

A. INTRODUCTION

As described in Chapter 1, “Project Description,” the proposed 53 West 53rd Street project includes the construction of a building that would rise to a height of approximately 1,250 feet. This chapter assesses whether the proposed project would result in new shadows that would adversely impact any nearby sun-sensitive resources, including publicly accessible open spaces, historic resources with sunlight-dependent architectural features, or important natural features.

As detailed below, compared with the Previously Approved Project, the proposed project would result in a significant adverse impact on the Fifth Avenue Presbyterian Church on the June 21 analysis day. The proposed project would not result in any significant adverse impacts on any other analysis days compared with the Previously Approved Project. Further, compared with the Expanded Development Scenario, the proposed project would not result in any significant adverse shadow impacts.

B. DAILY AND SEASONAL VARIATIONS IN SHADOWS

The sun rises in the east, casting long shadows toward the west. Later in the morning, the sun rises higher in the sky, casting shorter shadows toward the northwest. At noon, the sun is at its highest point in the sky and casts the shortest shadows of the day directly north. (During Daylight Savings Time, this occurs at 1:00 PM rather than at noon.) In the afternoon, the sun continues to move west and begins to descend, casting longer shadows toward the northeast and east. At the end of the day, shadows stretch to the east as the sun sets in the west.

In its yearly cycle, the height of the sun in the sky and the time and compass direction at which it rises and sets varies by season. In the winter, the sun travels in a low arc across the southern sky, rising late in the southeast and setting early in the southwest. Because it is so low in the sky, it casts longer shadows. In the spring and fall, the sun arcs through the sky at a somewhat higher angle, rises earlier in the east, and sets later in the west. In these seasons, shadows are of moderate length. In the summer, the sun arcs through the sky at its highest angle, rising almost directly overhead at noon. For this reason, summer shadows are shortest. In the summer, the sun rises earliest and sets latest; it also travels farther, rising from the northeast to high in the southern sky at noon and then arcing down to the northwest at dusk. Thus, the summer sun casts shadows in more directions than those seen in other seasons and the late sunset and early sunrise creates shadows earlier in the morning and later in the evening than in other seasons.

C. METHODOLOGY

The first step in the assessment of a project’s shadow impacts is to determine whether project shadows would be long enough to reach any sunlight-sensitive open spaces, natural features, or architectural resources at any time of year. If this preliminary or screening analysis indicates they might, then a detailed shadow analysis is warranted. The detailed analysis compares the

extent and duration of project-generated incremental shadows on any sun-sensitive uses and vegetation of open spaces, or sunlight-sensitive features of architectural resources, and assesses the effects of new shadows on such resources.

The detailed analysis compares project shadows to a baseline condition representing the future build year without the proposed project. As described in Chapter 1, this analysis assumes an impact analysis year of 2013. The future without the proposed project assumes that none of the proposed discretionary actions are approved. In this case, the project sponsor has stated that the development site would be developed with either of two as-of-right projects that can be built without any additional discretionary approvals—the Previously Approved Project and the Expanded Development Scenario. The analysis compares shadows that would be cast by the proposed project to those that would be cast in each of these as-of-right scenarios to determine the shadow increment that would be caused by the proposed project. The analysis also takes into account shadows cast by existing buildings, as well as those cast by additional developments in the study area expected to be completed by the 2013 build year.

Following the guidelines of the *New York City Environmental Quality Review (CEQR) Technical Manual*, this analysis considers shadows on four representative days of the year: March 21 (equivalent to September 21, the equinoxes); June 21, the summer solstice; May 6 (equivalent to August 6, the midpoints between the equinoxes and summer solstice); and December 21, the winter solstice.

The CEQR methodology does not consider shadows and incremental increases in shadows within 1½ hours of sunrise or sunset to be significant. Therefore, the analysis period on each of the four representative days is between 1½ hours after sunrise and 1½ hours before sunset. Additionally, CEQR does not consider shadows on City streets, sidewalks, and other buildings to be significant.

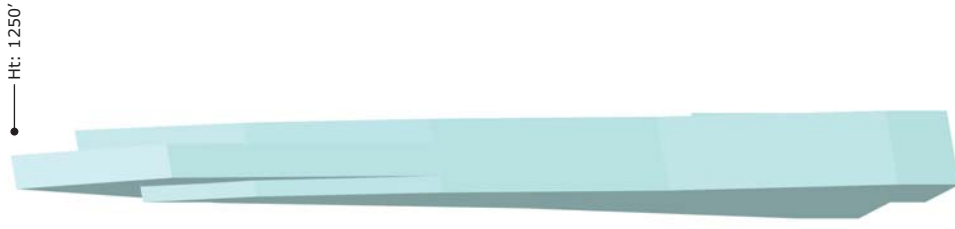
According to the *CEQR Technical Manual*, a significant shadow impact may occur when there is substantial reduction in sunlight to a sun-sensitive use or feature, threatening the survival of vegetation or significantly reducing the usability of the open space, or in the case of an architectural feature, obscuring the elements or details that make that resource significant. The determination of impact significance is based on an assessment of how a project's incremental shadows specifically would affect sun-sensitive features of individual resources.

For the detailed analysis, shadows were modeled using the solar rendering capabilities of MicroStation V8 software. A three-dimensional model of existing buildings and topography around the project site was provided by Fugro EarthData Inc. and augmented. Three-dimensional models of the proposed project, the Previously Approved Project, and the Expanded Development Scenario were integrated into the existing conditions model. Other known development projects in the study area were added to the existing conditions model, as accurately as available information allowed, to correctly model the future baseline conditions.

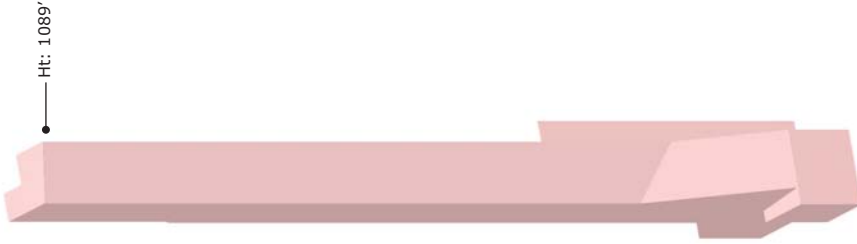
Figure 6-1 shows a side-by-side comparison of the proposed project, the Previously Approved Project, and the Extended Development Scenario massings used in the three-dimensional solar study.

D. SCREENING ANALYSIS

A screening analysis was performed to determine which open spaces, sunlight-sensitive historic resources, or important natural features could be affected by project shadows at any time of year. To identify resources of concern, the maximum shadow length was calculated for the proposed



Proposed Project



Expanded Development Scenario



Previously-Approved Project

Note: Heights are approximate, measured from curb level

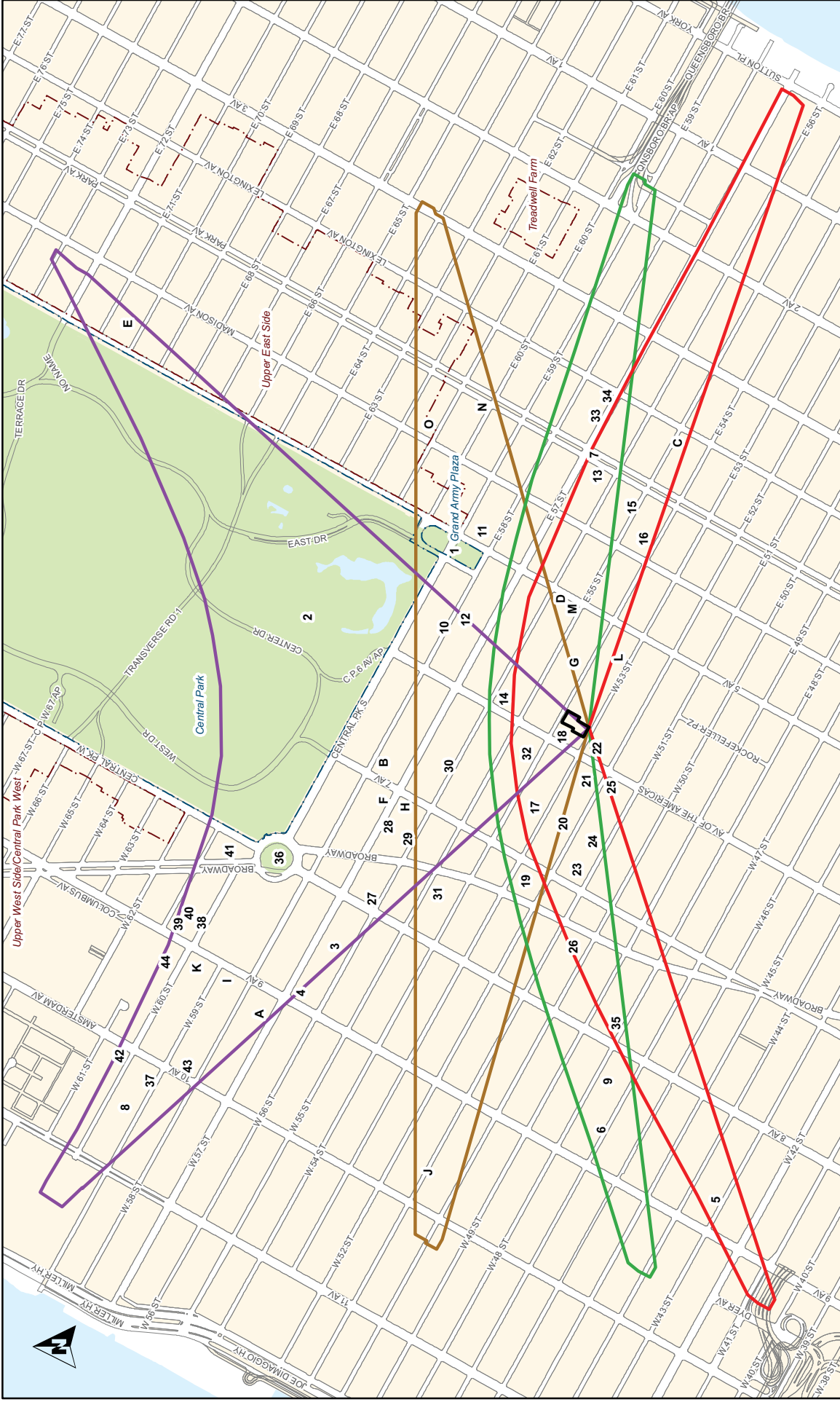
project on the four analysis days, taking into account time of day as well as season. For example, on the December 21 analysis day a building has a maximum shadow length factor equal to 4.3 times its height at the beginning and end of the analysis period when shadows are cast to the northwest and northeast, respectively. Toward midday, as the sun rises in the sky, the shadow length factor is reduced to 2.07 times the height of the building. Shadow length factors for the other analysis days throughout the calendar year are shorter than they are in December. However, the daylight hours are longer during the rest of the year, resulting in longer analysis periods and shadows that fall farther to the southwest and southeast at the beginning and end of the day. During the December analysis day, shadows are cast up to 43 degrees east and west of true north, but in June shadows are cast up to 108 degrees east and west. Open spaces in the southern portion of the area that could be reached by project shadow in June would not be affected in December.

Using the heights and forms of the proposed zoning envelopes, the full extent of the area that could be reached by project shadow was calculated for each of the analysis days and delineated on a street map (see **Figure 6-2**). In coordination with the open space and historic resource analyses presented in other chapters of this EIS, open spaces and historic resources were also shown on the map. All sun-sensitive resources that would fall fully or partially within the perimeter representing the maximum shadow length from the proposed project on the four analysis days were included in the more detailed analysis below. These resources of concern are listed in **Table 6-1** (open spaces) and **Table 6-2** (historic resources).¹ Potential (as well as designated) historic resources with sun-sensitive features were considered. Historic resources without sun-sensitive features were screened out from the analysis.

Table 6-1
Open Spaces Within Maximum Shadow Length Area

Map Key	Name
1	Grand Army Plaza (NYC Scenic Landmark)*
2	Central Park (NYC Scenic Landmark, S/NR) *
3	Sheffield plaza (east section)
4	Sheffield plaza (west section)
5	McCaffrey Playground
6	Ramon Aponte Park
7	Park Avenue malls
8	West 59th Street Recreation Center
9	Marian S. Heiskell Garden
10	Park Lane Hotel plaza
11	767 Fifth Avenue plaza
12	9 West 57th Street plaza
13	450 Park Avenue plaza
14	1370 Sixth Avenue plaza
15	Park Avenue Tower plaza
16	Walter Dillon Read plaza
17	1325 Sixth Avenue galleria
18	1330 Sixth Avenue plaza
19	810 Seventh Avenue plaza

¹ The MoMA Sculpture Garden is located on the project site. The proposed project’s shadow would not reach far enough to the south in the late afternoon on the March/September or December analysis days to reach this resource. On both the May/August and June analysis days, shadow from the proposed building could reach the Sculpture Garden in the late afternoon; however, existing buildings on the west side of the garden already cast the garden in shadow. Therefore, the proposed project does not have the potential to cast shadow on the MoMA Sculpture Garden.



- 1** Open Spaces
- A** Historic Resources with Sun-Sensitive Features
 - Historic Districts
 - Scenic Landmarks
 - Development Site

Longest Possible Shadow Length Cast by Proposed Project

- December 21
- June 21
- March 21 / Sept. 21
- May 6 / August 6

Shadow Study Area Resulting from Screening Analysis
Figure 6-2

**Table 6-1 (cont'd)
Open Spaces Within Maximum Shadow Length Area**

Map Key	Name
20	Flatotel galleria
21	1301 Sixth Avenue plaza
22	CBS Building plaza
23	Equitable Center atrium skylight
24	PaineWebber galleria
25	PaineWebber plaza
26	Paramount Plaza
27	Symphony House plaza
28	888 Seventh Avenue plaza
29	Carnegie Mews
30	Metropolitan Tower plaza
31	230 West 55th Street plaza
32	1345 Sixth Avenue plaza
33	135 East 57th Street (west section)
34	135 East 57th Street (east section)
35	The Ritz plaza
36	Columbus Circle
37	Concerto plaza
38	Regent plaza (south section)
39	Regent plaza (north section)
40	Beaumont plaza
41	Trump International Hotel and Tower plaza
42	P.S. 191 schoolyard
43	St. Luke's-Roosevelt Hospital plaza
44	Fordham University plaza
Notes: Map Key numbers correspond to Figure 6-2. * Grand Army Plaza and Central Park are considered sun-sensitive historic resources as well as public open spaces.	

