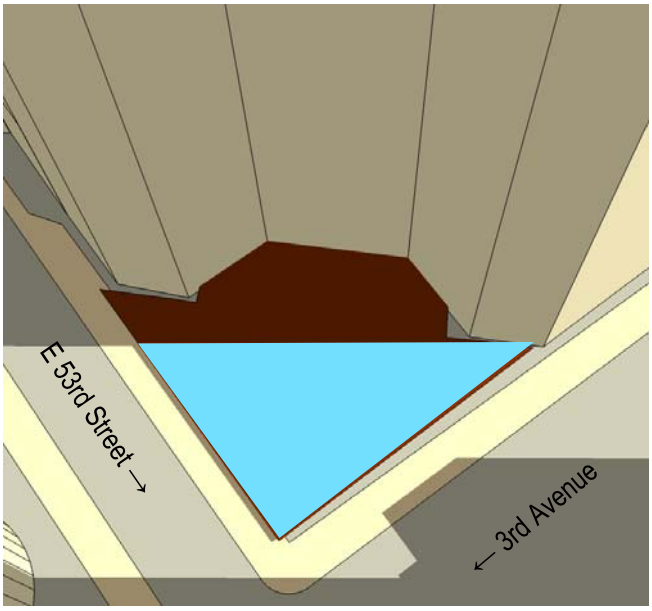
Figure 5-35

vhb

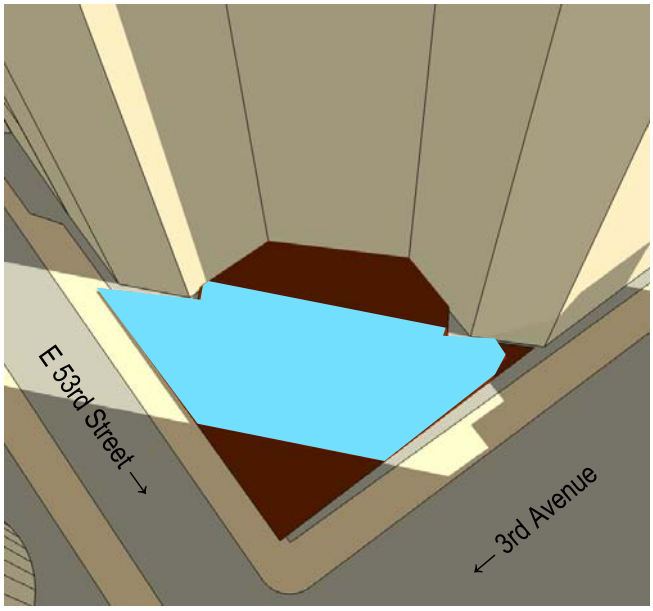
March 21 / September 21 at 2:20 PM



May 6 / August 6 at 2:25 PM



June 21 at 2:45 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

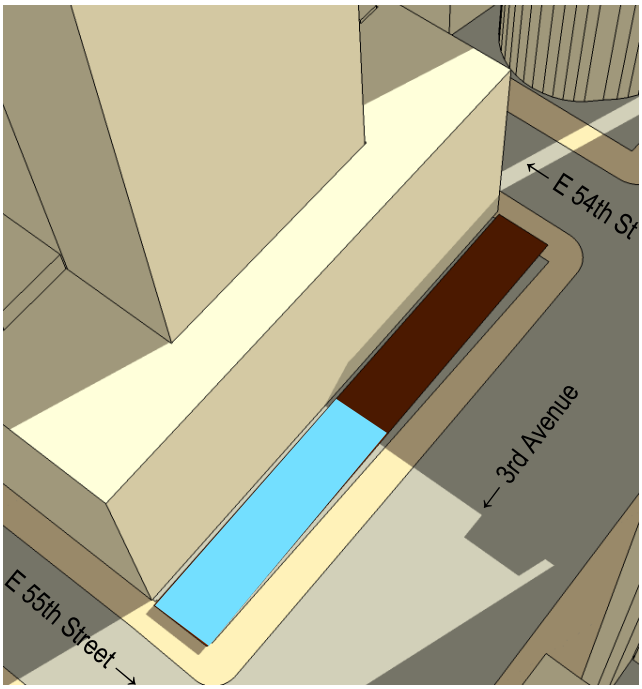
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 31:
875 Third Avenue
Representative Worst-Case Incremental Shadows

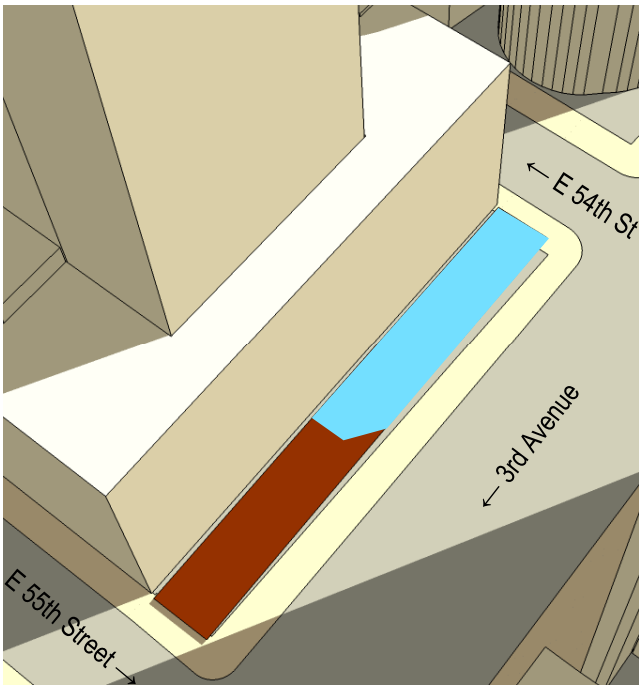
Figure 5-36

vhb

March 21 / September 21 at 2:25 PM



May 6 / August 6 at 2:00 PM



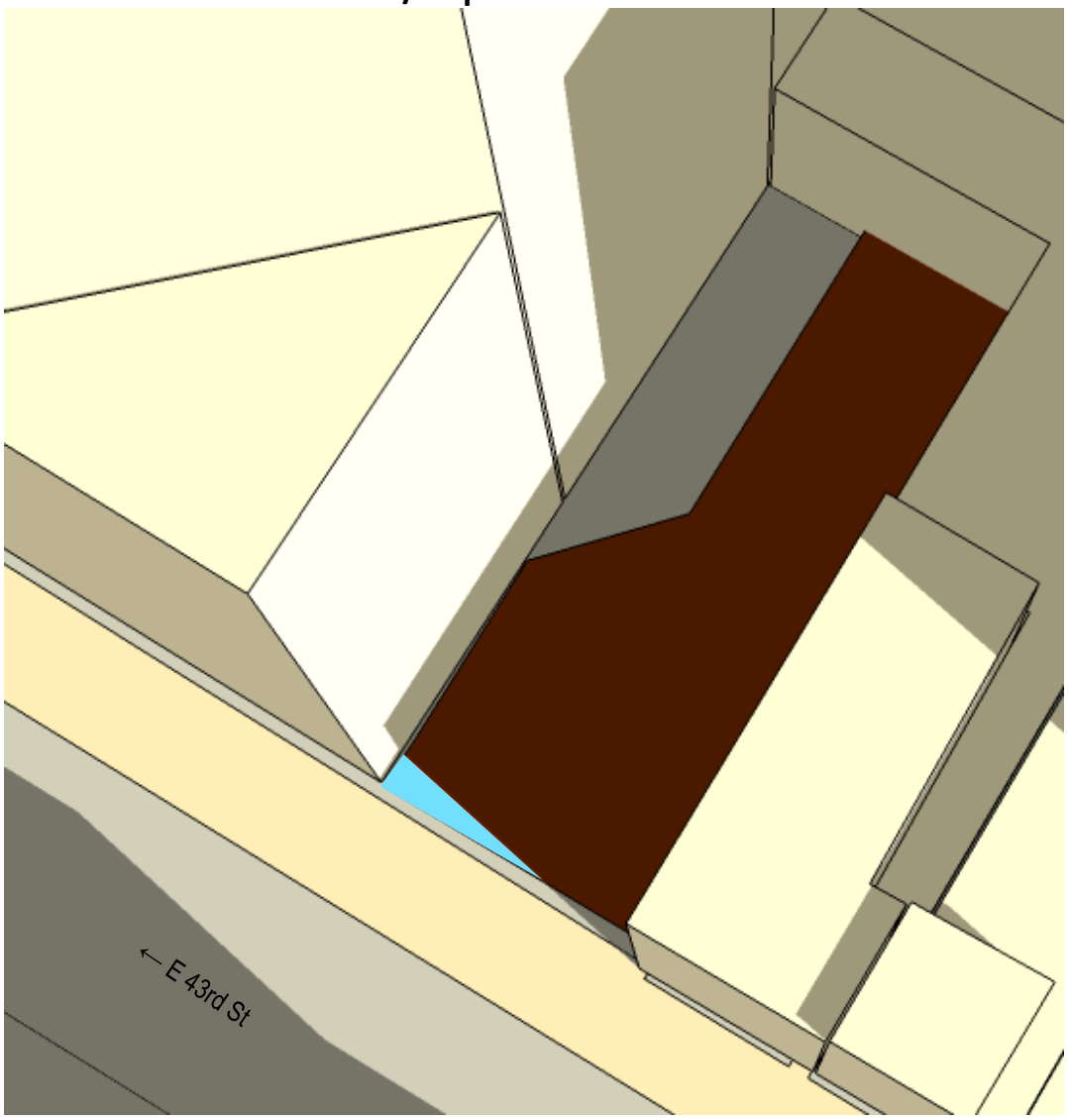
Projected Development Site	New Incremental Shadow
Potential Development Site	New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
Historic Resource	No-Action Shadow - Historic Resource
Open Space and Recreation	No-Action Shadow - Open Space and Recreation
Privately Owned Public Space (POPS)	No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 32:
909 Third Avenue
Representative Worst-Case Incremental Shadows

Figure 5-37

March 21 / September 21 at 9:30 AM



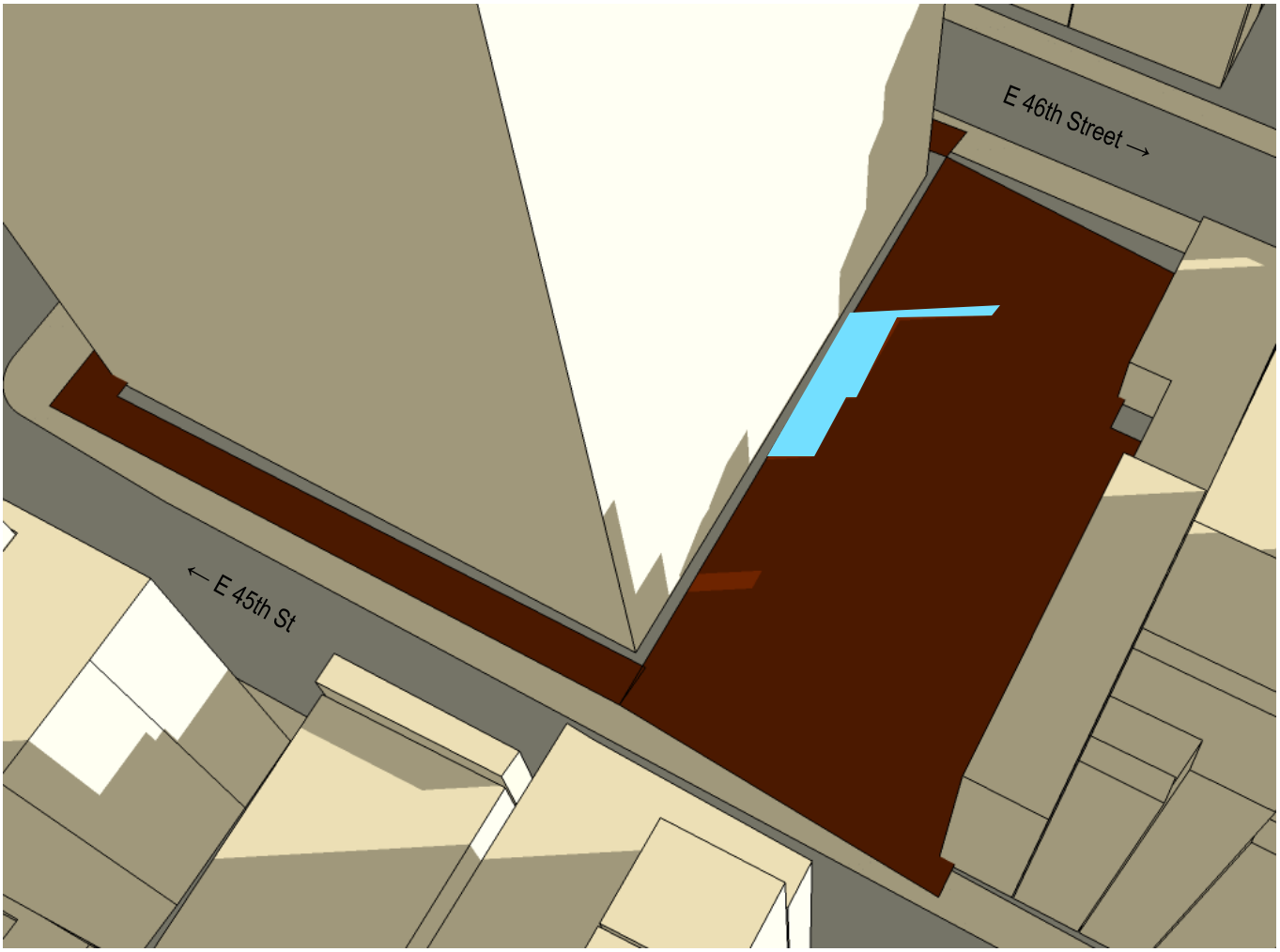
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 33:
425 Lexington Avenue
Representative Worst-Case Incremental Shadows

Figure 5-38

May 6 / August 6 at 6:55 AM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

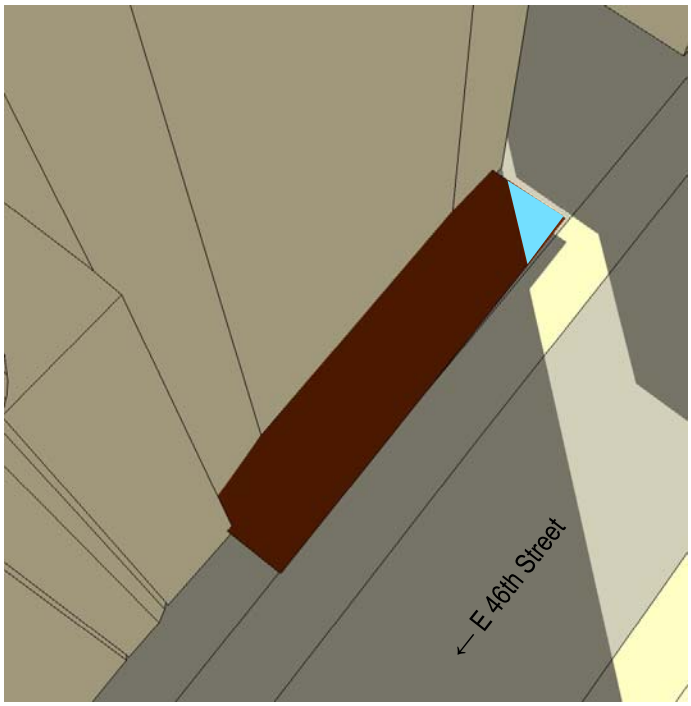
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 48:
1166 Sixth Avenue
Representative Worst-Case Incremental Shadows

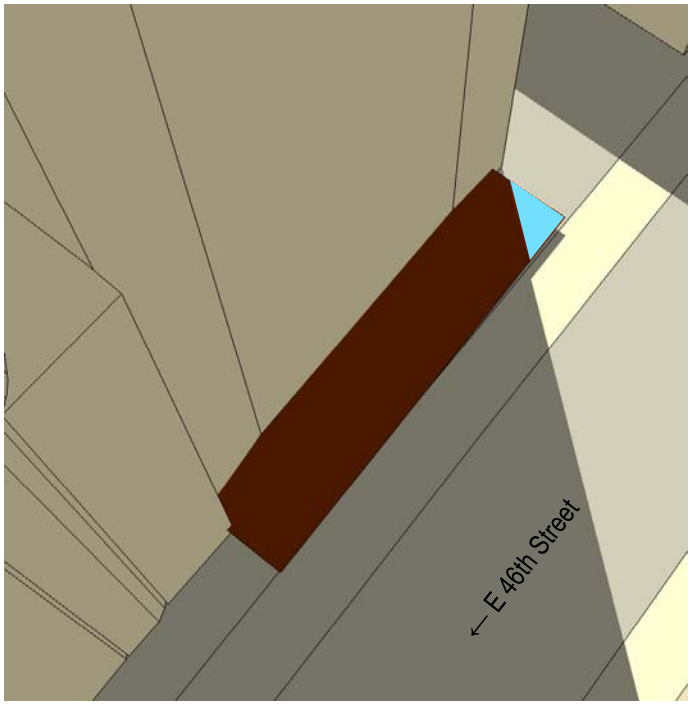
Figure 5-39

vhb

May 6 / August 6 at 2:50 PM



June 21 at 2:15 PM



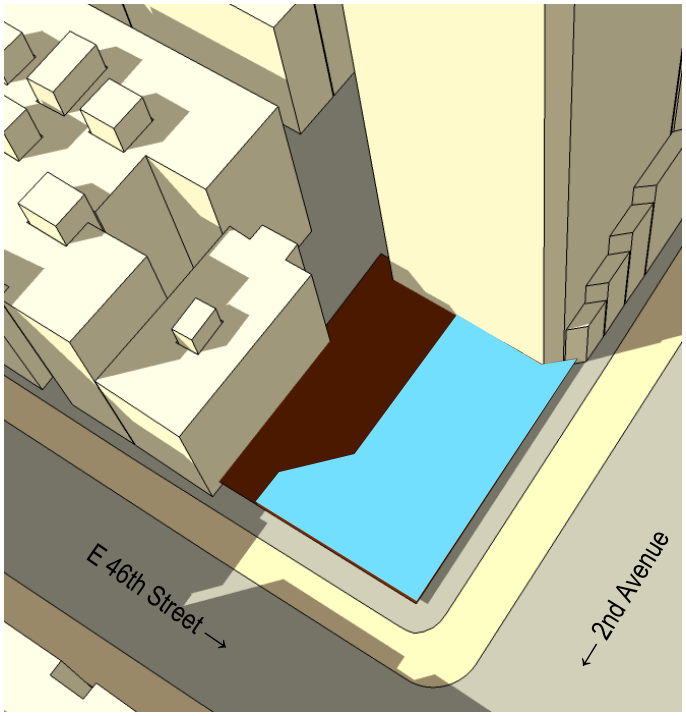
- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

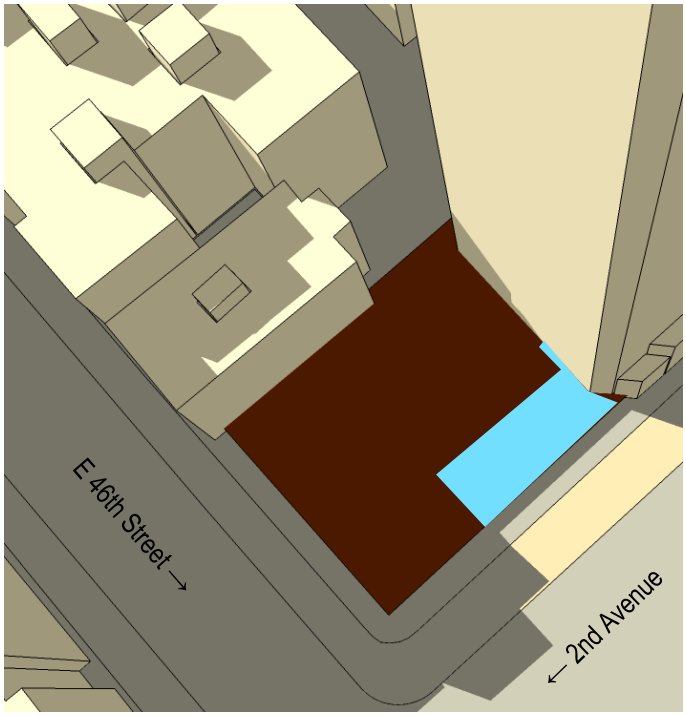
POPS Site ID No. 62:
234 East 46th Street
Representative Worst-Case Incremental Shadows

Figure 5-40

May 6 / August 6 at 2:50 PM



June 21 at 4:00 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

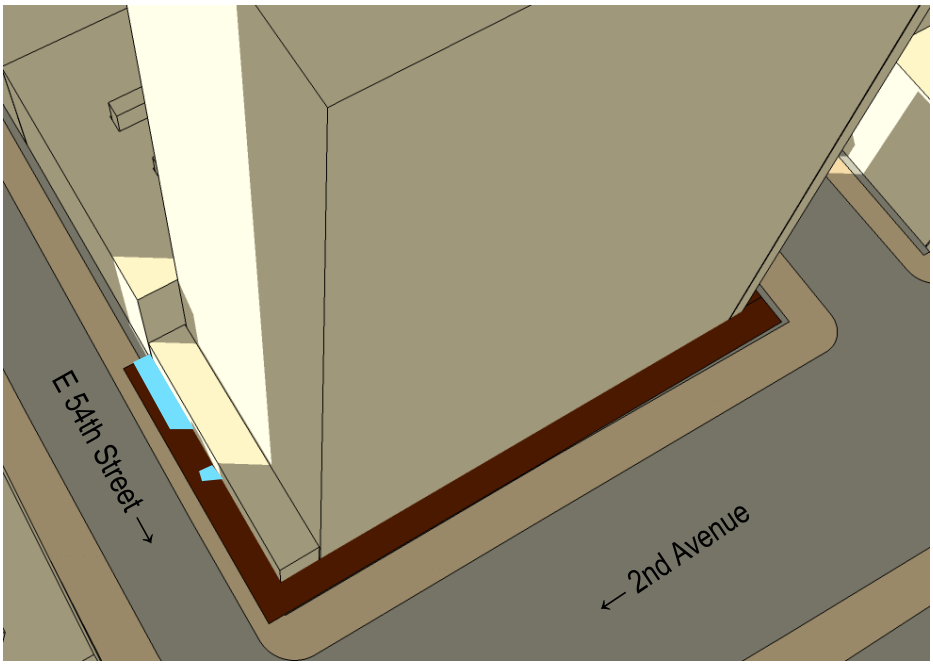
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 63:
240 East 47th Street
Representative Worst-Case Incremental Shadows

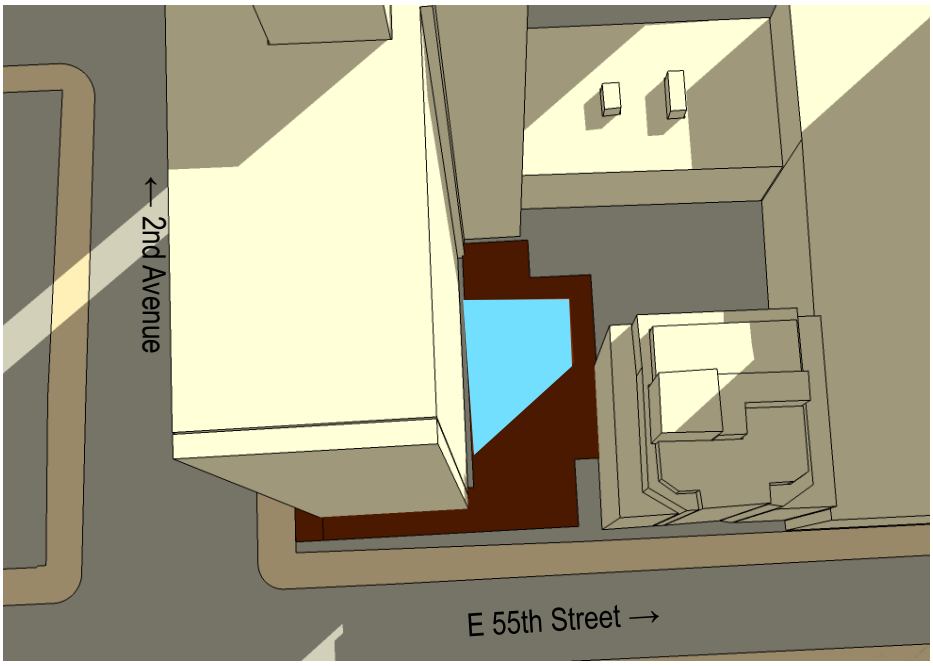
Figure 5-41

vhb

March 21 / September 21 at 3:20 PM



June 21 at 3:30 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

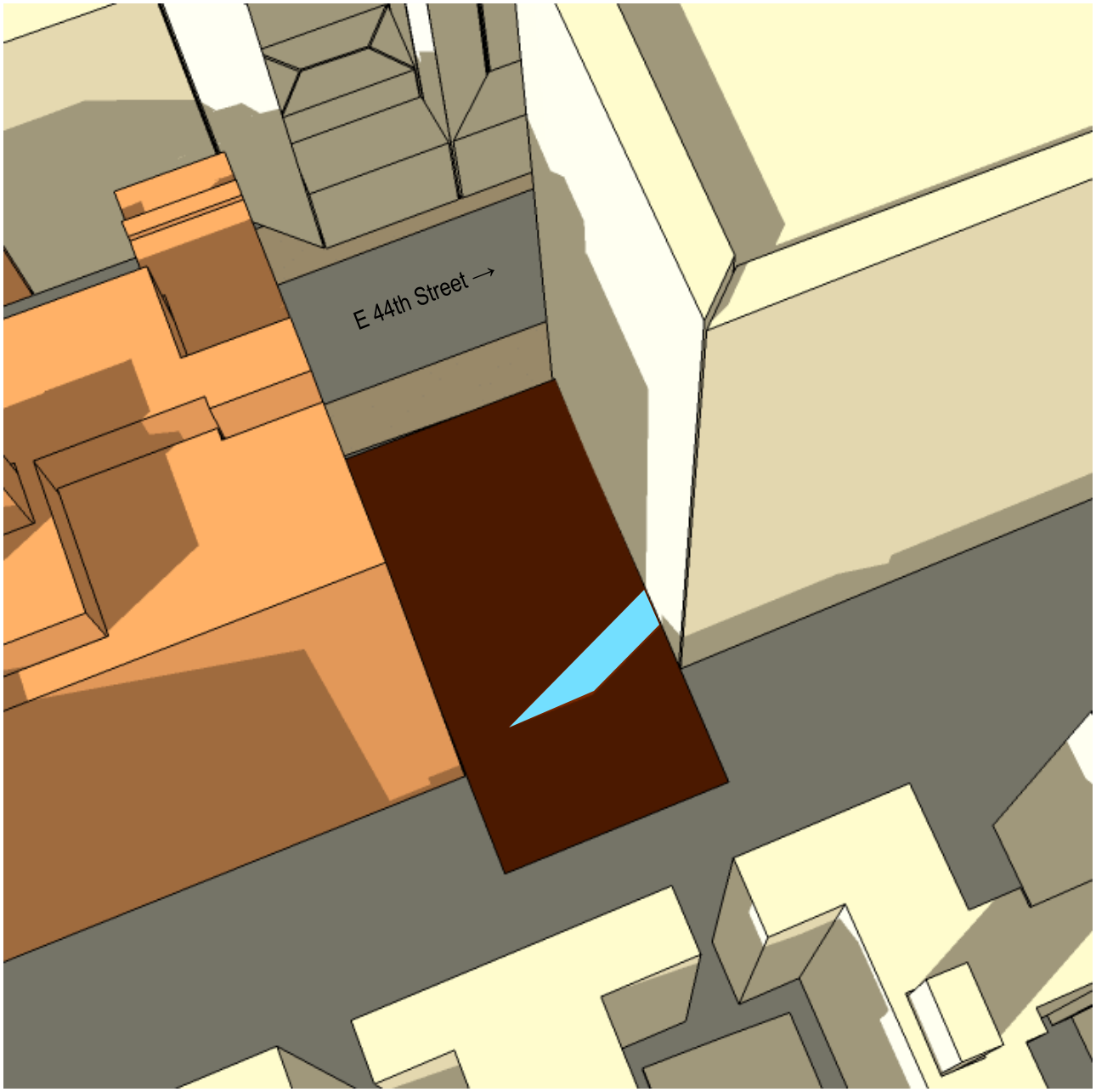
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 66:
245 East 54th Street
Representative Worst-Case Incremental Shadows

Figure 5-42

vhb

June 21 at 4:25 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

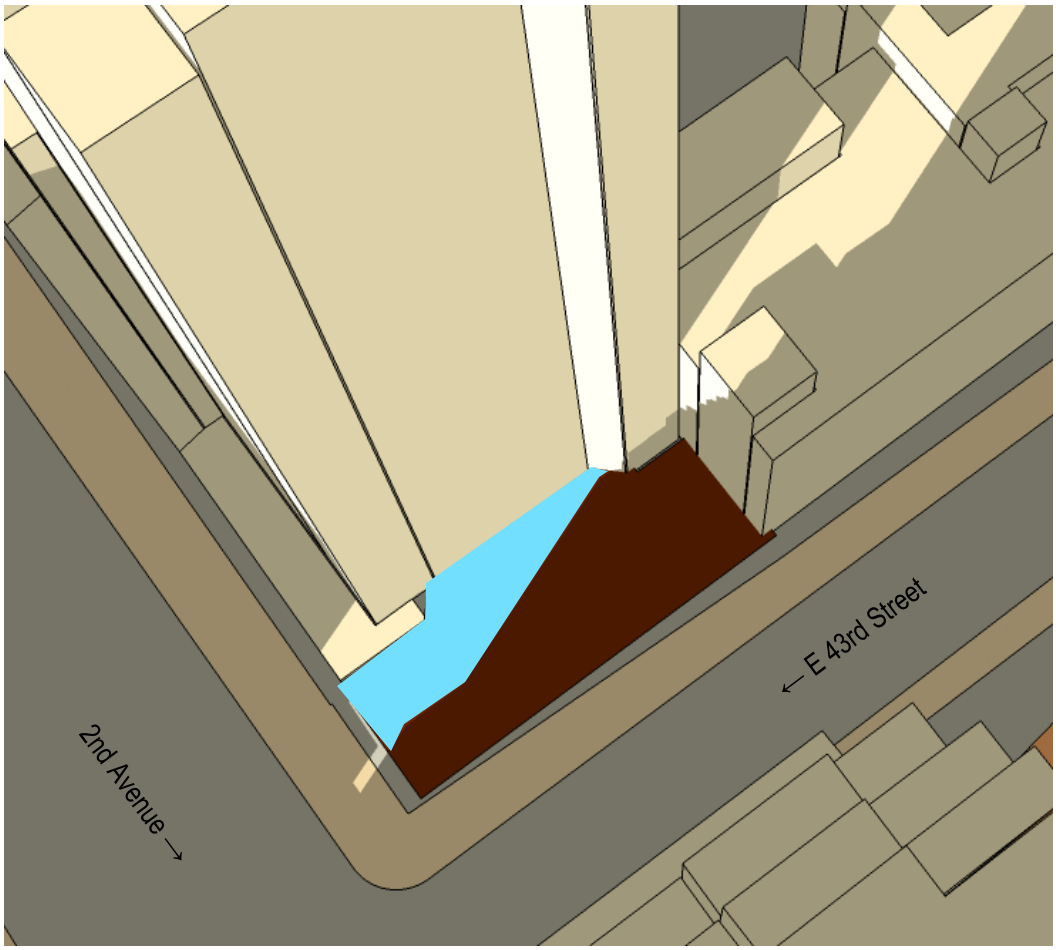
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 68:
3 United Nations Plaza
Representative Worst-Case Incremental Shadows

Figure 5-43

vhb

June 21 at 4:45 PM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

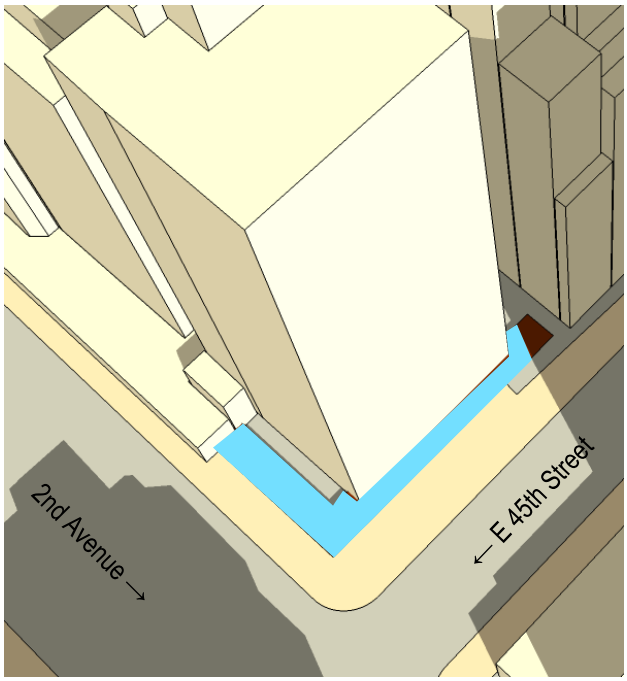
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 70:
303 East 43rd Street
Representative Worst-Case Incremental Shadows

