Chapter 7: Shadows

A. INTRODUCTION

As described in Chapter 1, "Project Description," the proposed 15 Penn Plaza project would result in the construction of a new commercial office tower above a podium base. Two options are being considered for the proposed building—a Single-Tenant Office Scenario and a Multi-Tenant Office Scenario. The two scenarios would result in different buildings, similar though not identical in overall height but with different tower and podium configurations. This chapter assesses whether either of the two proposed scenarios 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.

The analysis concluded that incremental shadow from the proposed project (both scenarios) would reach some nearby open spaces and historic resources, but in no case would the extent and duration of new shadow be substantial enough to result in significant adverse impacts to a sun-sensitive use or feature.

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 determines 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 approach to the detailed shadows analysis is to define the extent, or coverage, and duration of new shadows on shadow-sensitive resources during the year. Following the guidelines of the *City Environmental Quality Review (CEQR) Technical Manual*, this analysis considers shadows on March 21 (equivalent to September 21, the equinoxes); June 21, the summer solstice; and December 21, the winter solstice. These dates represent the full range of possible shadows over the course of the year. Additionally, CEQR guidelines recommend an additional representative date during the growing season (typically April through October in New York City) when focusing on an open space, specifically May 6 (equivalent to August 6, the midpoints between the equinoxes and summer 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.

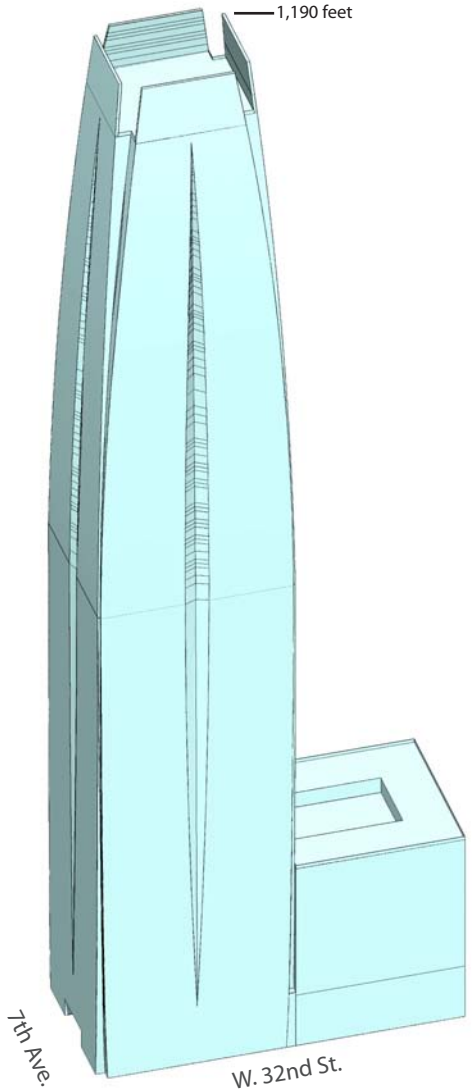
According to the *CEQR Technical Manual*, the uses and vegetation in an open space establish its sensitivity to shadows. Passive uses, such as sitting or sunning, and certain active uses, such as water features in playgrounds, rely on sunlight. Vegetation, including trees, shrubs and lawns, generally require at least four to six hours of sunlight. Conversely, certain areas within an open space might not be sunlight-sensitive, such as paved ball courts. When assessing shadows on historic resources, only features or landscapes that are dependent on sunlight need be assessed, for example stained-glass windows that are only visible in sunlight.

CEQR does not consider shadows on city streets, sidewalks, and other buildings to be significant.

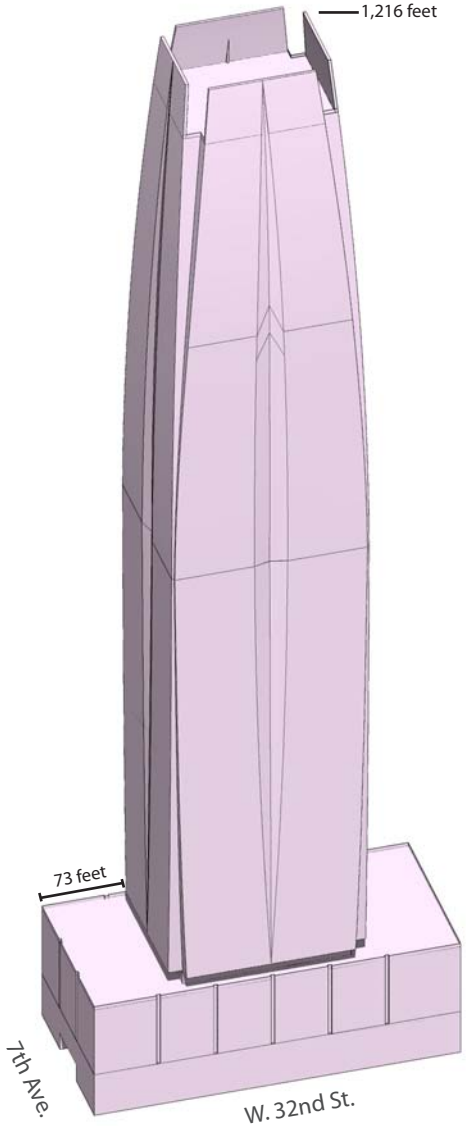
ANALYSIS FRAMEWORK

As in other technical areas of a CEQR environmental assessment, the detailed analysis compares conditions with the proposed project to conditions that would exist in the future Build year without the proposed project (the "No Action" condition). As stated in Chapter 1, "Project Description," the Build year for the proposed project is 2014. Absent approval of the proposed project, the applicant would develop an as-of-right project (or No Action building) on the development site. The detailed analysis presented below assesses whether either of the two proposed scenarios would, in comparison to the No Action building, result in incremental shadows that would adversely impact any nearby sun-sensitive resources.

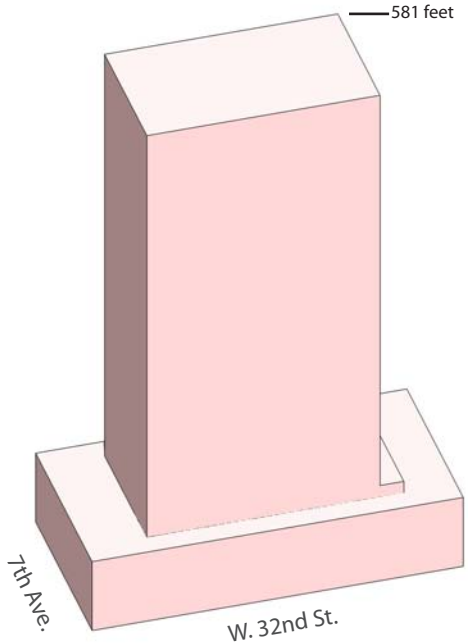
The two scenarios would differ somewhat in building configuration, and the No Action building would be considerably shorter in height than either of the proposed scenarios (see **Figure 7-1**). The Single-Tenant Office Scenario building would be approximately 1,130 feet in height to the top of the roof, with an additional 60-foot rooftop screen, bringing the total height to approximately 1,190 feet. The Multi-Tenant Office Scenario would be 26 feet taller than the Single-Tenant Office Scenario, 1,156 feet to the roof and 1,216 feet to the top of the rooftop screen, but the tower would be set back 73 feet from the Seventh Avenue frontage on top of a 130-foot podium base. The No Action building would have a full block base rising to a height of 85 feet, and an office tower setback above the podium rising to a total roof height of 581 feet, including mechanical space.