**Table 6-2
Sun-Sensitive Historic Resources Within Maximum Shadow Length Area**

Map Key	Name
A	Catholic Apostolic Church (NYCL)
B	Alwyn Court Apartments (NYCL, S/NR)
C	Central Synagogue (NYCL, S/NR)
D	Former Coty Building (NYCL, SR)
E	The Frick Collection (NYCL)
F	Osborne Apartments (NYCL, S/NR)
G	Rockefeller Apartments (NYCL)
H	Rodin Studios (NYCL)
I	William J. Syms Operating Theater
J	Sacred Heart of Jesus Church
K	St. Paul the Apostle Church (S/NR)
L	St. Thomas Church (NYCL, S/NR)
M	Fifth Ave Presbyterian Church
N	Christ Church United Methodist
O	Upper East Side Historic District
Notes: Map key letters correspond to Figure 6-2. NYCL—designated New York City Landmark. S/NR—listed State and National Register of Historic Places. SR—listed State Register of Historic Places.	

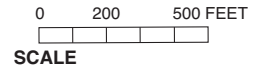
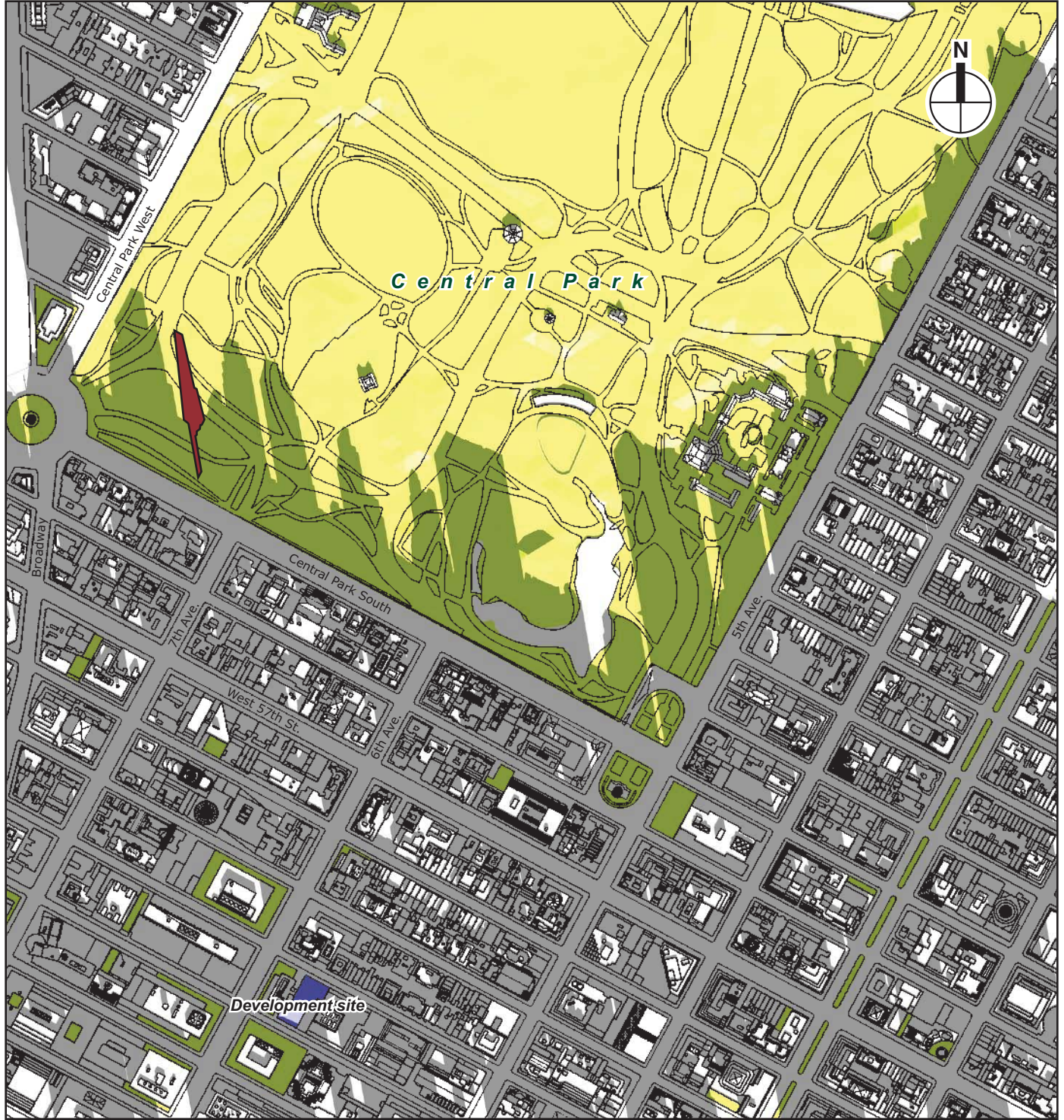
E. ASSESSMENT OF INCREMENTAL SHADOWS: PROPOSED PROJECT COMPARED WITH PREVIOUSLY APPROVED PROJECT

The detailed analysis compares the proposed project's shadows with the shadows in the future with the Previously Approved Project on each of the four analysis days. For a substantial number of open spaces and historic resources, the proposed project would not result in any incremental increase in shadow. These resources are described in **Appendix A**. Several additional resources would receive incremental shadow for fewer than 30 minutes. Because of the short duration of shadow on these resources, the proposed project would not result in significant adverse impacts; these resources are also described in Appendix A.

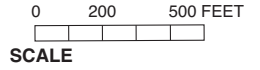
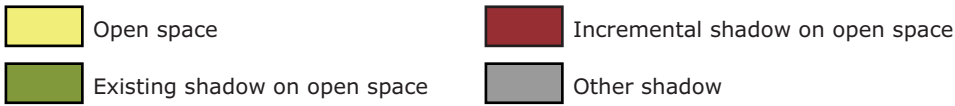
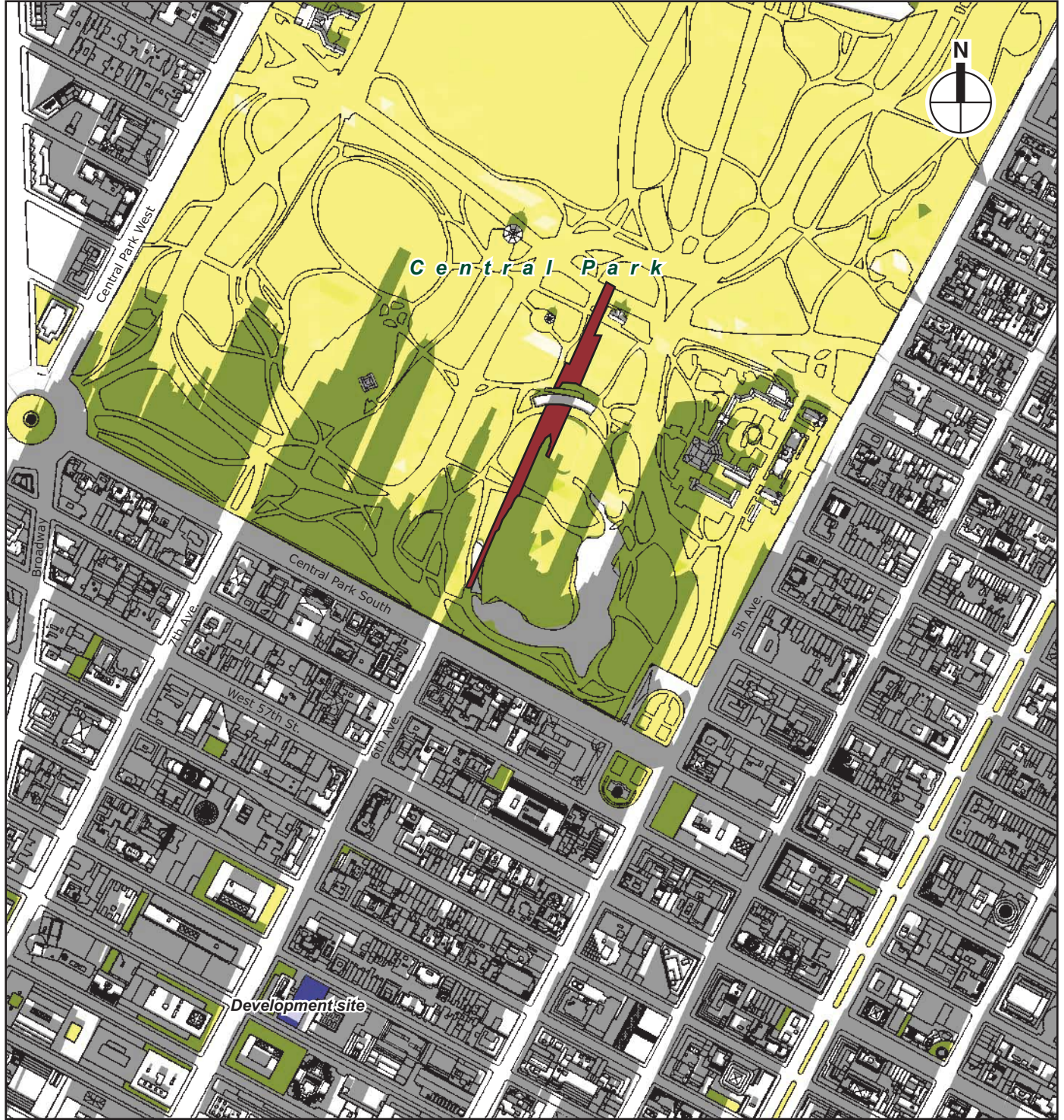
Table 6-3 shows the duration of incremental shadows on the remaining sun-sensitive resources on each of the four analysis days. The extent, duration, and effects of these incremental shadows are discussed below for each resource. **Figures 6-3 through 6-17** depict the extent of incremental shadows on the resources at certain times of each analysis day referenced in the text discussion.

Table 6-3
Incremental Shadow Durations: Proposed Project Compared with Previously Approved Project

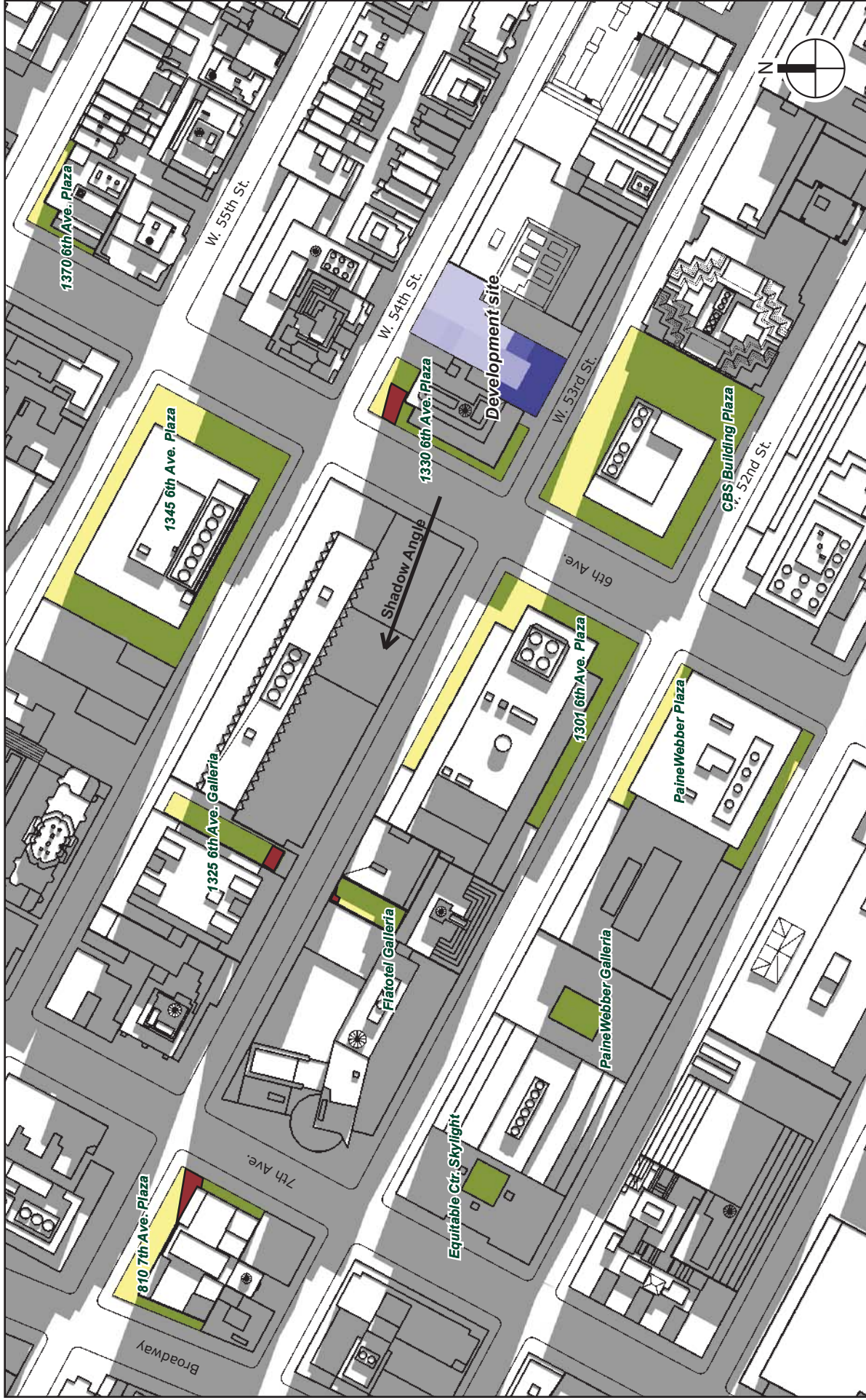
Resource	March 21 8:36 AM-5:29 PM EDT	May 6 7:27 AM-6:18 PM EDT	June 21 6:57 AM-7:01 PM EDT	December 21 8:51 AM-2:53 PM EST
OPEN SPACES				
Central Park	—	—	—	11:00 AM–2:53 PM Total: 3h 53m
767 Fifth Avenue plaza	4:15 PM–4:45 PM Total: 30m	—	—	
1325 Sixth Avenue galleria	9:45 AM–10:00 AM Total: 15m	10:00 AM–10:45 AM Total: 45m	10:40 AM–10:50 AM Total: 10m	—
Flatotel galleria	—	9:30 AM–10:00 AM Total: 30m	9:30 AM–10:30 AM Total: 30m	—
1301 Sixth Avenue plaza	—	9:15 AM–9:45 AM Total: 30m	8:00 AM–10:30 AM Total: 2h 30m	—
1330 Sixth Avenue plaza	—	9:15 AM–11:45 AM Total: 2h 30m	9:45 AM–12:00 PM Total: 2h 15m	—
1345 Sixth Avenue plaza	10:30 AM–10:45 AM 11:30 AM–12:45 AM Total: 1h 30m	11:15 AM–12:45 PM Total: 1h 30m	12:00 PM–12:45 PM Total: 45m	—
HISTORIC RESOURCES				
Rockefeller Apartments – south facade	—	4:35 PM–5:00 PM Total: 25m	4:10 PM–5:25 PM Total: 1h 15m	—
Fifth Avenue Presbyterian Church*	—	4:40 PM–5:20 PM Total: 40m	3:50 PM–5:10 PM Total: 1h 20m	—
Upper East Side Historic District	4:00 PM–4:30 PM 5:00 PM–5:15 PM Total: 45m	—	—	2:45 PM–2:53 PM Total: 8m
Notes:				
EST—Eastern Standard Time				
EDT—Eastern Daylight Time				
March 21 is the equivalent of September 21.				
May 6 is the equivalent of August 6.				
* Duration represents time that new shadow would fall on shadow-sensitive windows, rather than on façade as whole.				