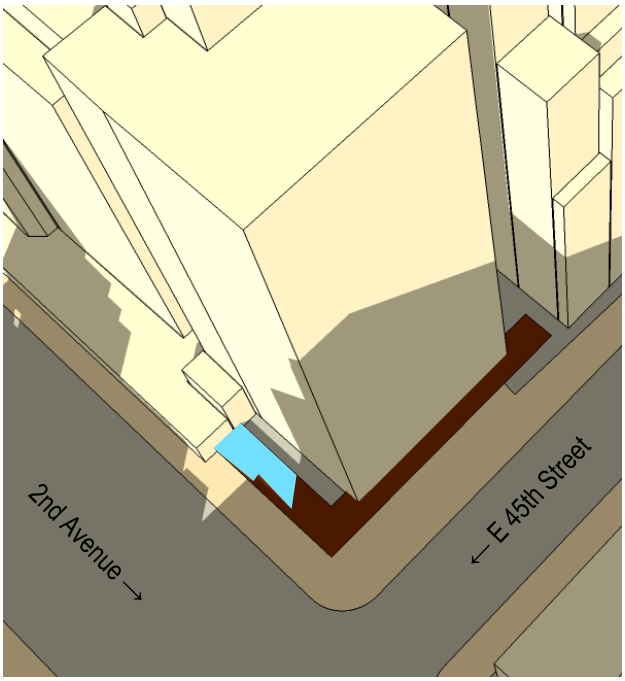
Figure 5-44

vhb

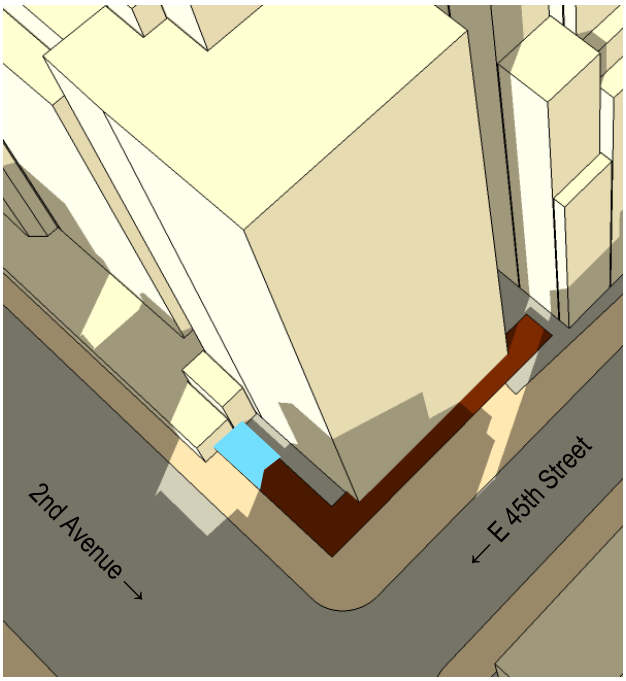
March 21 / September 21 at 2:30 PM



May 6 / August 6 at 3:45 PM



June 21 at 4:15 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

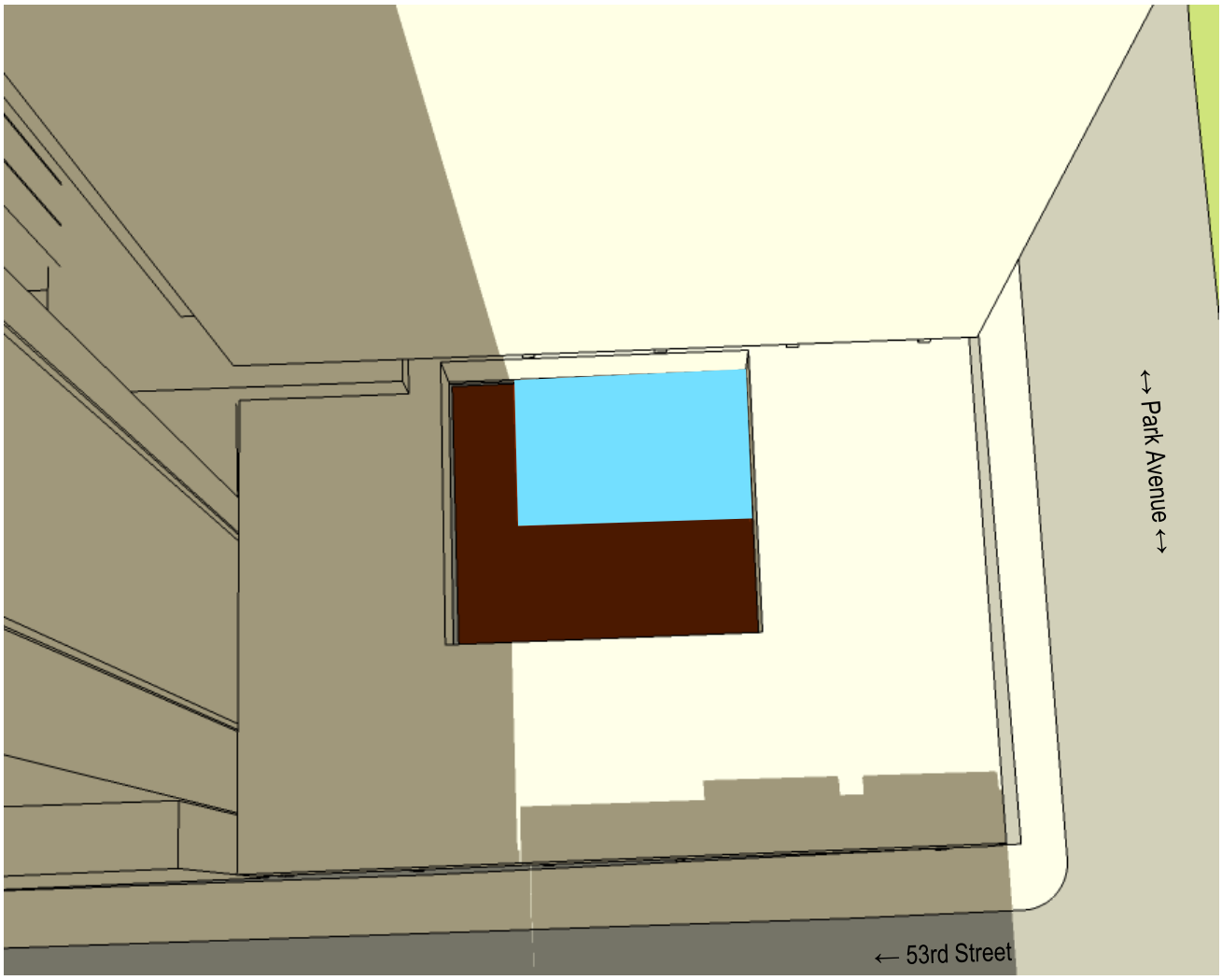
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 72:
301 East 45th Street
Representative Worst-Case Incremental Shadows

Figure 5-45

vhb

March 21 / September 21 at 1:20 PM



Projected Development Site	New Incremental Shadow
Potential Development Site	New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
Historic Resource	No-Action Shadow - Historic Resource
Open Space and Recreation	No-Action Shadow - Open Space and Recreation
Privately Owned Public Space (POPS)	No-Action Shadow - POPS

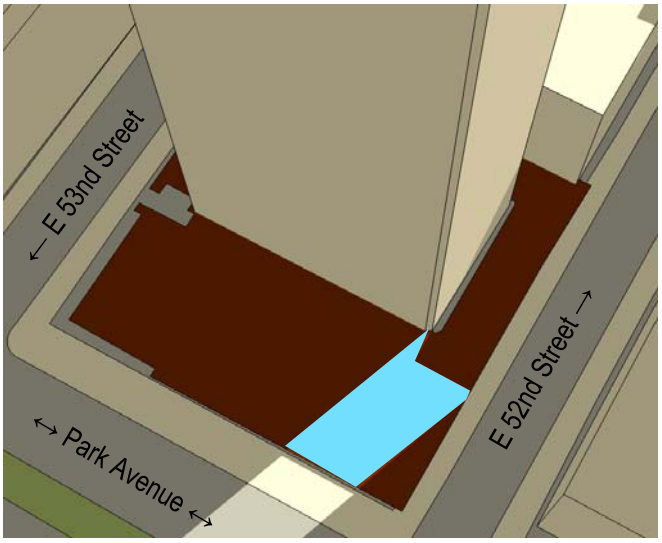
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 82:
390 Park Avenue
Representative Worst-Case Incremental Shadows

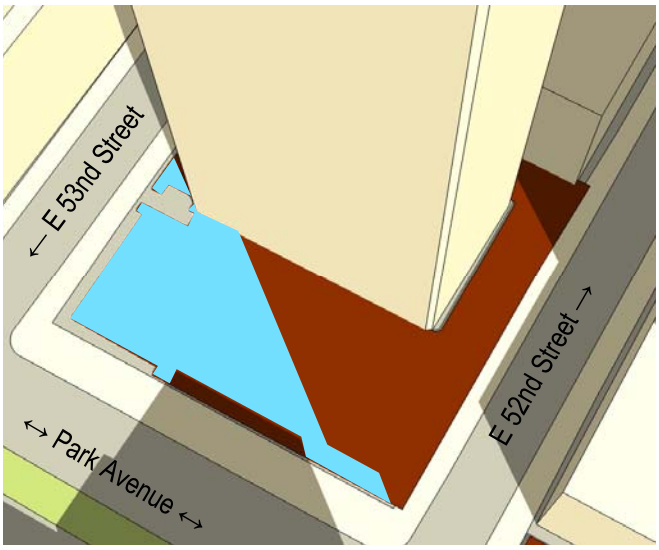
Figure 5-46

vhb

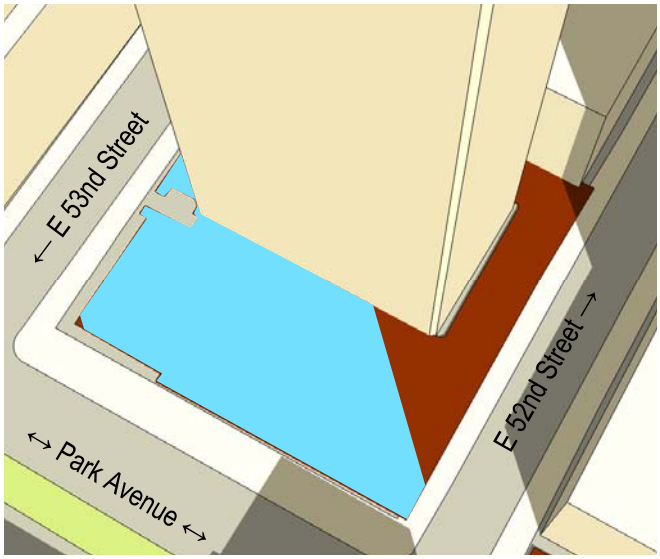
March 21 / September 21 at 10:00 AM



May 6 / August 6 at 2:30 PM



June 21 at 2:30 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

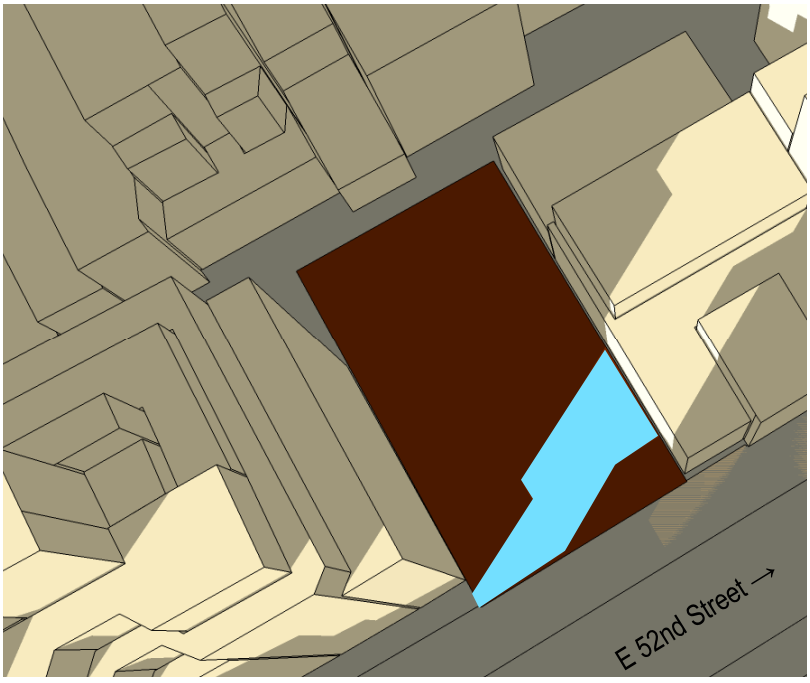
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 83:
375 Park Avenue
Representative Worst-Case Incremental Shadows

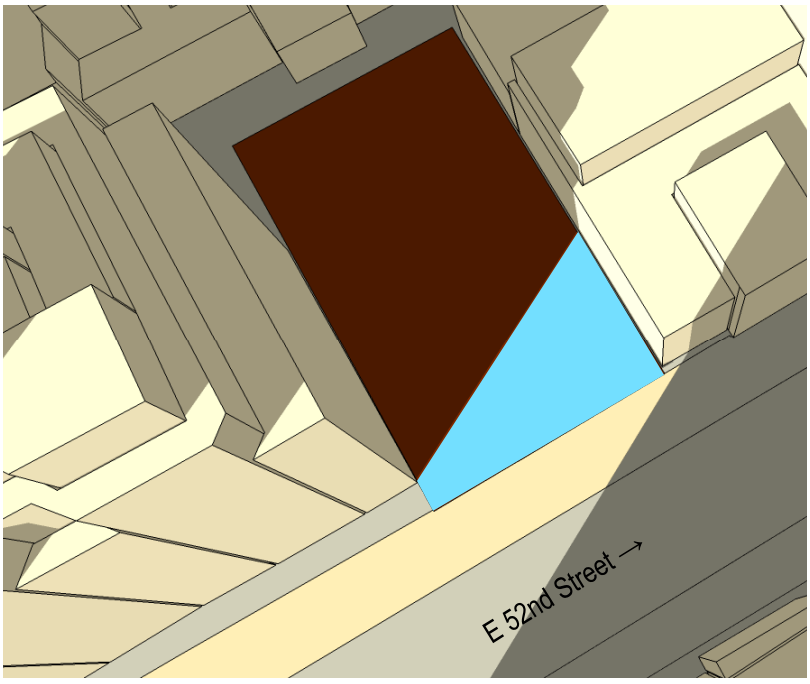
Figure 5-47

vhb

May 6 / August 6 at 4:30 PM



June 21 at 4:00 PM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

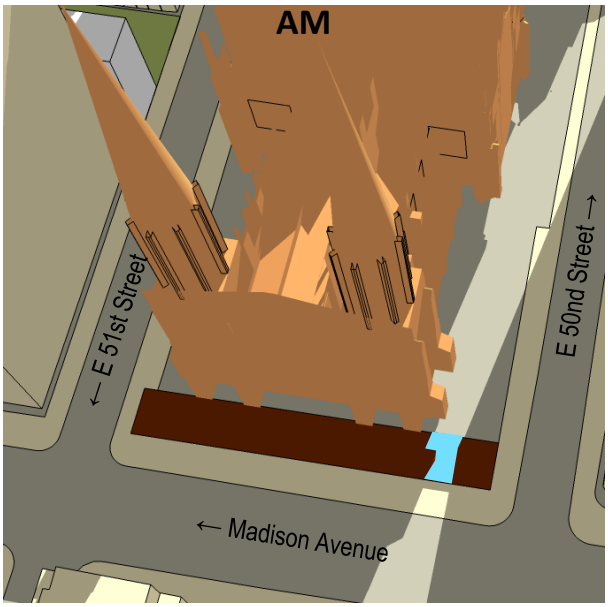
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 84:
217 East 51st Street
Representative Worst-Case Incremental Shadows

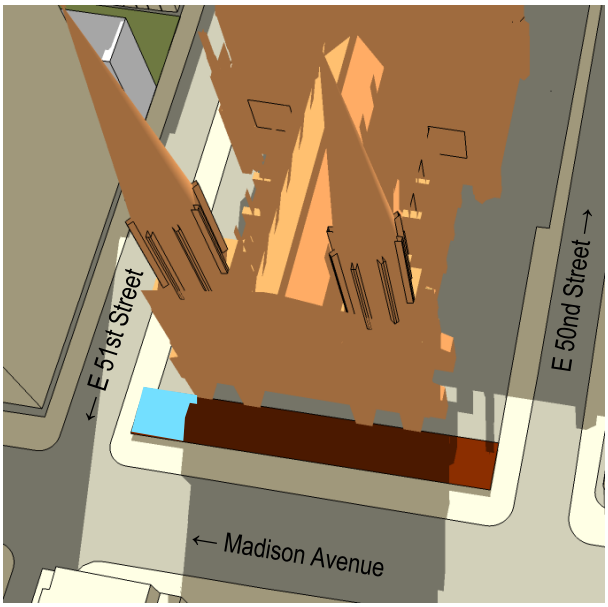
Figure 5-48

vhb

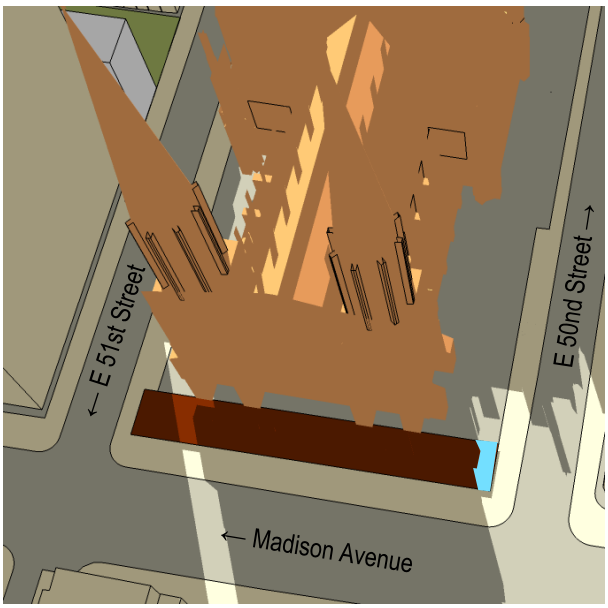
March 21 / September 21 at 9:30 AM



May 6 / August 6 at 8:50 AM



June 21 at 8:20 AM



- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

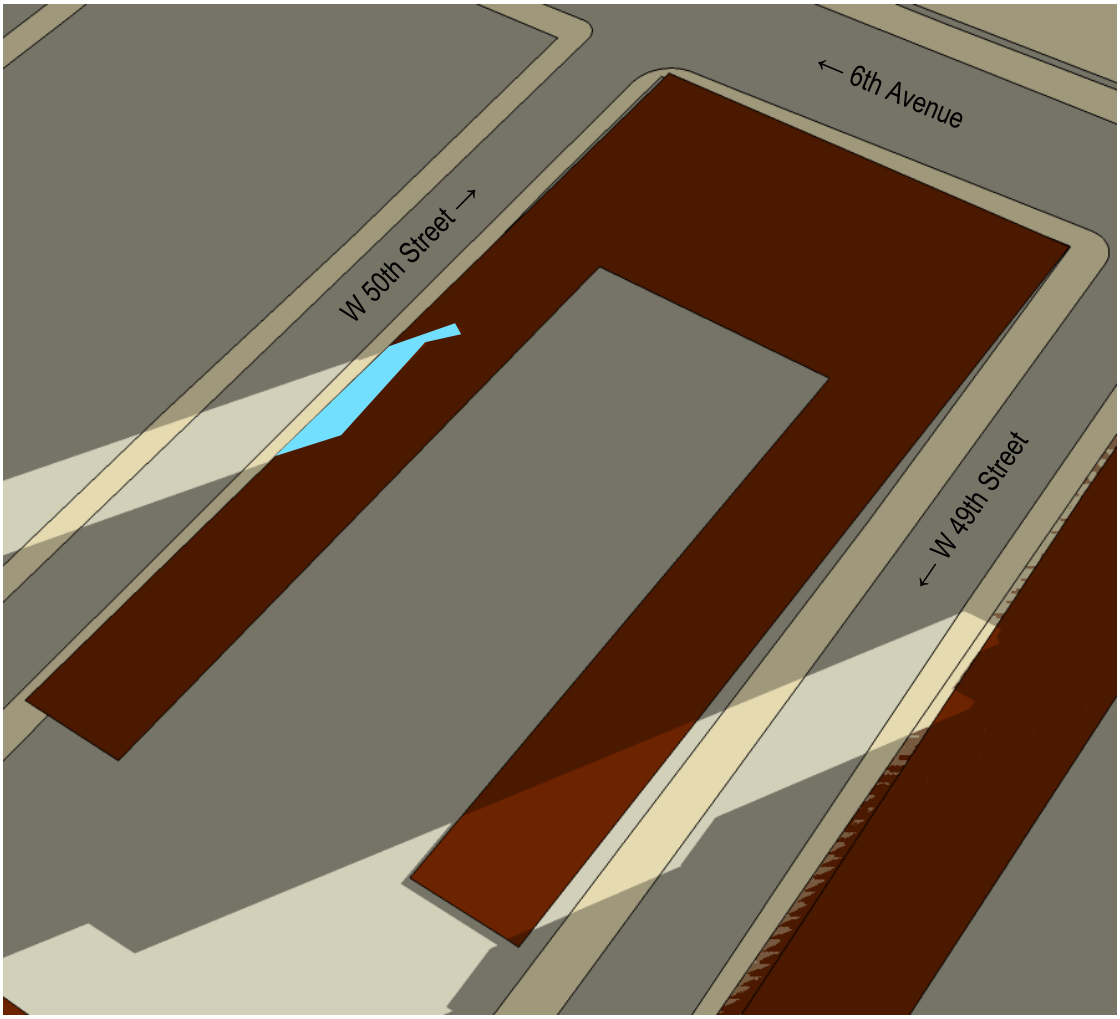
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 85:
460 Madison Avenue
Representative Worst-Case Incremental Shadows

Figure 5-49

vhb

December 21 at 10:00 AM



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

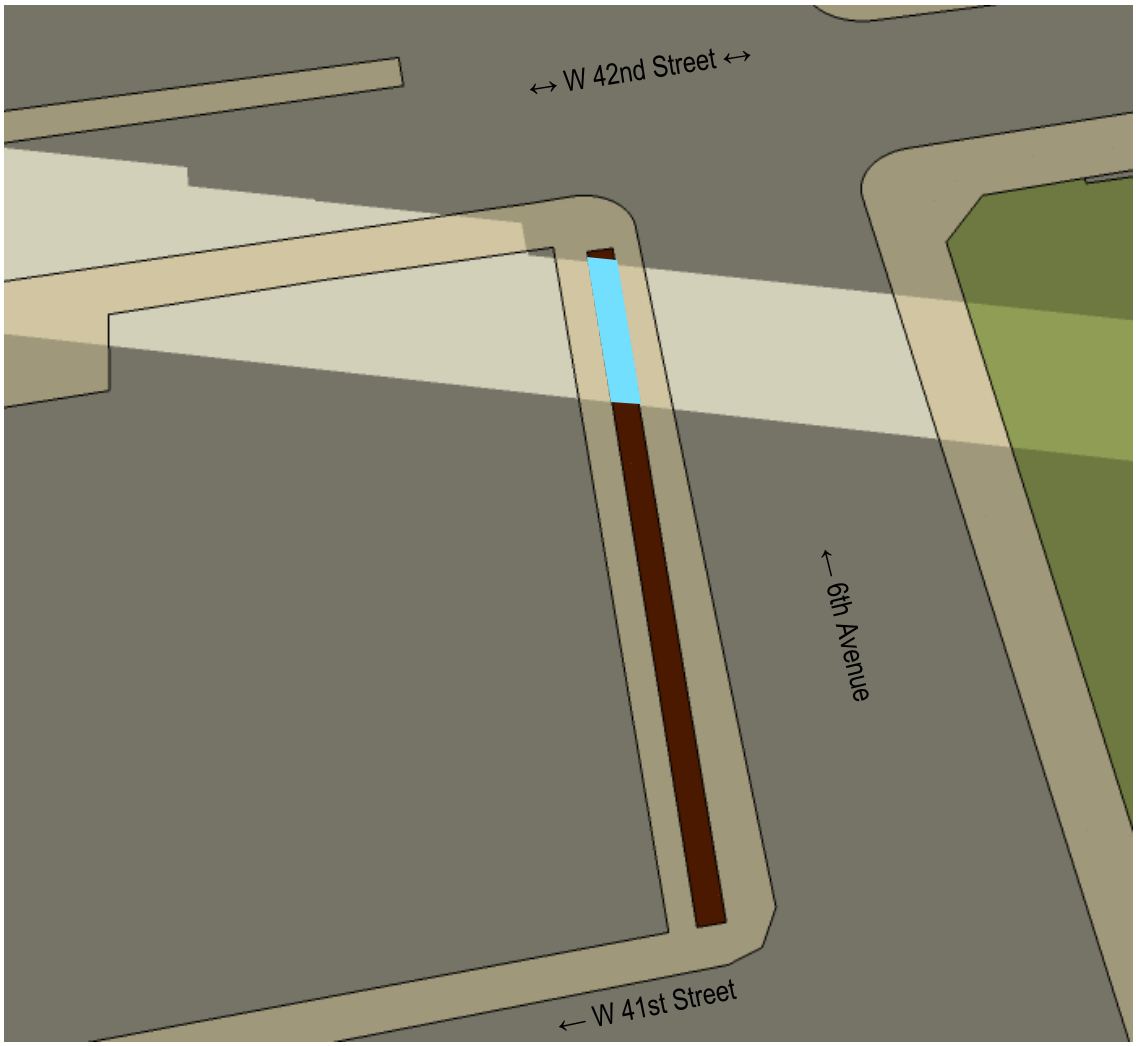
Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 103:
1251 Sixth Avenue
Representative Worst-Case Incremental Shadows

Figure 5-50

vhb

December 21 at 9:00 AM



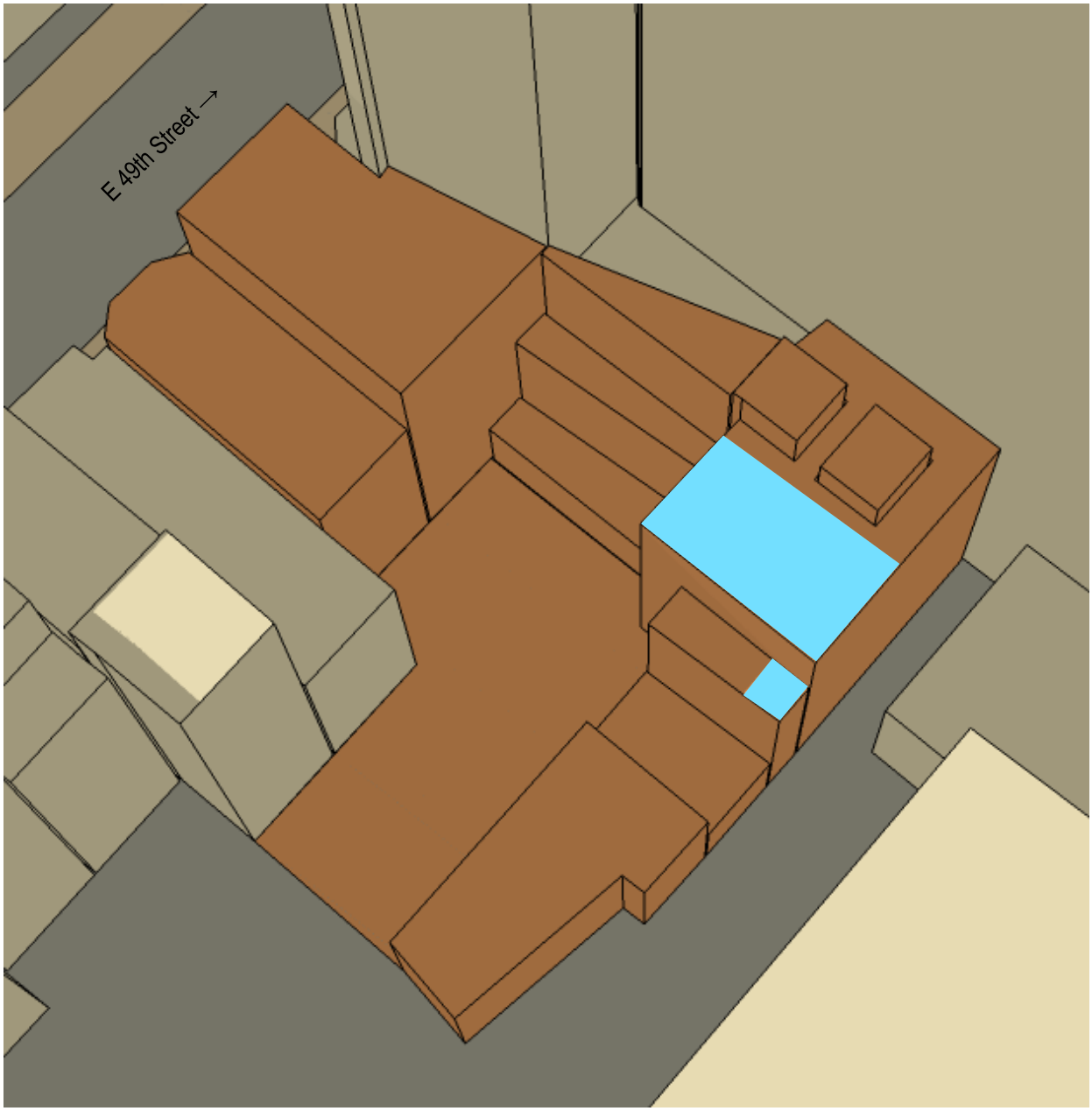
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

POPS Site ID No. 143:
1095 Sixth Avenue
Representative Worst-Case Incremental Shadows

Figure 5-51

vhb

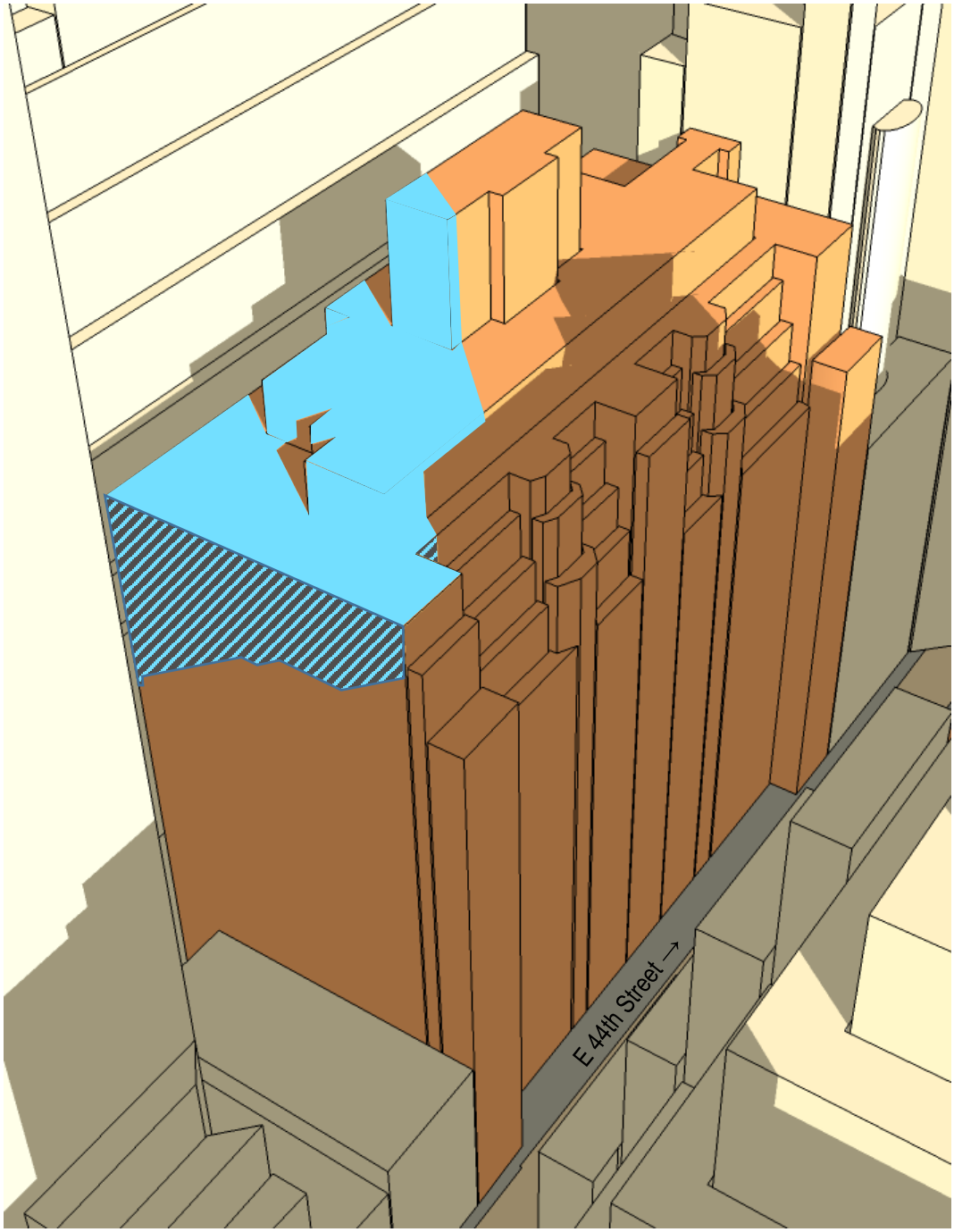


Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H1 - Amster Yard
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 1:45 PM

Figure 5-52



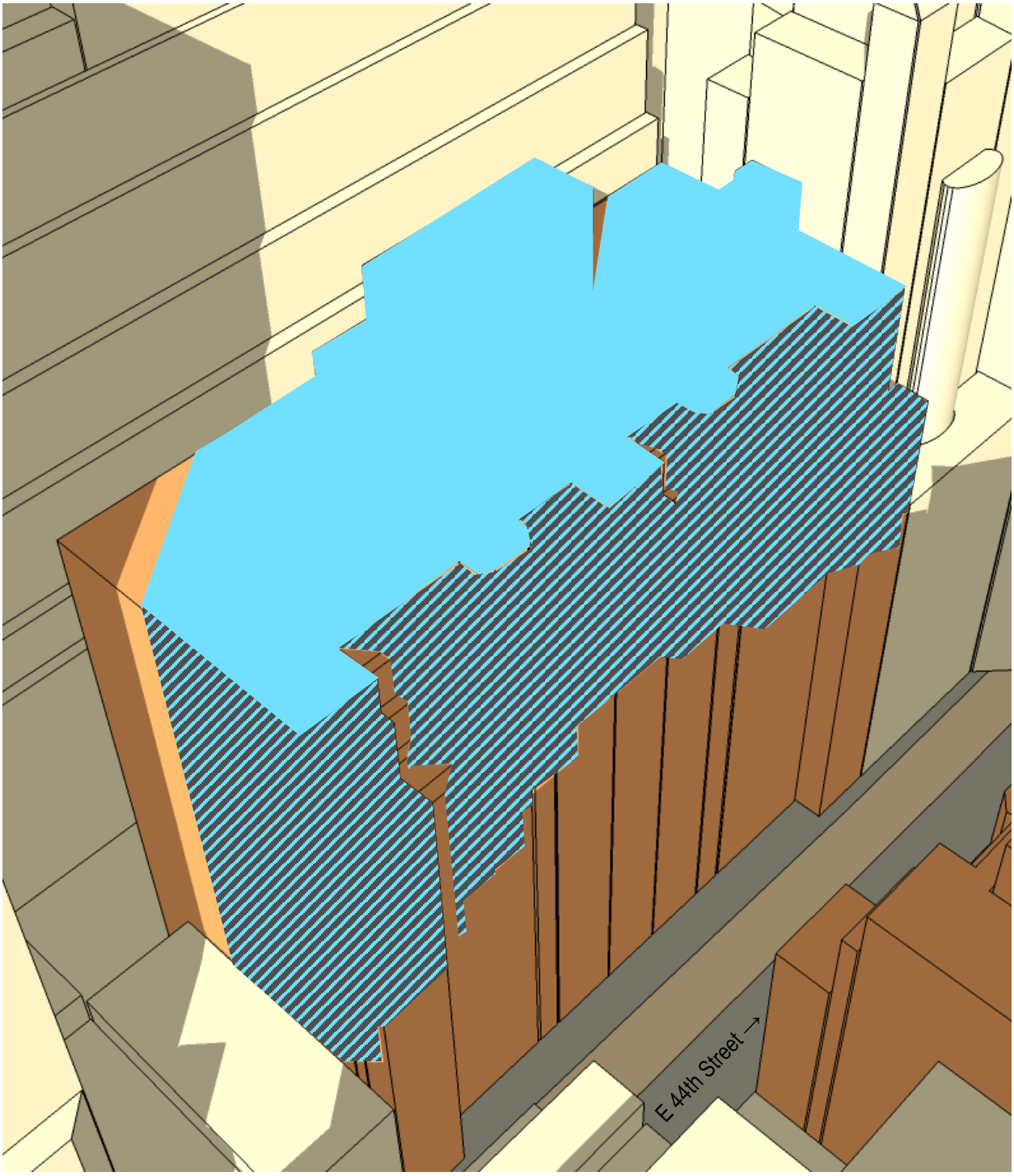
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H2 - Beaux Arts Apartments North
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day at 3:30 PM

Figure 5-53a

vhb



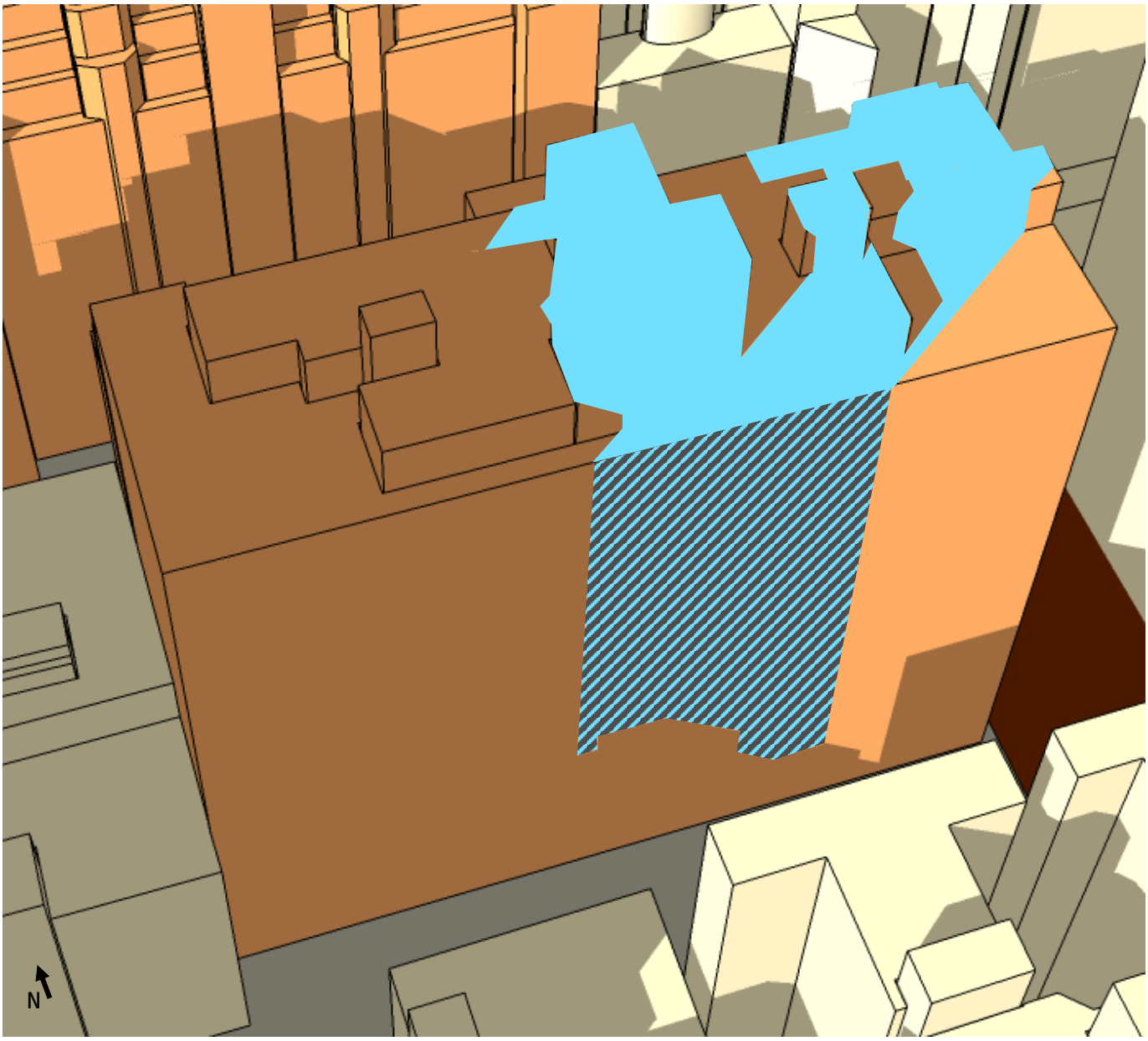
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H2 - Beaux Arts Apartments North
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 3:40 PM