Single-Tenant Scenario



Multi-Tenant Scenario



No Action Building

Proposed Project (Two Scenarios) and No Action Building

Figure 7-1

The extent of the study area for the detailed shadows analysis is determined by the results of the screening analysis, when the longest possible shadow that the proposed project could cast is calculated on a street map of the area.

ANALYSIS TOOLS AND DATA SOURCES

GIS software and data, supplemented by AKRF field surveys, were used in the preliminary screening analysis to determine the extent of the study area and which open spaces and sunlight-sensitive historic resources could potentially be affected by project shadow.

For the detailed analysis, a three-dimensional computer model was developed. Shadows were modeled using the solar rendering capabilities of MicroStation V8i software. A three-dimensional model of existing buildings and topography around the development site was provided by Fugro EarthData Inc. and augmented. Three-dimensional models of the two proposed scenarios and the No Action building 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 2014 baseline conditions.

DETERMINATION OF IMPACT SIGNIFICANCE

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.

D. SCREENING ANALYSIS

A preliminary screening analysis was conducted following *CEQR Technical Manual* guidelines. A map of the development site and surrounding area was prepared and, in coordination with the open space and historic resources analyses presented in other chapters of this EIS, all sunlight-sensitive resources were noted on the map. Designated (as well as potential) historic resources with sun-sensitive features were considered. Historic resources without sun-sensitive features were screened out from the analysis.

To identify resources of concern, the two buildings were combined to create a "combined building massing," and the maximum shadow length was calculated for the four analysis days, taking into account time of day as well as season. For example, on the December 21 analysis day a structure 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 height and form of the combined building massing, 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. **Figure 7-2** shows the results of the screening analysis. A number of open spaces and historic resources fall within the perimeter showing the maximum shadow length.

E. DETAILED SHADOWS ANALYSIS

A three-dimensional computer model was developed for the detailed shadows analysis. The model contains the buildings, topography, and open spaces within the study area delineated in the screening analysis above.

Existing buildings, planned developments expected to be completed by 2014, and the No Action building on the development site were used to determine the baseline shadows cast on the sun-sensitive resources. Then, shadows were rendered again using the two proposed scenarios to determine the extent and duration of incremental shadow from each scenario on the resources of concern. As noted in "Methodology," above, shadows were examined on the representative days of the year set forth in the *CEQR Technical Manual*: the summer and winter solstices, the equinoxes, and May 6/August 6, the midpoints between the summer solstice and the equinoxes. Further, the analysis period for each representative day begins an hour-and-a-half after sunrise and ends an hour-and-a-half before sunset.

The detailed analysis showed that many of the sun-sensitive resources in the study area would not receive any incremental shadow at any time of year from either proposed scenario, due to their distance from the development site and the presence of intervening structures already casting shadow on those resources during the times when project shadow would fall there. These resources are not discussed further.

In both scenarios, several sun-sensitive resources would experience an hour or more of incremental shadow on at least one of the analysis days, and several other resources would experience less than an hour of incremental shadow on one or more analysis days. The two scenarios cast shadows very similar in extent and duration on most of the affected resources. **Table 7-1** presents the entry and exit times and total duration of incremental shadow from the Single-Tenant Office Scenario on the affected sun-sensitive resources. **Table 7-2** presents the entry and exit times and total duration of incremental shadow from the Multi-Tenant Office Scenario. The extent, duration, and effects of these incremental shadows are discussed below for each resource. **Figures 7-3** through **7-19** depict the extent of incremental shadows for each of the two scenarios at representative times on the analysis days.

Figures 7-3 through **7-6** depict the shadows on the March 21/September 21 analysis day at 9:00 AM, 10:00 AM, 11:00 AM and noon. **Figures 7-7** through **7-12** show shadows on the May 6/August 6 analysis day at 8:00 AM, 9:00 AM, 10:00 AM, 11:00 AM, Noon, and 4:00 PM. **Figures 7-13** through **7-19** depict shadows on the June 21 analysis day at 8:00 AM, 9:00 AM, 10:00 AM, 11:00 AM, Noon, 4:00 PM, and 5:00 PM. No incremental shadows would occur on the December 21 analysis day in either scenario.

11.23.09



Screening Analysis
Figure 7-2

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Reduction in shadow on open space (compared to No Action)