Shadows
 Proposed Project Comparison to Previously Approved Project
 December 21 - 11:15 AM EST
 Figure 6-3

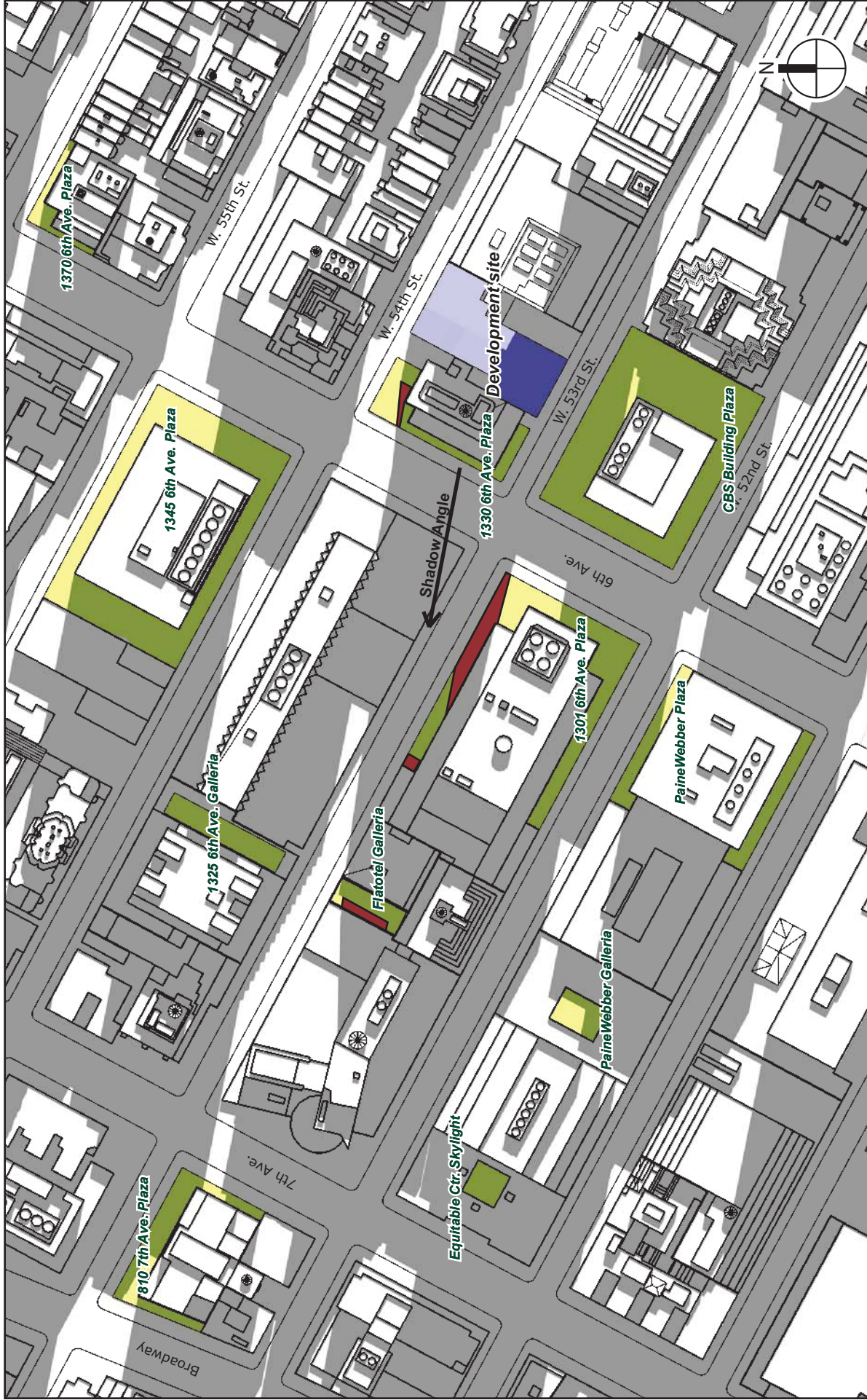


Shadows
 Proposed Project Comparison to Previously Approved Project
 December 21 - 1:30 PM EST
 Figure 6-4

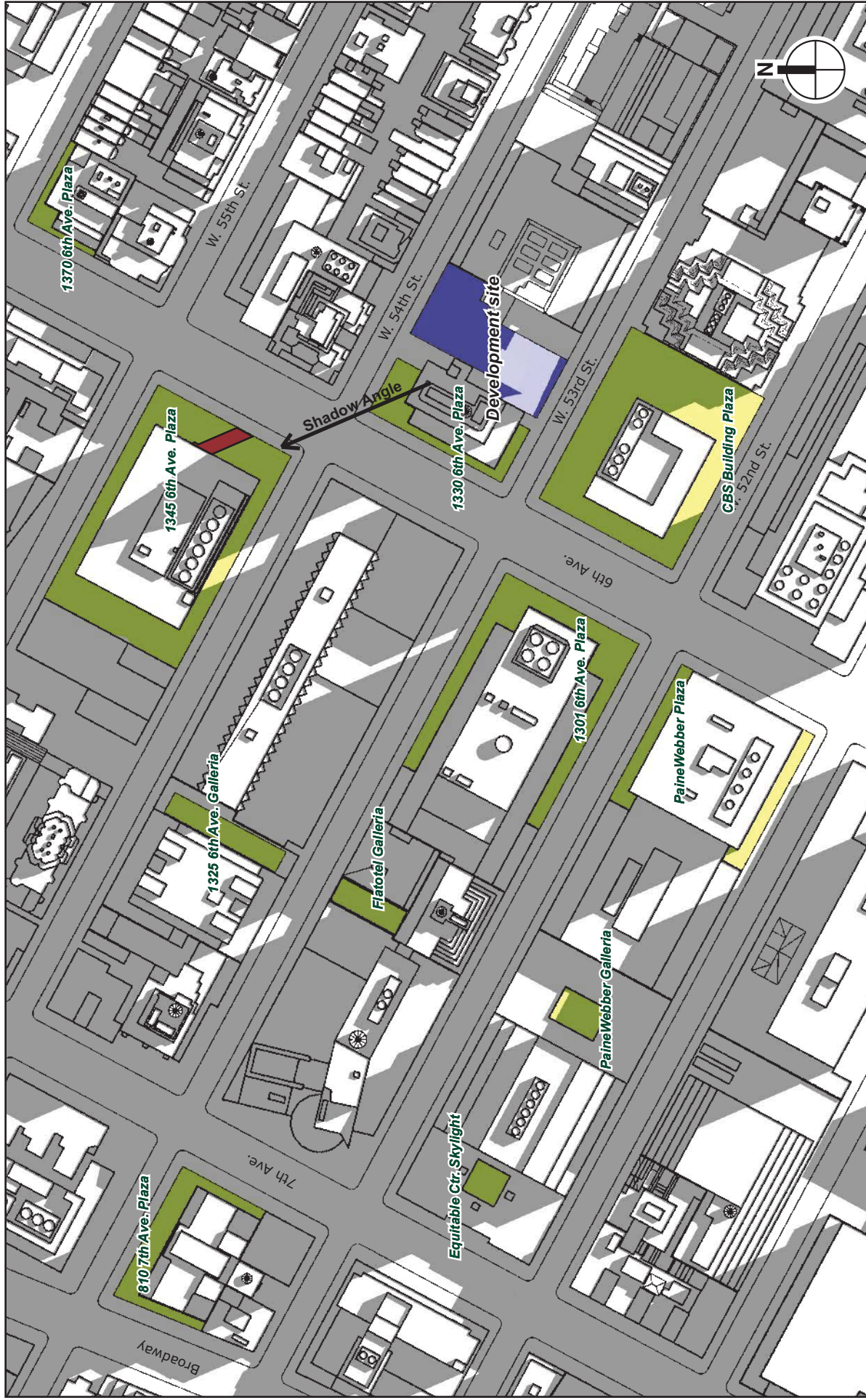


- Open space
- Incremental shadow on open space
- Existing shadow on open space
- Other shadow

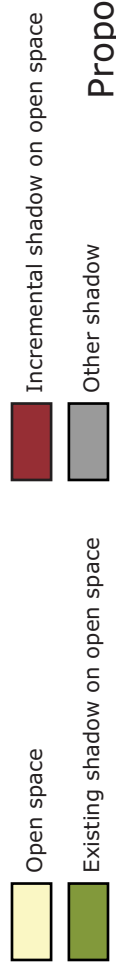
Proposed Project Comparison to Previously Approved Project
May 6 / August 6 - 10:00 AM EDT
Figure 6-5



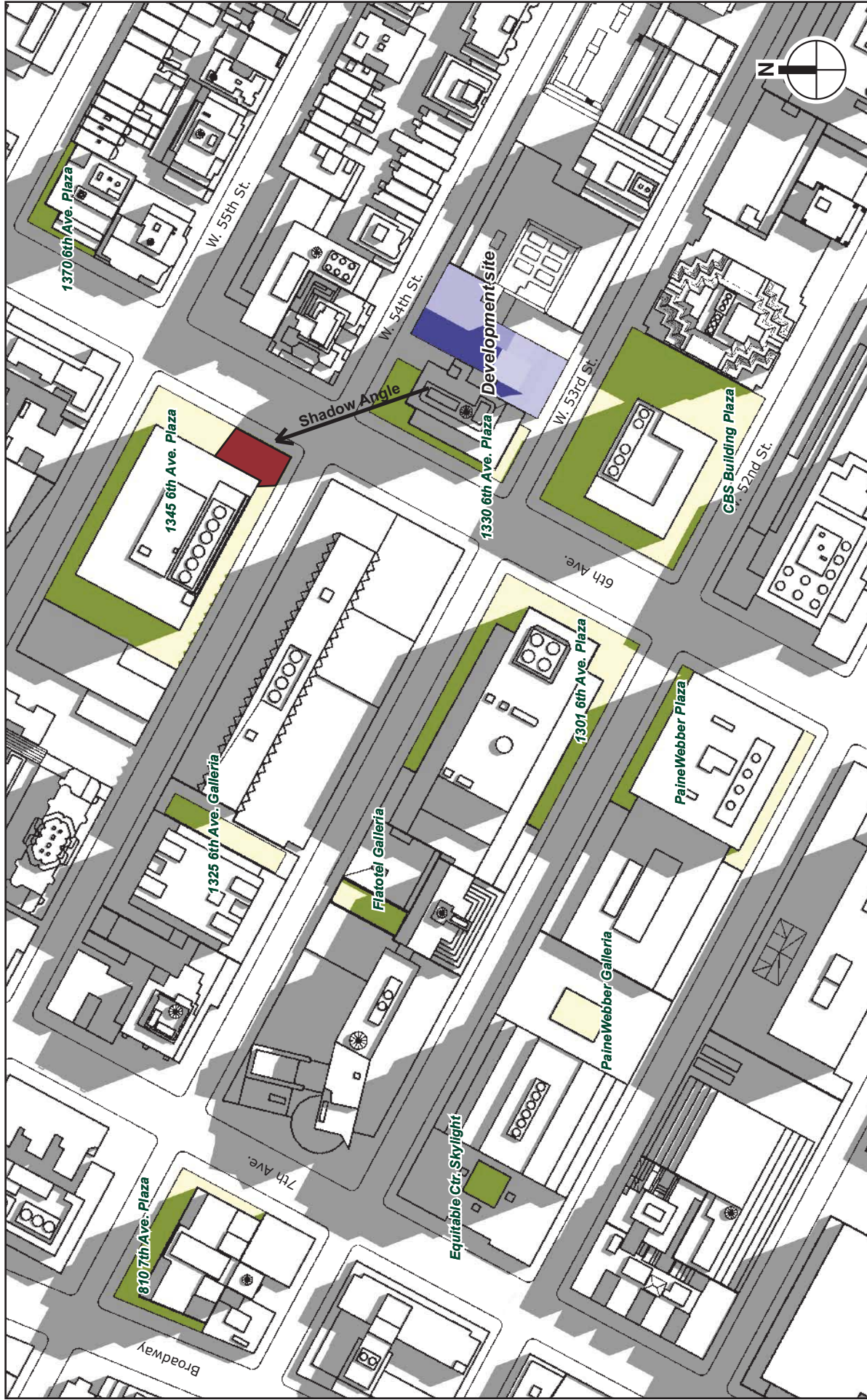
Proposed Project Comparison to Previously Approved Project
June 21 - 10:00 AM EDT
Figure 6-6



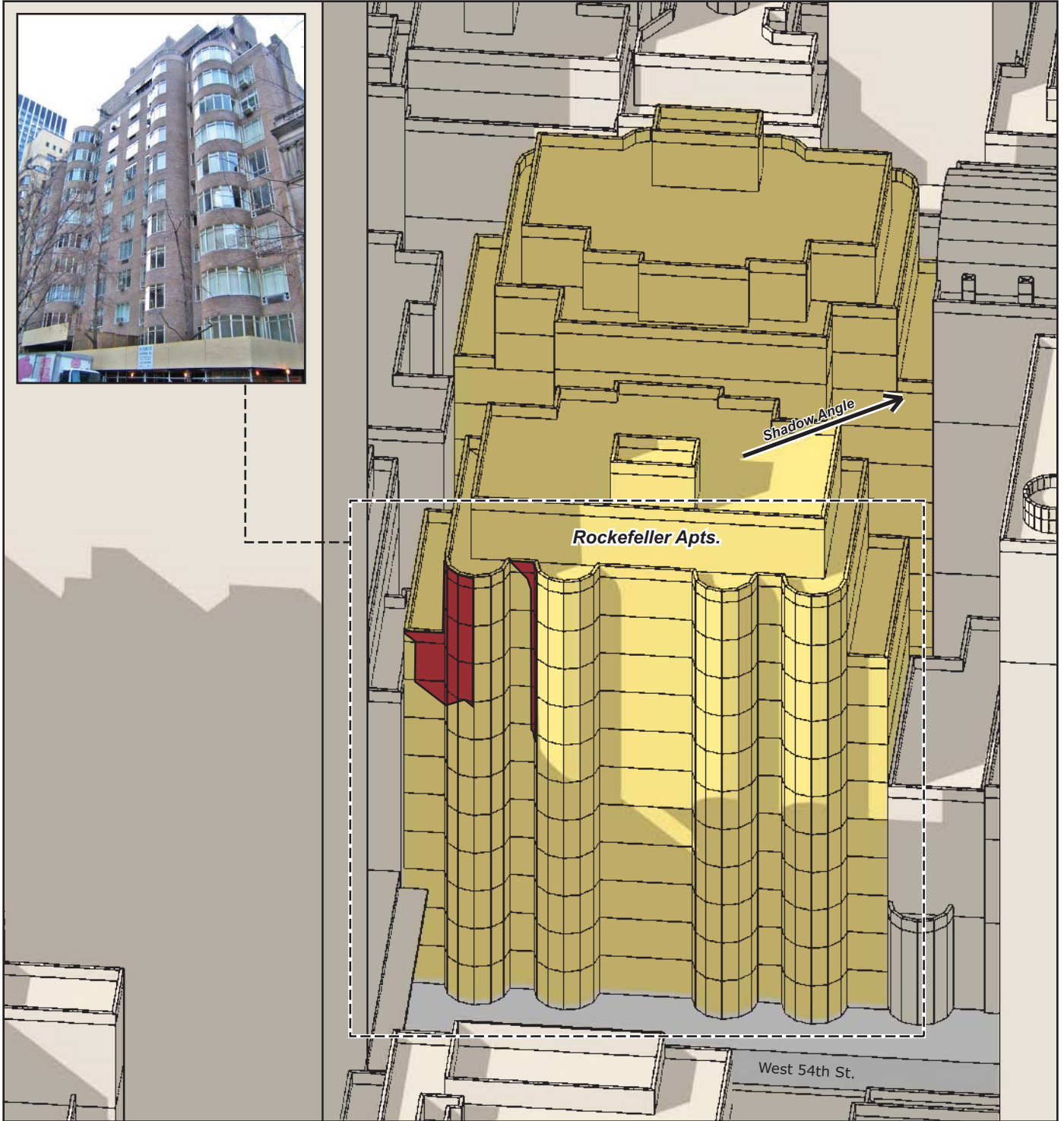
Proposed Project Comparison to Previously Approved Project
March 21 / Sept. 21 - 12:00 PM EDT
Figure 6-7