Figure 5-53b

vhb



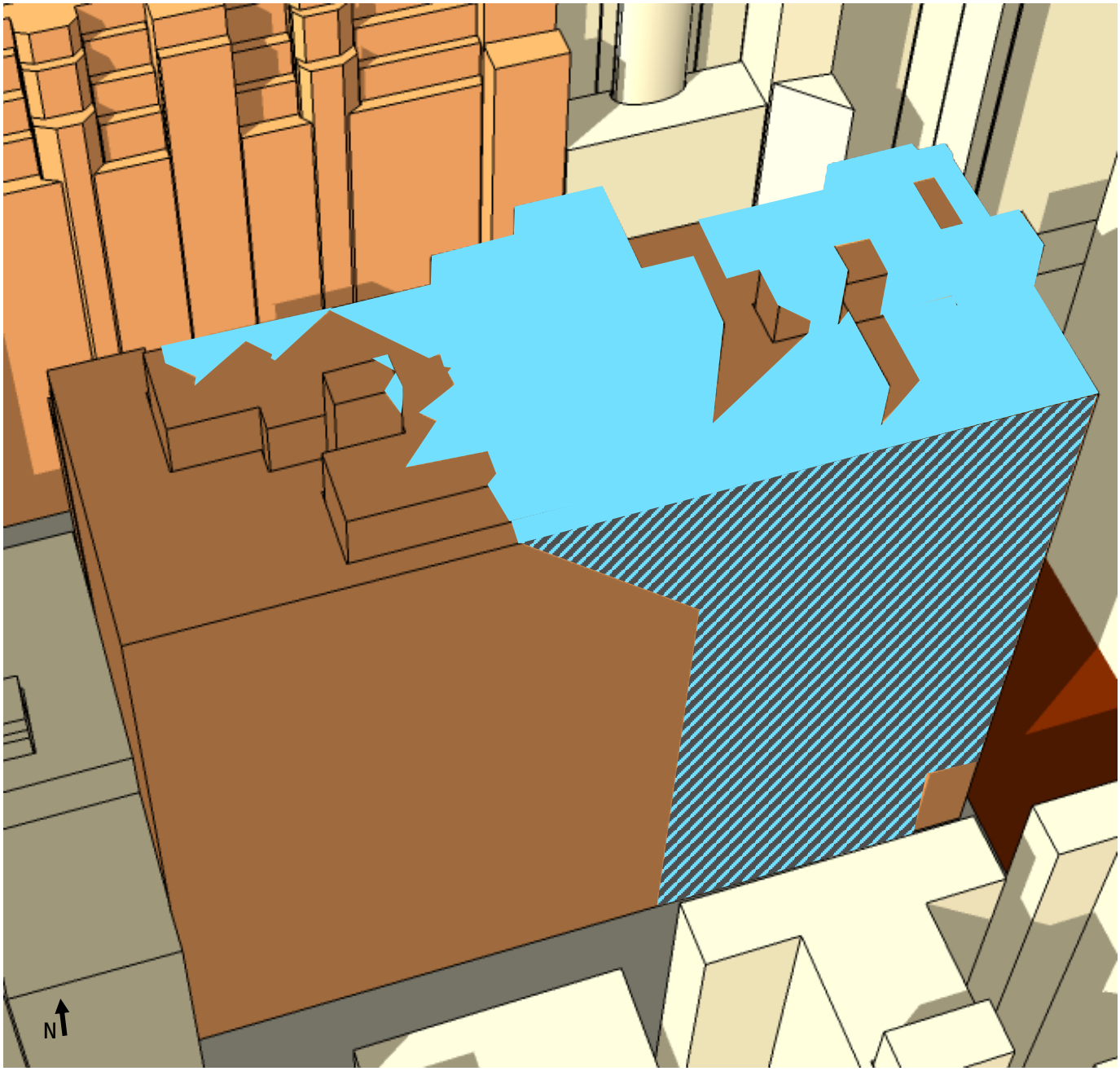
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H3 - Beaux Arts Apartments South
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 3:45 PM

Figure 5-54a

vhb



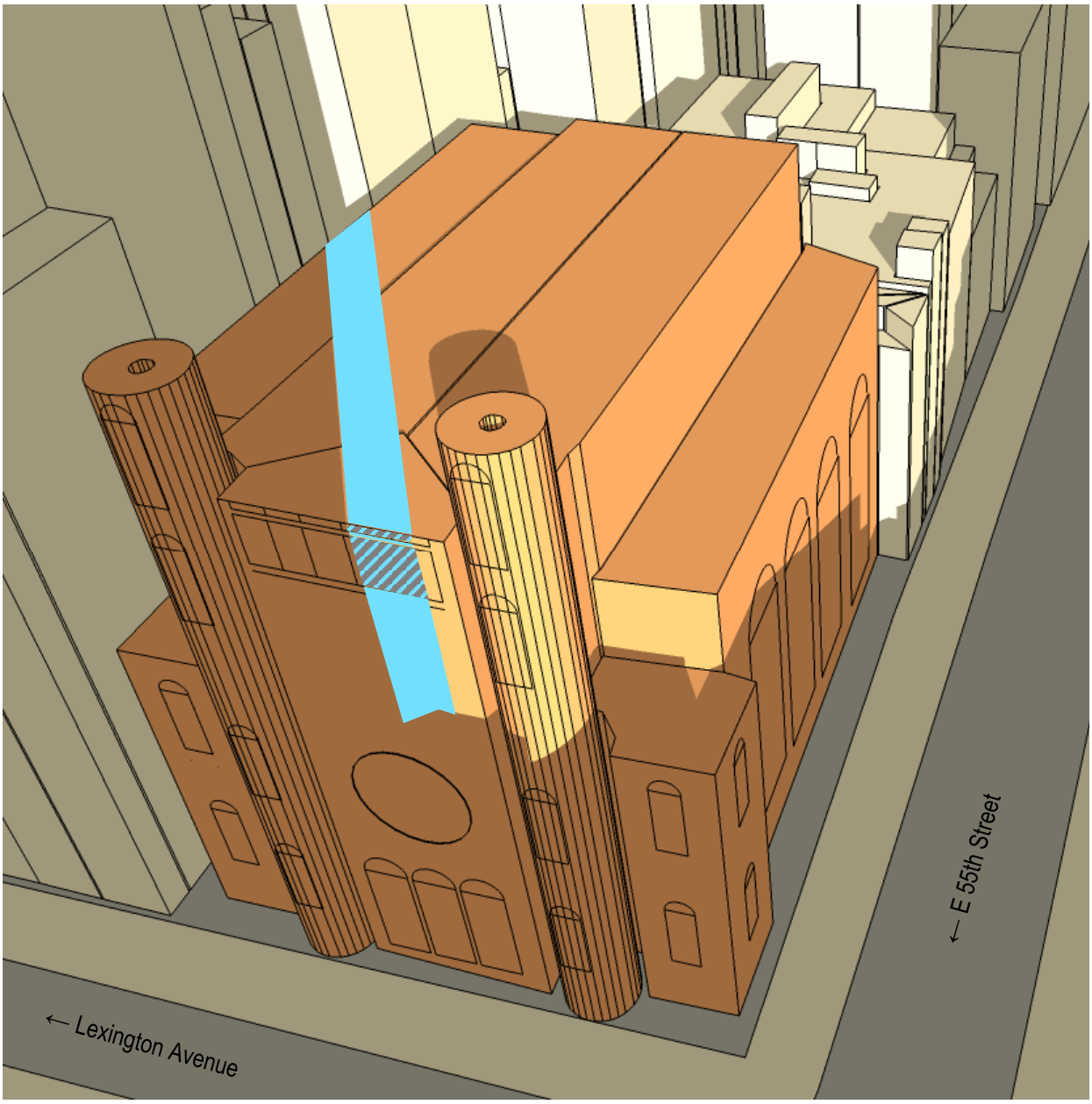
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H3 - Beaux Arts Apartments South
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 3:40 PM

Figure 5-54b

vhb



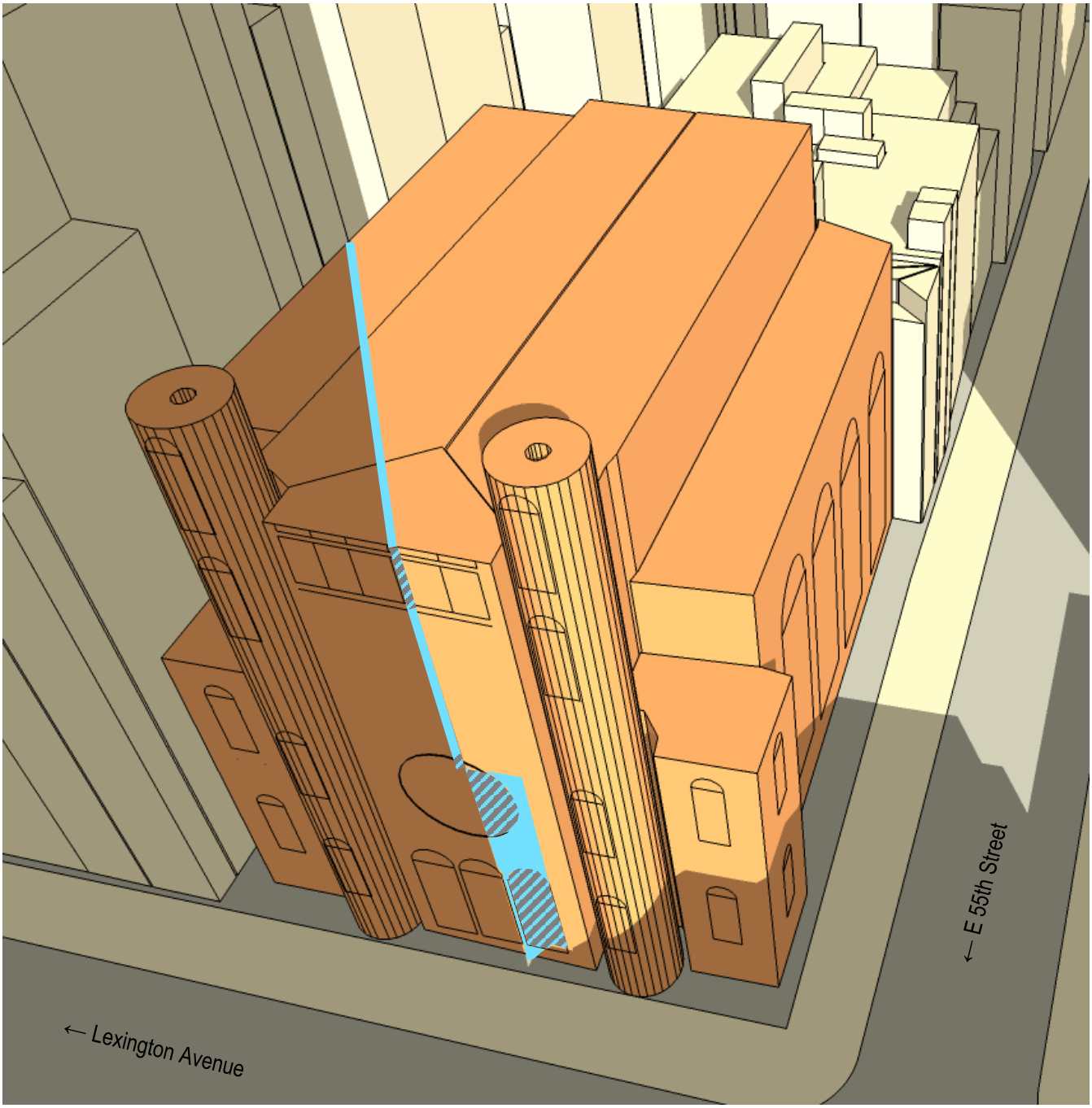
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H5 - Central Synagogue
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 6:45 AM

Figure 5-55a

vhb



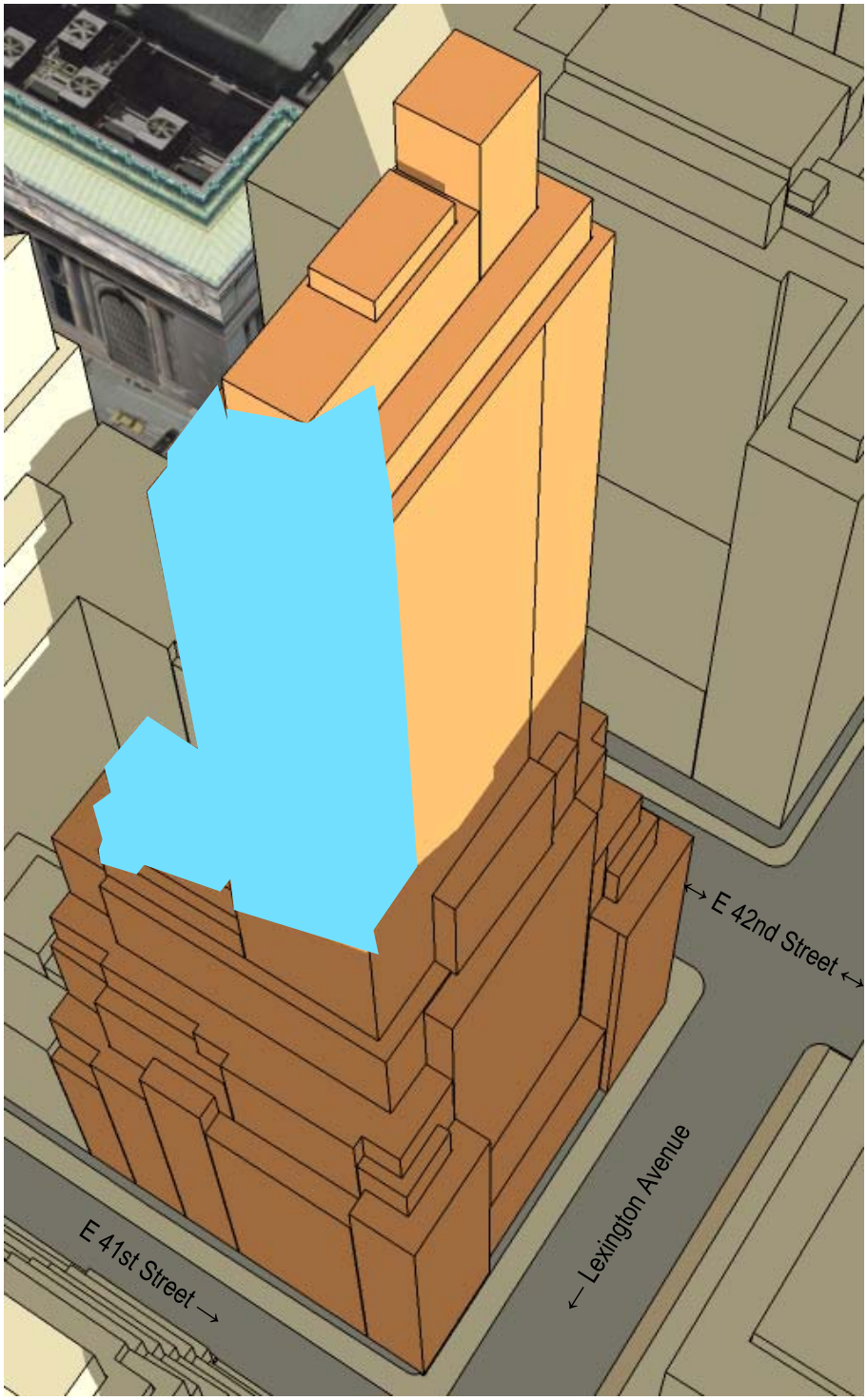
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H5 - Central Synagogue
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 7:30 AM

Figure 5-55b

vhb

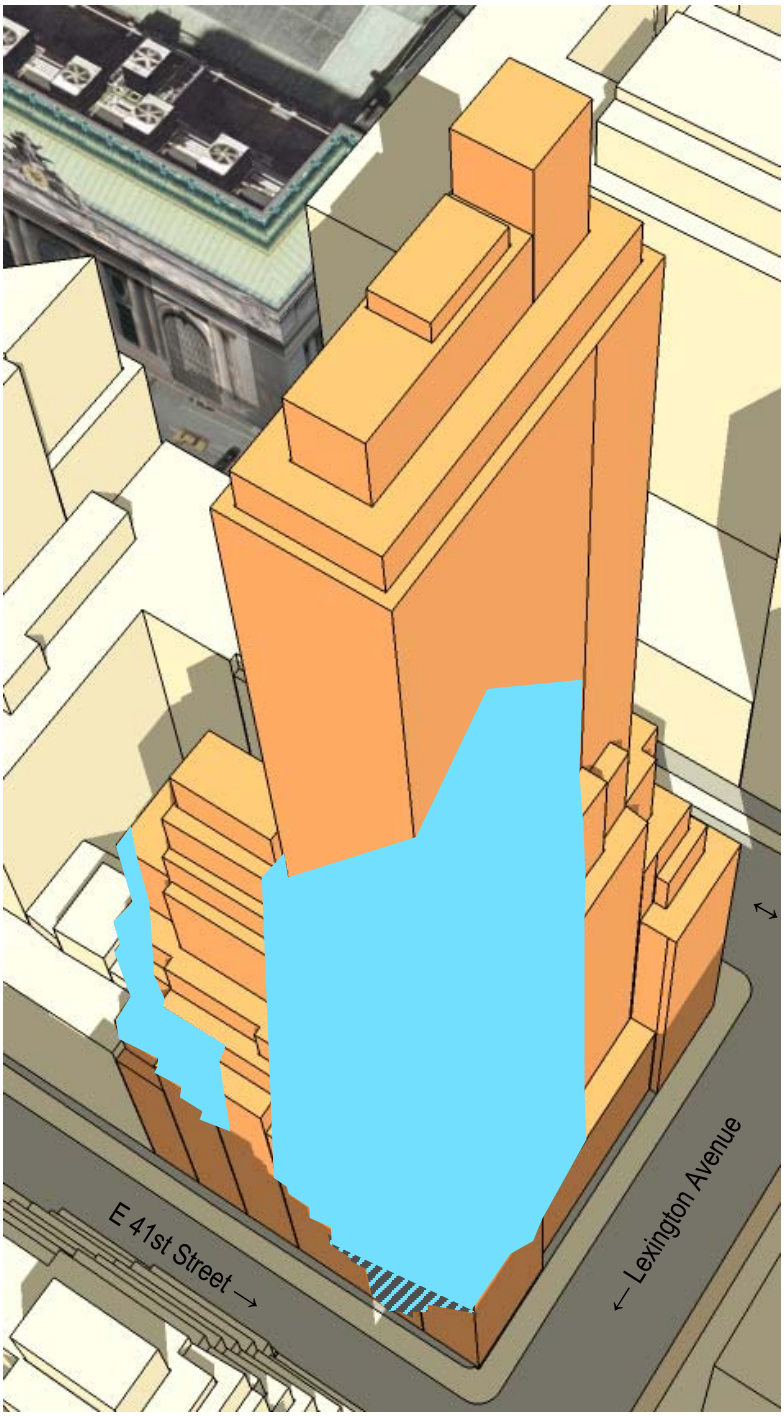


Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H6 - Chanin Building
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 10:30 AM

Figure 5-56a



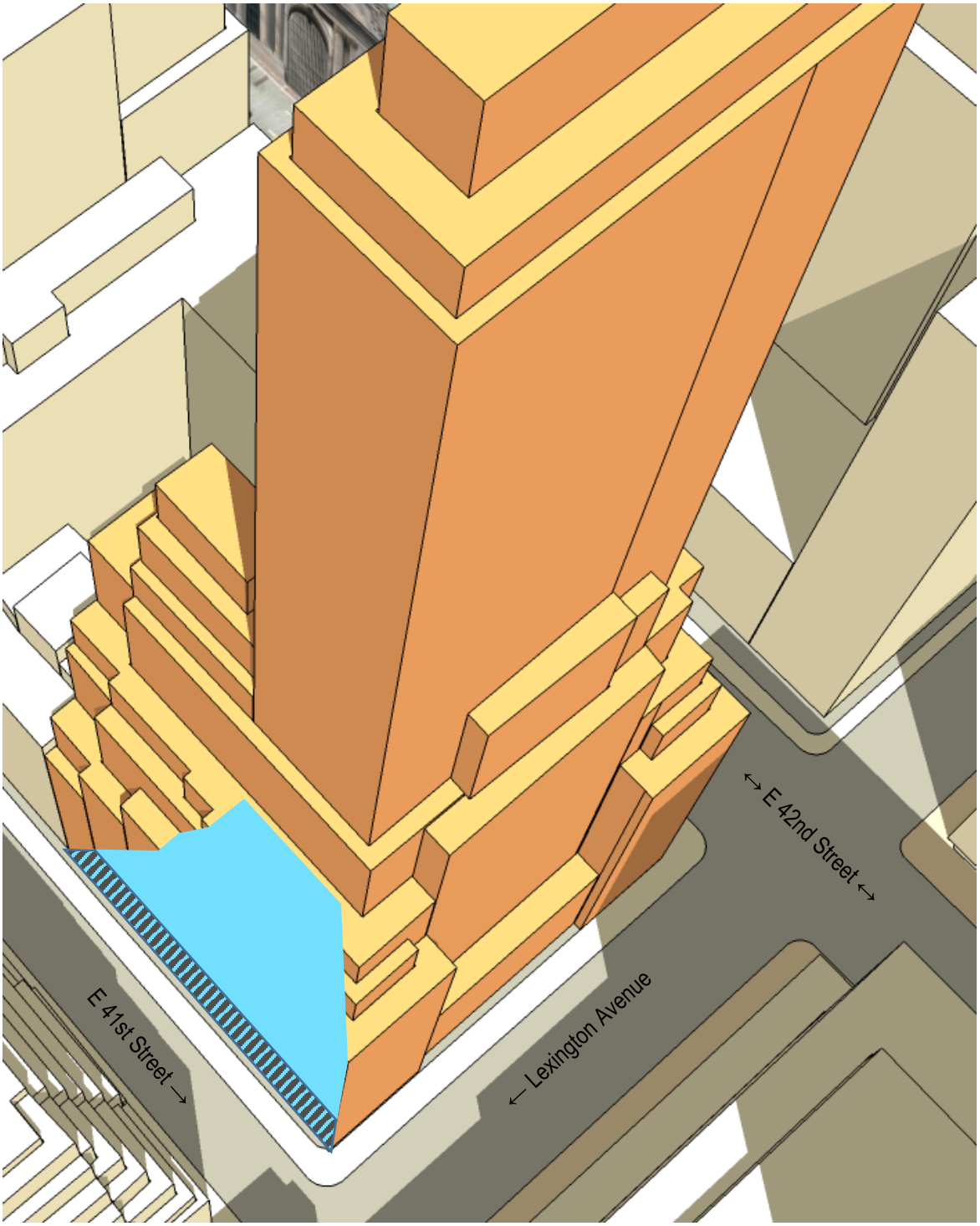
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H6 - Chanin Building
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day at 11:30 AM

Figure 5-56b

vhb



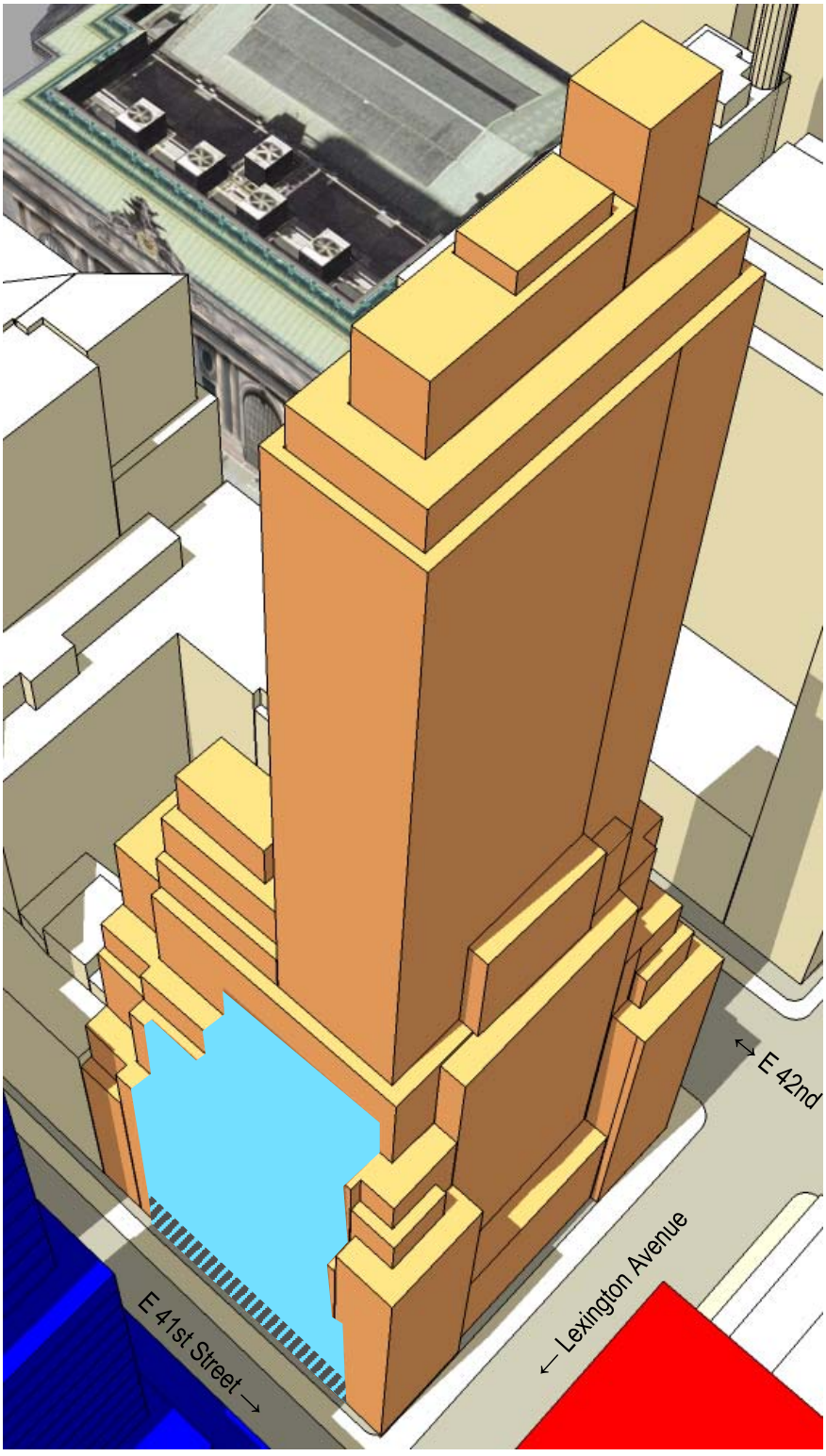
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H6 - Chanin Building
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 11:00 AM

Figure 5-56c

vhb



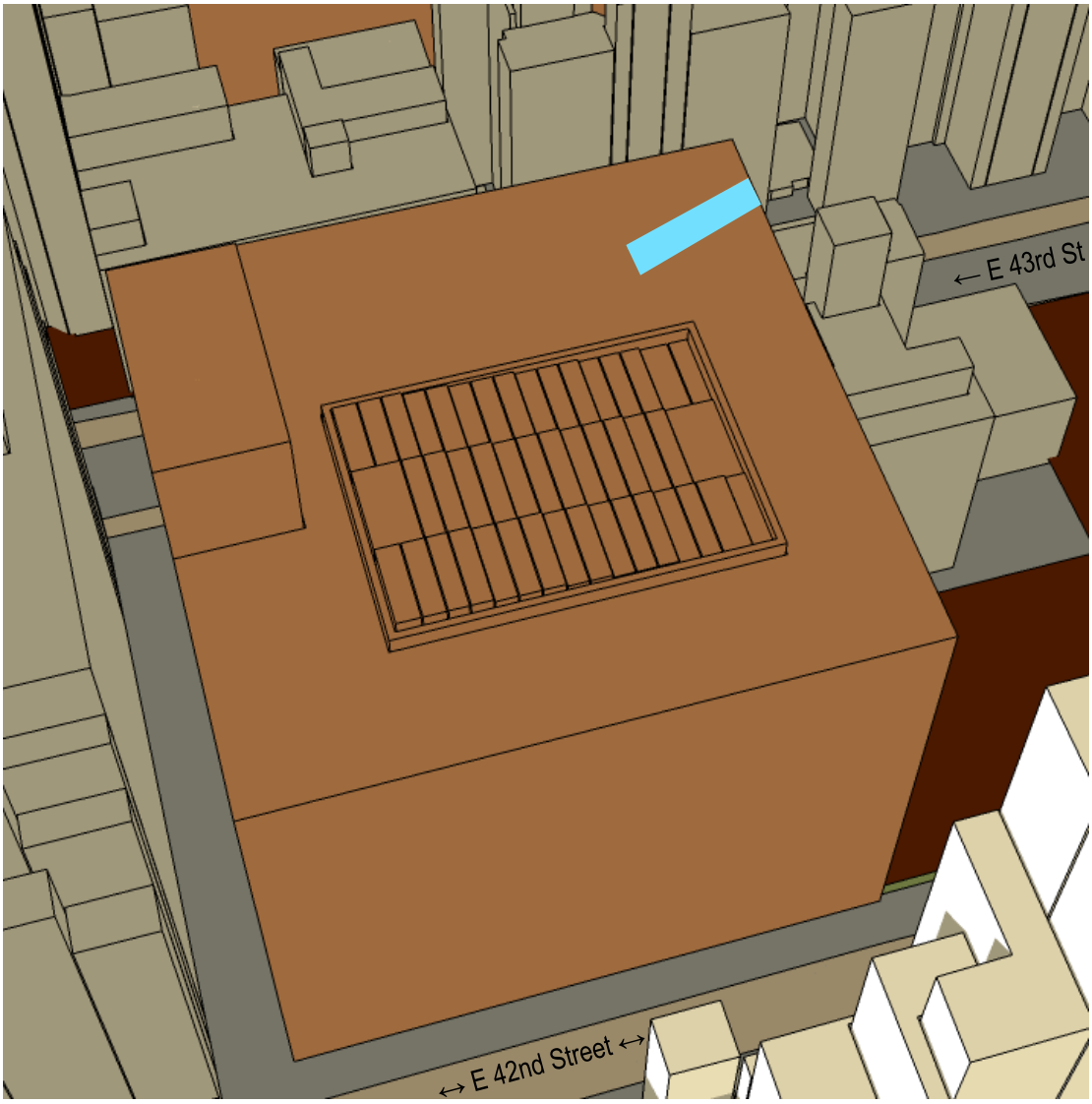
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H6 - Chanin Building
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 12:45 PM

Figure 5-56d

vhb



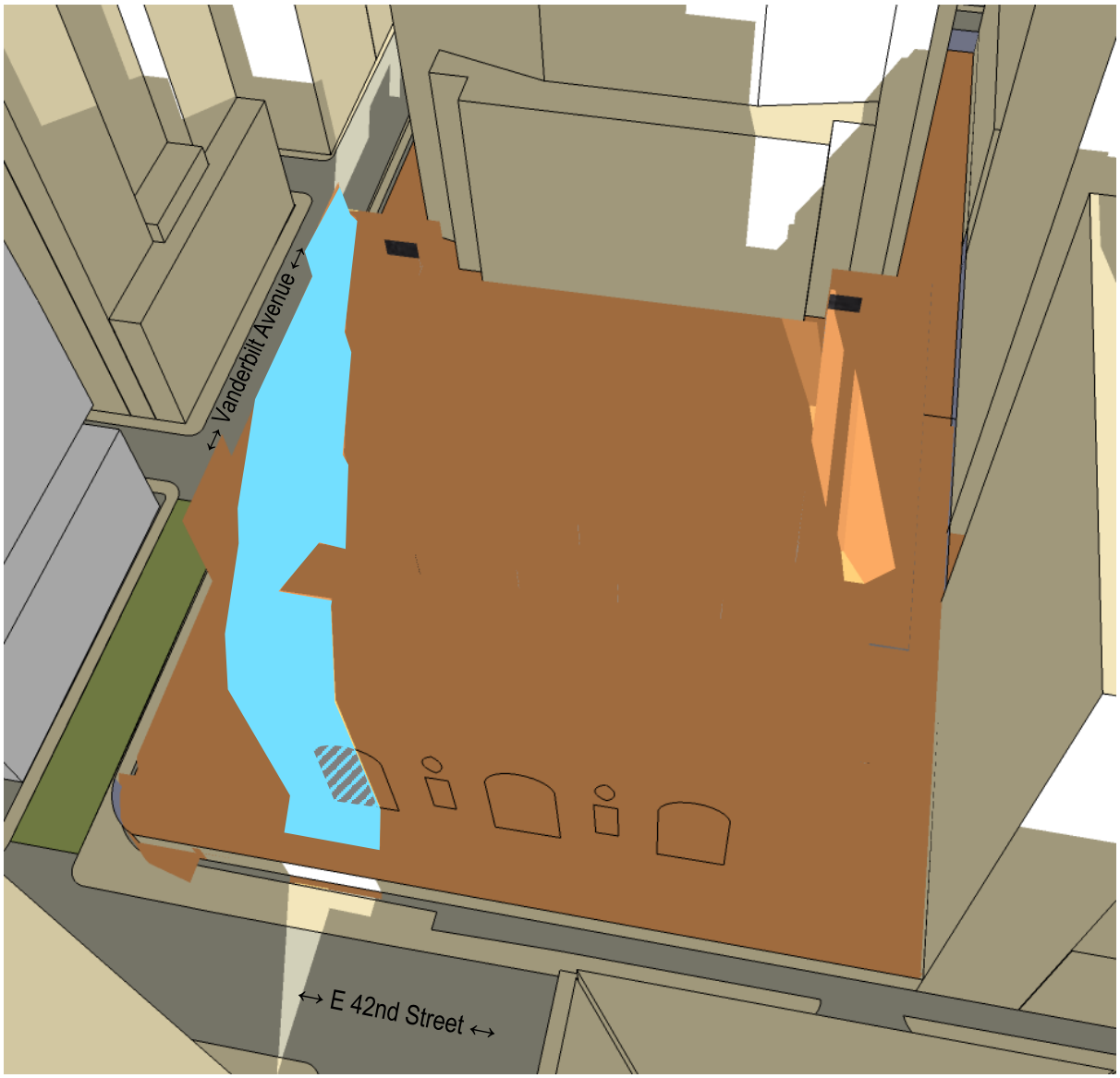
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H12 - Ford Foundation Building
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 5:15 PM