shadow angle

N

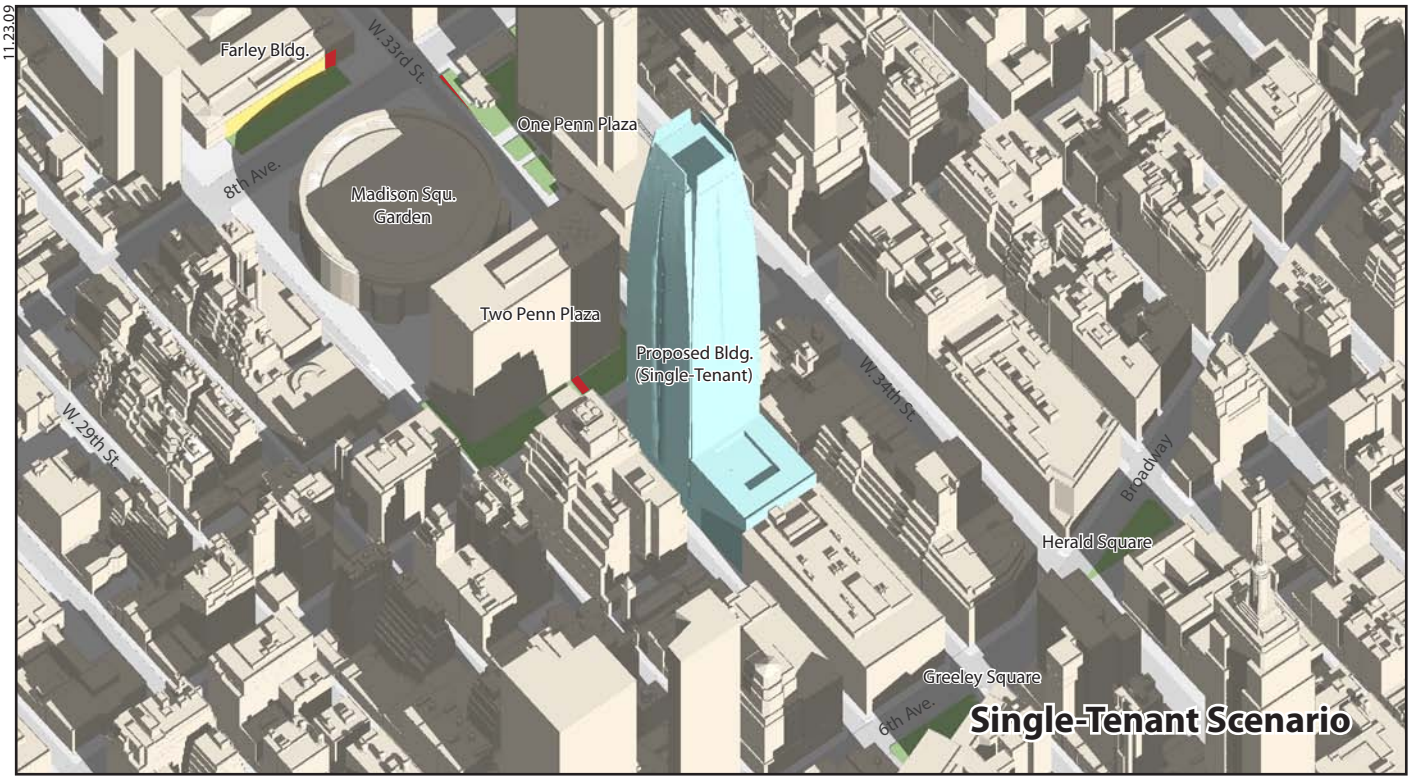
0 200 400 FEET

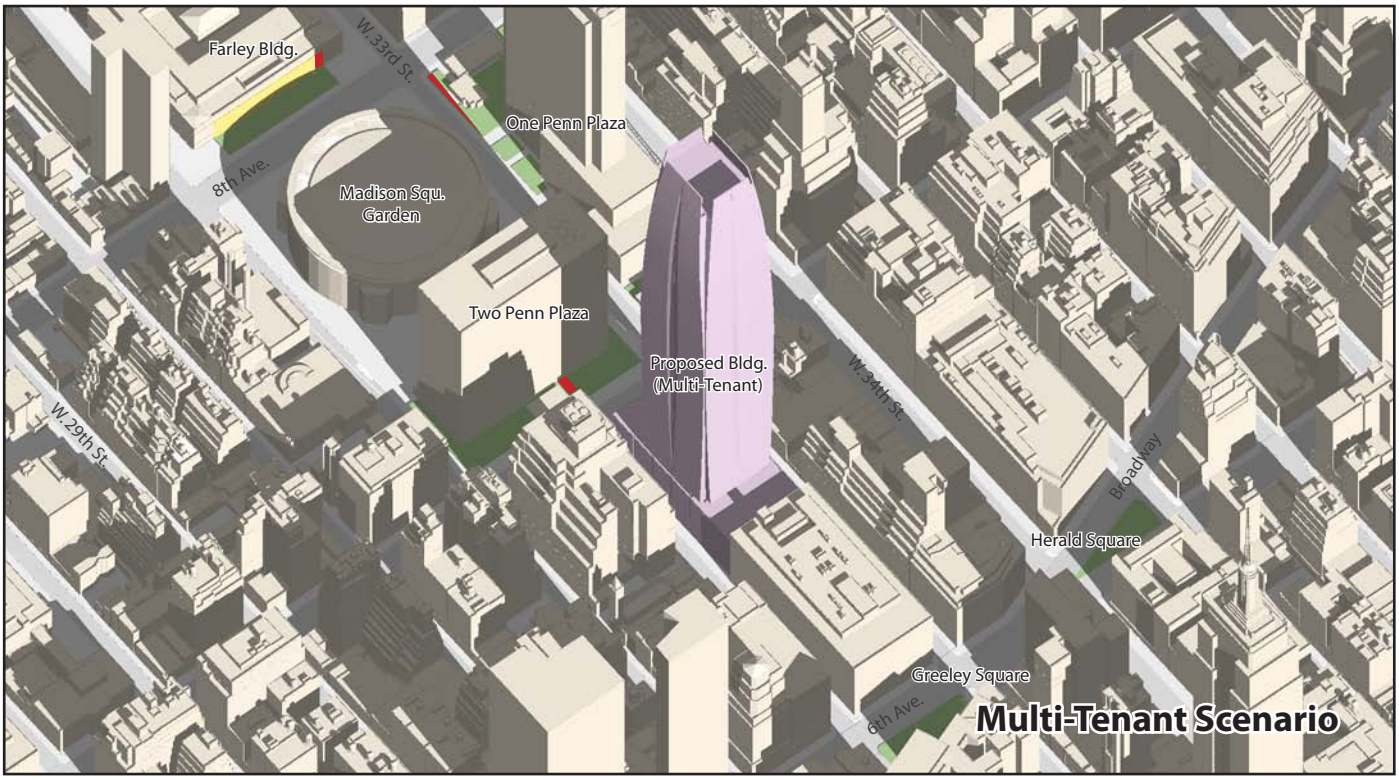
SCALE

March 21 / Sept. 21 - 9:00 AM EDT

Figure 7-3

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Sun-sensitive feature of historic resource