Proposed Project Comparison to Previously Approved Project
 May 6 / August 6 - 12:30 PM EDT
 Figure 6-8

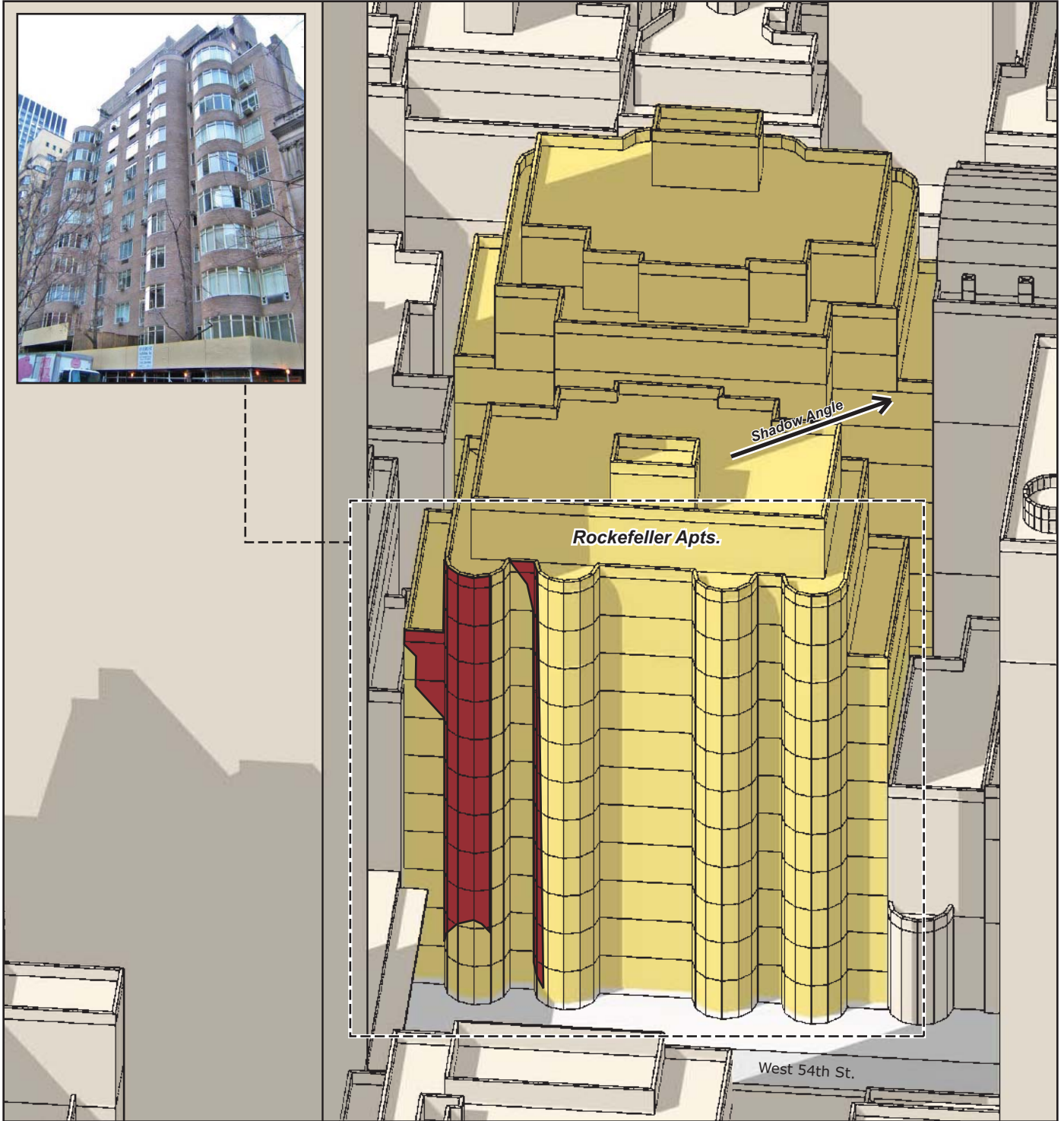


Proposed Project Comparison to Previously Approved Project
June 21 - 12:30 PM EDT
Figure 6-9



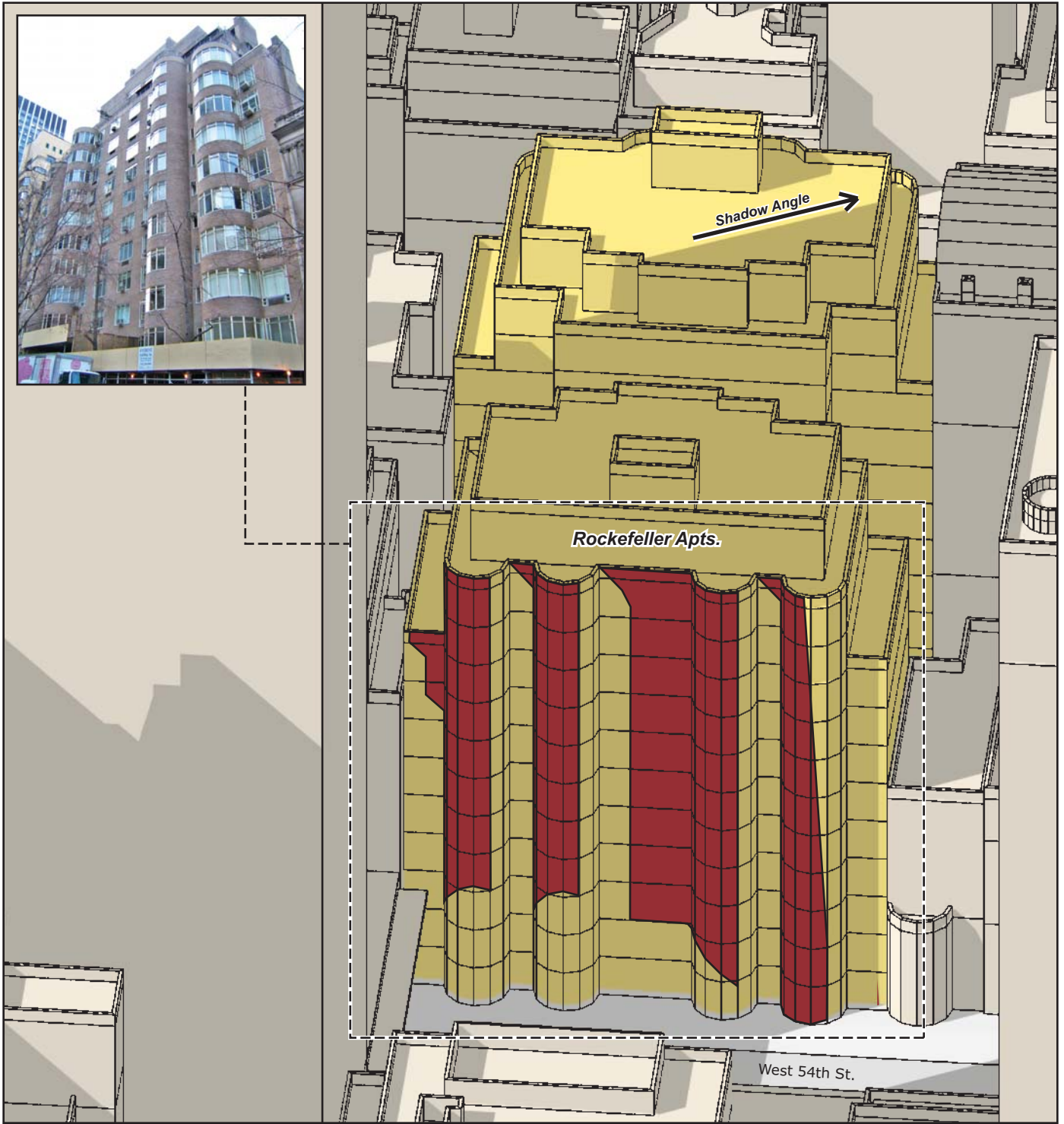
- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Facade

Shadows - View North
Proposed Project Comparison to Previously Approved Project
May 6 / August 6 - 4:45 PM EDT
Figure 6-10



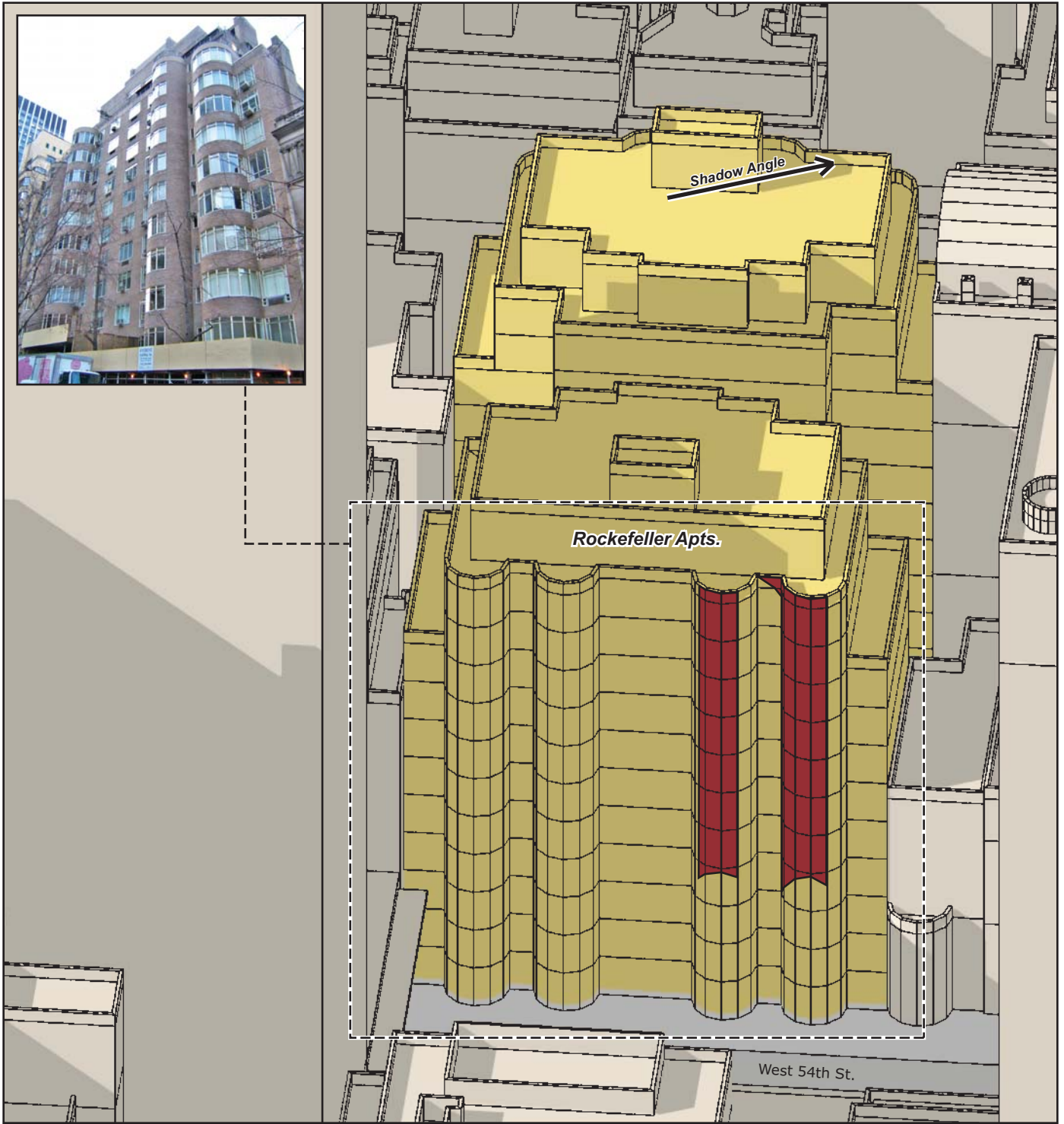
- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Facade

Shadows - View North
Proposed Project Comparison to Previously Approved Project
June 21 - 4:15 PM EDT
Figure 6-11



- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Facade

Shadows - View North
Proposed Project Comparison to Previously Approved Project
June 21 - 4:45 PM EDT
Figure 6-12