Figure 5-57

vhb

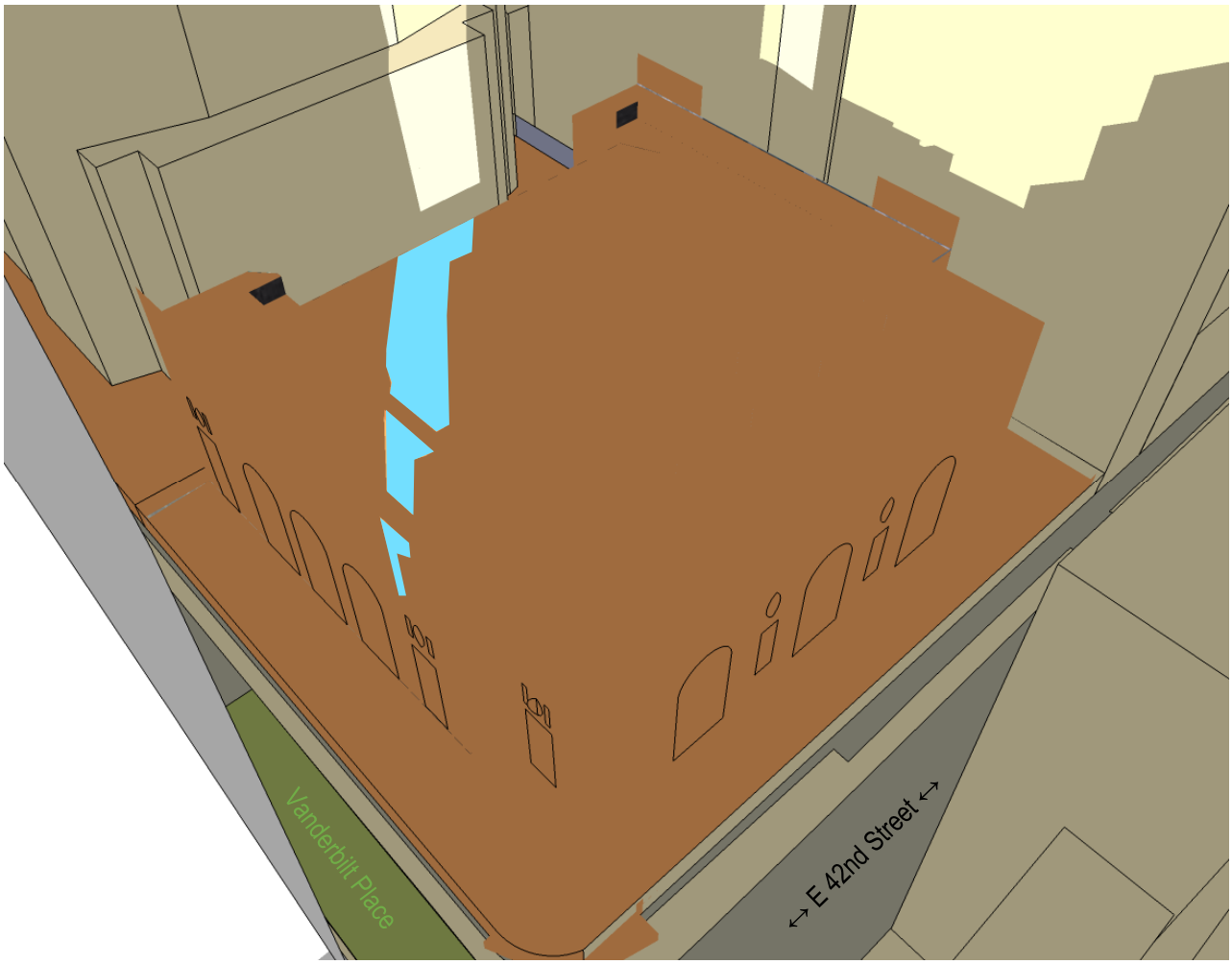


Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H14 - Grand Centeral Terminal
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 12:45 PM

Figure 5-58a



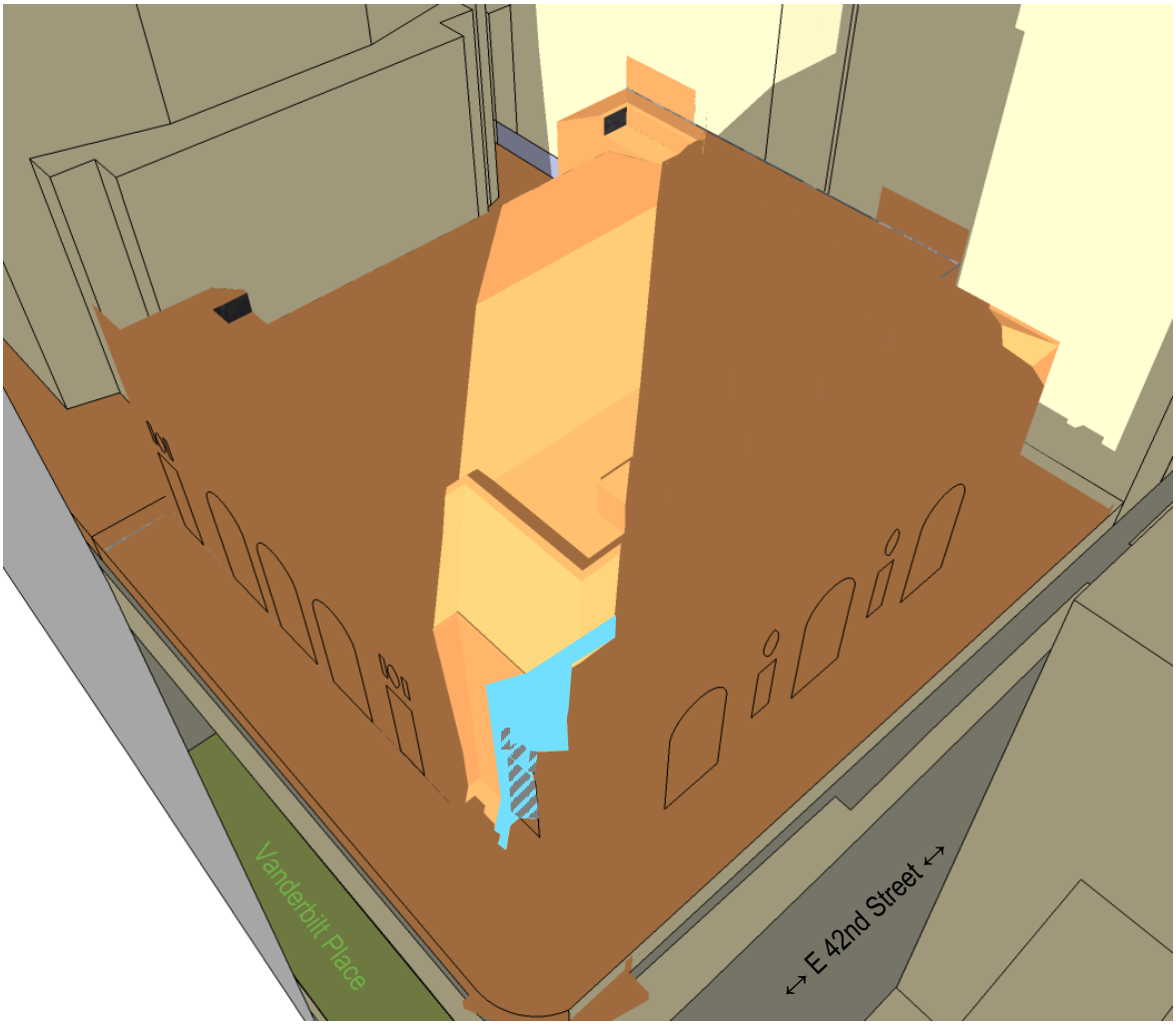
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H14 - Grand Centeral Terminal
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day at 3:45 PM

Figure 5-58b

vhb



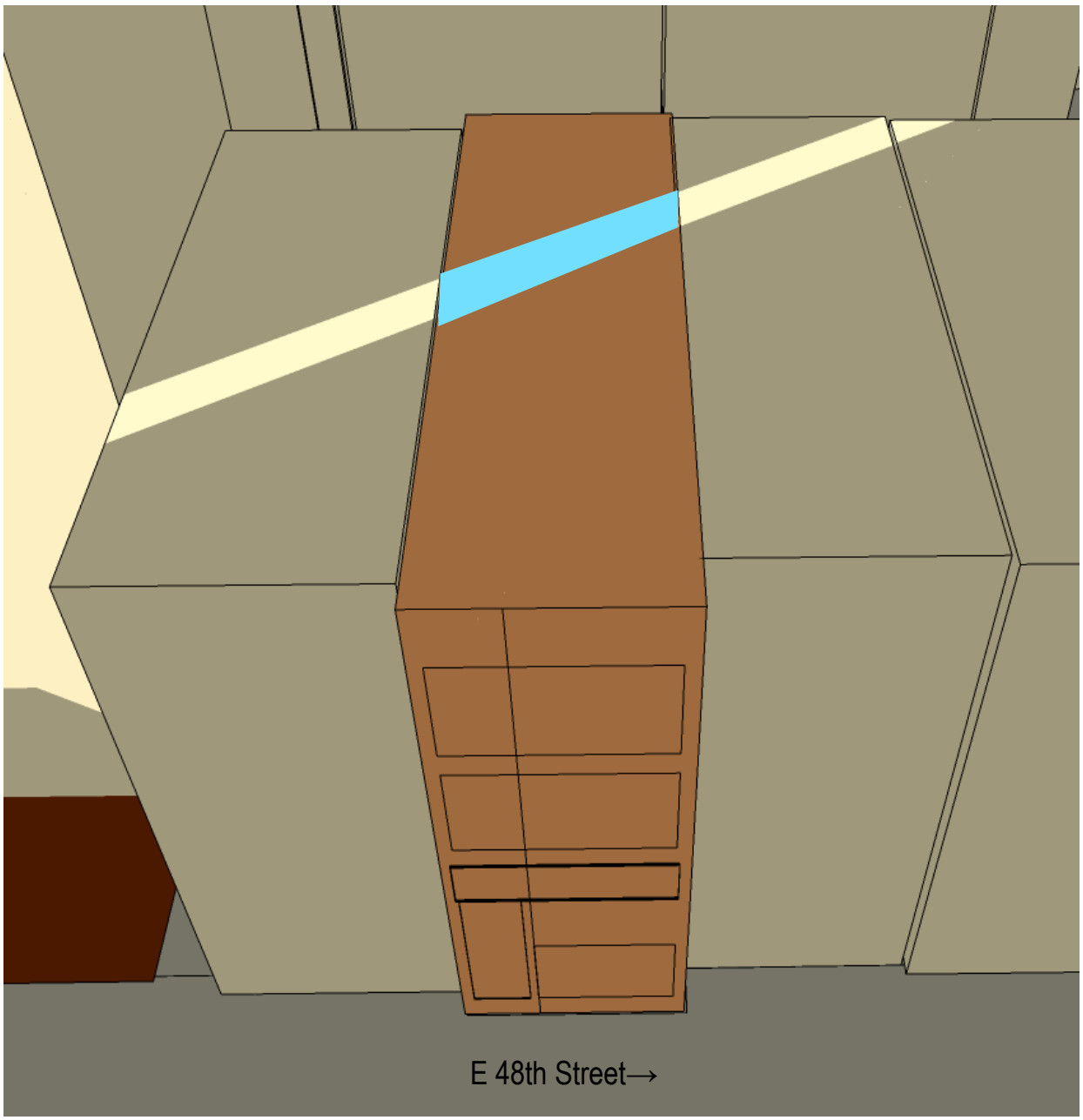
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H14 - Grand Centeral Terminal
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 3:15 PM

Figure 5-58c

vhb

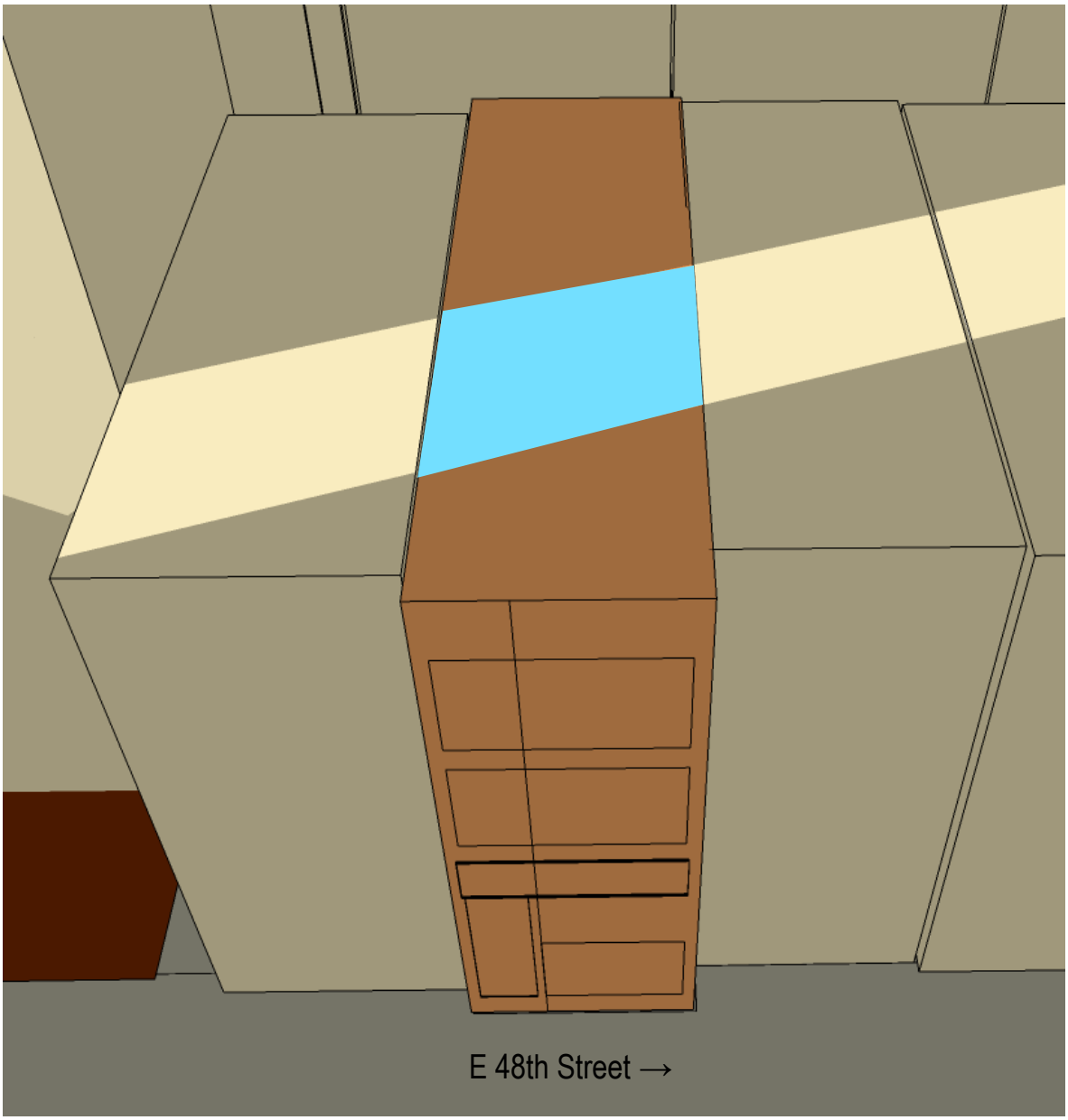


- Projected Development Site
- Potential Development Site
- Historic Resource
- Open Space and Recreation
- Privately Owned Public Space (POPS)
- New Incremental Shadow
- New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
- No-Action Shadow - Historic Resource
- No-Action Shadow - Open Space and Recreation
- No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H15 - William Lescaze House and Office
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 4:00 PM

Figure 5-59a



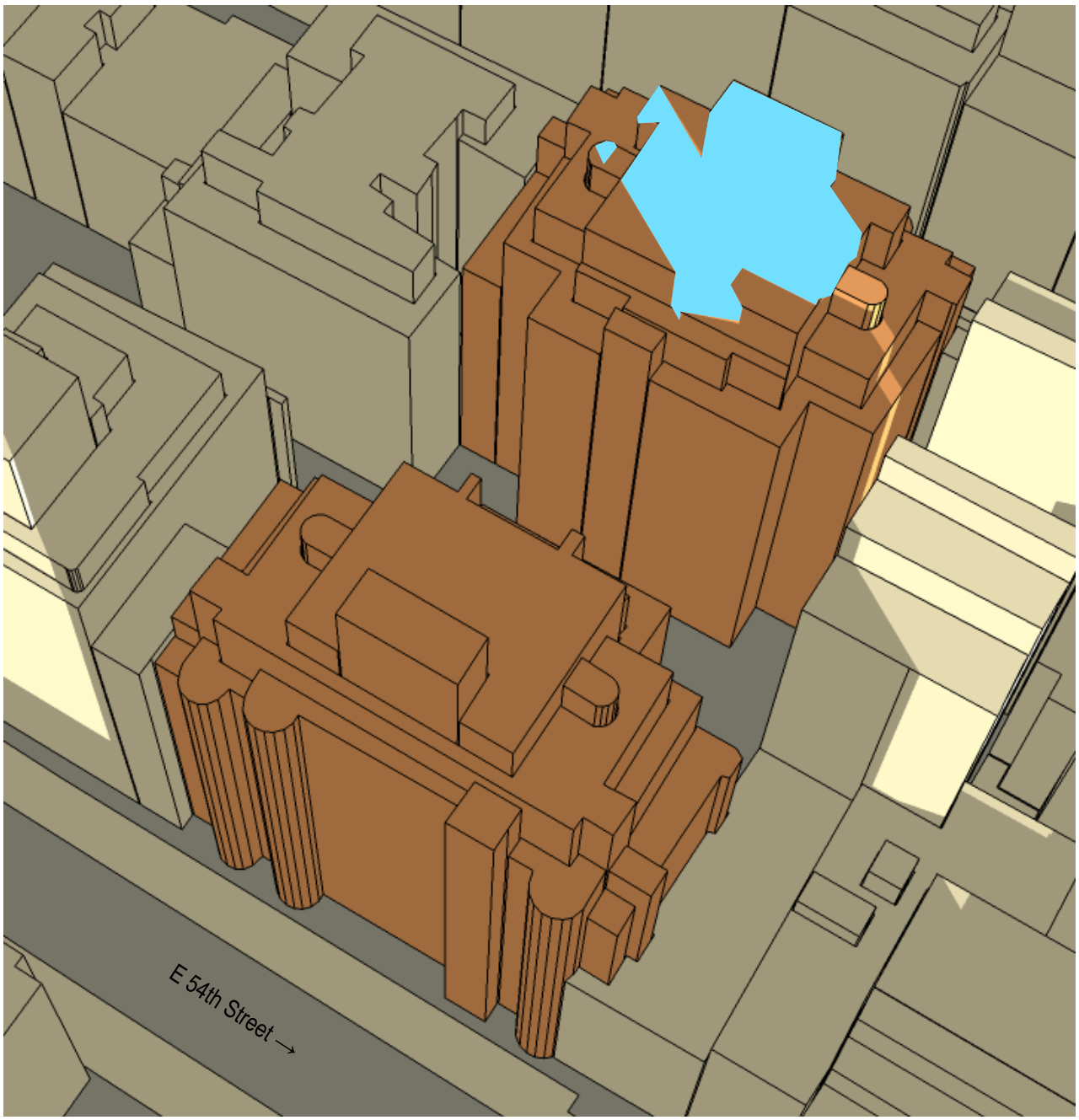
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H15 - William Lescaze House and Office
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 4:55 PM

Figure 5-59b

vhb

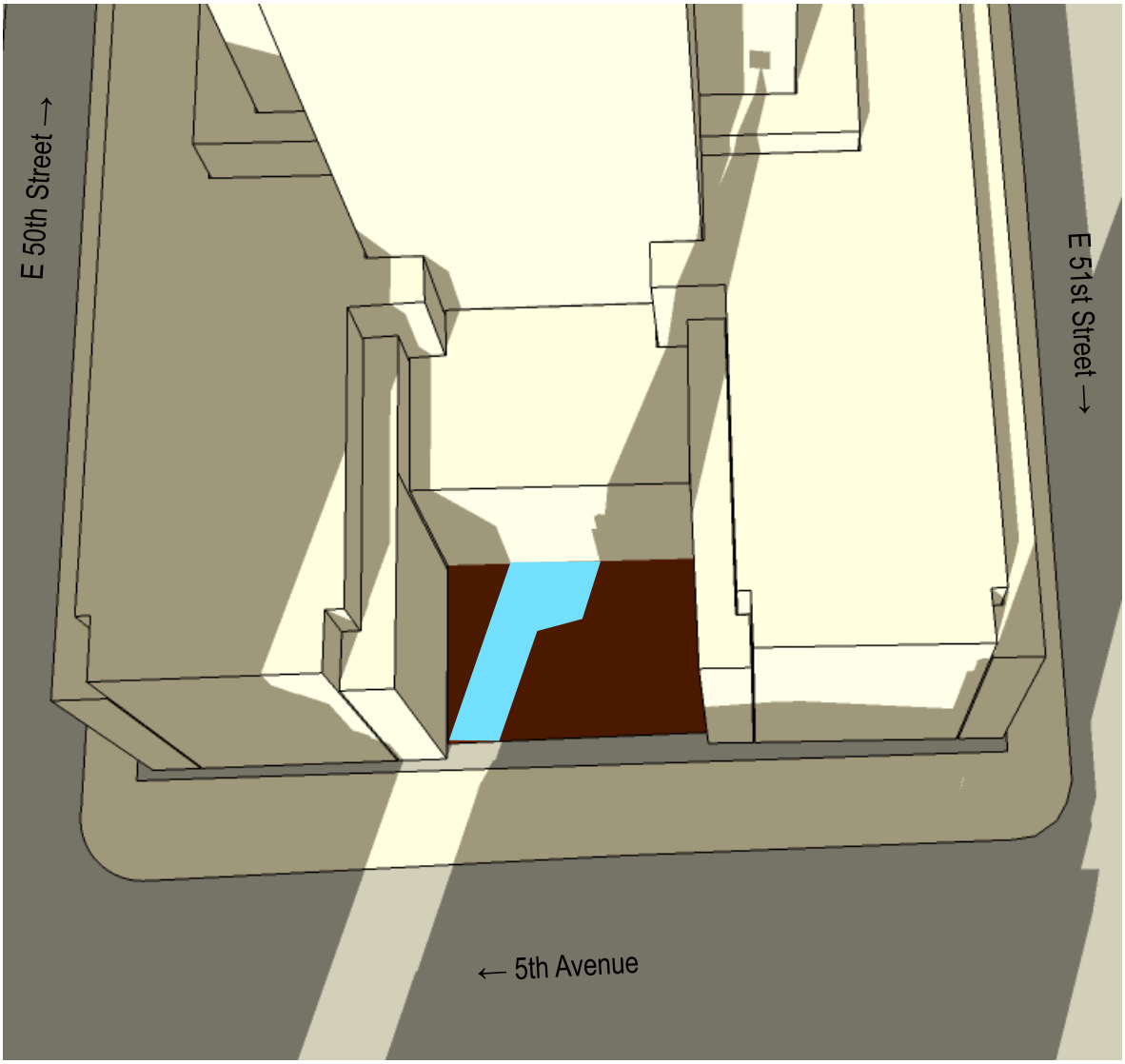


Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H17 - Rockefeller Apartments
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 10:00 AM

Figure 5-60

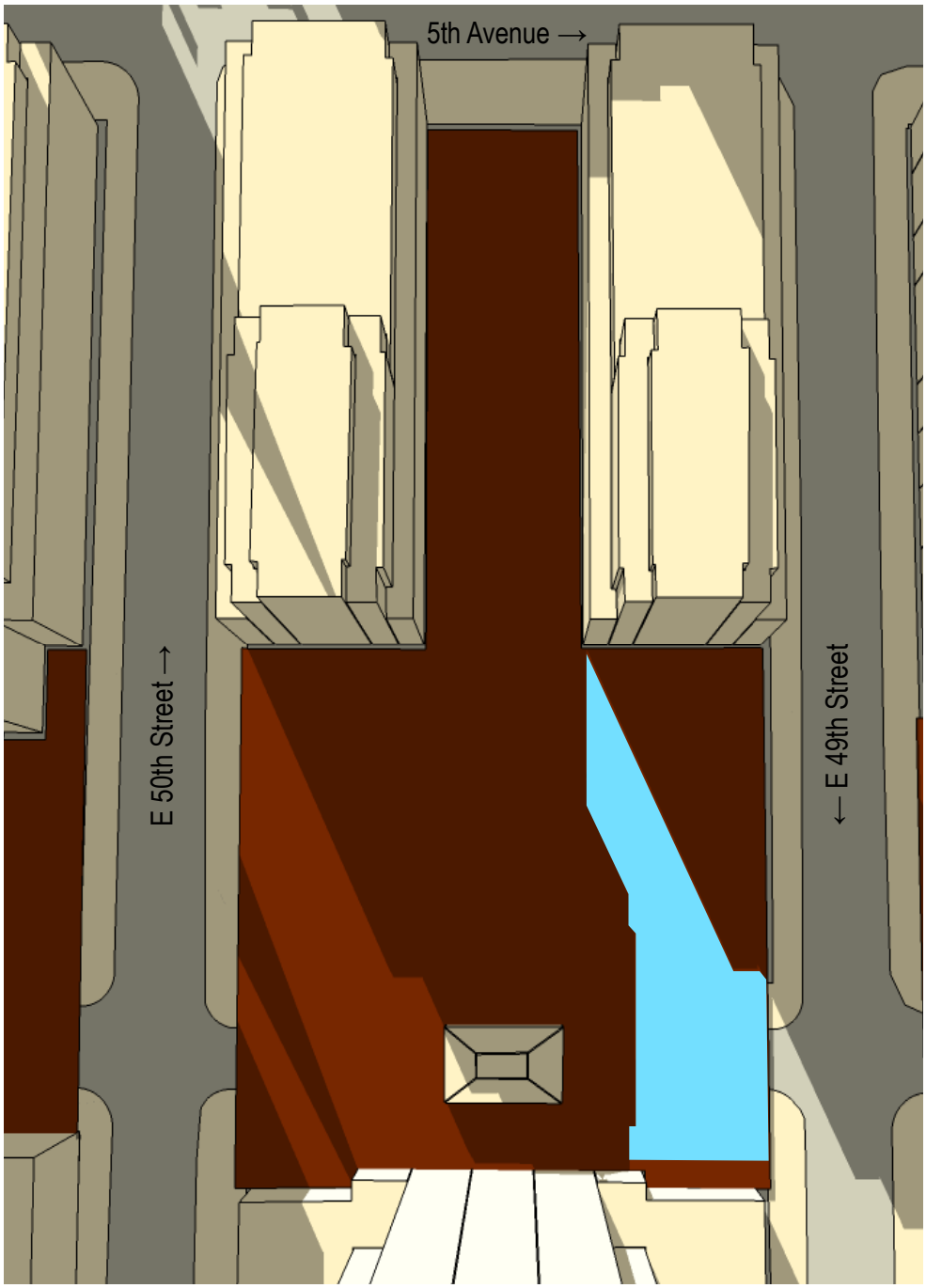


Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H18 - Rockefeller Center / Rockefeller Plaza
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day at 10:00 AM

Figure 5-61a

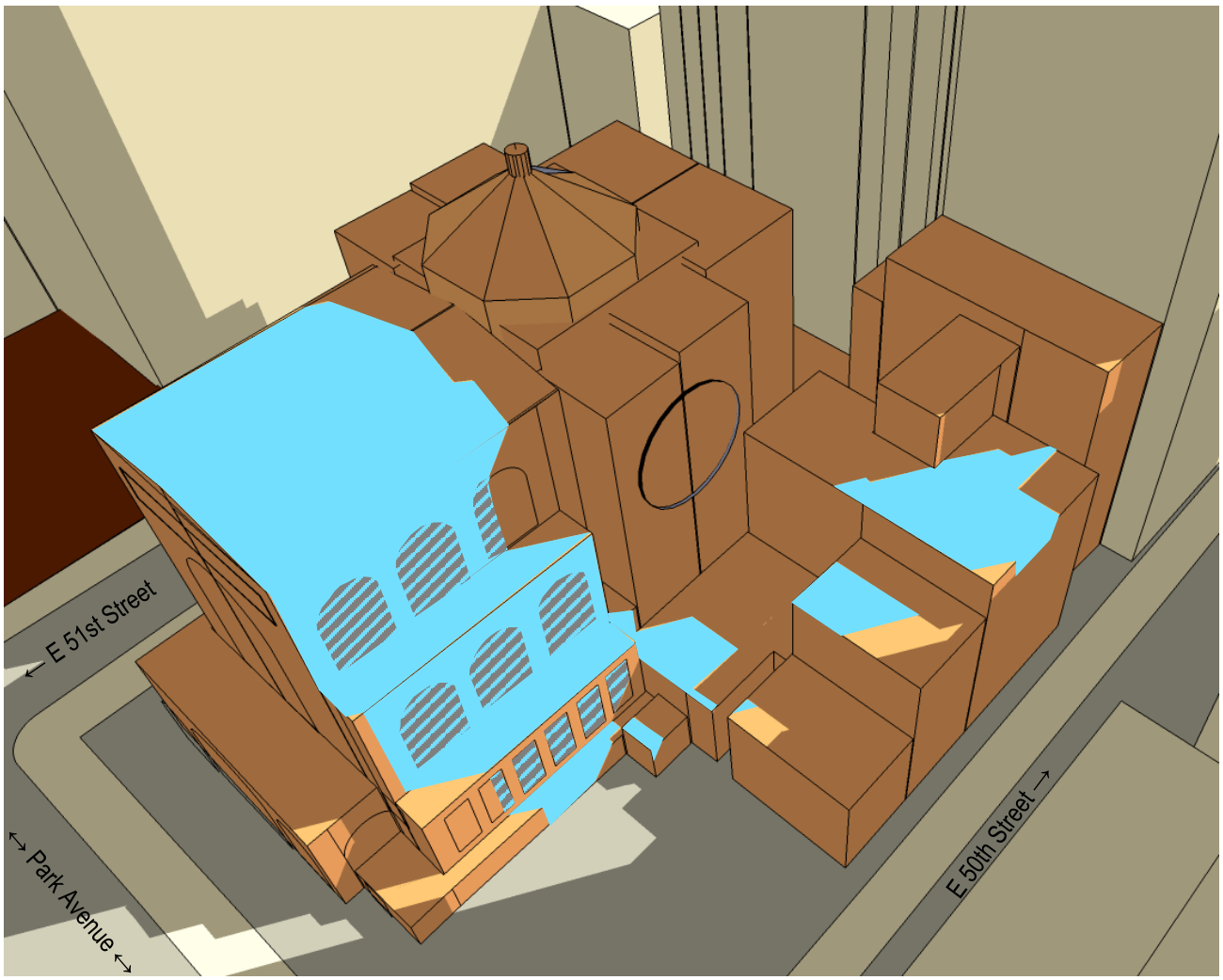


Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H18 - Rockefeller Center / Rockefeller Plaza
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 7:30 AM

Figure 5-61b

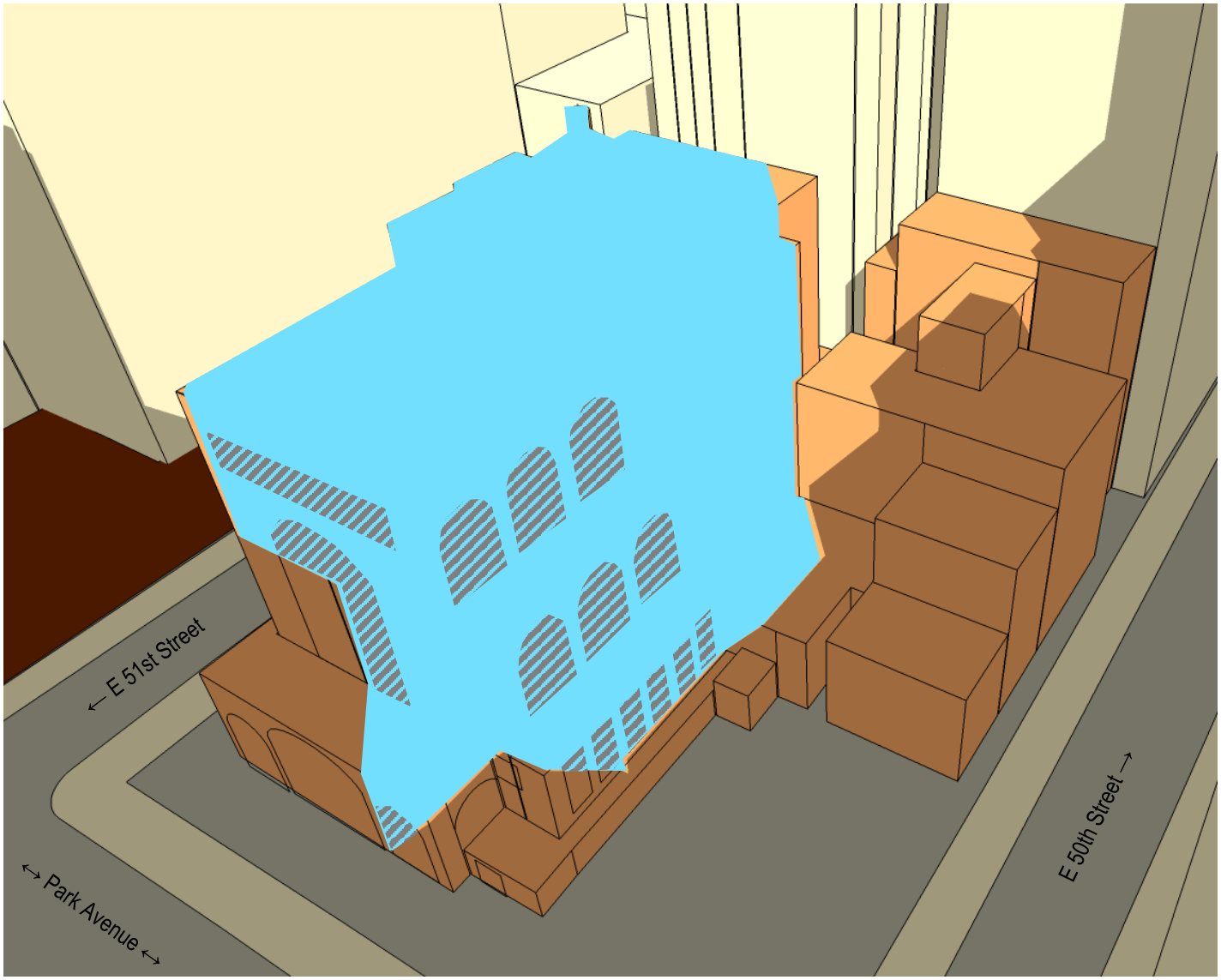


Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H19 - St. Bartholomew's Church and Community House
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day at 10:45 AM

Figure 5-62a

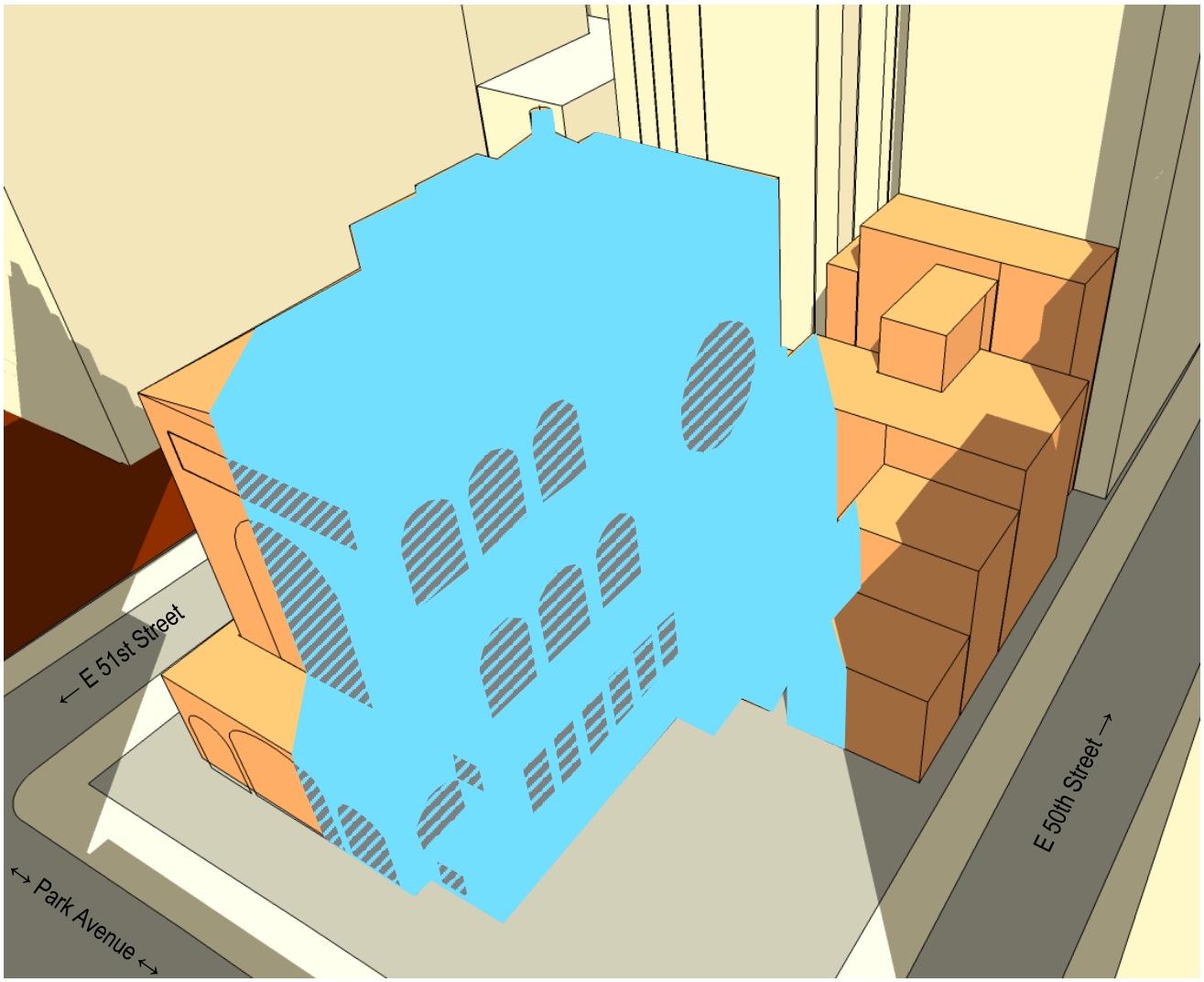


Projected Development Site	New Incremental Shadow
Potential Development Site	New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
Historic Resource	No-Action Shadow - Historic Resource
Open Space and Recreation	No-Action Shadow - Open Space and Recreation
Privately Owned Public Space (POPS)	No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H19 - St. Bartholomew's Church and Community House
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 3:20 PM