Existing / No Action shadow on sun-sensitive feature of historic resource

Incremental shadow on open space or sun-sensitive historic resource

View Northwest
March 21 / Sept. 21 - 10:00 AM EDT
Figure 7-4

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

Reduction in shadow on open space

shadow angle

N

0 200 400 FEET

SCALE

March 21 / Sept. 21 - 11:00 AM EDT

Figure 7-5

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

Reduction in shadow on open space

shadow angle

N

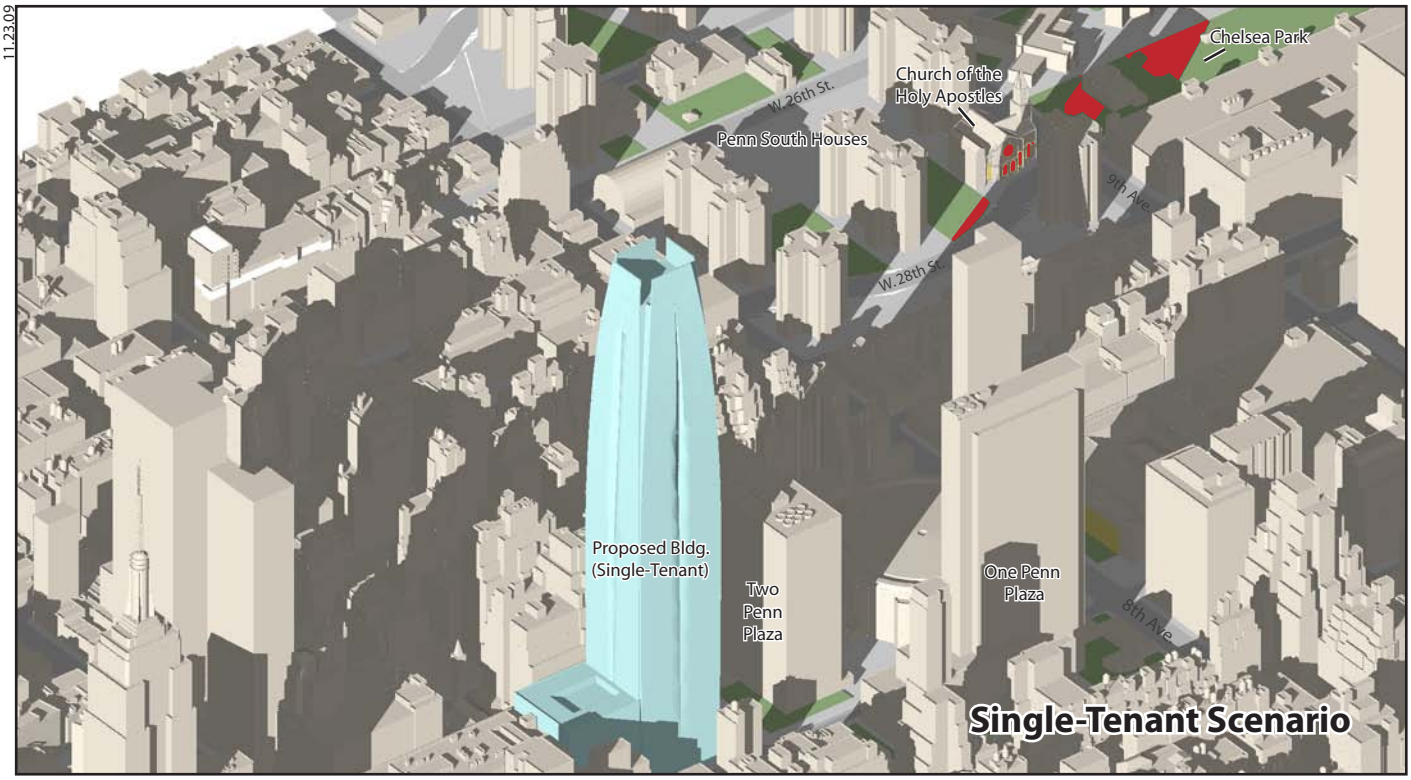
0 200 400 FEET

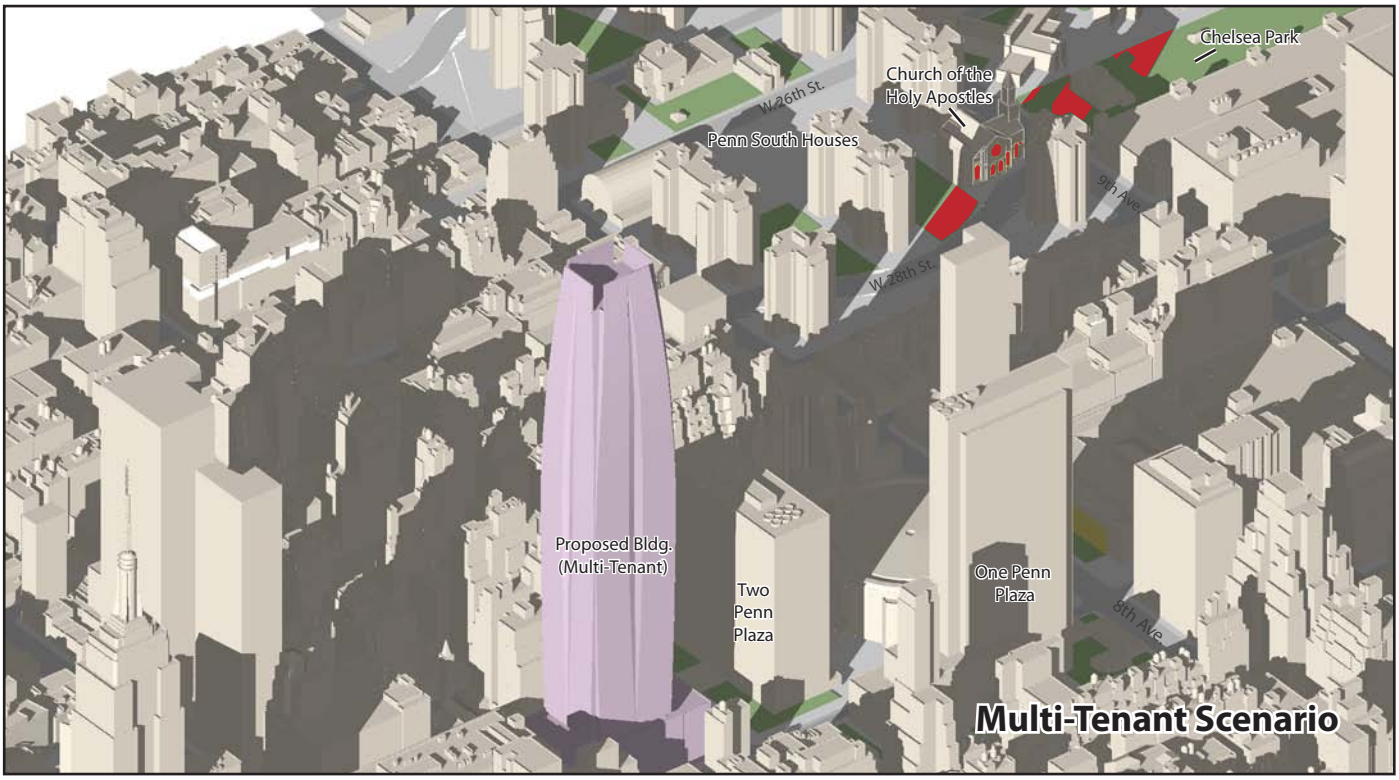
SCALE

March 21 / Sept. 21 - 12:00 PM EDT

Figure 7-6

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Sun-sensitive feature of historic resource