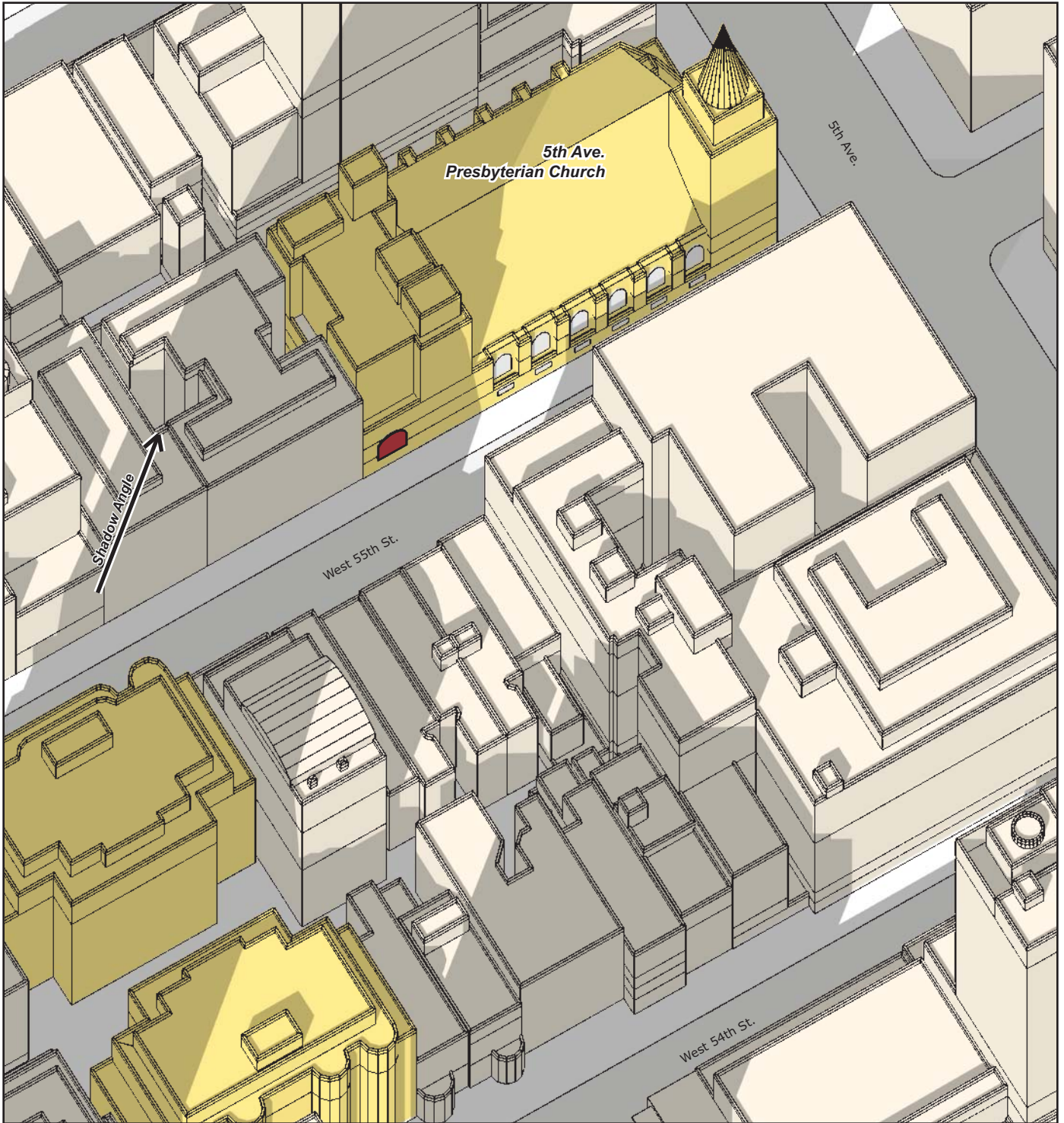
- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Facade

Shadows - View North
Proposed Project Comparison to Previously Approved Project
June 21 - 5:15 PM EDT
Figure 6-13



- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Window

Shadows - View Northeast
Proposed Project Comparison to Previously Approved Project
May 6 / August 6 - 4:45 PM EDT
Figure 6-14



- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Window

Shadows - View Northeast
Proposed Project Comparison to Previously Approved Project
June 21 - 4:00 PM EDT
Figure 6-15



- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Window

Shadows - View Northeast
Proposed Project Comparison to Previously Approved Project
June 21 - 4:30 PM EDT
Figure 6-16



- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Window

Shadows - View Northeast
Proposed Project Comparison to Previously Approved Project
June 21 - 5:00 PM EDT
Figure 6-17

The analysis concluded that Central Park, the 1301, 1330, and 1345 Sixth Avenue office plazas, and the south facades of the Rockefeller Apartments and the Fifth Avenue Presbyterian Church would each experience more than an hour of incremental shadow on at least one analysis day. The plaza at 767 Fifth Avenue, the 1325 Sixth Avenue galleria, the Flatotel galleria, and the Upper East Side Historic District would experience less than an hour of incremental shadow, and no significant adverse impacts on these resources would occur.

CENTRAL PARK

Central Park extends from 59th Street to 110th Street, and from Central Park West to Fifth Avenue. Shadows from the proposed building would be long enough to reach Central Park only on the December analysis day. Incremental shadow would fall on areas of the park from 11:00 AM to the end of the analysis day at 2:53 PM (see **Figures 6-3** and **6-4**). At times, the extent of new shadow would be marginal; at other times, particularly in the early afternoon, the extent of new shadow would be more substantial. However, December is not part of the growing season, and so vegetation would not be affected by the new shadow. Additionally, winter shadows move quickly over the course of the day, and the incremental shadow would not affect particular areas of the park for long. The area affected by incremental shadow at any given time would be small relative to the entire park area, and there would continue to be sunlit areas of the park nearby available to users. Ambient daylight on the park would not be affected by the proposed building due to its distance from the park. Therefore, the proposed project would not result in a significant shadow impact on this resource.

767 FIFTH AVENUE PLAZA

This recently redesigned plaza in front of the General Motors Building (on the east side of Fifth Avenue across from Grand Army Plaza) has water features and moveable furniture. On March 21 and September 21, incremental shadow from the proposed project would fall across portions of this plaza from 4:15 PM to 4:45 PM. A portion of the plaza would remain in sun during this period. Incremental shadow would not fall on the plaza on the other three analysis days. The limited duration and extent of incremental shadow on this plaza would not cause a significant adverse impact.

1325 SIXTH AVENUE GALLERIA

This tall, bright through-block galleria connects West 53rd and 54th Streets in the middle of the block between Sixth and Seventh Avenues. It features a vaulted skylight along much of its length. Located a block northwest of the development site, the galleria skylight would be affected by project shadow in the late mornings of the spring, summer, and fall analysis days. On December 21, however, the proposed building's shadow would fall just north of the galleria at the start of the analysis period and would not affect it on this day.

The tall intervening building at 1335 Sixth Avenue already casts shadow across the skylight in the late morning, but additional areas would be affected by project shadow for periods ranging from 10 minutes to 45 minutes depending on the season. On the March 21/September 21 and June 21 analysis days, very small areas would be affected for 15 minutes or less. On the May 6 and August 6 analysis day, a portion of the skylight would experience new shadow from 10:00 AM to 10:45 AM (see **Figure 6-5**). Other portions of the skylight would continue to receive sun during this affected period. The limited duration and extent of incremental shadow over the course of the year would not cause a significant adverse impact to the galleria.

FLATOTEL GALLERIA

This through-block galleria connects West 52nd and 53rd Streets midway between Sixth and Seventh Avenues. Located one block southwest of the development site, it features a glass roof over most of its length. On the March 21/September 21 analysis day, existing shadows cover the skylight at 9:00 AM when the proposed project could otherwise affect it, and no incremental shadow would occur. On the May 6/August 6 analysis day, a very small section of the skylight would receive incremental shadow from 9:30 AM to 10:00 AM (see **Figure 6-5**). On June 21, when shadows are shortest, existing shadows cover less area of the skylight at this time—though still more than half—and incremental shadow would occur from 9:30 AM to 10:30 AM (see **Figure 6-6**). The new shadow would remove all remaining sunlight for less than 15 minutes, at around 10:15 AM; some sun would continue to fall on the skylight during the rest of the affected period. No incremental shadow would occur on December 21, when morning shadows fall to the northwest. The limited duration and extent of incremental shadow on this plaza would not result in a significant adverse impact.

1301 SIXTH AVENUE PLAZA

This plaza is located in front and along the sides of the tower on the west side of Sixth Avenue between West 52nd and 53rd Streets. The plaza is completely paved and contains two large sculptures along the avenue frontage, and planters and benches on the West 52nd and 53rd street frontages. The plaza is heavily shaded in the mornings, when project shadow would fall toward it. On March 21 and September 21, no incremental shadow would occur. On May 6 and August 6, the plaza is fully in existing shadow from the start of the analysis day until about 9:15; a small area of incremental shadow would fall on the West 53rd extension of the plaza from 9:15 AM to 9:45 AM. On June 21, when shadows are shortest, a small band of incremental shadow would move across the Sixth Avenue portion of the plaza between 8:00 AM and 10:00 AM. Since there are no sun-sensitive features in this part of the plaza, this would not cause a significant adverse impact. A larger area of incremental shadow would move across the West 53rd portion from 9:45 AM to 10:30 AM (see **Figure 6-6**). Some sunlight would continue to reach portions of the plaza during these periods when incremental shadow would occur. On December 21, no incremental shadow would occur since shadows fall too far northward at the start of that analysis day. The limited extent of morning incremental shadow on this office plaza would not cause a significant adverse impact.

1330 SIXTH AVENUE PLAZA

The Previously Approved Project's base would be comparatively less bulky at the north and south sides and would consequently cast less shadow westward in the late mornings than the proposed project on the north and south areas of this plaza on May 6/August 6 and June 21. On the March 21/September 21 and December 21 analysis days when shadows are longer, there would be no difference in effect between the proposed project and the Previously Approved Project. On the May 6/August 6 analysis day, incremental shadow would remove a portion of the remaining sunlight between 9:15 AM and 11:45 AM (see **Figure 6-5**). On June 21, incremental shadow would remove a portion of the remaining sunlight between 9:45 AM and 12:00 PM (see **Figure 6-6**).

The areas of incremental shadow in the late spring and summer analysis days would be small relative to the overall space for nearly all of the 2 hour and 30 minute duration. The plaza itself contains no vegetation and has no amenities beyond the two wide steps encircling the space. While the incremental shadow might reduce the attractiveness of the plaza during the late

morning, the sun is not generally relied on for warmth during these months, and no incremental shadow would occur during the lunchtime period, which is when the plaza is most heavily used, and the proposed project would not cause a significant adverse impact to the plaza space or its users.

1345 SIXTH AVENUE PLAZA

Also known as Fisher Park, this plaza is located around the base of the office tower with sections in front on the west side of Sixth Avenue, and the north and south sides along West 54th and 55th Streets. It contains water features, tables and chairs, planters, and benches. On the March 21/September 21 analysis day, the proposed project's shadow would fall toward the plaza in the late morning and early afternoon. The plaza is largely shaded by existing buildings at this time, but between 10:30 AM and 10:45 AM a small section of the southern section of the plaza would receive incremental shadow, and between 11:30 AM and 12:45 PM incremental shadow would remove the area of remaining sunlight on the front section of the plaza, leaving only a sunlit area on the south portion during this time (see **Figure 6-7**).

On May 6 and August 6, incremental shadow from the proposed project would move across portions of the southern and main (Sixth Avenue) sections of the plaza between 11:15 AM and 12:45 PM (see **Figure 6-8**). Other portions of the plaza would remain in sun during this affected period. On June 21, the proposed project shadow would be shortest and pass across a smaller portion of the plaza between noon and 12:45 PM; much of the rest of the plaza would be in sun at this time (see **Figure 6-9**). On December 21, the plaza is fully in existing shadow throughout the morning and early afternoon, and so no incremental shadow would occur on this analysis day.

With incremental shadow durations ranging from 45 minutes to 90 minutes during the spring, summer, and fall, and no incremental shadow in the winter, the proposed project's shadow impacts on this plaza would be limited. In March and September, the extent of new shadow would be small and some sun would remain on the plaza throughout the affected period. In the late spring and summer, large areas of sun would remain on the plaza during the periods when incremental shadow would occur. While the new shadow may reduce the attractiveness of the plaza in some seasons for a limited period of the day, the proposed project would not cause a significant adverse impact to the plaza or its users.

ROCKEFELLER APARTMENTS (NYCL)

The Rockefeller Apartments are located northeast of the project site in the middle of the block bounded by West 54th and 55th Streets and Fifth and Sixth Avenues. According to the 1984 New York City Landmark Designation Report, “[The] Rockefeller Apartments changed the current standards in apartment house planning, giving 15 percent more space to light and air than required by building codes.” As further explained in the report “The buildings occupied 15 percent less than the maximum legal percentage of the site, permitting amenities like the landscaped courtyard and broader sidewalks and more light, sun, and air.”

In discussing the windows the Designation Report notes that “[t]he 54th Street façade faces south and enjoys the full circuit of sun all year round. The 55th Street façade [with similar turreted windows] and at our latitude seldom receives full sunlight except in the early morning and late afternoon.” While the north windows actually only receive sunlight in the morning on the June and May/August analysis periods, windows generally facing away from the light were designed in the same way as those facing the light. The regular lack of sunlight on the north façade does not impair the public enjoyment of the windows and the visual interest they bring to this historic building. The south façade of the building (on

West 54th Street) could be affected by project shadow; the north façade (on West 55th Street) would not be affected by project shadow. Further, unlike stained glass windows in a church or temple, the Rockefeller Apartment windows are for the illumination of private interior spaces that are not open to the public. In addition these private interior spaces are illuminated by interior electrical lighting. Nevertheless, the incremental shadows on the south façade of the Rockefeller Apartments were considered.

On the March/September and December analysis days, the proposed building's shadow would not reach far enough to the east in the late afternoon to fall on the south façade of this resource.

On the May/August analysis day, the south façade would be in direct sunlight from about 11:00 AM to 2:00 PM (before 11:00 AM the sun is positioned too far in the northern sky to shine on southern facades in the Manhattan grid in May and August). From 2:00 PM to 4:00 PM the shadow from the existing 580 foot high tower south of the Rockefeller Apartments across West 54th Street would move across the façade. Portions of the façade would still be in sun for most of this two-hour period, although around 3:00 PM nearly the entire façade would be in shadow.

At 4:00 PM, shadow from existing buildings southwest of the Rockefeller Apartments begins moving up the southern façade of the Rockefeller Apartments in the late afternoon. At 4:30 PM, when approximately the lower half of the façade is in existing shadow, incremental shadow from the proposed building would enter at the western edge of the upper portion of the façade. From 4:30 PM until 5:00 PM, a small area in the upper portion of the façade would be shaded by the proposed building (see **Figure 6-10**). After 5:00 PM, the portion of façade that would be affected by project shadow is fully in existing shadow, and by 5:15 PM the entire façade is covered in shadow from existing buildings, and remains in full shadow for the final hour of the analysis day. Due to the extent and brief duration of the shadows as well as the characteristics of the resource described above, this incremental shadow is not considered a significant adverse impact.

On June 21, shadows are shortest. The south façade would be in direct sunlight from about 11:00 AM to 1:45 PM (as in May and August, before 11:00 AM the sun is positioned too far in the northern sky to shine on southern facades in the Manhattan grid in June). From 1:45 PM to 3:45 PM the shadow from the existing 580-foot-high tower south of the Rockefeller Apartments across West 54th Street would move across the façade. Portions of the façade would still be in sun for most of this two-hour period, although around 2:45 PM nearly the entire façade would be in shadow.

In the late afternoon, in comparison to the May and August analysis day, less of the southern façade is covered by existing shadow during the time that the proposed building's shadow would pass across it, which would result in generally larger extents of incremental shadow. New shadow would be cast on the south façade at 4:10 PM and last until 5:25 PM (see **Figures 6-11 to 6-13**), after which the façade is entirely shaded by existing buildings.