Figure 5-62b

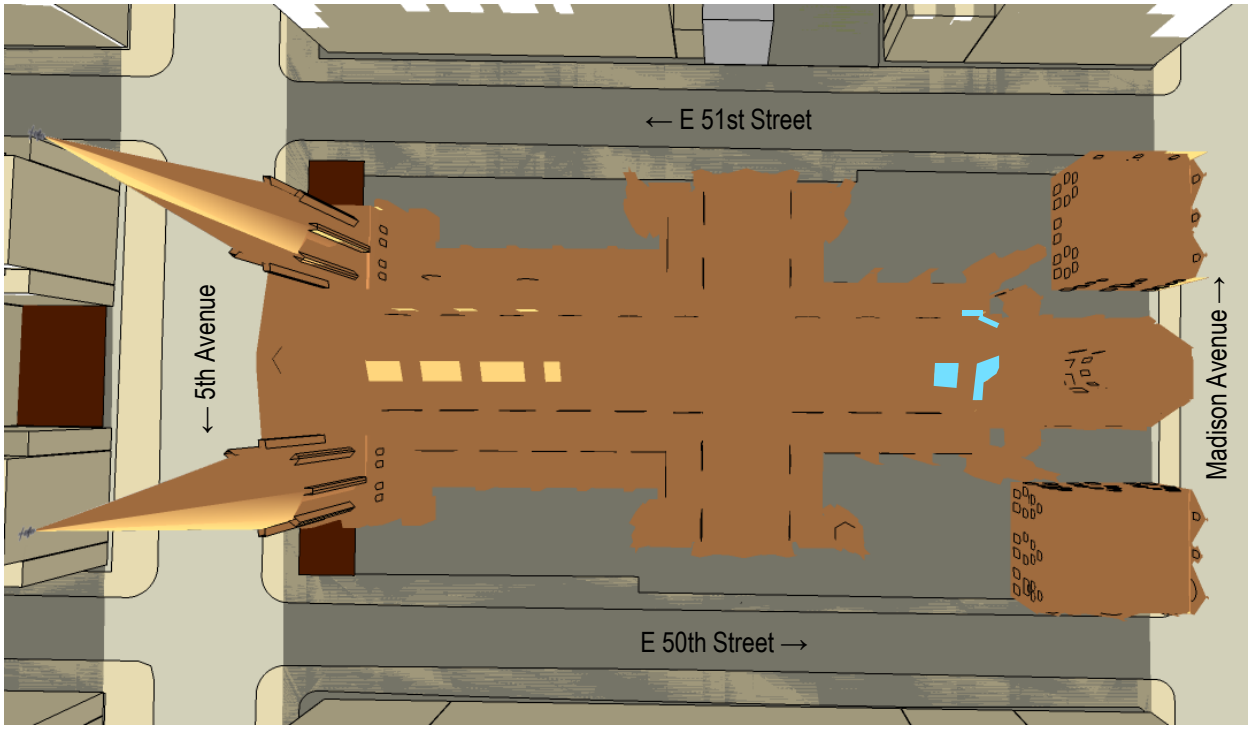


Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H19 - St. Bartholomew's Church and Community House
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 3:00 PM

Figure 5-62c



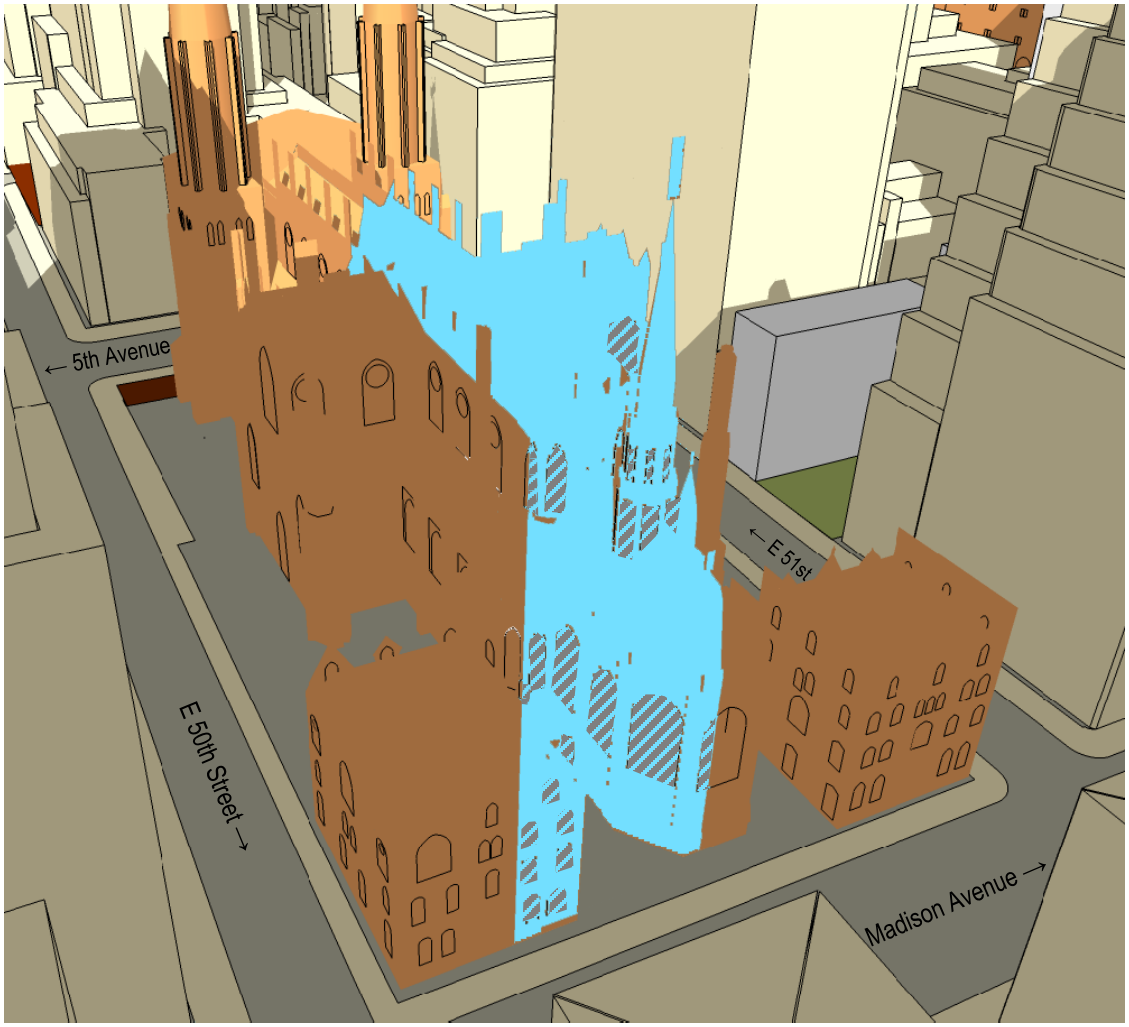
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H20 - St. Patrick's Cathedral
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 1:45 PM

Figure 5-63a

vhb



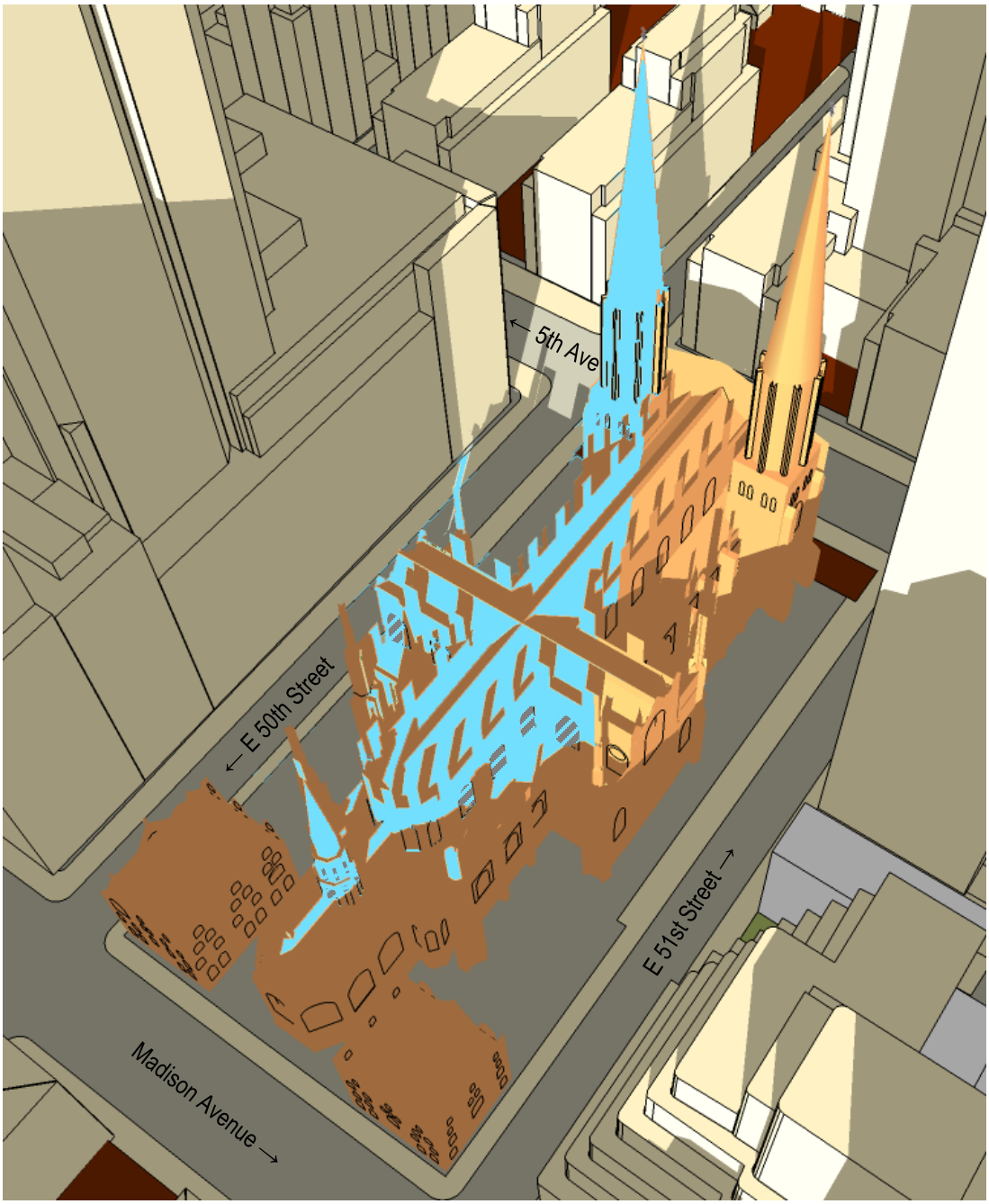
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H20 - St. Patrick's Cathedral
Representative Worst-Case Incremental Shadows
March 21 / September 21 Analysis Day at 10:30 AM

Figure 5-63b

vhb



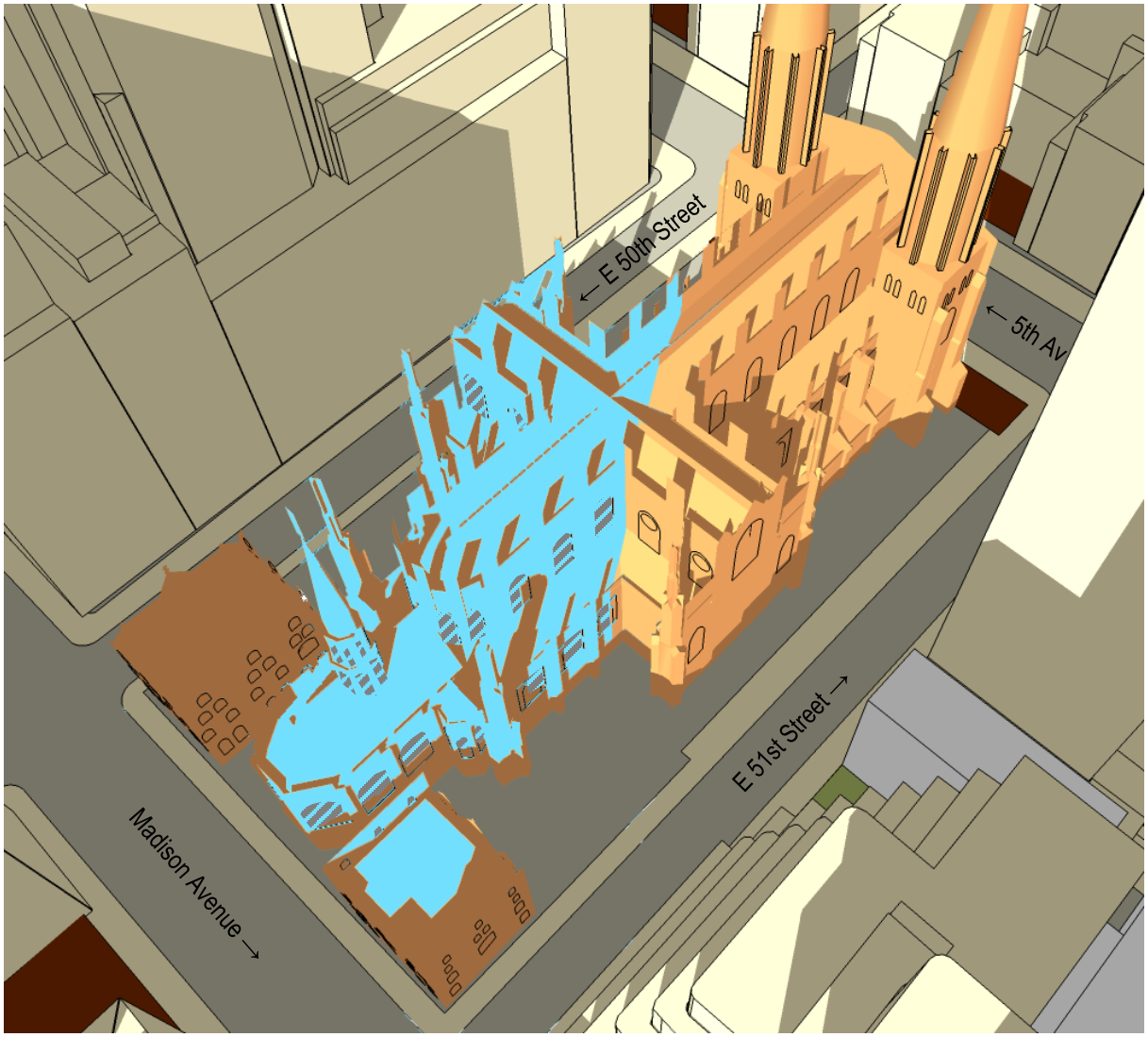
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H20 - St. Patrick's Cathedral
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 7:30 AM

Figure 5-63c

vhb



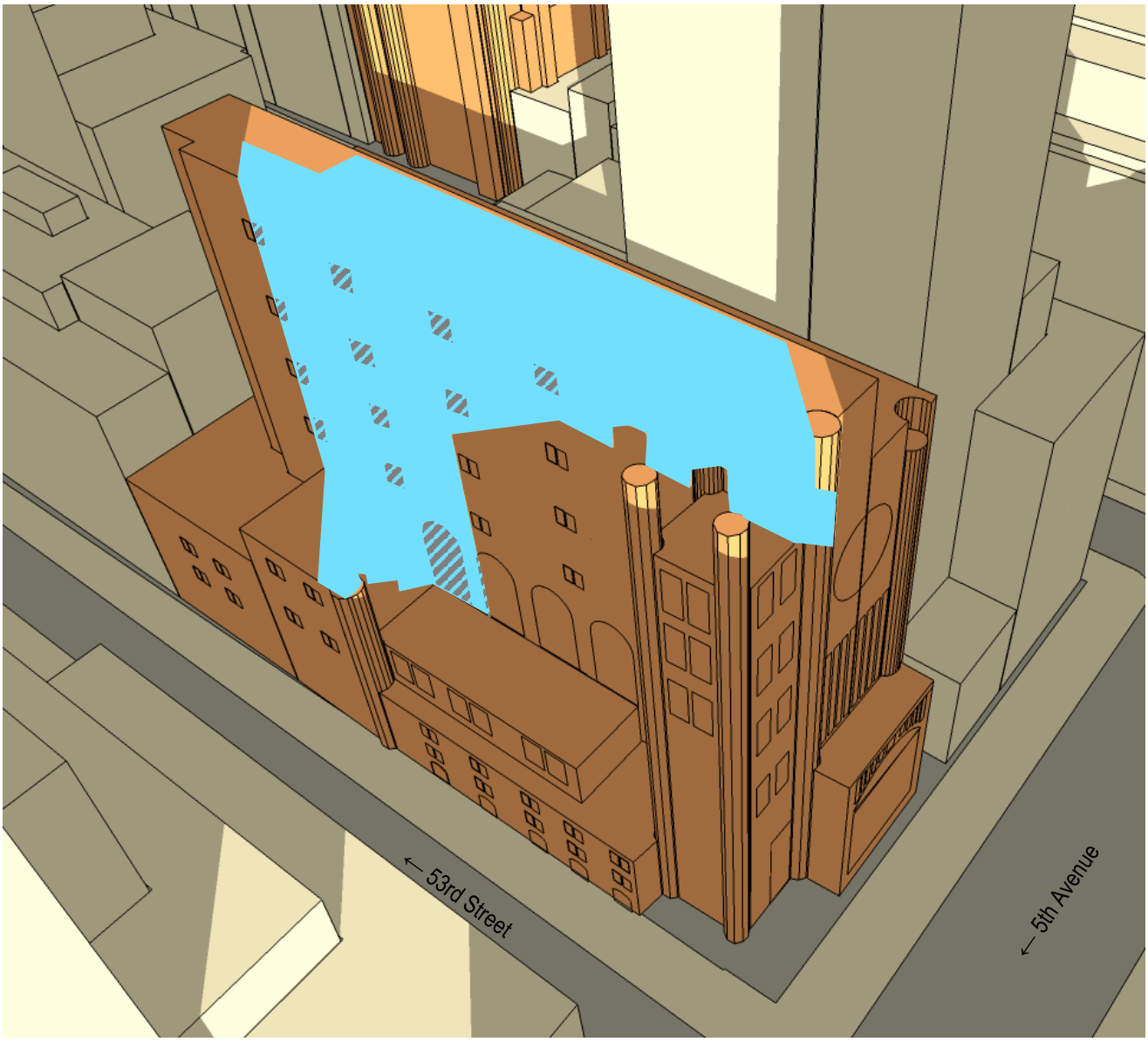
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H20 - St. Patrick's Cathedral
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 8:00 AM

Figure 5-63d

vhb



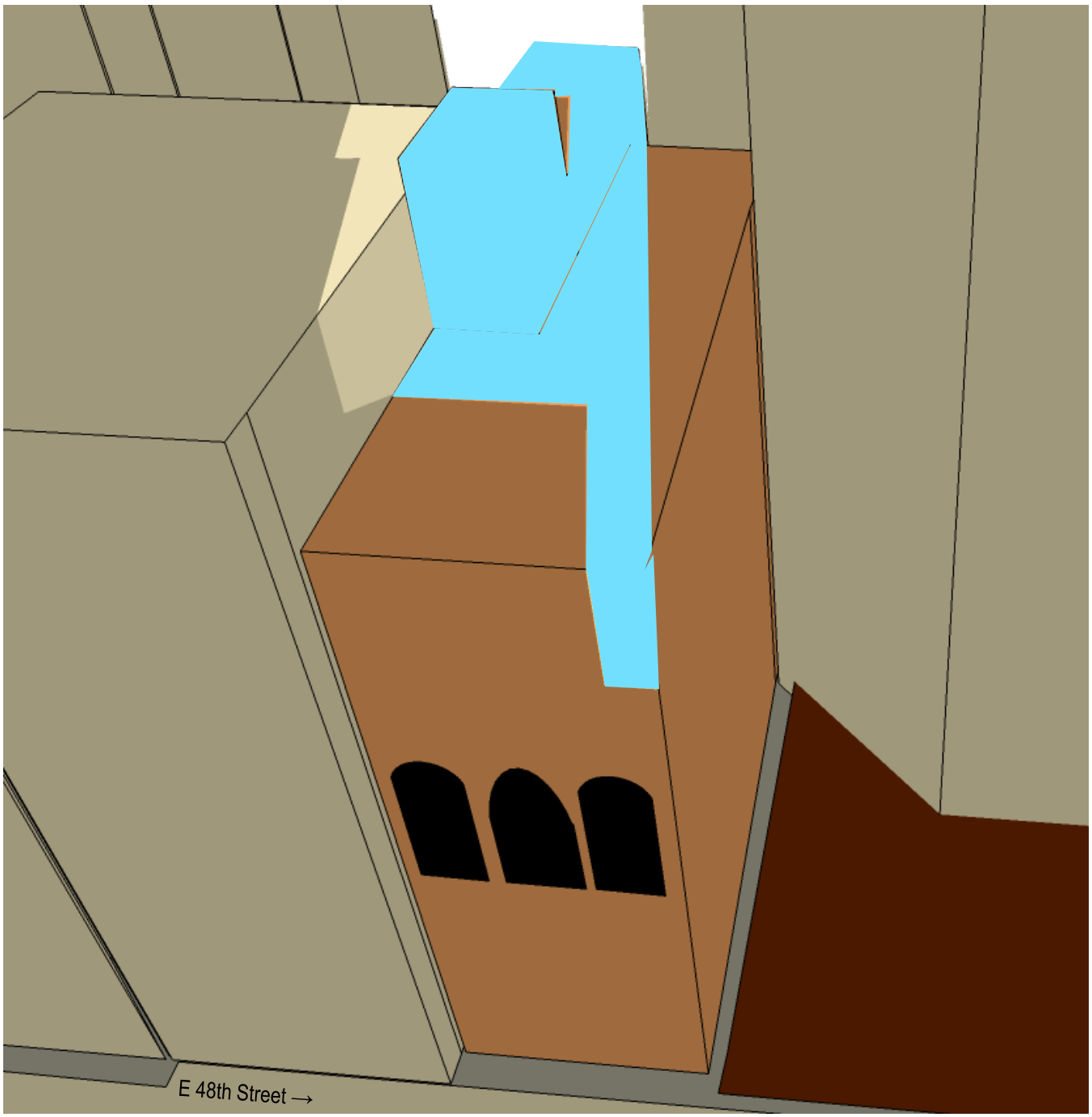
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H21 - St. Thomas Church and Parish House
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 10:45 AM

Figure 5-64

vhb



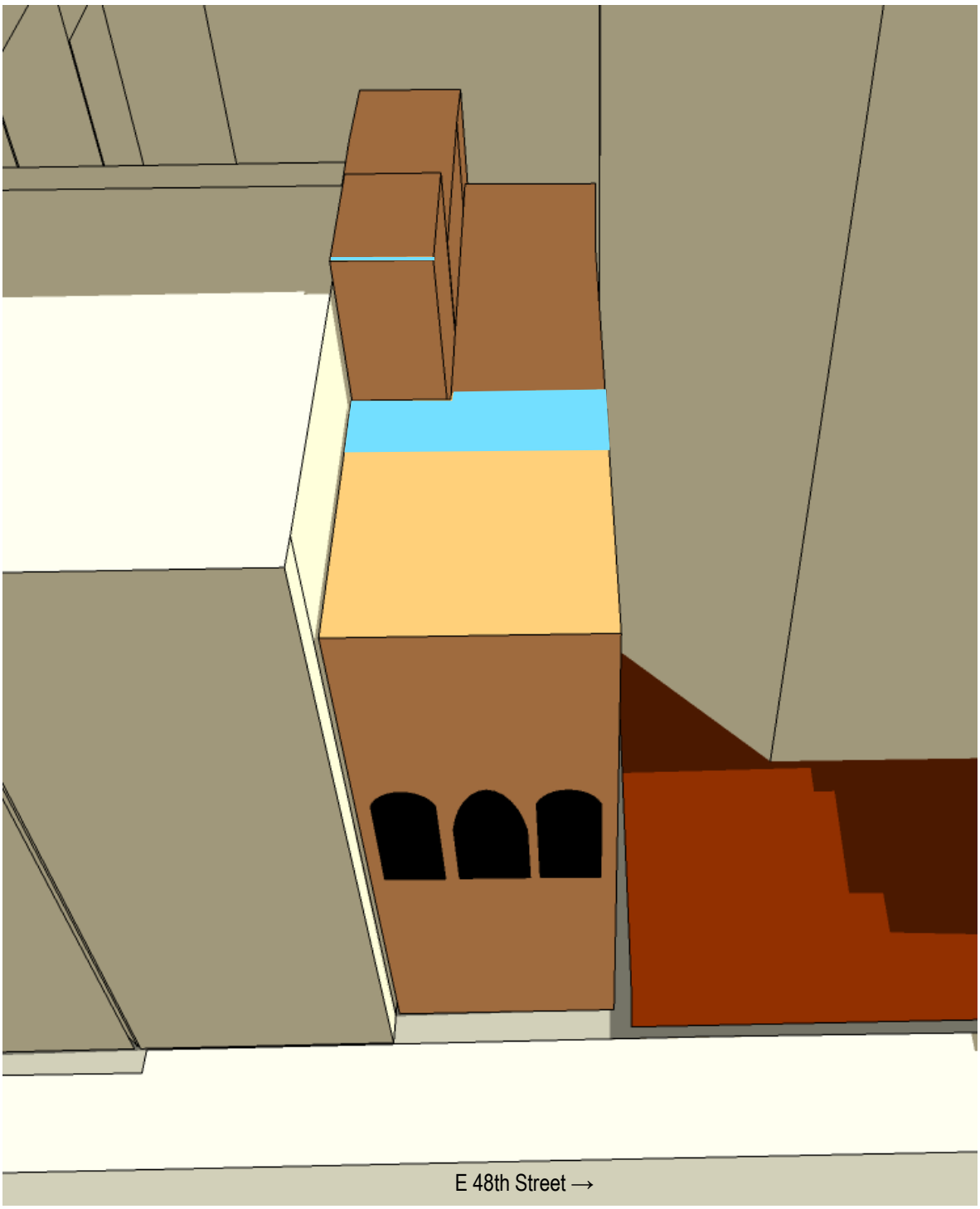
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H22 - Swedish Seamen's Church
Representative Worst-Case Incremental Shadows
December 21 Analysis Day at 12:53 PM

Figure 5-65a

vhb



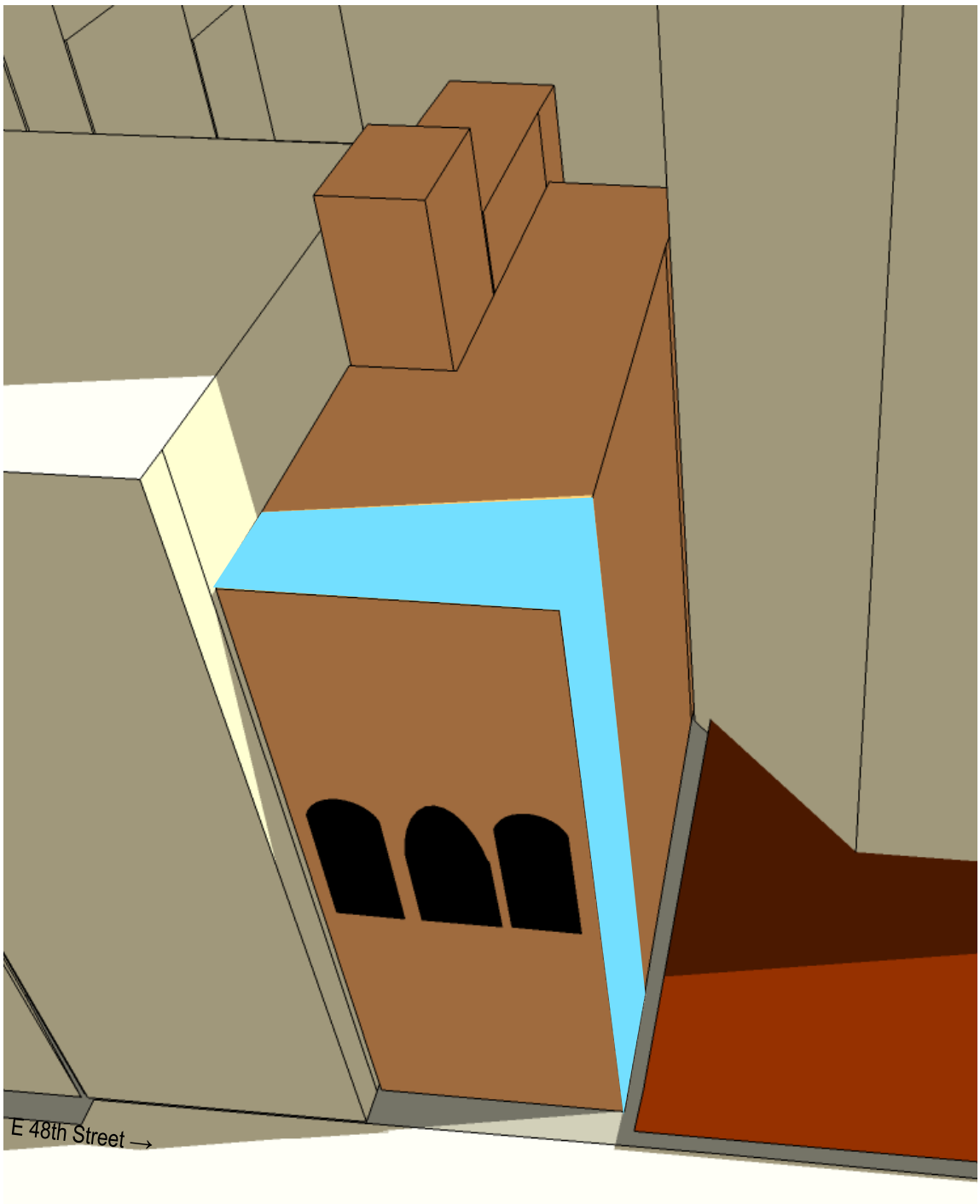
Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H22 - Swedish Seamen's Church
Representative Worst-Case Incremental Shadows
May 6 / August 6 Analysis Day at 9:30 AM

Figure 5-65b

vhb



Projected Development Site
Potential Development Site
Historic Resource
Open Space and Recreation
Privately Owned Public Space (POPS)
New Incremental Shadow
New Incremental Shadow on Historic Resource Sunlight Sensitive Feature(s)
No-Action Shadow - Historic Resource
No-Action Shadow - Open Space and Recreation
No-Action Shadow - POPS

Greater East Midtown Rezoning
Manhattan, New York

H22 - Swedish Seamen's Church
Representative Worst-Case Incremental Shadows
June 21 Analysis Day at 9:30 AM

Figure 5-65c

vhb

- **Section I. Longer Shadow Durations -** The first section below describes the resources that are affected by a more substantial shadow duration (above approximately 45 minutes for open spaces and 20 minutes for historic resources), and/or more substantial shadow coverage.
- **Section II. Shorter/Reduced Shadow Durations -** The second section below describes the resources that are only minimally affected by incremental shadow, generally between 10 and 45 minutes for open spaces. There were no sunlight sensitive historic resources which were affected by shadows by less than 20 minutes.

Section I. Longer Shadow Durations

Parks

P3: Bryant Park, Sixth Avenue from West 40th Street to West 42nd Street

This open space resource would experience longer incremental shadows on three analysis days during the early morning hours. On the March 21st analysis day, the incremental shadows would enter from the west at 8:02 AM and travel northeast before exiting the park at 9:45 AM, lasting for one hour and 43 minutes. The incremental shadows would intermittently cover the southerly one-third of the park where there are tables with chairs, allees and walking paths (Figure 5-2b).

On the May 6th analysis day, the incremental shadows would enter the park at 6:27 AM for approximately 1 hour and one minute, exiting the park at 7:28 AM. This incremental shadow would be added to the central portion of the site, affecting the fountain terrace area and the central lawn.

On the June 21st analysis day, the incremental shadows would enter the park from the south at 6:42 AM and travel north for approximately one hour and three minutes, passing over areas with planters, tables and movable chairs, and portions of the Great Lawn before exiting the park at 7:45 AM.

On all three of these analysis days that collectively encompass the growing season for vegetation, the park would continue to experience approximately 6 hours of direct sunlight exposure, and thus the incremental shadows would not be expected to result in any significant adverse impacts to vegetation growth.

It is noted that the December 21st analysis would see an added shadow of 45 minutes duration, between 8:51 AM and 9:36 AM, and while Bryant Park would be fully in shadow this period, the additional shadow is not considered significant as this is a period of low usage and outside of the growing period. Additionally, since the incremental shadows would be cast in the early morning hours, before the greatest park usage, no significant adverse impacts to passive recreation use are anticipated.

P5: Dag Hammarskjold Plaza, 833 First Avenue

The incremental shadows resulting from the Proposed Action would reach this resource during the May 6th and June 21st analysis days. On the May 6th analysis day, the western corner of the plaza would be affected by incremental shadows twice in the late afternoon; the first would be from 3:05 PM to 3:54 PM, for a duration of 49 minutes, and a second shadow entry would be at 4:00 PM and exit at 5:04 PM, a duration of one hour and four minutes (Figure 5-3b). The incremental shadows would cover the open steel lattice dome at this plaza, but would not cover any sunlight-sensitive features, and no significant adverse impacts to the usability of the plaza are anticipated.

On the June 21st analysis day, an incremental shadow would enter the western section of the plaza at 3:36 PM and travel east for a duration of two hours and eight minutes, before exiting at 5:44 PM (Figure 5-3c). The incremental shadows would pass over the steel lattice dome as well as benches on the northern side of the plaza, but they are not expected to reduce the utilization of the plaza. These incremental shadows would be cast late in the day, after the peak hours of usage, and the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, no significant adverse shadows impacts are anticipated at this plaza.

It is noted that during the March 21 / September 21 analysis period, this resource would experience a 24-minute incremental shadow, from 3:25 to 3:49 PM. At their highest coverage, these incremental shadows would cover small areas at the park's eastern and western ends (see Figure 5-3a). Based on the projected short duration and low coverage, no significant adverse impacts are anticipated with regard to shadows.

P15: Park Avenue Malls, Park Avenue median between East 34th and East 39th Streets, and between East 46th and East 65th Streets

The Park Avenue Malls north of East 46th Street would experience incremental shadows of more than 45 minutes on three analysis days. The portion of the open space resource between East 34th and East 39th Streets would not experience incremental shadows. On each of these three days, the incremental shadows would be cast intermittently throughout much of the day, covering very small portions of these north-south trending open spaces—comprising a landscaped median with various types of vegetation—for limited durations. No individual section of the malls would be cast in incremental shadow for the entire shadow duration. As shown in Table 5.5, the incremental shadows with the greatest extent and duration on each analysis day all enter from the west and travel east before exiting the open space resource.