Existing / No Action shadow on sun-sensitive feature of historic resource

Incremental shadow on open space or sun-sensitive historic resource

View Southwest
May 6 / August 6 - 8:00 AM EDT
Figure 7-7

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

Reduction in shadow on open space

shadow angle

N

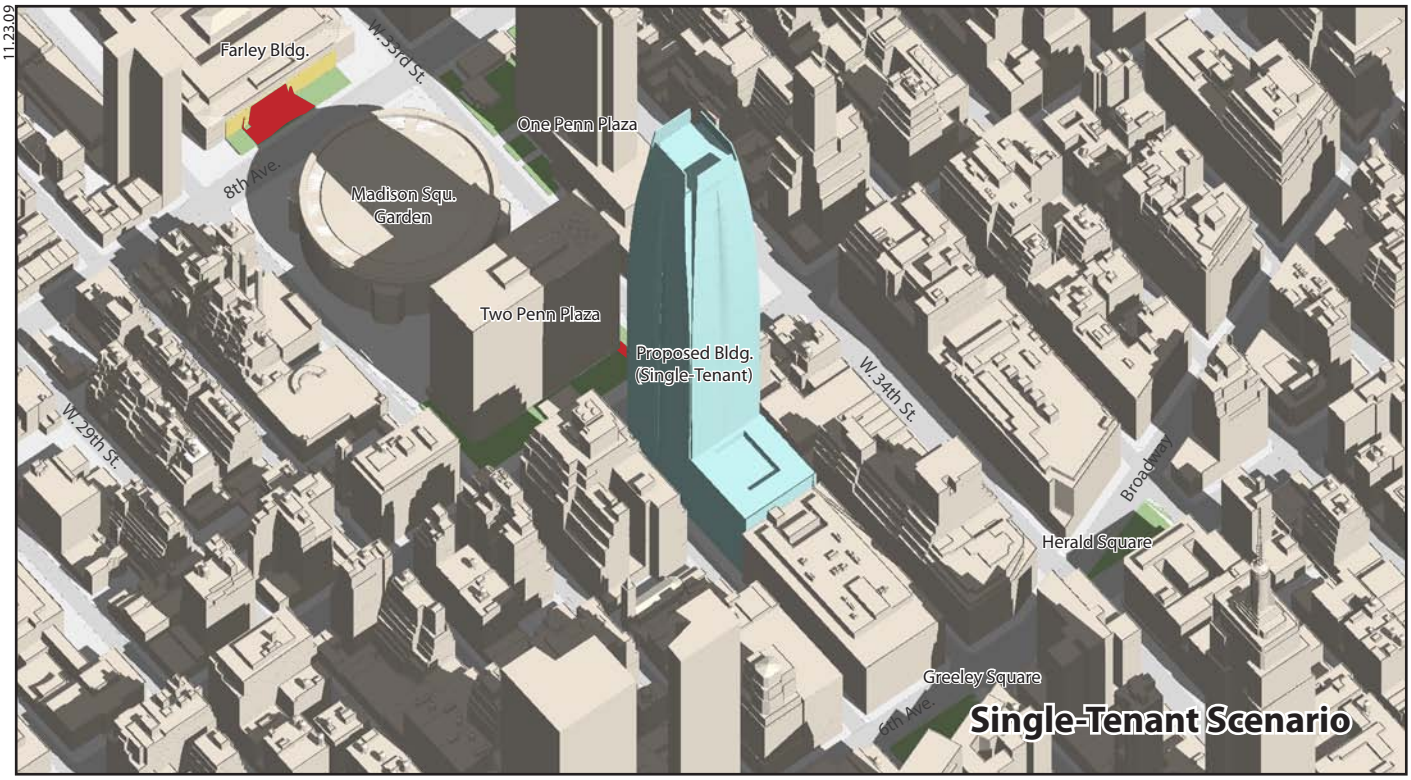
0 200 400 FEET

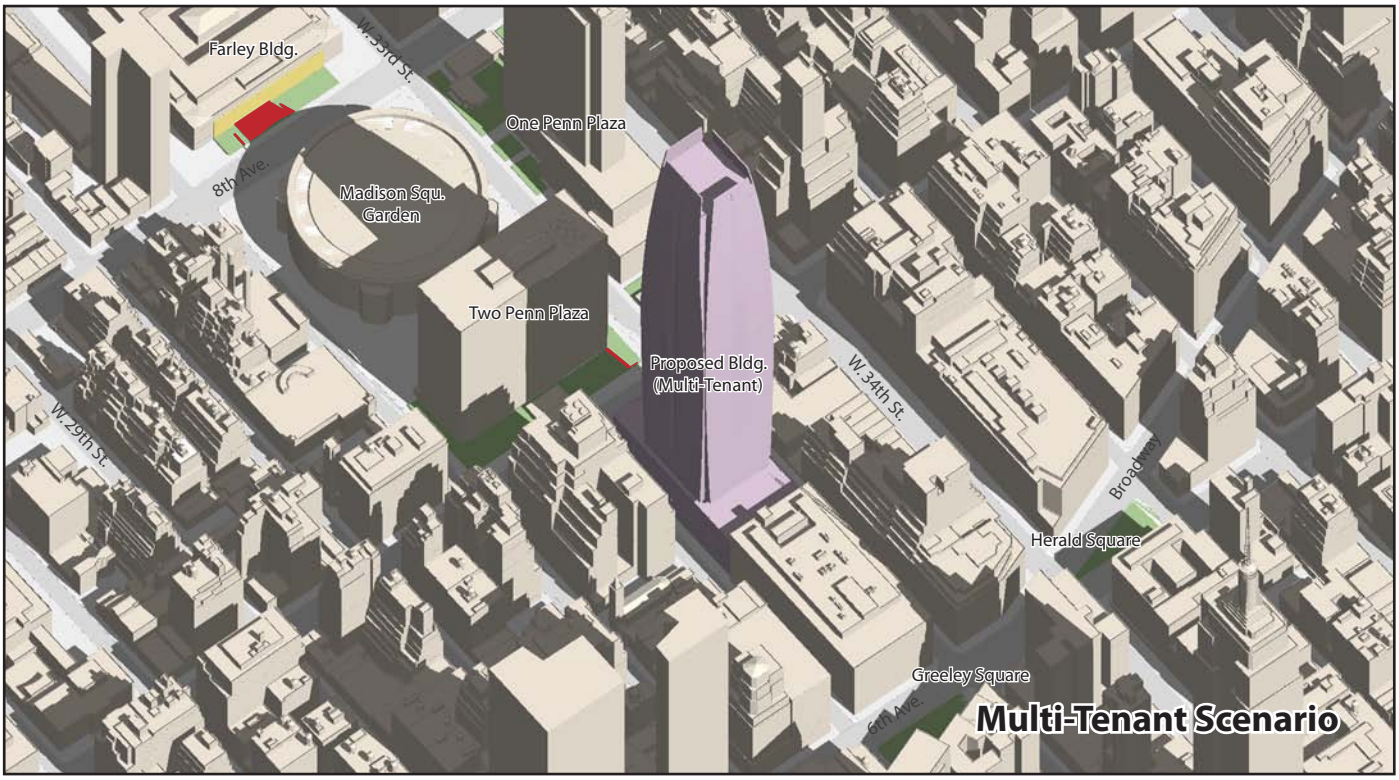
SCALE

May 6 / August 6 - 9:00 AM EDT

Figure 7-8

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Sun-sensitive feature of historic resource