While the June 21 incremental shadow would fall on some portion of the south façade of the Rockefeller Apartments for a total of an hour and 15 minutes, for much of the period the increment would fall on far less than the full façade. At the beginning and end of this period only a small portion of the façade is shaded by the proposed building, while during the middle of this period a larger area is affected. Incremental shadow fall across all four of the façade's window bays for only 15 minutes at around 4:30 PM (see **Figure 6-12**). Each individual window bay experiences 45 minutes of new shadow as the project-generated shadow passes west to east across the façade. Due to the extent and brief duration of the shadows on the full façade, and on any one window bay, as well as the characteristics of the resource as described above, this incremental shadow is not considered a significant adverse impact.

FIFTH AVENUE PRESBYTERIAN CHURCH

The Fifth Avenue Presbyterian Church is located at the northwest corner of West 55th Street and Fifth Avenue. The south façade along West 55th Street features six large, Gothic-arched stained-glass windows, which are separated by pier buttresses, as well as twelve small, paired rectangular stained-glass windows directly below each arched window. The stained-glass windows are set back from the façade behind separate, protective windows of clear leaded glass. The two windows are separated by a few inches, except for the westernmost stained-glass window (both the large arched and small rectangular), which is set back further from the leaded glass window as the stained-glass windows curve away from the exterior façade to follow the curve of the interior main sanctuary space. (The sanctuary has a U-shaped design, with the curve of the U at its western side.) The greater spacing between the two windows, and the curve of the interior stained-glass window, has a natural shading effect on this stained glass window when viewed from inside the sanctuary. As described in Chapter 7, “Historic Resources,” these windows were designed by John C. Spence, a Montreal-based stained glass designer. The non-representational designs of the windows were inspired by the English Reform precepts of the 19th century.

Adjacent to the main church building on the west is the Church House and chapel, also featuring a large, Gothic-arched stained-glass window on the south façade. The Church House was constructed in 1925 and designed by James Gamble Rogers, replacing an earlier two-story annex. In comparison to the main sanctuary, the chapel windows use stained glass to illustrate Bible stories. The chapel’s south façade window is larger than those to the east, and is not covered by a separate, protective window of clear leaded glass.

There is also a large, Gothic-arched stained-glass window at the eastern edge of the south façade, part of the church’s corner tower. This window is not an element of the main sanctuary or chapel, and thus is not considered in this analysis. At the 7th floor level of the Church House, there is a stained-glass window at the eastern façade. Since this window is not an element of any portion of the building that is regularly publicly accessible, it is not considered in this analysis.

On the March/September and December analysis days, the proposed building’s shadow would not reach far enough to the east in the late afternoon to fall on the church complex.

On the May/August analysis day, the majority of the windows on the south façade are in existing shadow for long periods of the day. New shadow from the proposed building would move onto portions of the sanctuary windows at 4:40 PM. For the next 40 minutes, the new shadow would move across portions of these windows. The sanctuary windows are already mostly in shadow during this period from existing buildings. The incremental shadow would remove all the remaining sunlight from the south façade from approximately 4:45 PM to 5:20 PM (see **Figure 6-14**). The last incremental shadow would move off the windows at 5:20 PM. All but a small area of the façade is in existing shadow for the final 30 minutes of the analysis day, which ends at 6:18 PM. The chapel window west of the sanctuary windows would be unaffected by project shadow on May 6 and August 6.

On the June analysis day, shadows are shortest, and the windows on the south façade experience somewhat less existing shadow. However, those on the eastern half of the building still spend most of June 21 in existing shadow. New shadow from the proposed building would move onto the large stained-glass window of the chapel at 3:50 PM. From 3:50 PM until 5:10 PM, the new shadow would spread eastward across the south façade of the church complex (see **Figures 6-15 to 6-17**). Due to the shorter shadows on this analysis day, less of the façade would be shaded by

existing buildings at this time in comparison to the May/August analysis day. Portions of the windows along the south façade would receive new shadow from the proposed building during this period. For 15 minutes (4:25 PM to 4:40 PM), any remaining direct sunlight would be removed from the windows by incremental shadow. At other times during the hour and 20 minutes of incremental shadow, sunlight would continue to reach portions of the south façade windows.

On June 21, incremental shadow would fall across one or more windows of the church for a total duration of an hour and 20 minutes. For much of this period, from 4:05 PM to 5:10 PM, multiple windows would be affected. The extent and duration of new shadow would cause a significant adverse impact to this architectural resource on June 21. Later in the summer, as well as earlier in May, the duration of incremental shadow would only total 40 minutes and would not cause a significant adverse impact. No incremental shadow would occur at all between September and March.

UPPER EAST SIDE HISTORIC DISTRICT

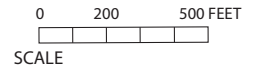
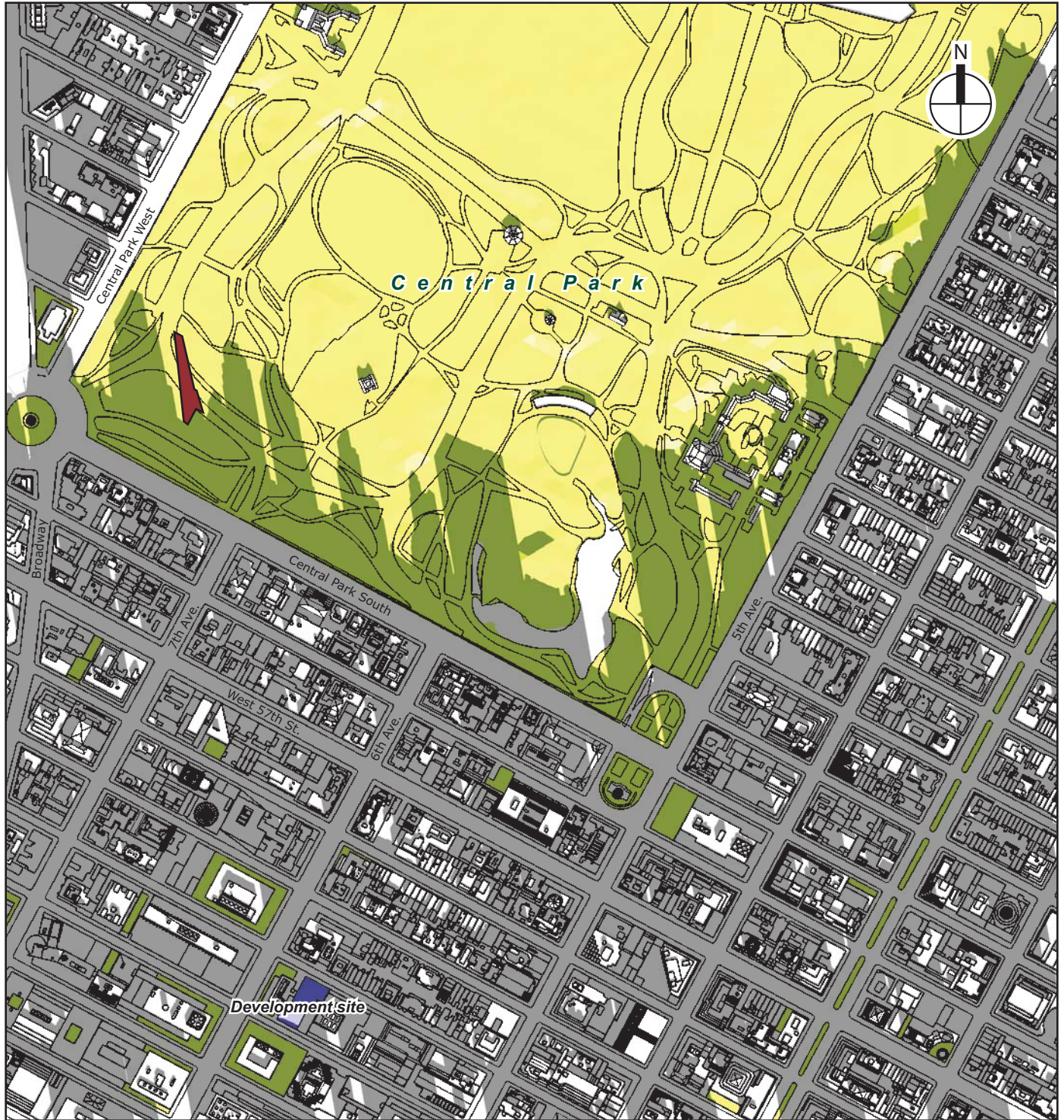
Incremental shadow would move across some buildings, streets, and sidewalks at the southern end of the Upper East Side Historic District for 45 minutes near the end of the March 21/September 21 analysis day. Incremental shadow would also move inside the western edge of the historic district at around East 70th Street for the final 8 minutes of the December 21 analysis day. This limited extent and duration of new shadow would not cause a significant adverse impact.

F. ASSESSMENT OF INCREMENTAL SHADOWS: PROPOSED PROJECT COMPARED WITH EXPANDED DEVELOPMENT SCENARIO

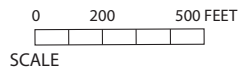
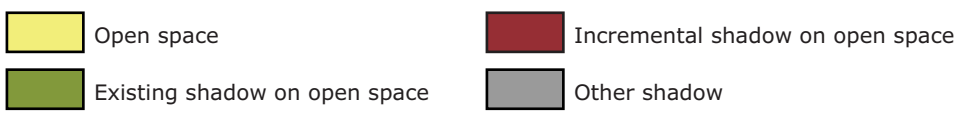
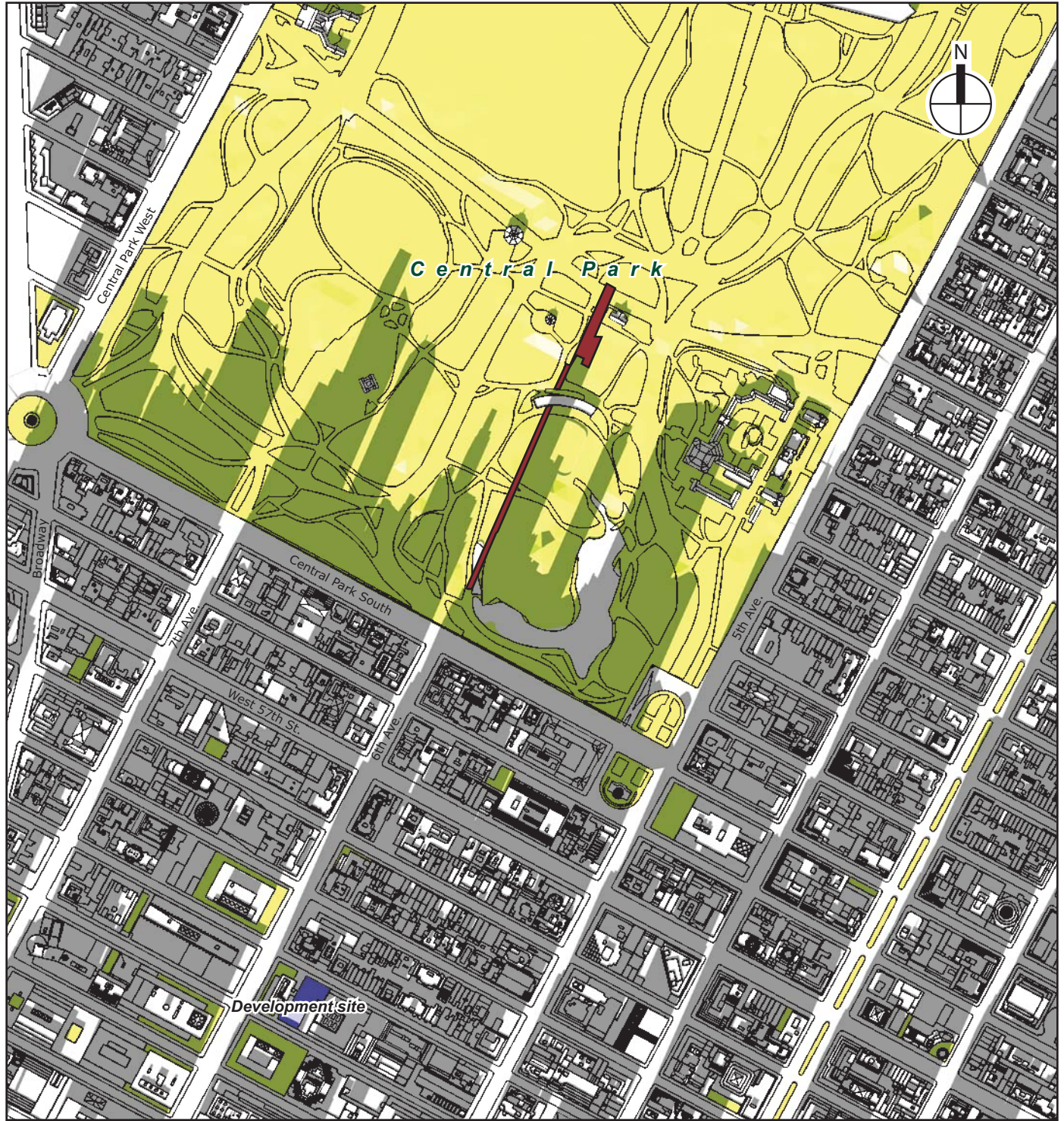
The detailed analysis compares the proposed project's shadows with shadows in the future with the Expanded Development Scenario on each of the four analysis days. The building's massing in the Expanded Development Scenario would be approximately 161 feet shorter than the massing of the proposed project, but otherwise it would be generally similar, differing primarily in bulkiness and the shape of the massing in the upper portion of the tower. The Expanded Development Scenario would include setbacks where the proposed project would not. The detailed analysis reveals that the difference in bulkiness between the two structures would result in minor differences in the shadows they would cast, but the general similarity of tower shape and location would lead to generally similar shadow effects.

For a substantial number of open spaces and historic resources, the proposed project would not result in any incremental increase in shadow (see **Appendix A**). Additional resources would receive incremental shadow for fewer than 30 minutes. Because of the short duration of shadow on these resources, the proposed project would not result in significant adverse impacts; these resources are also described in Appendix A. **Table 6-4** shows the duration of incremental shadows on the remaining sun-sensitive resources on each of the four analysis days. The extent, duration, and effects of these incremental shadows are discussed below for each resource. **Figures 6-18 through 6-25** depict the extent of incremental shadows on the resources at certain times of each analysis day referenced in the text discussion.