Figure 5-4b shows the March 21st analysis day, when incremental shadows would enter and exit between 9:32 AM and 10:44 AM (one hour and 12 minutes) again at 1:49 PM and exiting at 2:45 PM (56 minutes), as well as at 2:03 PM, exiting at 2:39 PM (36 minutes). Figure 5-4c shows the May 6th analysis day, when incremental shadows would also enter and exit in three separate events: first from 7:28 AM, exiting at 9:32 AM (two hours and 4 minutes); 10:24 AM exiting at 10:44 AM (20 minutes) and at 1:17 PM, exiting at 2:59 PM (one hour 48 minutes). Figure 5-4d shows the June 21st analysis day, when two incremental shadowing periods would occur; the first entering at 6:36 AM and exiting at 9:20 AM (two hours and 44 minutes) and in the afternoon, entering at 1:11 PM and exiting at 2:29 PM (one hour 48 minutes). For each of these analysis day, the Park Avenue Malls remain largely shaded for much of the day under Existing Conditions, and receives less than 4–6 hours of direct sunlight exposure. Therefore, it is assumed that the existing vegetation within the Park Avenue Malls is shade tolerant. As a result, the incremental shadows would not be expected to result in a significant adverse impact.

P28: New York Public Library, Fifth Avenue at 42nd Street

The plaza and terrace at the New York Public Library would experience incremental shadows during the March 21st, May 6th, and June 21st analysis days. On the March 21st analysis day, incremental shadow would begin to fall on the southern terrace area of this resource and proceed to sweep north across the seating / step areas fronting Fifth Avenue, eventually moving off of the resource, for a duration of two hours, 42 minutes, from 9:15 AM to 11:42 AM (Figure 5-7a).

On the May analysis date, the shadow entry would be at 8:53 AM and exit at 10:53 AM, a duration of 2 hours, where shadow increment would be contiguous to other existing shadows but which would not result in full shadowing of the resource (Figure 5-7b). During the June analysis period, the small increment of new shadow would enter at 9:18 AM and exit at 10:34 AM, a duration of one hour 16 minutes. These shadows would enter along the southerly end of the Fifth Avenue Terrace, which includes plantings and tables with movable chairs. The incremental shadows are not expected to substantially reduce the usability of this open space resource, as they would all dissipate before noon, and the terrace would continue to receive direct sunlight exposure in the early afternoon when utilization is expected to be at its peak. Additionally, under Existing Conditions on this analysis day, the open space resource receives less than 4–6 hours of direct sunlight exposure, and thus it is assumed that the plantings are shade tolerant. Therefore, the incremental shadows are not expected to adversely affect vegetation growth.

During the May 6th and June 21st analysis days, the incremental shadows with combined durations of two hours and 50 minutes and two hours and 13 minutes, respectively, would not be expected to reduce utilization of the plaza and terrace because the usability of seating areas is not reliant upon exposure to sunlight in the warmer months. Further, the total area of this resource covered by new incremental shadow during the identified duration periods would represent a small extent of the total resource area, with other areas remaining sunlit during these times. As a result, the incremental shadows resulting from the Proposed Action are not anticipated to create any significant adverse impacts on this open space resource.

P31: Pershing Square West, Park Avenue between East 41st and East 42nd Streets (No-Action Open Space)

This plaza, which will be created as part of the NYC Plaza Program and will comprise both sides of Park Avenue between East 41st and East 42nd Streets on the west side of the Pershing Square Viaduct (only the western portion of this plaza was considered for shadow impacts under the Proposed Action), would experience "longer duration" intermittent incremental shadows resulting from the Proposed Action on one of the four analysis days.

As shown on Figure 5-9b, on the March 21st analysis day, the incremental shadow would enter the plaza from the south at 9:21 AM, traveling northeast for one hour and 15 minutes before exiting at 10:36 AM, and a second incremental shadow would be cast at 11:54 AM and would travel north for 47 minutes before exiting at 12:41 PM. During this analysis day, the incremental shadow would cover the majority of the overall space and the second shadow event would overlap with a peak usage period. However, during warmer weather, there would be unshadowed portions of this feature where seats in the sun could be sought. This resource would experience two shadow durations during the December 21 and June 21 analysis periods meeting the "shorter duration" criteria, including durations of 25 minutes and 20 minutes, respectively (from 12:43 to 1:08 PM on the December 21 analysis day and from 2:39 to 2:59 PM on the June 21 analysis day). Given the short nature of these shadows, it is unlikely they would significantly affect utilization of this open space resource

Because Pershing Square West is in close proximity to a number of tall buildings—it receives less than four to six hours of direct sunlight exposure—it is assumed that any vegetation contained within this plaza will be well-suited for partially-shaded areas. Therefore, the incremental shadows would not be expected to result in a significant adverse impact during this analysis period.

Privately Owned Public Spaces (POPS)

POPS 2: Park Avenue Tower, 65 East 55th Street

The incremental shadows resulting from Potential Development Site F in the Proposed Action would reach the Park Avenue Tower Plaza on three of the four analysis days; there would be no incremental shadows on the December 21st analysis day (Figure 5-10). On the March 21st analysis day, small incremental shadows would enter the center of the plaza at 10:18 AM and travel east for two hours and one minute, covering the planters with seating on the western and eastern ends of the plaza before exiting the site at 12:19 PM. The incremental shadows would be narrow in extent and would be cast before the peak period of utilization, which generally corresponds to the hours between noon and 2:00 PM for passive open space resources in commercial areas. Additionally, there would continue to be intermittent periods of sunlight exposure while the incremental shadows would be cast on the plaza. As such, there is no expected significant adverse impact on the usability of this resource. Under Existing Conditions, the plaza receives less than four to six hours of direct sunlight exposure during this analysis day, so it is assumed that the planters are shade tolerant. This is relevant for the May 6th and June 21st analysis days, which are also within the growing season for vegetation.

On the May 6th and June 21st analysis days, incremental shadows would enter the site on the planters with seating in the southwest corner and travel east across the plaza for durations of two hours and 36 minutes and two hours and five minutes, respectively. In the May analysis period, the incremental shadows in combination with existing shadowing, would result in full shadowing of the plaza. In June the existing and With-Action shadowing would combine to result in almost full coverage of the plaza. The incremental shadows, despite their relatively large extent, would not be expected to substantially affect utilization of the plaza, as the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, no significant adverse impacts to passive recreation or vegetation growth at this plaza are expected as a result of the Proposed Action.

POPS 3: 535 Madison Avenue

This open space resource would experience incremental shadows on the May 6th and June 21st analysis days (Figure 5-11). On the May 6th analysis day, the incremental shadow would be a sliver shadow cast for one hour and 25 minutes (9:23 AM to 10:48 AM) on the westerly side of the resource where there are some planters with seating ledges. During this period, the other areas of the plaza with trees, additional planters with seating ledges, tables, and movable chairs, would continue to receive sunlight. During the June 21st analysis day, an incremental shadow would be cast on the resource for 1 hour and 59 minutes, exiting the plaza at 11:09 AM. On both of these analysis days, the incremental shadows would occur in the morning and exit before 11:10 AM, prior to the peak period of utilization, which is generally between noon and 2:00 PM for passive open space resources in commercial areas. Furthermore, the planters located at this plaza are assumed to be well suited for partially shaded areas, as the plaza receives less than four to six hours of direct sunlight exposure during these analysis days under Existing Conditions. For these reasons, it is not expected that incremental shadows cast by the Proposed Action would cause a significant adverse shadow impact to the plaza at 535 Madison Avenue.

POPS 4: 919 Third Avenue

This open space resource would experience incremental shadows of more than 45 minutes on the March 21st, day (Figure 5-12); increments in May and June are shorter because of shadows cast by other tall buildings in the vicinity; for all periods, the resource would be largely cast in full shadow due to

the combination of existing and With-Action shadows. On the March 21st analysis day, there would be afternoon shadowing between 1:53 PM and 2:58 PM, for a duration of one hour and five minutes. These planters would continue to receive between four and six hours of direct sunlight exposure during other hours of this analysis day, such that the viability of vegetation would not be jeopardized. There is no formal seating available at this plaza, and the planters that are available are expected to have shade-tolerant plant materials; passive recreation use is not expected to be affected by the incremental shadows on the analysis day. Therefore, the incremental shadows are not anticipated to result in any significant adverse impacts to this open space resource.

POPS 5: 345 Park Avenue

Incremental shadows would be cast on this plaza on three analysis days; there would be no new incremental shadows for the December 21st analysis date (Figure 5-13). During the March 21st analysis day, four periods of shadowing would occur, ranging from 45 minutes in length to one hour and 4 minutes. Two of the periods would be in the morning, ending at 10:15 AM and the two afternoon periods would commence at 2:11 PM ending at 4:09 PM. Therefore, while the total added shadowing for this analysis date would be three hours and 42 minutes, the periods of shadowing would not occur when the plaza would be most heavily used, weather permitting; this holds for the two other analysis days. For the May 6th analysis period, there would be two increments of shadowing, one from 8:50 AM to 9:37 AM and the second from 1:36 PM to 3:56 PM (total of three hours and seven minutes). For the June 21st analysis day, there would also be a morning shadow increment of one hour and two minutes (9:09 AM to 10:11 AM) and an afternoon increment from 1:39 PM to 3:25 PM, or one hour and 46 minutes; these periods precede or somewhat overlap with the peak usage hours, and are not expected to affect the usability of the plaza, which provides seat walls/ledges and stairs, planters, trees and street trees. While the March and May analyses indicate that the combined existing and With-Action shadow condition would cover a substantial portion of this resource, these shadows are not anticipated to result in a substantial reduction in the usability of the resource, as other portions of the plaza with these same features would simultaneously have direct sunlight exposure, and as noted above, the added shadowing does not completely coincide with peak usage periods. Additionally, the vegetation may receive less than 4–6 hours of sunlight exposure during this analysis day in Existing Conditions, so it is assumed that it is shade tolerant. Therefore, there would be no significant adverse shadow impact on this resource.

POPS 6: Wells Fargo Building, 437 Madison Avenue

The incremental shadows resulting from the Proposed Action would affect this resource for more than 45 minutes for three analysis days. As shown in Table 5.5, there would be an incremental shadow for a duration of two hours and 11 minutes on the March 21st analysis day; two incremental shadows for a duration of six hours and 32 minutes on the May 6th analysis day; and an incremental shadow for a duration of six hours and 16 minutes on the June 21st analysis day. The open space has plantings on the northerly and southerly faces, and the westerly side of the plaza, along Madison Avenue has some fixed ledge seating. Given the locations of the plantings and their limited exposure to sunlight in the Existing and No-Action Conditions, it is assumed they are shade tolerant in nature. Although the plaza would be in almost complete shadow, as shown on Figure 5-14, the incremental shadows are not expected to affect usability of this plaza. Although the seat walls/ledges on the northern and southern sides of the plaza would be intermittently covered by incremental shadows during the May 6th and June 21st analysis days, the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Additionally, although the western side of the plaza would be briefly covered by incremental shadows during the March 21st analysis days the seat walls/ledges would continue to

be exposed to sunlight during part of the peak period of utilization, between noon and about 1:00 PM. Therefore, the incremental shadows that would result from the Proposed Action would not result in a significant adverse impact on this resource.

POPS 8: 40 East 52nd Street

The incremental shadows resulting from the Proposed Action would only reach this resource on the June 21st analysis day (Figure 5-15). The incremental shadow would have a duration one hour and 23 minutes, between the hours of 10:00 AM and 11:23 AM. The new shadowing would cover a small area of this plaza amid existing and No-Action shadowing. Therefore, the incremental shadows would not be expected to result in a significant adverse impact to the usability of this resource or vegetation growth.

POPS 10: 777 Third Avenue

This open space resource would experience incremental shadows resulting from the Proposed Action on the May 6th and June 21st analysis days. On the May 6th and June 21st analysis days, incremental shadows would be cast along the western and southern sections of the plaza for durations of one hour and 55 minutes and one hour and 31 minutes, respectively, at times covering planters and benches located on Third Avenue, and with existing shadows, would result in almost complete coverage of the resource (Figure 5-17). Under Existing Conditions on this analysis day, the plaza receives less than four to six hours of direct sunlight exposure, and thus it is assumed that trees and planter vegetation at this plaza is shade tolerant. Although there is seating in the affected section of the plaza, it is covered by a building overhang, and thus the incremental shadows would have no effect on the seating, and new shadowing would occur following the peak midday periods. Therefore, there would be no significant adverse shadows impact on this resource.

The incremental shadows cast during these analysis days would not be expected to reduce the utilization of the open space resource, as the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, no significant adverse shadows impacts are anticipated at this plaza.

POPS 12: 590 Madison Avenue

The POPS at 590 Madison Avenue includes a plaza/arcade with plantings, planters, tables and movable chairs, sculpture, lighting, and heating. As shown on Figure 5-19, with the Proposed Action, there would be two periods of additional incremental shadowing, during the May 6th analysis day (9:18 AM to 10:18 AM, or one hour), and the June 21st analysis day (between 9:37 AM and 10:28 AM or 51 minutes). While new incremental shadow during the June 21 analysis period would result in increments of high total shadow coverage on this resource, it is not expected that this new shadowing on this plaza would be significant, as it falls before primary usage times, and as planting in the space is subject to the requirements of the enclosed environment. Additionally, the resource retains sunlight for the other analysis periods, and thus the impacts will not be significant or adverse.

POPS 13: HarperCollins Publishers, 10 East 53rd Street

Incremental shadows from the Proposed Action would be cast on this plaza only during the March 21st analysis day. Under Existing Conditions, the majority of this resource is covered by shadows during most of this analysis day. Incremental shadows would cover the southern section of the plaza, which does not offer any open space features, for 51 minutes from 9:21 AM to 10:12 AM The

incremental shadows would not be expected to reduce the usability of this passive open space because they would be cast in mid-morning, when public plazas are typically less utilized, and there is no seating in this area of the plaza (Figure 5-20). Therefore, the incremental shadows resulting from the Proposed Action are not expected to result in a significant adverse impact to this open space resource.

POPS 15: 299 Park Avenue

This public plaza would experience longer duration incremental shadows during two of the four analysis (Figure 5-21). Combined with existing shadowing, this resource would be largely in shadow. On the May 6th analysis day, this resource would be affected by two incremental shadows with a combined duration of two hours and 42 minutes, one increment from 8:10 AM to 9:24 AM (one hour 14 minutes) and the second from 1:39 PM, to 3:07 PM (one hour 28 minutes). Along the southern and western portions of the plaza, several planters—some of which have seating ledges—would be covered by these incremental shadows. Under Existing Conditions on this analysis day, this resource receives less than 4–6 hours of direct sunlight exposure, and thus the plantings are assumed to be well suited for shaded areas.

On the June 21st analysis day, the plaza would experience three hours and 35 minutes and one hour and five minutes of incremental shadows, respectively, which would intermittently cover the planters with seating ledges along the northern and southern sections of the plaza; however, the incremental shadows would not be expected to substantially affect utilization of the plaza, as the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. During the March 21 / September 21 analysis periods, short duration incremental shadows would fall on this resource for approximately 45 minutes, from 2:10 to 2:55 PM, on primarily the Park Avenue frontage of the open space. However, these shadows would be relatively short and are projected to fall outside of high usages times, such that utilization and viability of vegetation would not be compromised. Therefore, the incremental shadows are not expected to result in a significant adverse impact on either vegetation growth or usability of this plaza.

POPS 16: 245 Park Avenue

This public plaza would experience incremental shadows during three of the four analysis days; no incremental shadow would be cast on the December 21st analysis day. Despite the extended durations of the incremental shadows on the March 21st, May 6th, and June 21st analysis days—corresponding to three hours and 25 minutes, three hours and 24 minutes, and one hour and 57 minutes, respectively—the new incremental shadow would be limited in area. Given that resource is largely covered in existing shadow during these identified durations, new incremental shadows are not likely to result in any significant adverse impacts (Figure 5-22). Much of the plaza space is covered by the building overhang, and the majority of the space does not have any open space features. The limited planters and wall seating are located along the building's frontage on East 46th and East 47th Streets, and these areas are already covered in shade for most of the day under Existing Conditions during all three of the analysis days; thus, the planters are assumed to be shade tolerant, and the incremental shadows, which would be limited in extent, would not be anticipated to affect usability of the resource. Therefore, incremental shadows cast by the Proposed Action are not expected to result in a significant adverse impact to the plaza at 245 Park Avenue.

POPS 18: 101 Park Avenue

This open space resource would experience incremental shadows on all four analysis days, affecting peak usage periods for the warmer weather months. Combined with existing and No-Action shadows, the plaza would be in almost full shade for all analysis periods; the Proposed Action contributes the least shadowing. On the March 21st analysis day, a very small incremental shadow would enter the southern section of the plaza at 12:07 PM, covering some steps that serve as informal seats, and would travel north for 3:36 PM (three hours, 39 minutes). The incremental shadows would be of limited extent and would not be expected to reduce the usability of this plaza, which comprises a variety of informal seating types around its expansive perimeter, including ledges and steps. Under Existing Conditions on this analysis day, this plaza receives less than four to six hours of direct sunlight exposure, and thus the planters are assumed to be shade tolerant. The incremental shadows cast during the growing season—encompassing the March 21st, May 6th, and June 21st analysis days—are not expected to adversely affect vegetation growth.

During the May 6th analysis day, there would be two shadow entry exit periods, separated by eight minutes, resulting in a total show period of six hours and 18 minutes (8:45 AM to 3:11 PM) The June 21st analysis day would be similar, as two shadow increments separated by a 22-minute gap would cover the plaza for a cumulative period of four hours 25 minutes. While the May 6th increment would be limited in area and effect, in combination with existing shadows, the June 21st shadow would result in almost complete coverage of the plaza, including steps and planters with seating ledges. However, the incremental shadows would not be expected to reduce the usability of the plaza, and the vegetation is assumed to be shade tolerant. Informal seating options are available all throughout the perimeter of the plaza, and there would continue to be areas that receive direct sunlight exposure. Additionally, the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months, and thus no effects are anticipated to the utilization of the plaza (refer to Figure 5-24).

On the December 21st analysis day, there would be a small sliver of an incremental shadow that would enter the plaza from the west at 1:50 PM and travel east for one hour and two minutes before exiting at 2:51 PM. The incremental shadow would pass over the planters with seating ledges along Park Avenue and East 40th Street, but utilization of the plaza is unlikely to be affected, as the incremental shadow would be extremely small in extent. Therefore, the incremental shadows would not be expected to result in a significant adverse impact on any of the analysis days.

POPS 19: Tower 49, 12 East 49th Street

As shown in Table 5.5 and on Figure 5-25, this resource would experience incremental shadows from the Projected and Potential Development Sites on the May 6th, and June 21st analysis days. On the May 6th analysis day, an incremental shadow would be cast along the eastern portion of the plaza—covering trees, planters, seat walls/ledges, and benches—for a duration of three hours 36 minutes, beginning at 8:25 AM and existing at 11:50 AM. The plaza receives less than four to six hours of direct sunlight exposure under Existing Conditions on this analysis day, and thus it is assumed that the trees and plantings are shade tolerant. The new incremental shadow is not expected to affect the usability of the plaza, as existing shadow conditions already cover much of this resource (see Figure 5-25). Further, these incremental shadows are projected during early morning hours, which are not within the peak period of usage for passive open space resources in commercial areas. This also applies for the June 21st analysis day, when there would be a small incremental shadow along the northern portion of the plaza for a duration of three hours and five minutes, beginning at 8:52 AM and exiting at 11:57 AM.

Therefore, the incremental shadows resulting from the Proposed Action are not expected to cause any significant adverse impacts to this open space resource.

POPS 23: 780 Third Avenue

This plaza would experience longer duration incremental shadows on one analysis day. Shown on Figure 5-29, on the May 6th analysis day, an incremental shadow of 57 minutes in duration would pass over the southeastern portion of the plaza where there is publicly accessible seating and tree planting; this increment would enter onto the plaza at 1:27 PM and exit at 2:24 PM. The incremental shadows would not affect the usability of this passive open space resource, and there is no vegetation at this plaza. Two shorter duration shadows of 44 and 31 minutes, during the December 21 and June 21 analysis periods, respectively, and would cover relatively small areas at projected maximum coverage (see Figure 5-29), such that the resource's usability would not be compromised. Therefore, there would be no significant adverse impact on this resource.

POPS 24: 599 Lexington Avenue

This public plaza would experience longer duration incremental shadows of greater than 45 minutes on three analysis days (Figure 5-30), including the March 21, May 6, and June 6 periods. On the March 21st analysis day, incremental shadows would be cast on the northern portion of this resource for 51 minutes, then in the southern portion for 1 hour and 41 minutes, and finally in the western portion for one hour and six minutes. For the May 6th analysis day, the plaza would be in shadow for seven hours and 24 minutes, or from 8:31 AM to 3:55 PM, and the shadowing would be similar for the June 21s analysis day, at six hours and 32 minutes, from 8:59 AM to 3:31 PM. These incremental shadows would cover trees along the perimeter of the plaza. Under Existing Conditions, this resource receives less than four to six hours of direct sunlight exposure on the March analysis day, and thus the trees at this resource are assumed to be well suited for shaded areas; there is no seating available. However, incremental shadows would reach the seating ledge, which is already mostly covered by shadows under Existing Conditions. As such, the incremental shadows on these analysis days, despite their extended duration, are not expected to affect the usability of this resource. It is noted that, during the December 21 analysis period, this resource would experience a short duration incremental shadow of approximately 23 minutes, from 1:41 to 2:04 PM. The brief nature and small coverage of this incremental shadow would not compromise the resource's usability or its vegetation. Therefore, no significant adverse impacts on this plaza are anticipated due to incremental shadows.

POPS 25: Citigroup Center, 153 East 53rd Street

Incremental shadows with durations of more than 45 minutes are cast on this resource during the March 21 / September 21 and May 6 analysis periods for durations of 1 hour 18 minutes (combined) and 1 hour 6 minutes, respectively. On the March 21 / September 21 analysis day, two separate shadow durations would fall on this resource, from 9:40 to 10:12 AM (32 minutes) and from 10:46 to 11:32 AM (46 minutes). At their maximum extent, these incremental shadows would cover relatively small portions of the resource, while the remaining areas would be enveloped in the No-Action shadow condition.

Similarly, during the May 6 analysis period, from 10:20 to 11:26 AM, new incremental shadows would cover a relatively small portion of this resource while the remaining area would be covered in shadows by the Citigroup Building (see Figure 5-31). Incremental shadows during both of these analysis periods would be in the morning hours, outside of peak hours of usage (generally between noon and 2:00 PM

for passive open space resource in commercial areas). Further, under Existing Conditions, vegetation at this resources receives less than four to six hours of sunlight during this analysis day in Existing Conditions, so it is assumed that they are shade tolerant. Shorter duration incremental shadows would fall on this resource on the December 21 and June 21 analysis days, for durations of 38 minutes (combined) and 33 minutes, respectively. These durations are considered brief and are not expected to significantly compromise the resource's usability or the viability of its vegetation. Therefore, incremental shadows are not anticipated to result in significant adverse impacts to this resource.

POPS 27: 212 East 47th Street

This plaza would experience incremental shadows on three of the analysis days; there would no incremental shadows on the December 21st analysis day. During the March 21st, May 6th, and June 21st analysis days, incremental shadows would enter the southern section of the plaza on East 46th Street from the west, traveling east for durations of two hours and nine minutes, two hours and 54 minutes, and three hours and 38 minutes, respectively, before exiting the site; the northern section of the plaza on East 47th Street would be unaffected by incremental shadows on all three analysis days. During the May 6 / August 6 and June 21 analysis periods, incremental shadows, at their maximum extent, would cover the entirety of the southern plaza space. However, the southern section of the plaza that would be covered by incremental shadows has a few planters with spiked railings, rendering the ledges unfit to serve as a seating area. Under Existing Conditions, the plaza receives less than four to six hours of direct sunlight exposure on all three analysis days, and thus it is assumed that the planters are well suited for shaded areas. Therefore, the incremental shadows are not expected to create any significant adverse impacts on this open space resource.

POPS 28: 747 Third Avenue

The incremental shadows resulting from the Proposed Action would affect this resource on three analysis days; for the May 6th and June 21st analysis periods, the resource would be cast fully in shadow with the Proposed Action. On the March 21st analysis day, an incremental shadow would enter the plaza from the southwest at 10:09 AM, traveling northeast for one hour and 56 minutes—intermittently covering trees and seats—before exiting at 12:06 PM; and a second small shadow of 12 minutes duration would be cast on the western portions of the plaza along Third Avenue, passing over a bench. The incremental shadows would have no effect on the utilization of the bench on Third Avenue, but the benches on East 46th and East 47th Streets would be in shadow with the Proposed Action (Figure 5-34). The seats that are located further east along the East 46th Street frontage would be covered by incremental shadows for about 30 minutes in the late morning, but this would be before the peak period of usage, which is generally between noon and 2:00 PM for passive open space resources in commercial areas. Furthermore, under Existing Conditions on this analysis day, the plaza receives less than four to six hours of direct sunlight exposure, and thus the trees that are located at this plaza are assumed to be shade tolerant. The incremental shadows cast during the growing season—encompassing the March 21st, May 6th, and June 21st analysis days—are not expected to adversely affect vegetation growth. No adverse impacts due to the incremental shadows are expected on the March 21st analysis day.

On both the May 6th and June 21st analysis days, incremental shadows would be cast across the western and southern sections of this plaza, with combined durations of five hours and 36 minutes and three hours and 31 minutes, respectively. The incremental shadows on both analysis days would cover the entire southern section of the plaza along East 46th Street in the late morning and a portion of the southern and western sections during the peak period of use between noon and 2:00 PM; there would

continue to be seats that receive direct sunlight exposure. The incremental shadows are not expected to substantially reduce the usability of the plaza on either analysis day, as the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months, and thus no adverse impacts are anticipated.

POPS 30: 825 Third Avenue

As shown on Figure 5-35, there would be new incremental shadows cast on this open space in the May 6th analysis day and the June 21st analysis day; these would be 58 minutes long and one hour 27 minutes, respectively in the post-peak user period for both analysis days. While the incremental shadow, the plaza would be fully in shadow for these analysis days. However, the incremental shadow would only cover small sunlit areas, while the remainder of the plaza area would already be subject to No-Action shadow coverage during these identified durations. Therefore, there would be no effect on the usability of the plaza and no improvements to be adversely affected.

POPS 32: 909 Third Avenue

As shown on Figure 5-37, incremental shadows would reach this plaza on the March 21st and May 6th analysis days. For March 21st, the incremental shadow would enter onto the plaza at 1:59 PM and exit one hour and five minutes later. For the May 6th analysis date, the incremental shadow would enter the plaza at 1:25 PM and exit one hour 16 minutes later. While the incremental shadows would cover about half of the 909 Third Avenue plaza on its southerly side in both conditions, it is expected that there would be no significant impact as the plaza usage is not dependent on sunlight, and there is no sunlight sensitive planting. The incremental shadow would occur after the peak period, so utilization is not likely to be affected. As such, the incremental shadows are not expected to create any significant adverse impacts to this plaza.

POPS 33: 425 Lexington Avenue

Incremental shadows would reach this plaza on the March 21st analysis day, entering the plaza at 9:15 AM and exiting one hour and 10 minutes later at 10:25 AM. This new incremental shadow, at its maximum extent would only cover a small portion of the total plaza area, while the remaining plaza area would be covered by the No-Action shadow condition (see Figure 5-33). A such, the shadow increment would be nominal and would not affect the usage or enjoyment of the plaza, nor result in a significant adverse impact.

POPS 62: 234 East 46th Street

This plaza would experience small additional incremental shadows during the May 6th and June 21st analysis days, which when added to the existing increment of shadow, would cast the plaza in full shade. The May 6th analysis indicates an incremental shadow of almost two hours in duration, entering onto the plaza at 1:11 PM and exiting at 3:01 PM. The Junes 21st analysis indicates a shadow increment of one hour 19 minutes, entering onto the plaza at 1:40 PM and exiting at 2:59 PM; for both analysis periods, the incremental shadow would be added during the peak period of midday plaza usage. This small plaza features planters with seating ledges and additional ledge seating along the sides. The additional shadowing would not affect the usability of the plaza, which is not sunlight dependent in design. Vegetation is assumed to be shade tolerant. Therefore, the incremental shadows resulting from the Proposed Action would not be expected to affect vegetation growth or usability of this plaza, and there would be no significant adverse impacts.

POPS 63: Dag Hammarskjold Tower, 240 East 47th Street

This public plaza would experience incremental shadows during the May 6th and June 21st analysis days. On the May 6th analysis day, an incremental shadow would be cast on the southeast corner of the plaza for 16 minutes, from 2:32 PM to 3:38 PM, passing over some trees and plantings. On the June 21st analysis day, an incremental shadow would be cast over the northeast corner of the plaza for a duration of one hour and 44 minutes, from 3:07 PM to 4:51 PM. On both analysis days, while the analysis periods show that the street-adjacent portions of the plaza would be shadowed for some duration when existing and With-Action shadows are considered, there would continue to be sufficient sunlight (i.e., between 4 and 6 hours) to allow for vegetation growth. The seating areas in the center of the plaza would be unaffected by incremental shadows on both analysis days. Therefore, the incremental shadows resulting from the Proposed Action would not be expected to affect vegetation growth or usability of this plaza, and there would be no significant adverse impacts. Refer to Figure 5-41.

POPS 66: 245 East 54th Street

Longer duration incremental shadows resulting from the Proposed Action would reach this resource on the May 6th analysis day. Combined with the existing shadowing, the incremental shadows, which would be cast on this resource for 46 minutes in the late afternoon—from 3:09 PM to 3:55 PM—would add shadows on a very small area of the plaza where there is no seating, and cover the entire resource in shadows. Additionally, on this analysis day, the tree canopy at this plaza, which is expected to be a shade tolerant species, would continue to have exposure to sufficient sunlight (i.e., four to six hours) to allow for growth. A shorter duration incremental shadow would fall on this resource during the March 21 / September 21 analysis period, for 23 minutes from 3:15 to 3:38 PM. Given the brief nature of this shadow and that it occurs after peak hour usage periods for plazas in commercial areas, the usability and vegetation of this resource are not expected to be compromised. Therefore, the incremental shadows cast by the Proposed Action are not likely to result in a significant adversely impact on the vegetation growth or the utilization of this resource (refer to Figure 5-42).

POPS 68: 3 United Nations Plaza

The small incremental shadows resulting from the Proposed Action would affect this resource on the June 21st analysis day. Incremental shadows would be cast on this resource for one hour and 38 minutes in the afternoon, from 3:26 PM to 5:04 PM, on a very small area of the arcaded plaza where there is no seating. The added shadow in this analysis period would result in complete coverage of the resource for this period. Additionally, on this analysis day, the tree canopy at this plaza would continue to have exposure to sufficient sunlight (i.e., four to six hours) to allow for vegetation growth. Therefore, the incremental shadows cast by the Proposed Action are not likely to adversely affect vegetation growth or the utilization of this resource. Refer to Figure 5-43.

POPS 70: International Plaza, 303 East 43rd Street

This plaza would only experience incremental shadows on the June 21st analysis day. During this analysis day, two incremental shadows with a combined duration of two hours would sweep across the plaza from west to east, intermittently covering planters and seating, and combined with existing shadows would create full shadowing of the resource within the time period. The plaza would still receive approximately four hours of direct sunlight exposure on this analysis day, which is sufficient

for vegetation growth, and the incremental shadows are not expected to substantially reduce the usability of this passive open space resource. Therefore, no significant adverse impacts are anticipated.

POPS 72: 301 East 45th Street

This plaza would experience longer duration incremental shadows on the March 21st analysis day. During this analysis day, an incremental shadow would enter onto the plaza at 2:04 PM and exit at 3:58 PM, for a duration of one hour 54 minutes (see Figure 5-45). Combined with existing shadowing, the resource would be fully in shadow for the analysis time period. The plaza would still receive sunlight on this analysis day, which is sufficient for vegetation growth, and the incremental shadows would not substantially reduce the usability of this passive open space resource. During the May 6 / August 6 and June 21 analysis days, this resource would experience two shorter duration incremental shadows of 26 and 47 minutes, respectively. Both of these durations are considered relatively brief in nature and are also projected to fall in the later afternoon after peak usage times (see Table 5.5), such that vegetation at and utilization of the resource would not be comprised. Based on the foregoing, no significant adverse impacts are anticipated during any of these analysis periods.

POPS 82: Lever House, 390 Park Avenue

The Proposed Action would cast new shadows increment on the site's courtyard plaza during the March 21st analysis period. Two increments would be cast; the first of 16 minutes duration entering at 9:21 AM, exiting at 9:37 AM. The second would be one hour in duration, during the 12:55 PM to 1:55 PM period (see Figure 5-46). This incremental shadow would occur during a popular usage period, and would cast some trees and planting areas in shadow; with existing shadowing, the resource would be fully in shadow. However, the planting is expected to be shade-tolerant as this resource is cast in Existing Condition shadows for much of the day due to its nature as a courtyard. Further, this plaza remains popular despite the lack consistent sunlight due to its nature as a courtyard in the center of a large structure, such that additional incremental shadow generated from the Proposed Action is not anticipated to significantly compromise usability. Therefore, there would be no significant adverse shadow impacts on this resource.

POPS 83: Seagram Building, 375 Park Avenue

The incremental shadows resulting from the Proposed Action would reach this resource on three analysis days. On the March 21st analysis day, an incremental shadow would be cast across this resource, at times covering trees, water features, and the seat wall/ledges at this plaza, for a duration of one hours and 29 minutes. On this analysis day, the plaza receives less than four to six hours of direct sunlight exposure, and thus the trees located on the southern and northern portions of the plaza are assumed to be shade tolerant; and the morning shadowing would exit the site by 10:46 AM. There would be no incremental shadows cast on this resource between noon and 2:00 PM, when utilization would be expected to be at its peak for this passive open space; based on the 3D modeling software, portions of this plaza would continue receive direct sunlight exposure during the peak hours and through the duration of the incremental shadows. Therefore, the incremental shadows would not be expected to adversely affect the growth of vegetation or utilization of this plaza.

On the May 6th and June 21st analysis days, an incremental shadow would enter the plaza at 10:19 AM and exit at 10:58 AM, also of short duration and in advance of the peak usage of the site. A second incremental shadow would enter from the west at 1:48 PM, traveling east and covering the seat walls and water features for durations of two hours and four minutes. On the June 21st analysis day the

shadow would follow the same arc, entering the site at 3:42 PM and exiting at 5:23 PM for a duration of one hour 41 minutes; see Figure 5-47. For both these periods, the incremental shadows would be cast towards the end of the peak hours of utilization of this resource, and other sections of the plaza would continue to have direct sunlight exposure during this time, so usability of the plaza is not expected to be affected. Additionally, the usability of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, there would be no significant adverse shadow impacts on this resource.

POPS 84: Greenacre Park, 217 East 51st Street

This park would experience incremental shadows during the May 6th and June 21st analysis days. On the May 6th analysis day, two incremental shadows of 18 and 26 minutes would be cast, the first entering at 3:30 PM and exiting at 3:48 PM, the second entering at 4:16 PM and exiting at 4:42 PM. On the June 21st analysis day, shown on Figure 5-48, an incremental shadow would be cast along the southern portion of the park for a combined duration of one hour and 41 minutes, entering at 3:42 PM and exiting at 5:23 PM. For both analysis days, the incremental shadows would enter the southern portion of the arcaded park, which contains moveable planters, and seating. For both analysis days in the periods described, the incremental shadow would combine with Existing Conditions to result in fully shading the resource during the identified shadow duration. These analysis days fall within the growing season, and there would continue to be a sufficient amount of sunlight—four to six hours during the morning and early afternoon portions of these analysis periods—for plantings, which are expected to be shade tolerant. Additionally, the incremental shadows would not be expected to substantially affect utilization of the plaza, as the usability and location of seating areas is not reliant upon exposure to sunlight in the warm-weather months. Therefore, the new incremental shadows cast by the Proposed Action on Greenacre Park would not result in a significant adverse impact to this resource.