Incremental shadow on open space or sun-sensitive historic resource

View Northwest
May 6 / August 6 - 10:00 AM EDT
Figure 7-9

11.23.09

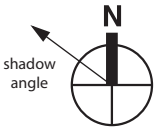


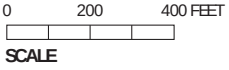


Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

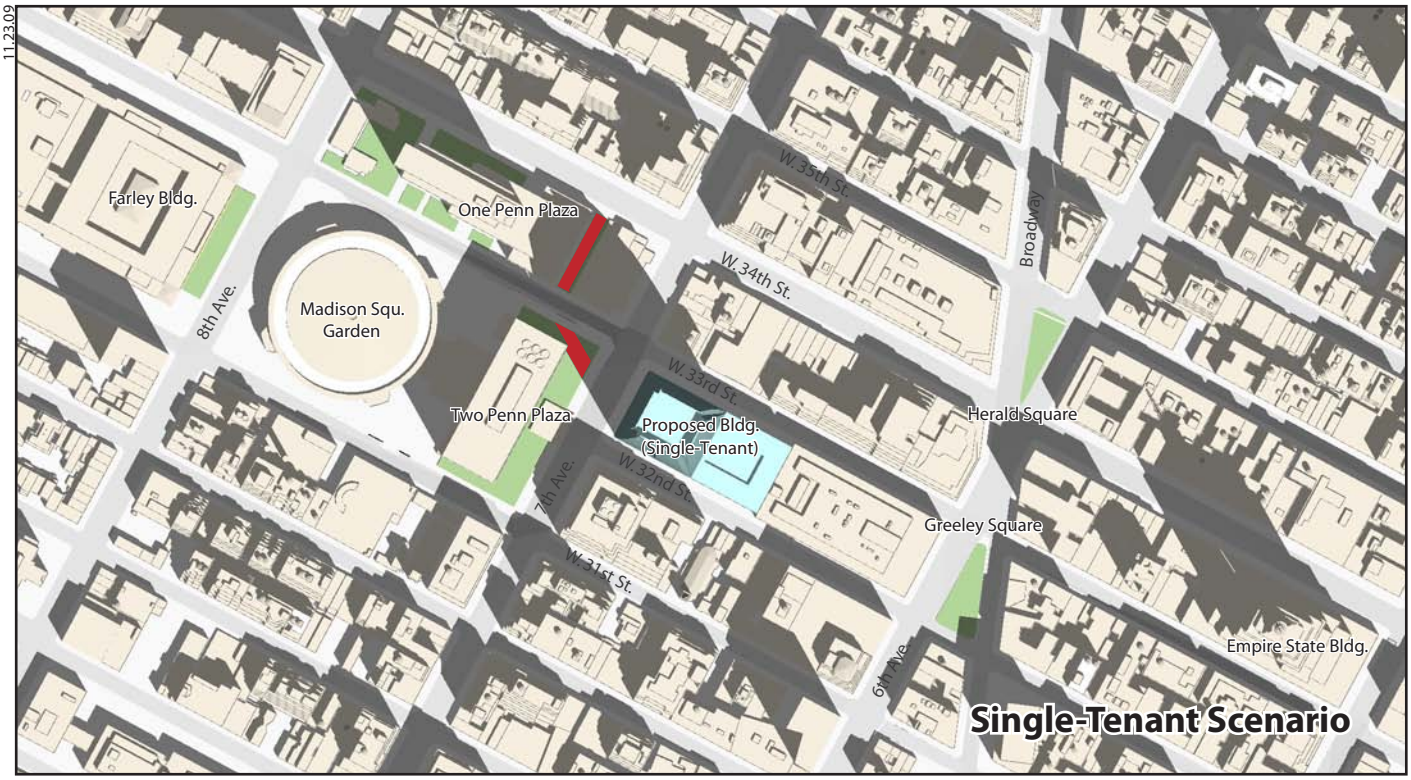


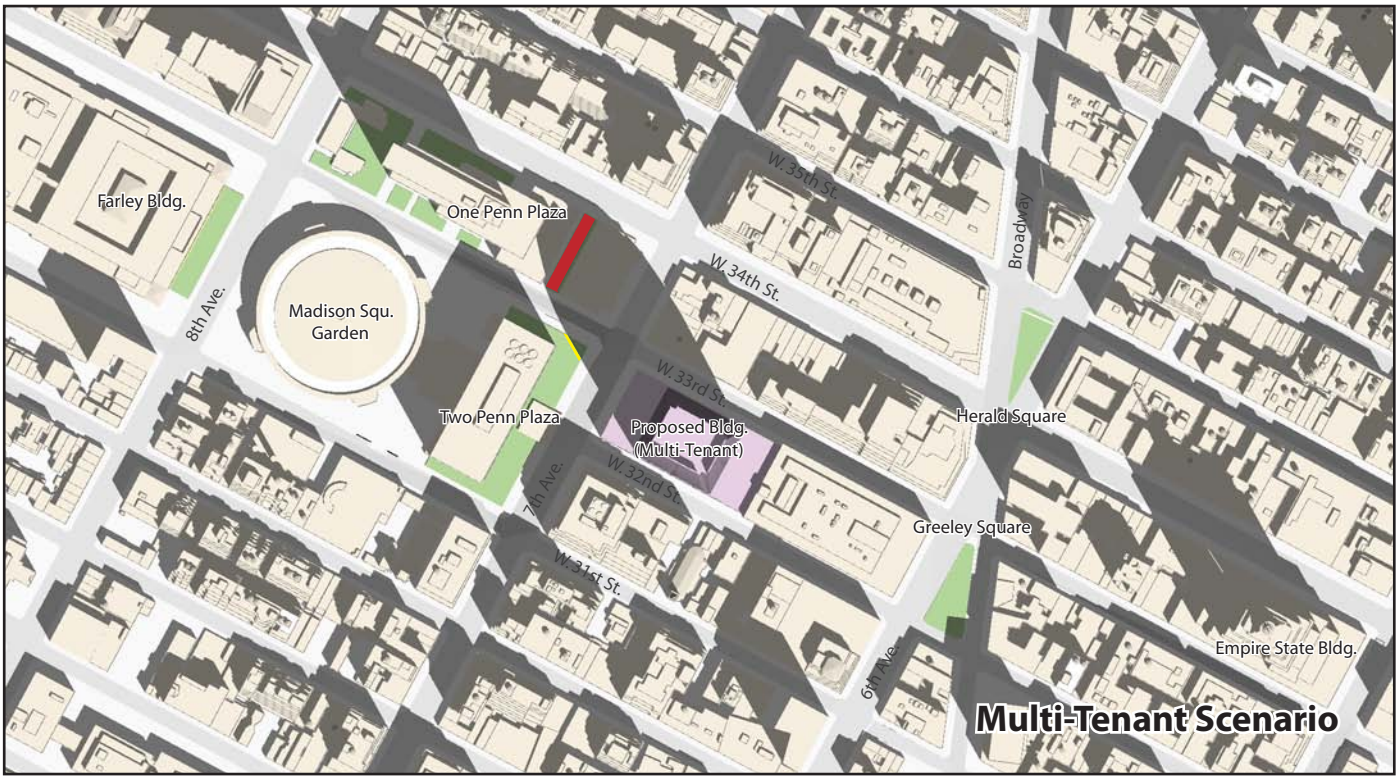


May 6 / August 6 - 11:00 AM EDT

Figure 7-10

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