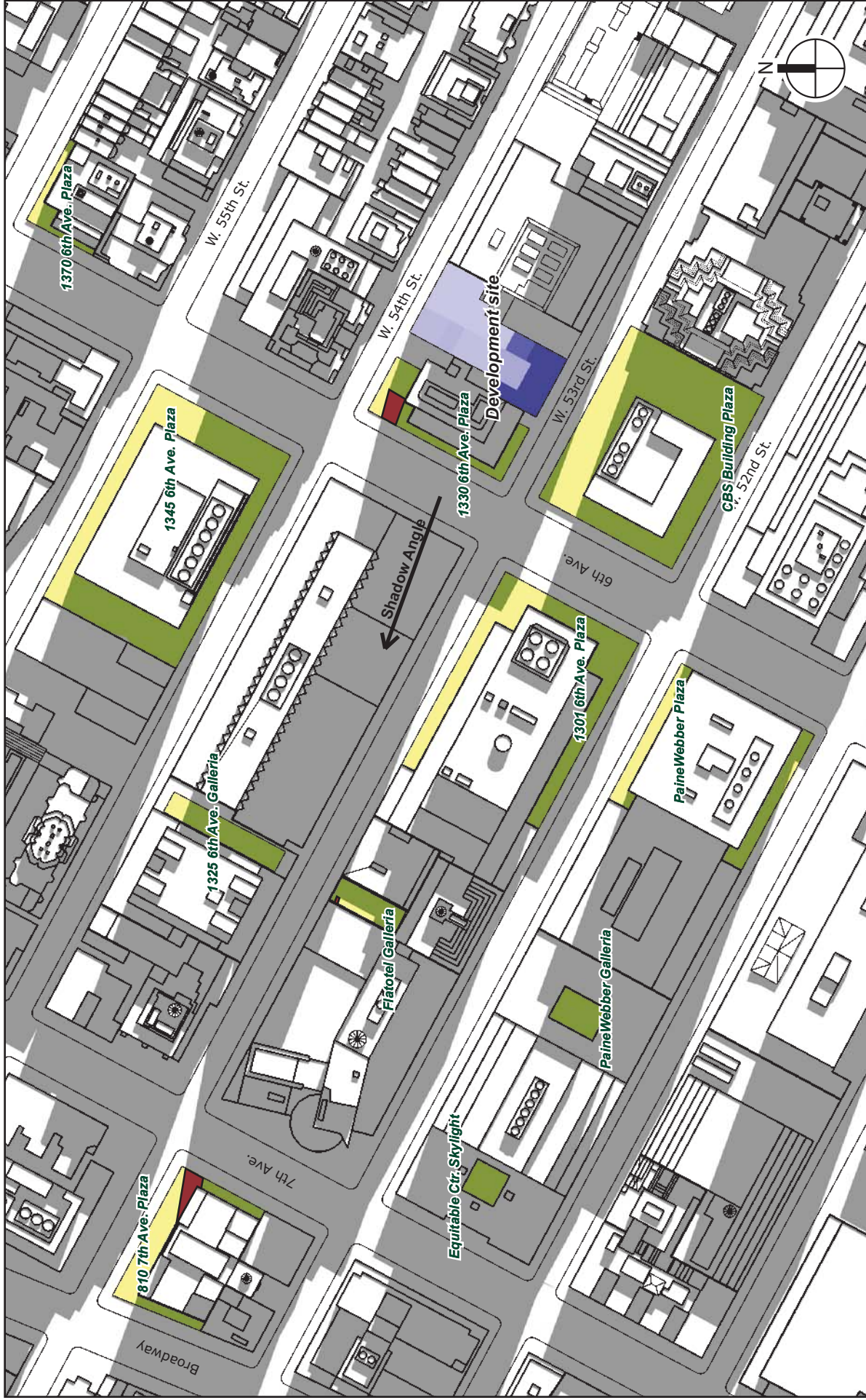
The analysis concluded that Central Park and the plazas at 1330 Sixth Avenue and 1301 Sixth Avenue would each experience more than an hour of incremental shadow on at least one analysis day, but that in no case would the shadow impact be considered significant. The Flatotel Galleria, the Rockefeller Apartments, the Fifth Avenue Presbyterian Church, and the Upper East



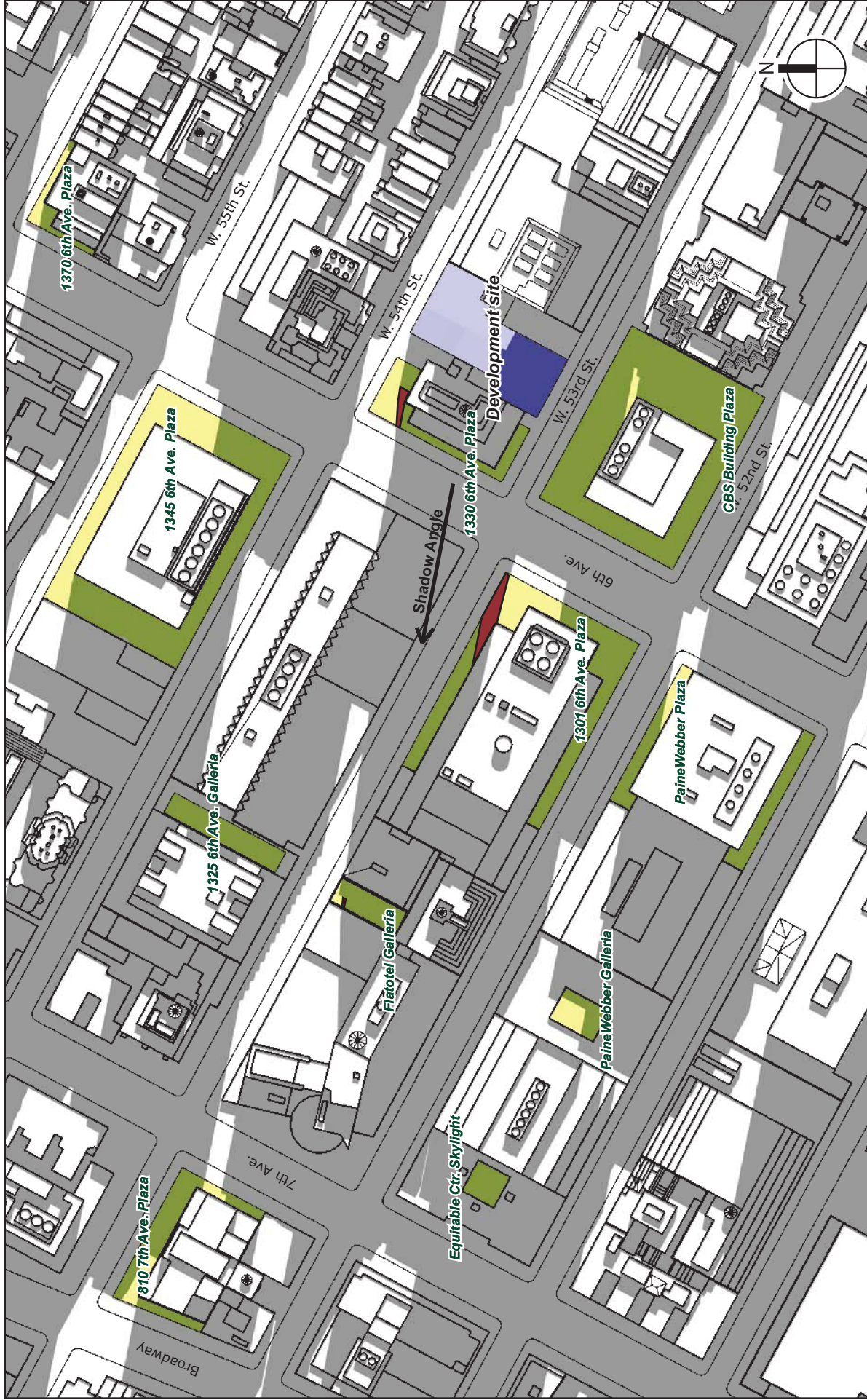
Shadows
 Proposed Project Comparison
 to Expanded Development Scenario
 December 21 - 11:15 AM EST
 Figure 6-18



Shadows
Proposed Project Comparison
to Expanded Development Scenario
December 21 - 1:30 PM EST
Figure 6-19



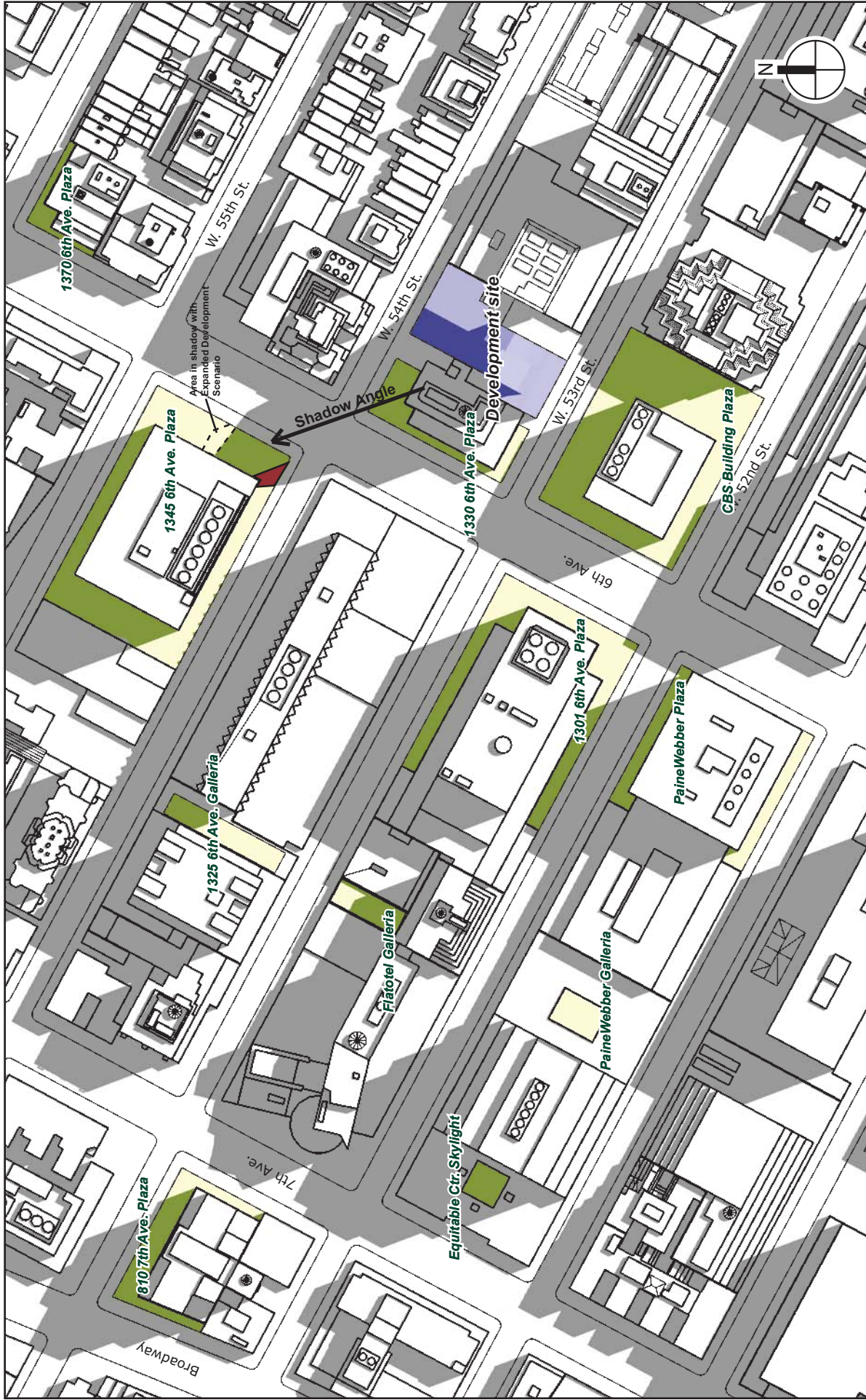
Proposed Project Comparison to Expanded Development Scenario
 May 6 / August 6 - 10:00 AM EDT
 Figure 6-20



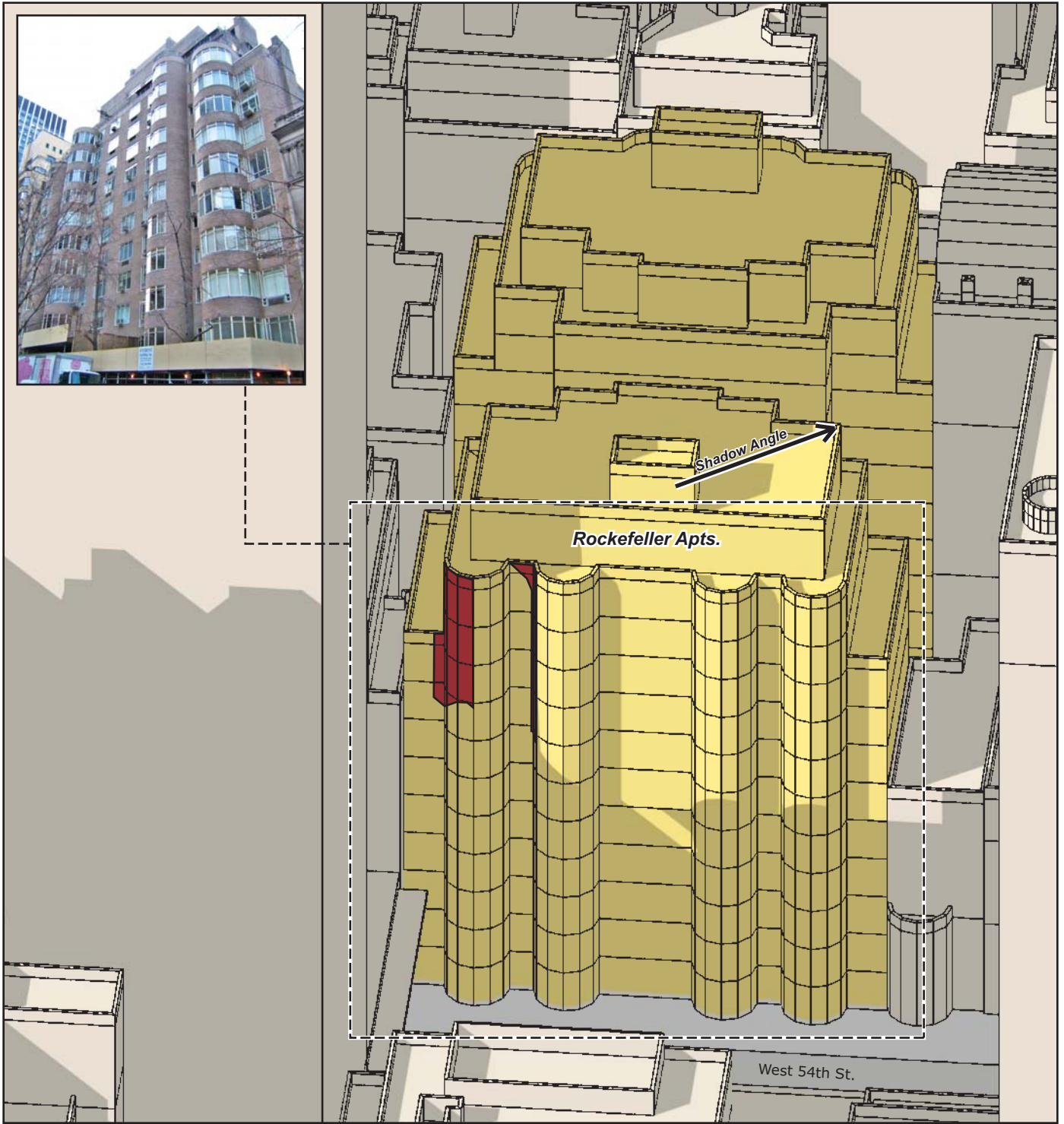
Proposed Project Comparison to Expanded Development Scenario
 June 21 - 10:00 AM EDT
 Figure 6-21