Historic Resources

H2: Beaux-Arts Apartments North

As shown in Table 5.5, the Projected and Potential Development Sites would cast incremental shadows on the sunlight-sensitive southern and western façades of the northern Beaux-Arts Apartments building—comprising a composition of light and dark brick and articulated setbacks on upper stories—during the late afternoon on the March 21st / September 21st and May 6th / August 6th analysis days. During the March 21st / September 21st analysis day, new incremental shadows would be cast on portions of this resource from 3:02 to 4:29 PM for a total duration of 1 hour, 27 minutes, moving from west to east across primarily the western façade and roof areas of the building. As illustrated in Figure 5-53a and as observed in the 3D modelling software, new incremental shadows would cover portions of the building's upper western façade that would be sunlit under the No-Action condition. During the May 6th / August 6th analysis period, new incremental shadows would fall on this resource for a total duration of 2 hours, 18 minutes (from 2:18 PM to 4:36 PM), moving from west to east, with up to an additional 30 percent of the building's western and southern sunlight sensitive façades covered in shadow that would be sunlit in the No-Action condition (see Figure 5-53b for a representative view of the highest coverage shadow condition).

Based on the resource's orientation and the surrounding existing built environment, the western façade of the building is not prominently visible nor does it significantly contribute to the public's use and enjoyment of the resource. Identified incremental shadows on the southern façade of this resource

during the May 6th / August 6th analysis period would fall primarily on the upper half of the building, where the sunlight sensitive architectural detail is less prominent than the pedestrian level view, while the lower portions of southern façade (where the sunlight sensitive architectural detail is more visible) would be subject to shadow in the No-Action condition during the identified new incremental shadow duration. Further, the southern façade would remain partially or entirely sunlit for significant portions of June 21 analysis period outside of the incremental shadow duration. Based on the foregoing, projected incremental shadows associated with the Proposed Action are not anticipated to result in significant adverse impacts on this resource and no further analysis is warranted.

H3: Beaux-Arts Apartments South

Projected new incremental shadows would fall on large portions of the roof, which is not sunlight-sensitive, and the sunlight sensitive southern façade of this resource during the May 6th / August 6th and June 21 analysis periods for total durations 2 hours, 5 minutes and 2 hours, 8 minutes, respectively. As described further below, the southern façade of this resource is not directly viewable from the pedestrian level, and views of this side of the resource are obscured by the buildings that abut it to the south. Therefore, the incremental shadows effects would not impair the public's enjoyment of the historic resource.

Specifically, during the May 6th / August 6th analysis period, new incremental shadows would cover approximately an additional 25 percent of areas of the building's roof and southern façade that would be sunlit under the No-Action condition in the late afternoon, moving west to east from 2:48 PM to 4:53 PM (see Figure 5-54a for a representative illustration of high incremental shadow coverage during this analysis period). In a similar manner, new incremental shadows in the June 21 analysis period would move from west to east across the roof and southern façade from 2:45 PM to 4:53 PM), covering increasingly larger portions of these areas that would be sunlit in the No-Action condition (see Figure 5-54b for a representative illustration of high incremental shadow coverage during this analysis period).

The sunlight sensitive southern façade of this building faces the interior of the block it is situated on, with existing building on the southern half of the block abutting it. As such, this façade and its architectural details are virtually completely obscured from view, such that the projected incremental shadows on them would not be a detriment to the public's enjoyment of this historic resource. Therefore, new incremental shadows on this resource associated with the Proposed Action would not result in significant adverse impacts. As such, no further analysis is warranted.

H5: Central Synagogue

New incremental shadows associated with the Proposed Action are anticipated to fall on the Central Synagogue during the May 6th / August 6th and June 21 analysis periods. Two separate incremental durations were identified during the May 6th / August 6th analysis period, from 6:27 AM to 7:41 AM (1 hour, 14-minute duration) and from 8:11 AM to 8:47 AM (36-minute duration), for a combined duration of 1 hour, 50 minutes. During both of these durations, new incremental shadows would be characterized by expansion of No-Action shadow conditions, primarily on the roof and eastern façade of the building, including sunlight-sensitive stained glass windows (see Figure 5-55a). These new incremental shadows would move from south to north across the building's eastern façade, would spend relatively short durations on these sunlight sensitive features, and would also cover relatively small areas of these features as well. Further, as illustrated by Figure 5-55a, many of the sunlight sensitive stained glass windows found on the building's eastern façade would already be entirely

covered by No-Action shadows, such that relatively minor shadow coverage of remaining sunlit sunlight sensitive features would not significantly change the shadow condition at the resource. As such, the public's use and enjoyment of the Central Synagogue is would not be compromised by shadow conditions generated by the Proposed Action.

New incremental shadows on the Central Synagogue during the June 21st analysis period would last from 7:05 AM to 9:09 AM, for a total duration of 2 hours and 4 minutes, moving from north to south primarily across the roof and eastern façade of the building. As illustrated in Figure 5-55b, these new incremental shadows would fall on small portions of sunlight sensitive stained glass windows on the building's eastern façade. However, the majority of stained glass windows on this resource during the identified incremental shadow duration would be partially or completed covered by shadows in the No-Action condition, such that additional coverage of would not significantly affect the public's use and enjoyment of this resource.

Based on the analysis presented above, new incremental shadows falling on the Central Synagogue during the May 6th / August 6th and June 21st analysis days would not generate significant adverse impacts. As such, no further analysis is necessary.

H6: Chanin Building

New incremental shadow durations on this historic resource were identified during all four analysis periods, as follows:

December 21st Analysis Period:

New incremental shadows are projected to fall on the Chanin Building during this analysis period from 9:40 AM to 2:53 PM, for a total duration of 5 hours and 13 minutes. However, projected incremental shadows would only fall on upper stories of the building, which do not contain any sunlight sensitive architectural features (see Figure 5-56a). Therefore, projected new incremental shadows during this analysis day would not affect the public's enjoyment of this historic resource and there would be no significant adverse shadow impacts.

March 21st / September 21st Analysis Period:

Two incremental shadow durations are projected during this analysis period, from 7:36 AM to 8:13 AM (37-minute duration) and from 10:02 AM – 3:59 AM (5 hour, 57-minute duration), for a combined duration of 6 hours, 34 minutes, however the vast majority of these shadows would fall on areas of the building that are not sunlight-sensitive. During the first identified duration, incremental shadows would only fall on upper stories of the building where there are no sunlight sensitive architectural features. During the second identified duration, incremental shadows would only fall on various portions of the sunlight sensitive terra cotta architectural details at the southern and eastern bases of the building for short durations between 11:15 AM and 12:30 PM (see Figure 5-56b), with other incremental shadows falling on upper stories of the resource that do not contain such features. It is noted that in both cases, shadows would be moving from west to east across the resource and would not cover the terra cotta details completely during the duration of the incremental shadow. Based on the foregoing, there would be no significant adverse impacts on the public's enjoyment of this resource associated with shadows during this analysis period.

May 6th / August 6th Analysis Period:

Three separate new incremental shadow durations, totaling 6 hours and 49 minutes, were identified on the Chanin Building during this analysis period, including: from 6:27 AM to 6:56 AM (29 minutes); from 10:26 AM to 3:07 PM (5 hours, 31 minutes); and from 4:29 PM to 5:18 PM (49 minutes). During the first and final identified durations, new incremental shadows would be cast on the upper stories of the building only, such that sunlight sensitive architectural features would not receive new shadows. During the second duration, new incremental shadows would be cast on various portions of the sunlight sensitive terra cotta architectural details located at the southern and eastern bases of the building, approximately between the times of 10:30 AM and 12:30 PM (see Figure 5-56c). These shadows would move relatively quickly across these features such that no individual portion of this architectural feature would spend an extended time in projected new incremental shadow. Further, these features would be either partially or entirely sunlit during other portions of the analysis period. As such, projected incremental shadows during this period would not significantly adversely impact the public's enjoyment of this historic resource.

June 21st Analysis Period:

Under the Proposed Action, two incremental shadow durations are projected on the Chanin Building during the June 21st analysis period, including from 5:57 AM to 6:48 AM (51-minute duration), and from 11:02 AM to 2:37 PM (3 hours, 35 minutes), for a total duration of 4 hours, 26 minutes. During the identified early morning duration, incremental shadows would only be cast on the upper levels of this historic resource, where no sunlight sensitive architectural features are located. During the afternoon duration, incremental shadows would be cast on various portions of the sunlight sensitive terra cotta features along the southern base on the building to varying degrees, beginning at approximately 11:30 AM and continuing to approximately 1:00 PM (see Figure 5-56d). This feature would be either partially or entirely in sunlight during other portions of the analysis period, such that the public's enjoyment of the resource would not be significantly diminished or compromised.

Therefore, the Proposed Action would not generate significant adverse impacts associated with shadows on this historic resource and no further analysis is necessary.

H14: Grand Central Terminal

Grand Central Terminal would experience new incremental shadows during three analysis periods, including the December 21st, March 21st / September 21st, and May 6th / August 6th analysis periods. During the December 21st analysis period, incremental shadows would move from west to east across the roof and southern façade of the building, starting at 10:23 AM and lasting through 1:19 PM (2 hour, 56-minute shadow duration). During this time, the majority of new incremental shadow area would be limited to the roof of the building, which is not a sunlight sensitive feature. New incremental shadows would also be cast on the eastern concourse window of the southern façade, which is considered sunlight sensitive (see Figure 5-58a for a representative illustration of incremental shadow coverage during this time period). However, based on the aforementioned 3D modeling software, projected incremental shadows on this sunlight sensitive feature would be relatively short (less than 45 minutes). Further, the identified main concourse window that would receive new incremental shadows is one of many main concourse windows on the southern, western, and eastern façades of the building, such that shadows on one of these windows would not compromise the public's use and enjoyment of their combined effect.

New incremental shadow coverage duration on Grand Central Terminal during the March 21st / September 21st analysis period is projected to last 1 hour, 34 minutes (from 2:55 PM to 4:29 PM). These new incremental shadows would move from west to east across this resource, and would be limited to portions of the roof, which is not considered sunlight sensitive (see Figure 5-58b). As such, the public's enjoyment of this resource is not anticipated to be compromised by new incremental shadows during the March 21st / September 21st analysis period.

During the May 6th / August 6th analysis period, new incremental shadows would be cast on Grand Central Terminal from 2:34 PM to 3:49 PM for a total duration of 1 hour, 15 minutes, moving generally from north to south. These shadows would generally be limited to small portions of the roof and western façade of the building, which include coverage on the southernmost concourse window on the building's western façade, a sunlight sensitive feature (see Figure 5-58c). However, this coverage is expected to be relatively short in duration (less than 45 minutes) and to only cover portions of the feature. Further, the identified main concourse window that would receive new incremental shadows is one of many main concourse windows on the southern, western, and eastern façades of the building, such that shadows on one of these windows would not compromise the public's use and enjoyment of their combined effect.

Overall, new incremental shadows cast on Grand Central Terminal as a result of the Proposed Action are not expected to generate significant adverse impacts regarding the public's use and enjoyment of this resource. As such, no further analysis is warranted.

H18: Rockefeller Plaza

New incremental shadows would fall on various portions the Rockefeller Plaza historic resource during the March 21st / September 21st and May 6th / August 6th analysis periods. During the March 21st/ September 21st analysis period, new incremental shadows would fall on portions of the eastern plaza area at 1260 Avenue of the Americas from 9:43 AM to 10:06 AM for a total duration of 23 minutes (see Figure 5-61a). This portion of the Rockefeller Plaza historic resource offers little to nothing in the way of passive recreation amenities or vegetation, such that new incremental shadows would not jeopardize the public's enjoyment of this resource or the viability of its vegetation. Further, the projected incremental duration would be extremely short (i.e., 23 minutes), such that the effects of the incremental shadow would be further minimized.

The incremental shadows during the May 6th / August 6th analysis period would fall on that plaza of this historic resource located at 610 Fifth Avenue, from 7:06 AM to 7:56 AM (50-minute duration). As illustrated in Figure 5-61b, these incremental shadows would be located in the southwestern portion of that plaza, which characterized by open paved plaza area with limited vegetation and seating, as well as the Rockefeller Center ice rink. Given the short duration of shadows and the lack of seating in this area of the plaza and the plaza as a whole, projected incremental shadows are not expected to negatively affect the public's use and enjoyment of this resource, nor the viability of its vegetation.

Overall, new incremental shadows cast on the Rockefeller Plaza as a result of the Proposed Action are not expected to create significant adverse impacts with regard to shadows. As such, no further analysis is warranted.

H19: St. Bartholomew's Church and Community House

St. Bartholomew's Church, commonly called St. Bart's, is a historic Episcopal parish founded in January 1835, and located on the east side of Park Avenue between East 50th and 51st Streets. St.

Bart's provides a number of different services, including weekday worship (currently scheduled at noon and 5:30 on weekdays and 6:00 PM on Wednesdays), Saturday worship (currently scheduled for 10 AM), Sunday worship (currently scheduled for 8 AM, 9 AM, 11 AM and 5 PM), as well as other events (e.g., weddings, baptisms, funerals, and memorials),[2] Services take place in the church's single large interior space--a vast, unified barrel-vaulted space without side aisles or chapels and with severely reduced transepts (see Chapter 6, "Historic Resources"). Since the sunlight-sensitive stained-glass windows are all experienced within a single large interior space, as opposed to multiple spaces where each individual space includes only a portion of the windows, the assessment of the potential impact caused by the incremental shadows considers the cumulative effect on all of the windows together.

Under the Proposed Action, St. Bartholomew's Church and Community House would experience two separate durations of incremental shadows during each of the March 21st / September 21st, May 6th / August 6th, and June 21st analysis periods.

This resource would experience new incremental shadows from 7:36 AM to 8:15 AM (39-minute duration) and 9:51 AM to 11:19 AM (1 hour, 28-minute duration), for a total duration of 2 hours, 7 minutes during the March 21st / September 21st analysis period. During the first identified duration, new incremental shadows would largely be limited to the roof of the church, where no sunlight sensitive features are located. During the second duration, new incremental shadows would fall primarily on the roof of the church building and its southern façade, which contains sunlight sensitive stained glass windows. The entirety or portions of many of these stained glass windows would receive new incremental shadows during the second identified duration period (see Figure 5-62a).

However, the No-Action shadow condition on these sunlight sensitive features during the second identified duration period would not be drastically different from the Proposed Action. No-Action shadows would cover portions or the entirety of the many stained glass windows on the church's southern façade, during, before, and after this duration. Further, the total time a majority of stained glass windows on the southern façade of the building would fall in incremental shadow duration is short, projected to be approximately 25 minutes (from 10:20 AM to 10:45 AM). As such, the cumulative effect of new incremental shadows on these features would be limited and similar to that of the No-Action Condition, such that the incremental shadow would not cause a substantial reduction in sunlight available for the enjoyment of the building's sunlight sensitive features. Significant adverse impacts related to shadows are not expected on this resource during the March 21st/ September 21st analysis period.

During the May 6th / August 6th analysis period, new incremental shadows would fall on St. Bartholomew's Church and Community House from 10:17 AM to 11:03 AM and from 1:54 PM to 4:41 PM, for total durations of 46 minutes and 2 hours, 47 minutes, respectively (a total duration of 3 hours, 33 minutes). During the first identified duration period, incremental shadows would be limited to primarily the roof and southern façade of the community house, where no sunlight sensitive features are located. Thus, no significant adverse impacts related to shadows are anticipated during this shadow duration. During the second identified duration, new incremental shadows would fall on large portions of the roof of the church building (which does not contain sunlight sensitive features), as well as its western and southern façades, both of which contain sunlight sensitive stained glass windows (see Figure 5-62b).

Compared to the No-Action Condition during the second duration period, portions or the entirety of many of the stained glass windows on the southern and western church façade would experience

[2] http://stbarts.org/worship/home/ accessed December 23, 2016.

prolonged durations of incremental shadows (from approximately 2:15 PM to 3:30 PM – 1 hour, 15 minutes). This would completely eliminate all direct sunlight on these stained-glass windows, with the potential to affect the public's enjoyment of these features.

The June 21st analysis period would see incremental shadows fall on this resource for a total duration of 5 hours, 55 minutes, including from 6:37 AM to 9:28 AM (a 2 hour, 51-minute duration) and from 1:41 PM to 4:45 PM (a 3 hour, 4-minute duration). During the first identified duration, new incremental shadows would fall on the roof of the church building, which is devoid of sunlight sensitive features, and northern façade of the building, which contains stained-glass windows. However, the northern façade is largely covered in No-Action shadow during this shadow condition, such that coverage of the remaining sunlit areas under the Proposed Action would not alter the cumulative shadow effect on this portion of the building significantly. As such, significant adverse impacts would not occur during this shadow duration and no further analysis is necessary.

During the second identified duration period, new incremental shadows are projected to fall on the church roof and the western and southern facades of the building, which, as previously discussed, feature multiple sunlight sensitive stained glass windows. The majority of these stained glass windows are projected to receive new incremental shadows during this analysis period (see Figure 5-62c). Portions or the entirety of the majority of the stained glass windows on these facades would be covered in new incremental shadows for approximately 1 hour, 45 minutes, from 1:45 PM to 3:30 PM. During this time frame, sunlight to these stained glass windows would be completely eliminated, with the potential to affect the public's enjoyment of these features.

Overall, the Proposed Action may impact the public's use and enjoyment of the St. Bartholomew's Church and Community House on the May 6th / August 6th and June 21st analysis periods due to extended durations of new incremental shadows on the church's stained glass windows on its western and southern building facades. Therefore, significant adverse impacts related to shadows are expected for this resource.

H20: St. Patrick's Cathedral

New incremental shadows would be cast on St. Patrick's Cathedral during all four analysis periods, described as follows:

December 21st Analysis Period:

During this analysis period, two separate periods of incremental shadows would fall on this resource, including from 8:51 AM to 9:39 AM (48-minute duration) and from 12:01 PM to 2:18 PM (2 hour, 17-minute duration), for a total duration of 3 hours and 5 minutes, moving from west to east in both cases. However, new incremental shadows would be limited to small portions of roof areas of this resource (see Figure 5-63a), which are not considered sunlight sensitive. As such, incremental shadows are not expected to jeopardize the public's use and enjoyment of this resource during the December 21st analysis period and no further analysis is needed.

March 21st / September 21st Analysis Period:

Incremental shadows cast on St. Patrick's Cathedral during this analysis period would occur at two separate times: from 7:36 AM to 8:23 AM (47-minute duration) and from 9:26 AM – 11:45 AM (2 hours, 19-minute duration), for a total duration of 2 hours, 32 minutes. During the first projected incremental shadow duration, new incremental shadows would generally fall on roof areas of the northern half of

the cathedral building, and not any sunlight sensitive features, while moving west to east. As such, significant adverse impacts to sunlight sensitive features are not anticipated during this identified duration and further analysis is not warranted.

During the second identified shadow duration, new incremental shadows would fall on the southern and eastern façades of the church building and the southern and northern parish houses. Incremental shadows would begin falling on stained glass windows of the central portion of church's southern façade, and move up to third-story stained glass windows at the western portion of the façade at approximately 9:40 AM. These incremental shadows would sweep west to east across this façade, and, for a short period (from approximately 10:00 AM to 10:15 AM) would cover remaining sunlit areas on the southern façade. These incremental shadows would move off these areas of the resource shortly after, such that the western portion of the southern façade, which includes many stained glass windows, would receive direct sunlight after such shadows passed. Further, many more stained glass windows on this façade would already be covered by shadow in the No-Action shadow, such that the cumulative impact of additional shadow coverage on remaining sunlit stained glass windows would be marginal.

Incremental shadows would begin falling on the stained glass windows on the southern façade of the southern parish house beginning at 9:32 AM, and would move across this façade, that building's eastern façade, the church building's eastern façade, and then the southern and eastern façades of the north parish house (all of which contain stained glass windows), sequentially, from south to north, until the end of the identified duration (i.e., 11:45 AM). However, the new incremental shadow would only cover a modest proportion of any area at any time during this shadow sweep (see Figure 5-63b). Further, those portions of this area outside of the new incremental shadow would be entirely within No-Action shadow. As such, new incremental shadow on this area during this identified duration would only marginally add to the cumulative total shadow effect on the resource.

Based on the foregoing, the cumulative impact of new incremental shadows during both identified durations of this analysis day are not expected to effect the public's use and enjoyment of this historic resource, such that no significant adverse impacts would result. Thus, no further analysis is needed.

May 6th / August 6th Analysis Period:

Two periods of incremental shadows would fall on St. Patrick's Cathedral during this analysis period, from 6:35 AM to 8:55 AM (2 hours, 20 minutes) and from 10:11 AM to 10:57 AM (46 minutes), for a total duration of 3 hours, 6 minutes. During the latter duration, shadows would primarily fall on various portions the roof and northern and eastern façades of the parish house building at the southeast corner of the property. Those northern and eastern façades contain several stained glass windows, a sunlight sensitive feature. During the first shadows duration, incremental shadows would be cast primarily on the northern façade of the cathedral building, as well as roof areas of the entire building. Portions or all of several stained glass windows would experience incremental shadow durations during this time (see Figure 5-63c). As illustrated in the figure, while new incremental shadows would cover a significant area on the roof and façades on the church, comparatively small area would cover stained glass windows that would be sunlit under the No-Action condition. As such, the aggregate effect of incremental shadows on sunlight sensitive features of this resource would be minimal, such that no significant adverse impact would occur. Therefore, further analysis with regard to new incremental shadows is not required.

June 21st Analysis Period:

Incremental shadows from the Proposed Action would fall on St. Patrick's Cathedral from 6:44 AM to 9:28 AM, for a total duration of 2 hours, 44 minutes, during the June 21st analysis period. These incremental shadows would move from east to west along primarily the northern façade of the church building and the eastern and northern façade of the north parish house building, both of which include multiple stained glass windows, portions or all of which would be covered during portions of this incremental shadow duration (see Figure 5-63d). With regard to the church building, incremental shadows would move from east to west across the northern facade, starting to fall on eastern sunlight sensitive stained glass windows at approximately 7:00 AM and subsequently covering an increasing number of these resource moving west, until approximately 8:45 AM, when new incremental shadow begin moving off the eastern portion of the church's northern façade. New incremental shadows on stained glass windows of the northern parish house building would start at approximately 8:08 AM on the building's eastern façade and would cover portions or the entirety of stained glass windows on both the eastern and northern façade until 9:27 AM. For a relatively brief period in that duration, new incremental shadows would entirely cover these façades and associated stained glass windows, from approximately 8:35 AM to 8:55 AM (20 minutes). Outside of that specific time frame, stained glass windows on these façades would either be sunlit or case in No-Action shadow.

Under an approach which considers the cumulative effects of incremental shadows on all of the windows in St. Patrick's Cathedral together, while the incremental shadow would have a relatively long durations (up to 2 hours, 44 minutes), and would at times have a large extent as it would sweep across a number of stained-glass windows on both the church building and northern parish house, at no time would the incremental shadow completely eliminate all direct sunlight on all of the Cathedral's stained-glass windows. As such, incremental shadows would not cause a substantial reduction in sunlight available for the enjoyment of the building's sunlight-sensitive features, and thus the incremental shadow would not result in a significant adverse impact.

H21: St. Thomas Church and Parish House

The St. Thomas Church and Parish House is projected to receive new incremental shadows during the December 21 analysis period from 10:20 AM to 11:19 AM for a total duration of 59 minutes. These projected shadows would fall primarily on the roof and southern façade of the proposed building, moving southwest to northeast across the resource. Multiple stained glass windows are located on the southern façade of the building, some of which would be partially or entirely covered by incremental shadows during this analysis period (see Figure 5-64). However, other stained glass windows on this resource would be either partially or entirely covered by No-Action shadow during this identified duration such that additional shadow under the Proposed Action would not significantly alter the overall shadow condition on the resource. Further, these incremental shadows would be of limited duration (i.e., approximately one hour in length), and would move off of these sunlight sensitive features quickly. Based on the foregoing, new incremental shadows on the St. Thomas Church and Parish House are not expected to significantly affect the public's use and enjoyment of this historic resource.

Several historic resources would receive relatively short durations of new incremental shadows that would not fall on any sunlight sensitive features on that resource. These resources are listed below, along with the associated analysis day(s), incremental shadow duration(s), and figure number(s), in Table 5.6 below.

Section II. Shorter / Reduced Shadows

Parks

P25N: Greenstreets – First Avenue (North)

Incremental shadows would pass over this Greenstreet resource on First Avenue and East 47th Street in the May 6th and August 6th analysis period for a limited duration of 18 minutes total, in the late afternoon (between 4:40 PM and 5:07 PM). Given the short timeframe of this shadow as well as the minimal use of the park, there would be no significant adverse shadow impacts on this resource.

P27: United Nations Sculpture Garden

New incremental shadows are projected to be cast on this resource during the March 21st / September 21st, May 6th / August 6th, and June 21st analysis periods for short duration periods, including from 3:56 PM to 4:29 PM (33-minute duration), from 4:45 PM to 5:18 PM (33-minute duration), and from 5:15 PM to 6:01 PM (46-minute duration), respectively. Given the relatively brief nature of these incremental shadows and the comparatively small area of additional shadow coverage versus the No-Action condition (see Figures 5-6a through 5-6c), they are not expected to significantly impact the public's use and enjoyment of this resource of the viability of its vegetation. As such, no significant adverse shadow impacts would occur.

P30: One Vanderbilt Plaza (No- Action Open Space)

This plaza, which will be completed with or without the Proposed Action by the 2036 analysis year, would experience no new incremental shadows on the March 21st, June 21st and December 21st analysis days. For the May 6th, analysis day, there would be an incremental shadow of 23 minutes duration, between 2:25 PM and 2:47 PM. The location of the plaza is expected to be largely in shade due to its proximity to several tall buildings, and could receive less than four to six hours of direct sunlight exposure during the growing season. It is anticipated that any vegetation at the plaza would be shade tolerant. Additionally, given the small extent of the incremental shadows, it is not likely that they would result in any adverse effects to the usability of the resource. Therefore, no significant adverse shadows impacts are anticipated.

POPS

POPS 31: 875 Third Avenue

Incremental shadows would reach this plaza on three of the analysis days; there would be no incremental shadows on the December 21st analysis day. During the March 21st / September 21st, May 6th / August 6th, and June 21st analysis days, incremental shadows would enter the plaza from the west on Third Avenue and travel east—for durations of 54 minutes, one hour and 19 minutes, and two hours and 27 minutes, respectively—before exiting on the south side of East 53rd Street. The incremental shadows would sweep across the planter that has a seating ledge along the frontage of Third Avenue, but would not affect the publicly accessible tables and movable chairs located at this plaza, and there would be no anticipated effects to the usability of this passive open space resource. During the March 21st analysis day, when the usability of seating areas is reliant upon exposure to sunlight, the incremental shadow would occur after the peak period, so utilization is not likely to be affected. On all three analysis days, the planter that would be covered by the incremental shadow receives less than four to six hours of direct sunlight exposure under existing conditions, and thus the

vegetation is assumed to be shade tolerant. As such, the incremental shadows are not expected to create any significant adverse impacts to this plaza.

POPS 9: 800 Third Avenue

This public plaza would experience incremental shadows during only one of the analysis days, June 21st; no incremental shadow would be cast on the March 21st / September 21st, May 6th / August 6th or December 21st analysis days. The incremental shadow would be short in duration and also a very small sliver of shadow as shown on Figure 5-16, lasting only 18 minutes in the early morning between 6:20 AM and 6:38 AM when there would be very low usage of the space, therefore there would be no significant adverse shadows impacts.

POPS 11: Trump Tower, 725 Fifth Avenue

New incremental shadows would be cast on the POPS located at 725 Fifth Avenue during the March 21st / September 21st and June 21st analysis periods, for relatively short durations of 25 minutes and 13 minutes, respectively. This POPS is comprised of two separate spaces at the 4th floor terrace level of the building, one at the buildings southern building frontage and the other at the northern frontage. During the March 21st / September 21st analysis period, shadows would fall on the southern portion of this POPS from 8:20 AM to 8:45 AM, while new incremental shadows during the June 21st analysis period would fall on the same southern portion from 9:51 AM to 10:04 AM (see Figure 5-18). Due to the relatively short nature of these new incremental shadows in both analysis periods, the public's use and enjoyment of this resource and the viability of its vegetation is not expected to be compromised. As such, there would be no significant adverse impacts associated with shadows on this resource, and no further analysis is necessary.

POPS 17: 6 East 43rd Street

The POPS located at 6 East 43rd Street would experience new incremental shadows under the Proposed Action during the June 21st analysis period from 8:53 AM to 9:10 AM (17-minute duration). These should would be limited to small southeastern portions of this POPS, an area which is only characterized by pavement. Given the extremely short duration of the projected new incremental shadows and the nature of the area on which they are expected fall, no significant adverse impacts would occur. As such, no further analysis is necessary.

POPS 20: Grand Central Plaza, 622 Third Avenue

This open space resource would experience a small incremental shadow on the June 21st analysis day. The incremental shadow would sweep across the southeast corner of the landscaped terrace for a brief duration of 37 minutes, from 4:54 PM to 5:31 PM. Due to the relatively short duration of shadow and limited coverage, passive recreation use would be unaffected by the incremental shadows, and thus no significant adverse shadows impacts are anticipated.

POPS 21: 140 East 45th Street

This plaza would experience incremental shadows on only the March 21st analysis day. On the March 21st analysis day, the incremental shadows would be cast along a small section of the northern portion of this open space resource for approximately 26 minutes, from 10:16 AM to 10:42 AM. Under existing conditions on this analysis day, the majority of this resource is covered in shadows and receives less than 4–6 hours of direct sunlight exposure; therefore, the planters are assumed to be well suited for

shaded areas. Therefore, the incremental shadows are not expected to result in a significant adverse impact on this plaza.

POPS 22: 141 East 48th Street

The incremental shadows resulting from the Proposed Action would reach this open space resource on only the May 6th analysis day; no incremental shadows would be cast on the remaining analysis days. On the May 6th analysis day, an incremental shadow would cover some planters with seating ledges in this plaza for a duration of 26 minutes. Under existing conditions, this resource receives less than 4–6 hours of direct sunlight exposure, and thus the plantings are assumed to be well suited for shaded areas. Additionally, most of the space, including the seating ledge, is covered by shadows for the majority of the day under existing conditions, and thus the incremental shadows, which are limited in extent, are not expected to affect utilization of the resource. Therefore, no significant adverse impacts on this plaza are anticipated due to incremental shadows.

POPS 26: 201 East 42nd Street

During the May 6th / August 6th analysis period, new incremental shadows resulting from the Proposed Action would be cast on the POPS located at 201 East 42nd Street from 2:22 PM to 2:49 PM (a 27-minute duration). As illustrated in Figure 5-32, these new incremental shadows would fall on a relatively large central portion of this POPS at their peak, portions of which include a large planter. However, given the brief nature of these new incremental shadows, they are not expected to jeopardize the viability of this vegetation. Further, the lack of amenities in this space (e.g., seating or tables of any sort) make it unlikely this space would be used recreationally, such that new incremental shadows would not affect the public's use and enjoyment of his resource. Therefore, further analysis is not warranted.

POPS 48: 1166 Sixth Avenue

This plaza would experience incremental shadow resulting from the Proposed Action only on the March 21st analysis day. The small incremental shadow would cover some limited areas of the landscaped plaza for a duration of 24 minutes, from 6:41 AM to 7:05 AM, which would not be expected to reduce the usability of the plaza, as it would be cast for a limited duration in the early morning before the peak hours of utilization. Therefore, the incremental shadow would not be expected to result in a significant adverse impact.

POPS 85: St. Patrick's Cathedral, 460 Madison Avenue

The open space resource at St. Patrick's Cathedral would experience incremental shadows on the March 21st / September 21st, May 6th / August 6th, and June 21st analysis days. On the March 21st / September 21st analysis day, two incremental shadows with a combined duration of 57 minutes would enter the site at 9:15 AM from the southwest and cover a small area, intermittently coverage southern and northern portions of the steps and sidewalk area along Fifth Avenue and the landscaped areas along Madison Avenue and East 50th and East 51st Streets, and exit at 10:37 AM. The incremental shadows are not expected to affect the usability of the plaza along the Fifth Avenue frontage of the building, as the shadows would quickly sweep across the southwest portion of the plaza, covering the steps for only a brief period in the early morning. Furthermore, under existing conditions on this analysis day, the open space resource receives less than 4–6 hours of direct sunlight exposure, and thus it is assumed that the vegetation on this site is shade tolerant. Therefore, the incremental shadows during the early mornings of the May 6th and June 21st analysis days—with overall durations of 1 hour

and 19 minutes and 33 minutes, respectively, sweeping across the landscaped areas east and north of the building—would similarly not have an adverse effect on the vegetation. The plaza portion of the open space resource would be unaffected by the incremental shadows on the May 6th and June 21st analysis days. As such, the incremental shadows resulting from the Proposed Action are not expected to have any significant adverse impacts on the open space resource at St. Patrick's Cathedral.

POPS 103: 1251 Sixth Avenue

From 8:51 AM to 9:11 AM (a 20-minute duration) during the December 21st analysis period, shadows would fall on the POPS located at 1251 Sixth Avenue. As illustrated on Figure 5-50, these incremental shadows would be limited to a relatively small portion the POPS, and area comprised primarily of benches. Given the relatively short duration of these projected incremental shadows, the lack of vegetation in the area they are anticipated to fall, and the fact that the majority of area associated with the entire POPS is projected to be within No-Action shadow during the duration, no significant adverse impacts associated with shadows would occur, and no further analysis is necessary.

POPS 143: 1095 Sixth Avenue

This POPS would only experience a brief duration of incremental shadow on the December 21st analysis day. Projected incremental shadows would only fall on a northern portion of the eastern plaza area (fronting along Sixth Avenue) from 8:51 AM to 9:11 AM, for a 20-minute duration (see Figure 5-51). This eastern portion of the POPS is defined by an expanded sidewalk area with no amenities or vegetation. Given the short duration of shadows and the nature of the POPS, no significant adverse impacts would occur. Therefore, no further analysis is necessary.