Reduction in shadow on open space

shadow angle

N

0 200 400 FEET

SCALE

May 6 / August 6 - 12:00 PM EDT

Figure 7-11

11.23.09

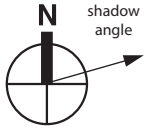


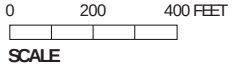


Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

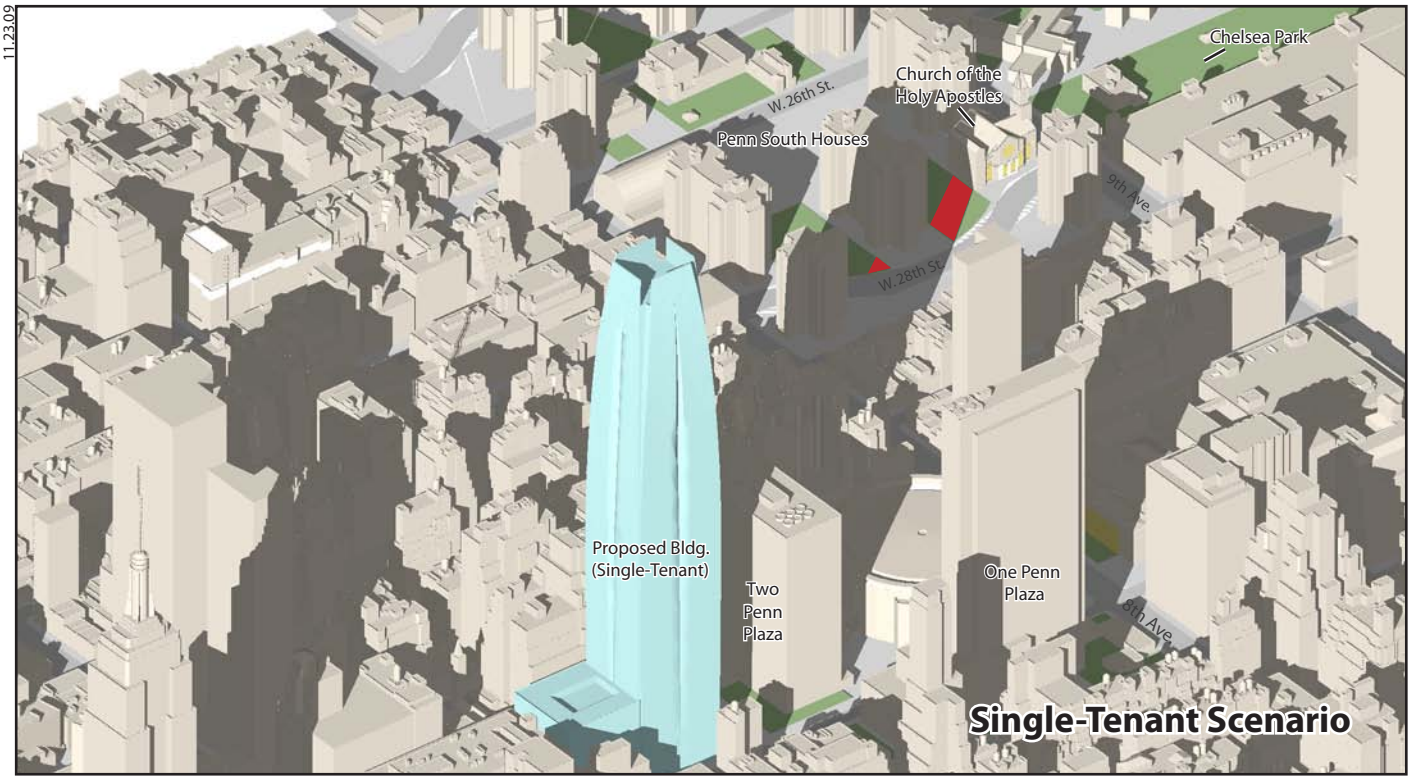


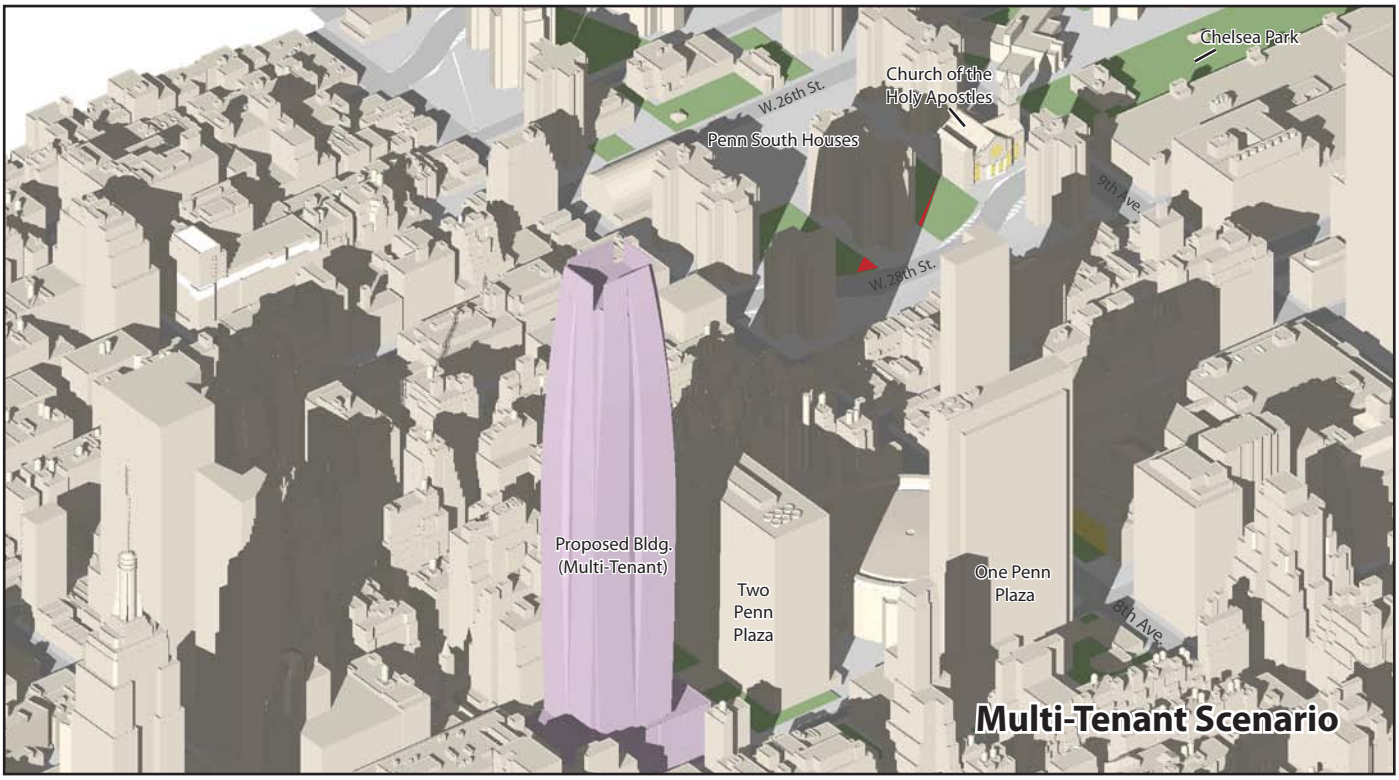


May 6 / August 6 - 4:00 PM EDT

Figure 7-12

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Sun-sensitive feature of historic resource