Proposed Project Comparison to Expanded Development Scenario
 May 6 / August 6 - 12:30 PM EDT
 Figure 6-22

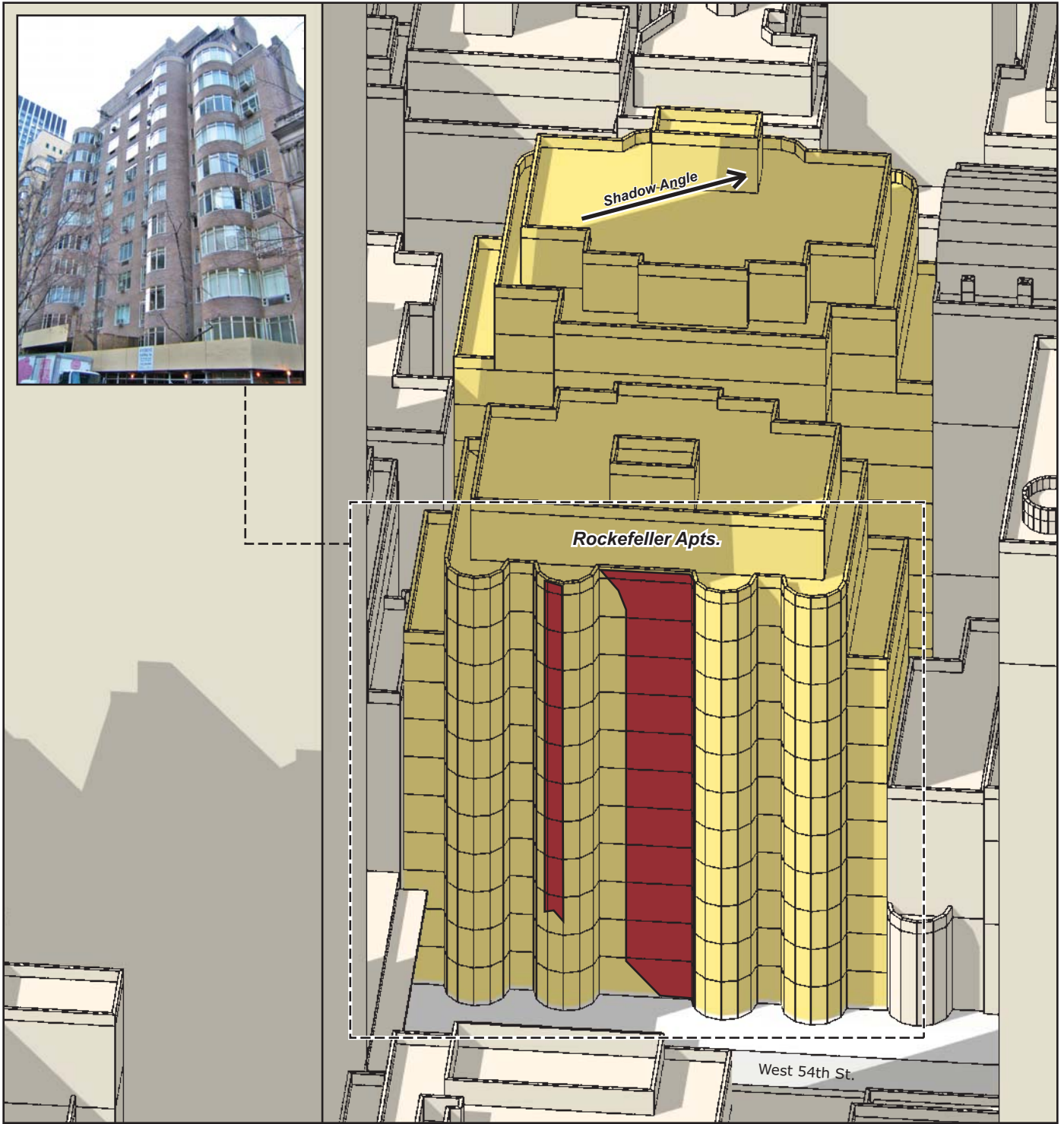


Proposed Project Comparison to Expanded Development Scenario
 June 21 - 12:30 PM EDT
 Figure 6-23



- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Facade

Shadows - View North
Proposed Project Comparison
to Expanded Development Scenario
May 6 / August 6 - 4:45 PM EDT
Figure 6-24



- Historic Resource with Sun-Sensitive Feature
- Incremental shadow on Sun-Sensitive Facade

Shadows - View North
 Proposed Project Comparison
 to Expanded Development Scenario
 June 21 - 4:30 PM EDT
 Figure 6-25

Side Historic District would experience less than an hour of incremental shadow, and no significant adverse impacts on these resources would occur.

CENTRAL PARK

Shadows from the proposed building would be long enough to reach Central Park only on the December analysis day. Incremental shadow would fall on areas of the park from 11:00 AM to the end of the analysis day at 2:53 PM (see **Figures 6-18** and **6-19**). At times, the extent of new shadow would be marginal; at other times, particularly in the early afternoon, the top 161 feet of the proposed project would cast a more substantial area of new shadow. However, December is not part of the growing season, and vegetation would not be affected by the new shadow. Additionally, winter shadows move quickly over the course of the day, and the incremental shadow would not affect particular areas of the park for long. The area affected by incremental shadow at any given time would be small relative to the entire park area, and there would continue to be sunlit areas of the park nearby available to users. Ambient daylight on the park would not be affected by the proposed building due to its distance from the park. Therefore, the proposed project would not result in a significant shadow impact on this resource.

Table 6-4
Incremental Shadow Durations: Proposed Project Compared with Expanded Development Scenario

Resource	March 21 8:36 AM-5:29 PM EDT	May 6 7:27 AM-6:18 PM EDT	June 21 6:57 AM-7:01 PM EDT	December 21 8:51 AM-2:53 PM EST
OPEN SPACES				
Central Park	—	—	—	11:00 AM–2:53 PM Total: 3h 53m
1330 Sixth Avenue plaza	—	9:00 AM–11:45 AM Total: 2h 45m	9:45 AM–12:15 PM Total: 2h 30m	—
Flatotel galleria	—	9:45 AM–10:00 AM Total: 15m	9:45 AM–10:00 AM Total: 15m	—
1301 Sixth Avenue plaza	—	9:30 AM–9:45 AM Total: 15m	8:00 AM–10:30 AM Total: 2h 30m	—
1345 Sixth Avenue plaza	10:30 AM–11:00 AM 11:25 AM–12:15 PM Total: 1h 20m	11:15 AM–12:45 PM Total: 1h 30m	12:00 PM–12:45 PM Total: 45m	—
HISTORIC RESOURCES				
Rockefeller Apartments – south facade	—	4:35 PM–5:00 PM Total: 25m	4:10 PM–4:50 PM Total: 40m	—
Fifth Avenue Presbyterian Church*	—	4:35 PM–4:45 PM Total: 10m	4:15 PM–4:20 PM Total: 5m	—
Upper East Side Historic District	4:00 PM–4:30 PM 5:00 PM–5:15 PM Total: 45m	—	—	2:45 PM–2:53 PM Total: 8m
<p>Notes: EST—Eastern Standard Time EDT—Eastern Daylight Time March 21 is the equivalent of September 21. May 6 is the equivalent of August 6. * Duration represents time that new shadow would fall on shadow-sensitive windows, rather than on façade as whole.</p>				

1330 SIXTH AVENUE PLAZA

The Expanded Development Scenario's base would be comparatively less bulky at the north and south sides and would consequently cast less shadow westward in the late mornings than the proposed project on the north and south areas of this plaza on May 6/August 6 and June 21. On the March 21/September 21 and December 21 analysis days when shadows are longer, there would be no difference in effect between the proposed project and the Expanded Development Scenario. On the May 6/August 6 analysis day, incremental shadow would remove a portion of the remaining sunlight between 9:00 AM and 11:45 AM (see **Figure 6-20**). On June 21, incremental shadow would remove a portion of the remaining sunlight between 9:45 AM and 12:15 PM (see **Figure 6-21**).

The areas of incremental shadow in the late spring and summer analysis days would be small relative to the overall space for nearly all of the approximately two and a half hour duration. The plaza itself contains no vegetation and has no amenities beyond the two wide steps encircling the space. While the incremental shadow might reduce the attractiveness of the plaza during the late morning, the sun is not generally relied on for warmth during these months, and no incremental shadow would occur during the lunchtime period, which is when the plaza is most heavily used, and the proposed project would not cause a significant adverse impact to the plaza space or its users.

FLATOTEL GALLERIA

On the March 21/September 21 analysis day, existing shadows cover the skylight at 9:00 AM when the proposed project could otherwise affect it, and no incremental shadow would occur. On the May 6/August 6 analysis day, a very small section of the skylight would receive incremental shadow from 9:45 AM to 10:00 AM (see **Figure 6-20**). On June 21, a very small area of incremental shadow would occur from 9:45 AM to 10:00 AM (see **Figure 6-21**). Sun would continue to fall on a portion of the skylight during the affected period. No incremental shadow would occur on December 21, when morning shadows fall to the northwest. The limited duration and extent of incremental shadow on this plaza would not cause a significant adverse impact.

1301 SIXTH AVENUE PLAZA

The plaza is heavily shaded in the mornings when project shadow would fall toward it. On March 21 and September 21, no incremental shadow would occur. On May 6 and August 6, the plaza is fully in existing shadow from the start of the analysis day until about 9:15; a small area of incremental shadow would fall on the West 53rd extension of the plaza from 9:30 AM to 9:45 AM.

On June 21, shadows are shortest and reach farthest to the south. Shadow from the proposed project as well as from the Expanded Development Scenario would pass across this plaza from the start of the analysis period at 6:57 AM until about 10:30 AM, although much of the plaza is covered with existing shadow during this period. Since the tower of the Expanded Development Scenario would be set back from its base on the south side, the bulkier southern façade of the proposed project building would therefore result in a slightly wider shadow being cast westward as it passes across the plaza. This strip of incremental shadow would move across the main, Sixth Avenue portion of the plaza between 8:00 AM and 10:30 AM (see **Figure 6-21**). This area of the plaza contains no sun-sensitive features. On December 21, no incremental shadow would occur since shadows fall too far northward at the start of that analysis day. The incremental shadow on this plaza would only occur on the May/August and June analysis days. On both days, the extent of new shadow would be small, and would not cause a significant adverse impact.

1345 SIXTH AVENUE PLAZA

On the March 21/September 21 analysis day, the proposed project's shadow would fall toward the plaza in the late morning and early afternoon. The plaza is largely shaded by existing buildings at this time, but between 10:30 AM and 11:00 AM a small section of the southern section of the plaza would receive incremental shadow, and between 11:25 AM and 12:15 PM another small area of incremental shadow would fall on the front section of the plaza. In both cases, the incremental shadow would be due to minor differences in the bulkiness of the massings of the proposed project and the Expanded Development Scenario. Similarly, on May 6 and August 6, very small areas of incremental shadow would move across the south and main (Sixth Avenue) sections of the plaza between 11:15 AM and 12:45 PM, reflecting the minor differences in the bulkiness of the massings of the proposed project and the Expanded Development Scenario (see **Figure 6-22**). Other portions of the plaza would be in sun during this period. On June 21, very small areas of incremental shadow would pass across the southeastern area of the plaza between 12:00 PM and 12:45 PM (see **Figure 6-23**); much of the rest of the plaza would be in sun at this time, including a small area that would be in shadow with the Expanded Development Scenario (see **Figure 6-23**).

With incremental shadow durations ranging from 45 minutes to 90 minutes during the spring, summer, and fall, and no incremental shadow in the winter, the proposed project's shadow impacts on this plaza would be limited. In each season, the extent of incremental shadow would be very small, and the proposed project would not cause a significant adverse impact to the plaza or its users.

ROCKEFELLER APARTMENTS (NYCL)

The Rockefeller Apartments' south façade is on West 54th Street, and shadow from the proposed project would fall on it. However, its north façade faces West 55th Street and would not be affected by project shadow.

In comparing the proposed project and the Expanded Development Scenario, the relatively minor differences in the bulkiness of the base and lower tower floors would result in only very small differences in the shape and path of the shadows they would cast on nearby resources.

On the March/September and December analysis days, the proposed building's shadow would not reach far enough to the east in the late afternoon to fall on the south façade of this resource.

On the May/August analysis day, shadow from existing buildings begins moving up the southern façade of the Rockefeller Apartments in the late afternoon. At 4:30 PM, when approximately the lower half of the façade is in existing shadow, a very small area of incremental shadow from the proposed building would enter at the western edge of the upper portion of the façade. From 4:30 PM until 5:00 PM, a very small area in the upper portion of the façade would be shaded by the extra bulkiness of the proposed building (see **Figure 6-24**). After 5:00 PM, the portion of façade that would be affected by project shadow is fully in existing shadow, and by 5:15 PM the entire façade is covered in shadow from existing buildings, and remains in full shadow for the final hour of the analysis day.

On June 21, a very small patch of incremental shadow would enter the façade at 4:10 PM and last until 4:50 PM (see **Figure 6-25**).

Given the very small extent and limited duration of incremental shadow cast by the additional bulkiness of the proposed project, as well as the characteristics of this resource described above, the proposed project would not result in significant adverse shadow impacts.

FIFTH AVENUE PRESBYTERIAN CHURCH

In comparing the proposed project and the Expanded Development Scenario, the relatively minor differences in the bulkiness of the base of the structures and their lower tower floors would result in only very small differences in the shape and path of the shadows they would cast on nearby resources.

On the March/September and December analysis days, the proposed building's shadow would not reach far enough to the east in the late afternoon to fall on the Fifth Avenue Presbyterian Church.

On the May/August analysis day, a small area of incremental shadow from the proposed building would move west to east across portions of the church complex between 4:35 PM and 4:45 PM. Much of the church, including most of the windows along the south façade, is already in shadow from existing buildings during this period. On the June analysis day, a small area of incremental shadow from the proposed building would move west to east across portions of the church complex beginning at 4:15 PM and exiting before 4:20 PM. The very limited size of incremental shadow, and its short duration, would not cause any significant adverse impacts.

UPPER EAST SIDE HISTORIC DISTRICT

Incremental shadow would move across some buildings, streets and sidewalks at the southern end of the Upper East Side Historic District for 45 minutes near the end of the March 21/September 21 analysis day. Incremental shadow would also move inside the western edge of the historic District at around East 70th Street for the final 8 minutes of the December 21 analysis day. This limited extent and duration of new shadow would not cause a significant adverse impact. *