Table 5.1: Resources of Concern within Defined Shadow Radius – Open Spaces Affected by Incremental Shadows

Map ID #	Name/Location	Description	Hours of Access	Condition	Utilization
P3	Bryant Park, Sixth Avenue from West 40th Street to West 42nd Street	Tables and movable chairs, benches, lighting, trees, monuments / fountains, drinking fountain, garbage cans, vendors, carrousel, game area, petanque courts, ping pong area, reading area, piano, ice rink (seasonal), subway access	Opens at 7am daily; closing time varies with month, ranging from 7pm to midnight	Excellent	Moderate
P5	Dag Hammarskjold Plaza, East 47th Street between 1st and 2nd Avenues	Plaza, trees, planters, benches, seat wall / ledges, garbage cans	24 hours/day	Good	Low
P13	MacArthur Park, East 48th Street to East 49th Street, FDR Drive	Playground facilities, chairs, benches, tables, landscaping	TBD	TBD	TBD
P15	Park Avenue Malls	Landscaped Median	24 hours/day	Excellent	N/A[3]
P25N	Greenstreets – First Avenue (North)	Landscaped Median	24 hours/day	Excellent	N/A[3]
P27	United Nations Sculpture Garden	Sculptures, landscaping	Limited to Official United Nations Building Tours and Visitors	Excellent	Low
P28	New York Public Library – Fifth Avenue and 42nd Street	Plaza/terrace, tables and movable chairs, seating steps, statues, trees, plantings	24 hours/day	Excellent	Moderate
P30	One Vanderbilt Plaza (No-Action Open Space), Vanderbilt Avenue between East 42nd and East 43rd Streets	No-Action plaza	24 hours/day	N/A[2]	N/A[2]
P31	Pershing Square West (No-Action Open Space), Park Avenue between East 41st and East 42nd Streets	No-Action plaza	24 hours/day	N/A[2]	N/A[2]
2	Park Avenue Tower, 65 East 55th Street	Plaza, planters with seating ledges, garbage cans	24 hours/day	Excellent	Low
3	535 Madison Avenue	Plaza/arcade, tables and movable chairs, trees, planters with seating ledges	24 hours/day	Excellent	Low

Table 5.1: Resources of Concern within Defined Shadow Radius – Open Spaces Affected by Incremental Shadows (Continued)

Map ID #	Name/Location	Description	Hours of Access	Condition	Utilization
4	919 Third Avenue	Plaza, planters, seat wall, lighting, garbage cans	24 hours/day	Good	Low
5	345 Park Avenue	Plaza, trees, planters with seating ledges, benches, seat wall / ledges, sculpture	24 hours/day	Good	Low
6	Wells Fargo Building, 437 Madison Avenue	Plaza/arcade, seat wall / ledges, seating steps, lighting	24 hours/day	Fair	Low
8	40 East 52nd Street	Plaza, seat wall / ledges, planters, sculptures, garbage cans, lighting	24 hours/day	Excellent	Low
9	800 Third Avenue	Plaza/arcade, trees, planters with seating ledges, garbage cans, bicycle racks	24 hours/day	Good	Low
10	777 Third Avenue	Plaza/arcade, benches, seating swing, trees, planters	24 hours/day	Good	Moderate
11	Trump Tower, 725 Fifth Avenue	Indoor plaza with tables and movable chairs, garbage cans, lighting, heating, water feature; outdoor landscaped terraces with trees, planters, benches, seat wall / ledges	8am to 10pm	Excellent	Moderate
12	590 Madison Avenue	Indoor plaza/arcade, trees, planters, tables and movable chairs, sculpture, lighting, heating	8am to 10pm	Excellent	Moderate
13	HarperCollins Publishers, 10 East 53rd Street	Plaza/arcade with planters; through-block connection to 52nd Street with retail, seat wall / ledges	24 hours/day	Excellent	Low
14	280 Park Avenue	Plaza, trees, planters with seating ledges, tables and movable chairs, lighting	24 hours/day	Good	Low
15	299 Park Avenue	Plaza/arcade, trees, planters, benches, garbage cans	24 hours/day	Good	Low
16	245 Park Avenue	Plaza/arcade	24 hours/day	Good	Low
17	6 East 43rd Street	Plaza, planters with seating ledges, statue	24 hours/day	Excellent	Low
18	101 Park Avenue	Plaza/arcade, plantings, seat wall / ledges, seating steps	24 hours/day	Excellent	Low
19	Tower 49, 12 East 49th Street	Plaza/arcade, trees, planters, marble benches, seat wall / ledges	24 hours/day	Excellent	Low
20	Grand Central Plaza, 622 Third Avenue	Outdoor plaza with trees, planters with seating ledges, benches, seat wall / ledges, garbage cans; indoor arcade with benches, seat wall / ledges, lighting, heating; landscaped terrace with trees, planters with seating ledges, benches, tables and movable chairs, lattice, garbage cans	24 hours/day (outdoor plaza); weekdays 7am-8pm / weekends 9am-6pm (indoor arcade); varies by season (landscaped terrace)	Excellent / partially under construction	Moderate

Table 5.1: Resources of Concern within Defined Shadow Radius – Open Spaces Affected by Incremental Shadows (Continued)

Map ID #	Name/Location	Description	Hours of Access	Condition	Utilization
21	140 East 45th Street	Plaza/arcade, planters, garbage cans, expanded sidewalk	24 hours/day	TBD	TBD
22	141 East 48th Street	Plaza, trees, planters with seating ledges, seat wall / ledges	24 hours/day	Good	Low
23	780 Third Avenue	Plaza, seat wall / ledges, lighting, food trucks	24 hours/day	Good	Moderate
24	599 Lexington Avenue	Plaza, planters, benches, lighting	24 hours/day	Good	Low
25	Citigroup Center, 153 East 53rd Street	Indoor plaza with planters, tables and movable chairs, garbage cans, lighting, heat, piano, wifi; outdoor plaza with trees, planters, garbage cans, water feature, vendors, lighting	7am-11pm, closed for events (Indoor plaza); 24 hours/day (Outdoor plaza)	Excellent	Heavy
26	201 East 42nd Street	Planters	24 hours/day	Excellent	Low
27	212 East 47th Street	Plaza, benches, lighting, garbage cans	24 hours/day	Excellent	Heavy
28	747 Third Avenue	Plaza, tables and fixed chairs, seat wall / ledges, lighting, gazebo, artwork	24 hours/day	Good	Low
30	825 Third Avenue	Expanded sidewalk	24 hours/day	Excellent	Low
31	875 Third Avenue	Indoor plaza with planters, tables and movable chairs, garbage cans, lighting, heat, food court, bathrooms; outdoor plaza/arcade with tables and movable chairs, planters with seating ledges	Mon-Sat, 7am-11pm / Sun and holidays, 11am-7pm (Indoor plaza); 24 hours/day (Outdoor plaza/arcade)	Excellent	Moderate
32	909 Third Avenue	Expanded sidewalk, arcade, sculptures, plantings	24 hours/day	Excellent	Low
33	425 Lexington Avenue	Plaza, seat wall / ledges, planters with seating ledges, garbage cans	5/1–9/30, 7 am –11:30 pm.; 10/1–4/30, 7 am – 7 pm	Good	Low
48	1166 Sixth Avenue	Plaza/arcade, tables and movable chairs, benches, seat walls / ledges, garbage cans, lamps, trees, plantings, sculpture, through-block connection between 45th and 46th Streets	24 hours/day	Excellent	Low
49	Grace Plaza, 1114 Sixth Avenue	Plaza/arcade, trees, plantings, tables and movable chairs, benches, garbage cans, water fountain, food vendor	24 hours/day	Good	Low
62	234 East 46th Street	Expanded sidewalk, planters, ledge seating	24 hours/day	Excellent	Low

Table 5.1: Resources of Concern within Defined Shadow Radius – Open Spaces Affected by Incremental Shadows (Continued)

Map ID #	Name/Location	Description	Hours of Access	Condition	Utilization
63	Dag Hammarskjold Tower, 240 East 47th Street	Plaza, trees, planters with seating ledges, benches, lighting, garbage cans, water feature	24 hours/day	Good	Low
66	245 East 54th Street	Plaza, trees, planters with seating ledges, benches, seat wall / ledges, lighting, sculpture, bicycle racks	24 hours/day	Good	Moderate
68	3 United Nations Plaza	Chairs, benches, tables, planters, trees, garbage cans	7:00 am – 8:30 PM	TBD	TBD
70	International Plaza, 303 East 43rd Street	Plaza, trees, planters, seats, garbage cans	24 hours/day	Good	TBD
72	301 East 45th Street	Expanded sidewalk	24 hours/day	Excellent	Low
73	100 United Nations Plaza	Plaza, trees, planters with seating ledges, seat wall / ledges, sculpture, water feature	24 hours/day	Excellent	Moderate
82	Lever House, 390 Park Avenue	Plaza, trees, planters, benches, lighting, sculpture	24 hours/day	Excellent	Moderate
83	Seagram Building, 375 Park Avenue	Plaza, seat wall / ledges, sculpture, water feature	24 hours/day	Excellent	Low
84	Greenacre Park, 217 East 51st Street	Vest-pocket park, sculptures, trees, plantings, gazebo, tables and movables chairs, marble benches, waterfall	Dawn to dusk	Excellent	Low
85	St. Patrick's Cathedral, 460 Madison Avenue	Plaza, steps	24 hours/day	Good / construction above	Moderate
103	1251 Sixth Avenue	Fountain / pool, ledge seating, benches, plantings / landscaping, subway access, expanded sidewalk	24 hours/day	Excellent	Heavy
143	1095 Sixth Avenue	Outdoor plaza with trees, planters with seating ledges, benches, tables and movable chairs, seat wall / ledges, garbage cans	24 hours/day	Excellent	Moderate

Sources: New York City Department of Parks and Recreation open space database; *Privately Owned Public Spaces: The New York City Experience* (2000); *East Midtown Rezoning Final Environmental Impact Statement* (2013); Municipal Art Society Privately Owned Public Space in New York City Website (http://apops.mas.org/), accessed November 14, 2016.

Notes:

[1] Open space resources that are listed as "Under construction" are not currently accessible to the public, and thus there is no current utilization.

[2] Open space resources that would be created in the future either without or with the Proposed Action do not have a current condition or utilization.

[3] The Park Avenue Malls and 1st Avenue Greenstreet do not comprise usable open space. Therefore, there is no utilization of this open space resource.

Table 5.2: Resources of Concern within Defined Shadow Radius –
Open Spaces Not Affected by Incremental Shadows

Map ID#	Name/Address
PUBLIC PARKS	
P1	14 Honey Locusts Park
P2	Andrew Haswell Green Park
P4	Central Park
P6	Father Duffy Square
P7	Five Parks (FDR Drive)[1]
P8	Grand Army Plaza
P9	Greeley Square Park
P10	Greenstreets – East 66th Street
P11	Greenstreets – Broadway[1]
P12	Herald Square[1]
P14	Mary O'Connor Playground
P16	Peter Detmold Park[1]
P17	Queensboro Oval
P18	Ralph Bunche Park
P19	Robert Moses Playground
P20	Sutton Place Park
P21	Tramway Plaza
P22	Trygve Lie Plaza
P23	Tudor Grove Playground
P24	Twenty-Four Sycamores Park
P26	Greenstreets - East 49th Street
P29	Four Freedoms Park
P32	7-11 East 51st Street (No-Action)
PRIVATELY OWNED PUBLIC SPACES (POPS)	
1	450 Park Avenue
7	457 Madison Avenue
9	800 Third Avenue
14	280 Park Avenue
17	6 East 43rd Street
20	622 Third Avenue
22	141 East 48th Street
29	767 Third Avenue
34	432 Park Avenue
35	520 Madison Avenue
36	36 Central Park South
37	767 Fifth Avenue
38	500 Park Avenue
39	499 Park Avenue
40	110 East 59th Street
41	9 West 57th Street

Table 5.2: Resources of Concern within Defined Shadow Radius –
Open Spaces Not Affected by Incremental Shadows (Continued)

Map ID#	Name/Address
PRIVATELY OWNED PUBLIC SPACES (POPS)	
42	58 West 58th Street
43	40 West 57th Street
44	1370 Sixth Avenue
45	1350 Sixth Avenue
46	1330 Sixth Avenue
47	51 West 52nd Street
48	1166 Sixth Avenue
50	445 Fifth Avenue
51	135 East 57th Street
52	420 Fifth Avenue
53	31 West 52nd Street
54	600 Third Avenue
55	845 First Avenue
56	950 Third Avenue
57	150 East 58th Street
58	633 Third Avenue
59	245 East 40th Street
60	235 East 40th Street
61	212 East 42nd Street
63	240 East 47th Street
64	885 Second Avenue
65	255 East 49th Street
67	309 East 48th Street
69	320 East 46th Street
71	333 East 45th Street
74	300 East 54th Street[1]
75	360 East 57th Street
76	300 East 59th Street
77	118 East 60th Street
78	200 East 61st Street
79	750 Lexington Avenue
80	425 Fifth Avenue
81	3 East 53rd Street
90	Tudor City - North
91	Tudor City - South
92	One Astor Place - 1515 Broadway[1]
93	Ritz - 235 West 48th Street[1]
94	Trump Palace - 200 East 69th Street
95	Sovereign - 425 East 58th Street
96	Metropolitan Tower - 146 West 57th Street
97	888 Seventh Avenue

Table 5.2: Resources of Concern within Defined Shadow Radius –
Open Spaces Not Affected by Incremental Shadows (Continued)

Map ID#	Name/Address
PRIVATELY OWNED PUBLIC SPACES (POPS)	
98	Marriott Marquis - 1535 Broadway
99	Paramount Plaza - 1633 Broadway[1]
100	Grand Sutton - 418 East 59th Street[1]
101	Carlton Towers - 200 East 64th Street[1]
102	Phoenix - 160 East 65th Street
104	265 East 66th Street
105	Rio - 304 East 65th Street
106	Two Penn Plaza/Madison Square Garden - 2 Pennsylvania Plaza
107	River Tower - 420 East 54th Street[1]
108	World Apparel Center - 1411 Broadway
109	325 Fifth Avenue
110	Revere - 400 East 54th Street[1]
111	Alliance Capital - 1345 Sixth Avenue
112	Royale - 188 East 64th Street
113	Stevens Tower - 1185 Sixth Avenue[1]
114	Plaza 400 - 400 East 56th Street[1]
115	Evansview - 303 East 60th Street
116	1700 Broadway[1]
117	Bristol - 200 East 65th Street
118	Paladin - 300 East 62nd Street
119	Carnegie Mews - 211 West 56th Street
120	254 East 68th Street
121	Symphony House - 1755 Broadway
122	St. James Tower - 415 East 54th Street[1]
123	Trump Plaza - 167 East 61st Street
124	Concorde - 220 East 65th Street[1]
125	McGraw-Hill - 1221 Sixth Avenue
126	125 West 55th Street
127	Bridge Tower Place - 401 East 60th Street
128	Hotel Eventi - 835 Sixth Avenue
129	Rivercourt - 429 East 52nd Street[1]
130	1250 Broadway
131	Le Parker Meridien Hotel - 118 West 57th Street
132	Tower 53 - 825 Seventh Avenue
133	New Yorker East - 410 East 58th Street
134	Saint Tropez - 340 East 64th Street
135	810 Seventh Avenue
136	172 Madison Avenue
130	1250 Broadway
131	Le Parker Meridien Hotel - 118 West 57th Street
132	Tower 53 - 825 Seventh Avenue
133	New Yorker East - 410 East 58th Street

Table 5.2: Resources of Concern within Defined Shadow Radius –
Open Spaces Not Affected by Incremental Shadows (Continued)

Map ID#	Name/Address
PRIVATELY OWNED PUBLIC SPACES (POPS)	
134	Saint Tropez - 340 East 64th Street
135	810 Seventh Avenue
136	172 Madison Avenue
137	Wellington Estates - 200 East 62nd Street
138	1155 Sixth Avenue
139	PaineWebber - 1285 Sixth Avenue
140	La Premiere - 230 West 55th Street
141	1301 Sixth Avenue
142	745 Seventh Avenue
144	1211 Avenue of the Americas - 1211 Sixth Avenue
145	1133 Sixth Avenue
146	One Penn Plaza - 1 Pennsylvania Plaza

Notes:
[1] Incremental shadows are not expected to fall on these resources given their distance from the proposed Projected and Proposed Development Sites and the height of intervening buildings.

Table 5.3: Resources of Concern within Defined Shadow Radius –
Sunlight-Sensitive Historic Resources Affected by Incremental Shadows

Map ID#	Resource Name	Address/Location	Sunlight-Sensitive Features
H1	Amster Yard	211-13 East 49th Street	Vegetation in the landscaped garden
H2	Beaux-Arts Apartments - North	307 East 44th Street	Composition in light and dark brick
H3	Beaux-Arts Apartments - South	310 East 44th Street	Composition in light and dark brick
H5	Central Synagogue	652 Lexington Avenue	Stained-glass windows
H6	Chanin Building	374 Lexington Avenue, 122 East 42nd Street	Terra cotta art; massive band of bas relief designs
H12	Ford Foundation	303 East 42nd Street	Glass-walled and sky-lit atrium
H14	Grand Central Terminal	77 East 42nd Street	Windows of the Main Concourse
H15	William Lescaze House and Office	211 East 48th Street	Glass block, glass bricks, and ribbon windows
H17	Rockefeller Apartments	17 West 54th Street	Turreted windows
H18[1]	Rockefeller Center / Rockefeller Plaza	48th Street to 51st Street, between Fifth and Sixth Avenues	Seating areas; vegetation
H19	St. Bartholomew's Church and Community House	321 Park Avenue	Stained-glass windows
H20	St. Patrick's Cathedral	631 Fifth Avenue	Stained-glass windows
H21	St. Thomas Church and Parish House	678 Fifth Avenue	Stained-glass windows
H22	Swedish Seamen's Church	5 East 48th Street	Leaded-glass windows on the second floor

Notes:
[1] Corresponded to POPS I.D. nos. 87 through 90 on Figure 5-1.

Table 5.4: Resources of Concern within Defined Shadow Radius –
Sunlight-Sensitive Historic Resources Not Affected by Incremental Shadows

Map ID#	Resource Name	Address/Location	Sunlight-Sensitive Features
H4	Bernard Museum Temple Emanu-El	6 East 56th Street	Stained-glass windows
H7	Christ Church United Methodist	520 Park Avenue	Stained-glass windows
H8	Church of Our Savior	59 Park Avenue	Stained-glass windows
H9	Church of St. Francis of Assisi	135 West 31st Street	Stained-glass windows
H10	Church of St. Vincent Ferrer	869 Lexington Avenue	Stained-glass windows
H11	Fifth Avenue Presbyterian Church	7 West 55th Street	Stained-glass windows
H13	Former Coty Building	712 Fifth Avenue	Decorative glass windows
H16	Park Avenue Synagogue	50 East 87th Street	Stained-glass windows
H23	The Free Church of Saint Mary The Virgin	143 West 46th Street	Stained-glass windows

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
OPEN SPACE RESOURCES – PUBLIC PARKS					
P3	*Bryant Park*				
	Shadow Enter-Exit Time	8:51 AM – 9:36 AM	8:02 AM – 9:45 AM	6:27 AM – 7:28 AM	6:42 AM – 7:45 AM
	Incremental Shadow Duration	45 minutes	1 hour, 43 minutes	1 hour, 1 minute	1 hour, 3 minutes
P5	*Dag Hammarskjold Plaza*				
	Shadow Enter-Exit Time	No New Incremental Shadows	3:25 PM - 3:49 PM	(1) 3:05 PM – 3:54 PM; (2) 4:00 PM – 5:04 PM	3:36 PM – 5:44 PM
	Incremental Shadow Duration		24 minutes	(1) 49 minutes; (2) 1 hour, 4 minutes	2 hours, 8 minutes
P13	*MacArthur Park*				
	Shadow Enter-Exit Time	No New Incremental Shadows	4:22PM - 4:29 PM	No New Incremental Shadows	5:32 PM – 5:36 PM
	Incremental Shadow Duration		7 minutes		4 minutes
P15	*Park Avenue Malls*				
	Shadow Enter-Exit Time	2:04 PM – 2:25 PM	(1) 9:32 AM - 10:44 AM; (2) 1:49 PM - 2:45 PM; (3) 2:03 PM - 2:39 PM	(1) 7:28 AM – 9:32 AM; (2) 10:24 AM – 10:44; (3) 1:17 PM-2:59 PM	(1) 6:36 AM – 9:20 AM; (2) 1:11 PM-2:59 PM
	Incremental Shadow Duration	21 minutes	(1) 1 hour, 12 minutes; (2) 56 minutes; (3) 36 minutes;	(1) 2 hours, 4 minutes; (2) 20 minutes; (2) 1 hour, 48 minutes	(1) 2 hours, 44 minutes (2) 1 hour, 48 minutes
P25N	*Greenstreets – First Avenue (North)*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	4:49 PM – 5:07 PM	No New Incremental Shadows
	Incremental Shadow Duration			18 minutes	
P27	*United Nations Sculpture Garden*				
	Shadow Enter-Exit Time	No New Incremental Shadows	3:56 PM – 4:29 PM	4:45 PM – 5:18 PM	5:15 PM – 6:01 PM
	Incremental Shadow Duration		33 minutes	33 minutes	46 minutes

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
P28	*New York Public Library – Fifth Avenue and 42nd Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	9:15 AM – 11:42 AM	8:53 AM – 10:53 AM	9:18 AM – 10:34 AM
	Incremental Shadow Duration		2 hours, 42 minutes	2 hours	1 hour, 16 minutes
P30	*One Vanderbilt Plaza (No-Action Open Space)*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	2:25 PM – 2:47 PM	No New Incremental Shadows
	Incremental Shadow Duration			23 minutes	
P31	*Pershing Square West (No-Action Open Space)*				
	Shadow Enter-Exit Time	12:43 PM – 1:08 PM	(1) 9:21 AM – 10:36 AM; (2) 11:54 AM – 12:41 PM	No New Incremental Shadows	2:39 PM – 2:59 PM
	Incremental Shadow Duration	25 minutes	(1) 1 hour, 15 minutes; (2) 47 minutes		20 minutes
OPEN SPACE RESOURCES – PRIVATELY-OWNED PUBLIC SPACES (POPS)					
2	*65 East 55th Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	10:18 AM – 12:19 PM	10:59 AM – 1:35 PM	11:19 AM – 1:24 PM
	Incremental Shadow Duration		2 hours, 1 minute	2 hours, 36 minutes	2 hours, 5 minutes
3	*535 Madison Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	9:23 AM – 10:48 AM	9:10 AM – 11:09 AM
	Incremental Shadow Duration			1 hour, 25 minutes	1 hour, 59 minutes
4	*919 Third Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	1:53 PM – 2:58 PM	2:45 PM – 3:18 PM	(1) 2:33 PM – 5:40 PM; (2) 5:53 – 6:01 PM
	Incremental Shadow Duration		1 hour, 5 minutes	33 minutes	(1) 3 hours, 5 minutes; (2) 8 minutes

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
5	*345 Park Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	(1) 8:15 AM – 9:00 AM; (2) 9:11 AM – 10:15 AM; (3) 2:11 PM – 3:09 PM; (4) 3:14 PM – 4:09 PM	(1) 8:50 AM – 9:37 AM; (2) 1:36 PM – 3:56 PM	(1) 9:09 AM – 10:11 AM; (2) 1:39 PM – 3:25 PM
	Incremental Shadow Duration		(1) 45 minutes; (2) 1 hour, 4 minutes; (3) 58 minutes; (4) 55 minutes	(1) 47 minutes; (2) 2 hours, 20 minutes	(1) 1 hour, 2 minutes; (2) 1 hour, 46 minutes
6	*437 Madison Avenue*				
	Shadow Enter-Exit Time	1:52 PM – 2:35 PM	12:50 PM – 3:01 PM	(1) 8:52 AM – 11:31 AM; (2) 11:48 AM – 3:41 PM	9:25 AM – 3:41 PM
	Incremental Shadow Duration	43 minutes	2 hours, 11 minutes	(1) 2 hours, 39 minutes; (2) 3 hours, 53 minutes	6 hours, 16 minutes
8	*40 East 52nd Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows	10:00 AM – 11:23 AM
	Incremental Shadow Duration				1 hour, 23 minutes
9	*800 Third Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows	6:19 AM – 6:38 AM
	Incremental Shadow Duration				19 minutes
10	*777 Third Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	2:56 PM – 3:35 PM	2:09 PM – 4:04 PM	2:12 PM – 3:43 PM
	Incremental Shadow Duration		39 minutes	1 hour, 55 minutes	1 hour, 31 minutes
11	*725 Fifth Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	8:20 AM – 8:45 AM	No New Incremental Shadows	9:51 AM – 10:04 AM
	Incremental Shadow Duration		25 minutes		13 minutes

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
12	*590 Madison Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	9:18 AM – 10:18 AM	9:37 AM – 10:28 AM
	Incremental Shadow Duration			1 hour	51 minutes
13	*10 East 53rd Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	9:21 AM – 10:12 AM	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration		52 minutes		
14	*280 Park Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows	8:25 AM – 8:35 AM
	Incremental Shadow Duration				10 minutes
15	*299 Park Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	2:10 PM – 2:55 PM	(1) 8:10 AM – 9:24 AM; (2) 1:39 PM – 3:07 PM	(1) 8:45 AM – 12:20 PM; (2) 1:40 PM – 2:45 PM
	Incremental Shadow Duration		45 minutes	(1) 1 hour, 14 minutes; (2) 1 hour, 28 minutes	(1) 3 hours, 35 minutes; (2) 1 hour, 5 minutes
16	*245 Park Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	(1) 8:25 AM – 9:11 AM (2) 9:16 AM – 11:55 AM	(1) 8:55 AM – 11:36 AM; (2) 3:28 PM – 4:11 PM	(1) 10:16 AM-11:45 AM; (2) 2:28 PM-3:16 PM
	Incremental Shadow Duration		(1) 46 minutes (2) 2 hours, 39 minutes	(1) 2 hours, 41 minutes; (2) 43 minutes	(1) 1 hour, 29 minutes; (2) 28minutes
17	*6 East 43rd Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows	8:53 AM – 9:10 AM
	Incremental Shadow Duration				17 minutes
18	*101 Park Avenue*				
	Shadow Enter-Exit Time	1:50 PM - 2:51 PM	12:07 PM - 3:46 PM	(1) 8:45 AM-11:09 AM; (2) 11:17 M-3:11 PM	(1) 9:45 AM-11:16 AM; (2) 11:38 AM-2:32 PM
	Incremental Shadow Duration	1 Hour, 1 minute	3 hours, 39 minutes	(1) 2 hours, 24 minutes; (2) 3 hours, 54 minutes	(1) 1 hour, 31 minutes; (2) 2 hours, 54 minutes

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
19	*12 East 49th Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	(1) 8:13 AM – 8:23 AM; (2) 8:37 AM – 8:41 AM	8:25 AM – 11:50 AM	8:52 AM – 11:57 AM
	Incremental Shadow Duration		(1) 10 minutes; (2) 4 minutes	3 hours, 25 minutes	3 hours, 5 minutes
20	*622 Third Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows	4:54 PM – 5:31 PM
	Incremental Shadow Duration				37 minutes
21	*140 East 45th Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	10:16 AM – 10:42 AM	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration		26 minutes		
22	*141 East 48th Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	12:43 PM – 1:09 PM	No New Incremental Shadows
	Incremental Shadow Duration			26 minutes	
23	*780 Third Avenue*				
	Shadow Enter-Exit Time	12:39 PM - 1:23 PM	No New Incremental Shadows	1:27 PM – 2:24 PM	1:38 PM – 2:09 PM
	Incremental Shadow Duration	44 minutes		57 minutes	31 minutes
24	*599 Lexington Avenue*				
	Shadow Enter-Exit Time	1:41 PM – 2:04 PM	(1) 7:50 AM - 8:41AM; (2) 9:22 AM - 11:03 AM; (3) 12:46 PM - 1:52 AM	8:31 AM – 3:55 PM	8:59 AM – 3:31 PM
	Incremental Shadow Duration	23 minutes	(1) 51 minutes; (2) 1 hour, 41 minutes; (3) 1 hour, 6 minutes	7 hours, 24 minutes	6 hours, 32 minutes

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
25	*153 East 53rd Street*				
	Shadow Enter-Exit Time	(1) 10:50 AM - 11:07 AM; (2) 1:42 PM - 2:03 PM	(1) 9:40 AM - 10:12 AM (2) 10:46 AM - 11:32 AM	10:20 AM – 11:26 AM	10:53 AM – 11:26 AM
	Incremental Shadow Duration	(1) 17 minutes (2) 21 minutes	(1) 32 minutes; (2) 46 minutes	1 hour, 6 minutes	33 minutes
26	*201 East 42nd Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	2:22 PM-2:49 PM	No New Incremental Shadows
	Incremental Shadow Duration			27 minutes	
27	*212 East 47th Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	(1) 10:09 AM - 12:05 PM; (2) 2:19 PM - 2:32 PM	10:55 AM – 1:49 PM	11:18 AM – 2:56 PM
	Incremental Shadow Duration		(1) 1 hour, 56 minutes; (2) 13 minutes	2 hours, 54 minutes	3 hours, 38 minutes
28	*747 Third Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	(1) 10:09 AM - 12:06 PM; (2) 12:56 PM - 1:08 PM	10:41 AM-3:17 PM	11:30 PM-3:18 PM
	Incremental Shadow Duration		(1) 1 hour, 57 minutes; (2) 12 minutes	5 hours, 36 minutes	3 hours, 31 minutes
30	*825 Third Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	2:57 PM – 3:55 PM	2:43 PM – 4:10 PM
	Incremental Shadow Duration			58 minutes	1 hour, 27 minutes
31	*875 Third Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	2:03 PM – 2:34 PM	1:46 PM-3:06 PM	1:46 PM – 4:08 PM
	Incremental Shadow Duration		31 minutes	1 hour, 16 minutes	2 hours, 22 minutes

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
32	*909 Third Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	1:59 PM – 3:04 PM	1:25 PM – 2:29 PM	No New Incremental Shadows
	Incremental Shadow Duration		1 hour, 5 minutes	1 hour, 4 minutes	
33	*425 Lexington Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	9:15 AM – 10:25 AM	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration		1 hour, 10 minutes		
48	*1166 Sixth Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	6:41 AM – 7:05 AM	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration		24 minutes		
49	*1114 Sixth Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	7:36 AM – 7:42 AM	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration		6 minutes		
62	*234 East 46th Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	1:11 PM – 3:01 PM	1:40 PM – 2:59 PM
	Incremental Shadow Duration			1 hour, 51 minutes	1 hour, 19 minutes
63	*240 East 47th Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	2:32 PM – 3:38 PM	3:07 PM – 4:51 PM
	Incremental Shadow Duration			1 hour, 6 minutes	1 hour, 44 minutes
66	*245 East 54th Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	3:15 PM – 3:38 PM	3:09 PM – 3:55 PM	No New Incremental Shadows
	Incremental Shadow Duration		23 minutes	46 minutes	

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
68	*3 United Nations Plaza*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows	3:26 PM – 5:04 PM
	Incremental Shadow Duration				1 hour, 38 minutes
70	*303 East 43rd Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows	(1) 1:59 PM – 2:53 PM; (2) 3:55 PM – 5:01 Pm
	Incremental Shadow Duration				(1) 54 minutes; (2) 1 hour, 6 minutes
72	*301 East 45th Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	2:04 PM – 3:58 PM	3:28 PM – 3:54 PM	4:00 PM – 4:47 PM
	Incremental Shadow Duration		1 hour, 54 minutes	26 minutes	47 minutes
73	*100 United Nations Plaza*				
	Shadow Enter-Exit Time	No New Incremental Shadows	4:21 PM – 4:29 PM	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration		8 minutes		
82	*390 Park Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	(1) 9:21 AM - 9:37 AM; (2) 12:55 PM - 1:55 PM	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration		(1) 16 minutes (2) 1 hour		
83	*375 Park Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	9:17 AM – 10:46 AM	(1) 10:19 AM-10:58 AM; (2) 1:48 PM-3:52 PM	1:40 PM – 4:20 PM
	Incremental Shadow Duration		1 hour, 29 minutes	(1) 39 minutes; (2) 2 hours, 4 minutes	3 hours, 40 minutes

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
84	*217 East 51st Street*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	(1) 3:30 PM-3:48 PM; (2) 4:16 PM-4:42 PM	3:42 PM – 5:23 PM
	Incremental Shadow Duration			(1) 18 minutes (2) 26 minutes	1 hour, 41 minutes
85	*460 Madison Avenue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	(1) 9:15 AM - 9:38 AM; (2) 10:03 PM - 10:37 AM	(1) 7:36 AM – 8:11 AM; (2) 8:15 AM – 8:59 AM	(1) 7:57 AM – 8:30 AM;
	Incremental Shadow Duration		(1) 23 minutes; (2) 34 minutes	(1) 35 minutes; (2) 44 minutes;	(1) 33 minutes
103	*1251 Sixth Avenue*				
	Shadow Enter-Exit Time	9:53 AM – 10:08 AM	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration	15 minutes			
143	*1095 Sixth Avenue*				
	Shadow Enter-Exit Time	8:51 AM – 9:11 AM	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration	20 minutes			
SUNLIGHT SENSITIVE HISTORIC RESOURCES					
H1	*Amster Yard*				
	Shadow Enter-Exit Time	1:30 PM – 2:04 PM	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration	34 minutes			
H2	*Beaux-Arts Apartments - North*				
	Shadow Enter-Exit Time	No New Incremental Shadows	3:02 PM - 4:29 PM	2:18 PM-4:36 PM	No New Incremental Shadows
	Incremental Shadow Duration		1 hour, 27 minutes	2 hours, 18 minutes	
H3	*Beaux-Arts Apartments - South*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	2:48 PM – 4:53 PM	2:45 PM – 4:53 PM
	Incremental Shadow Duration			2 hours, 5 minutes	2 hours, 8 minutes

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
H5	*Central Synagogue*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	(1) 6:27 AM – 7:41 AM; (2) 8:11 AM – 8:47 AM	7:05 AM – 9:09 AM
	Incremental Shadow Duration			(1) 1 hour, 14 minutes; (2) 36 minutes	2 hours, 4 minutes
H6	*Chanin Building*				
	Shadow Enter-Exit Time	9:40 AM – 2:53 PM	(1) 7:36 AM – 8:13 AM; (2) 10:02 AM – 3:59 PM	(1) 6:27 AM-6:56 AM; (2) 10:26 AM-3:07 PM; (3) 4:29 PM-5:18 PM	(1) 5:57 AM – 6:48 AM (2) 11:02 AM – 2:37 PM
	Incremental Shadow Duration	5 hours, 13 minutes	(1) 37 minutes (2) 5 hours, 57 minutes	(1) 29 minutes (2) 5 hours, 31 minutes (3) 49 minutes	(1) 51 minutes (2) 3 hours, 35 minutes
H12	*Ford Foundation Building*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	5:03 PM – 5:18 PM	No New Incremental Shadows
	Incremental Shadow Duration			15 minutes	
H14	*Grand Central Terminal*				
	Shadow Enter-Exit Time	10:23 AM – 1:19 PM	2:55 PM – 4:29 PM	2:34 PM – 3:49 PM	No New Incremental Shadows
	Incremental Shadow Duration	2 hours, 56 minutes	1 hour, 34 minutes	1 hour, 15 minutes	
H15	*William Lescaze House and Office*				
	Shadow Enter-Exit Time	No New Incremental Shadows	No New Incremental Shadows	3:53 PM – 4:15 PM	(1) 3:19 PM – 3:42 PM; (2) 4:52 PM – 5:14 PM
	Incremental Shadow Duration			22 minutes	(1) 23 minutes; (2) 22 minutes
H17	*Rockefeller Apartments*				
	Shadow Enter-Exit Time	9:37 AM – 10:13 AM	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration	36 minutes			

Table 5.5: Incremental Shadow Duration on Resources of Concern – Open Space and Sunlight Sensitive Historic (Continued)

Resource ID	Resource Name	ANALYSIS DAYS			
		December 21: 8:51 AM – 2:53 PM	March 21 / September 21: 7:36 AM – 4:29 PM	May 6 / August 6: 6:27 AM – 5:18 PM	June 21: 5:57 AM – 6:01 PM
H18	*Rockefeller Center / Rockefeller Plaza*				
	Shadow Enter-Exit Time	No New Incremental Shadows	9:43 AM – 10:06 AM	7:06 AM – 7:56 AM	No New Incremental Shadows
	Incremental Shadow Duration		23 minutes	50 minutes	
H19	*St. Bartholomew's Episcopal Church*				
	Shadow Enter-Exit Time	No New Incremental Shadows	(1) 7:36 AM – 8:15 AM; (2) 9:51 AM – 11:19 AM	(1) 10:17 AM – 11:03 AM; (2) 1:54 PM – 4:41 PM	(1) 6:37 AM – 9:28 AM; (2) 1:41 PM – 4:45 PM
	Incremental Shadow Duration		(1) 39 minutes; (2) 1 hour, 28 minutes	(1) 46 minutes; (2) 2 hours, 47 minutes	(1) 2 hours, 51 minutes; (2) 3 hours, 4 minutes
H20	*St. Patrick's Cathedral*				
	Shadow Enter-Exit Time	(1) 8:51 AM – 9:39 AM; (2) 12:01 PM – 2:18 PM	(1) 7:36 AM – 8:23 AM; (2) 9:26 AM – 11:45 AM	(1) 6:35 AM – 8:55 AM; (2) 10:11 AM – 10:57 AM	6:44 AM – 9:28 AM
	Incremental Shadow Duration	(1) 48 minutes; (2) 2 hours, 17 minutes	(1) 47 minutes; (2) 2 hours, 19 minutes	(1) 2 hours, 20 minutes; (2) 46 minutes	2 hours, 44 minutes
H21	*St. Thomas Church and Parish House*				
	Shadow Enter-Exit Time	10:20 AM – 11:19 AM	No New Incremental Shadows	No New Incremental Shadows	No New Incremental Shadows
	Incremental Shadow Duration	58 minutes			
H22	*Swedish Seamen's Church*				
	Shadow Enter-Exit Time	12:50 – 1:21 PM	No New Incremental Shadows	9:23 AM – 9:42 AM	8:58 AM – 10:14 AM
	Incremental Shadow Duration	31 minutes		19 minutes	1 hour, 16 minutes

Table 5.6: Historic Resources with no Incremental Shadows on Sunlight Sensitive Features

Map ID#	Resource Name	Analysis Period(s)	Incremental Shadow Duration(s)	Figure Number(s)
H1	Amster Yard	December 21st	1:30 PM – 2:04 PM (34 minutes)	Figure 5-52
H12	Ford Foundation Building	May 6th / August 6th	5:03 PM – 5:18 PM (15 minutes)	Figure 6-57
H15	William Lescaze House	May 6th / August 6th	3:53 PM – 4:15 PM (22 minutes	Figure 5-59a
		June 21st	3:19 PM – 3:42 PM (23 minutes)	Figure 5-59b
H17	Rockefeller Apartments	December 21st	4:52 PM – 5:14 PM (22 minutes)	Figure 5-60
H22	Swedish Seaman's Church	December 21st	9:37 AM – 10:13 AM (36 minutes)	Figure 5-65a
		May 6th/ August 6th	12:50 PM – 1:21 PM (31 minutes)	Figure 5-65b
		June 21st	9:23 AM – 9:42 AM (19 minutes)	Figure 5-65c