Existing / No Action shadow on sun-sensitive feature of historic resource

Incremental shadow on open space or sun-sensitive historic resource

View Southwest
June 21 - 8:00 AM EDT
Figure 7-13

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

Reduction in shadow on open space

N

shadow angle

0 200 400 FEET

SCALE

June 21 - 9:00 AM EDT

Figure 7-14

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

Reduction in shadow on open space

shadow angle

N

0 200 400 FEET

SCALE

June 21 - 10:00 AM EDT

Figure 7-15

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

shadow angle

N

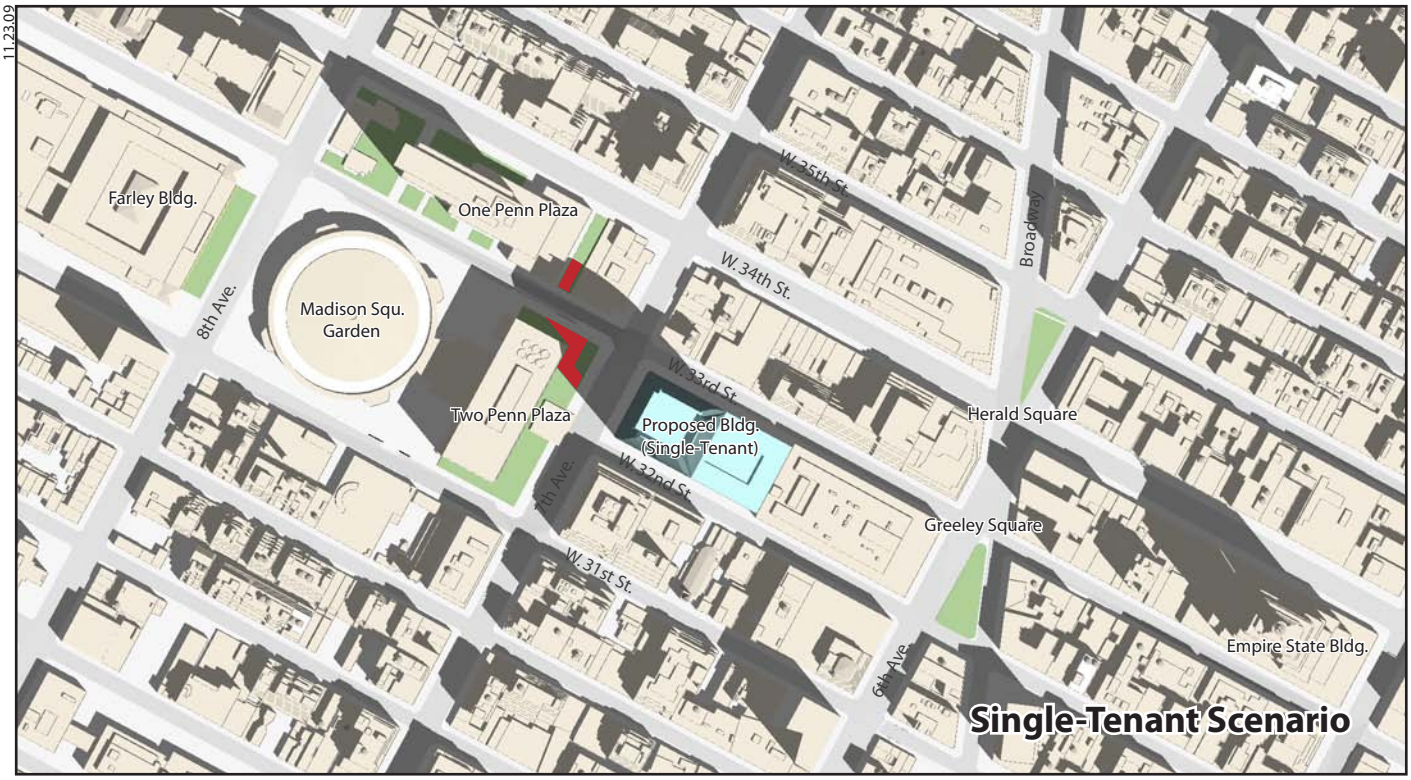
0 200 400 FEET

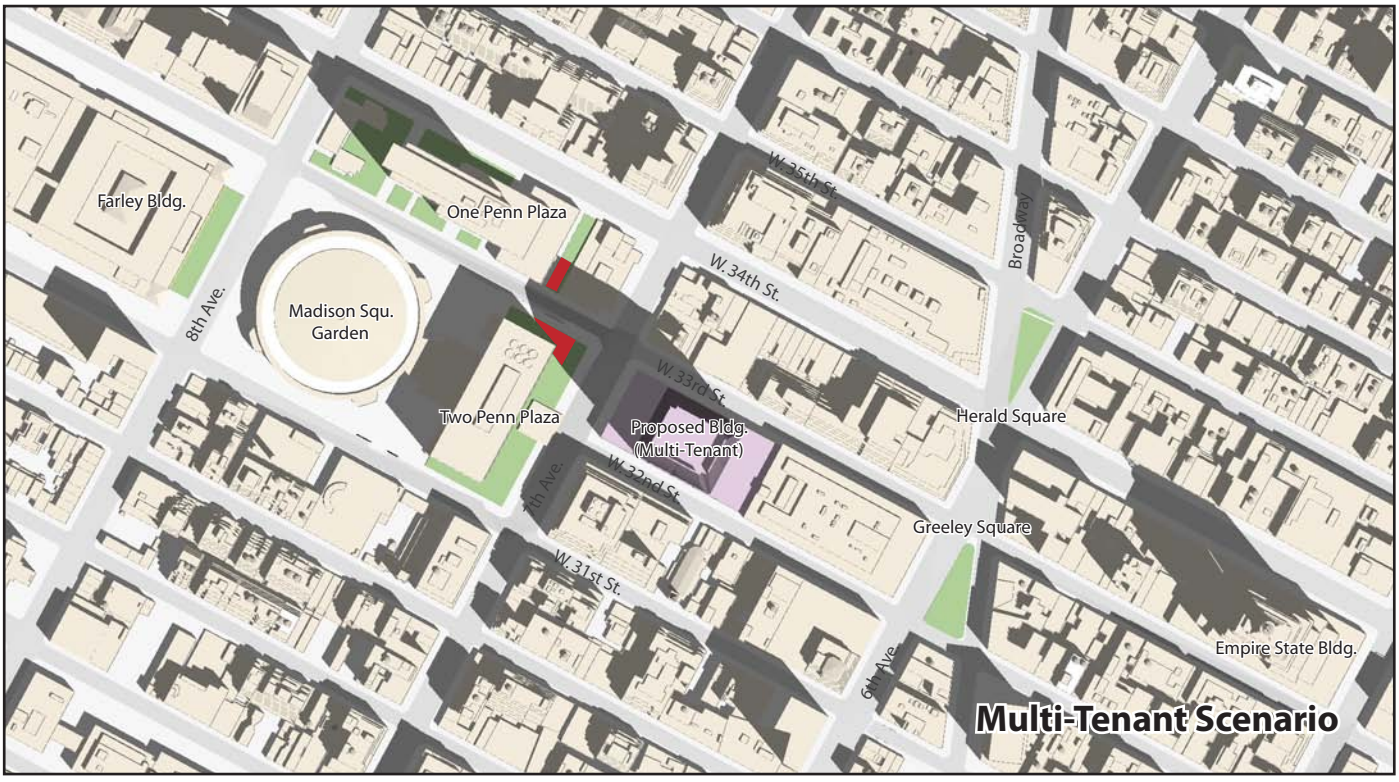
SCALE

June 21 - 11:00 AM EDT

Figure 7-16

11.23.09

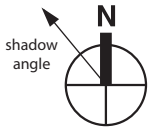


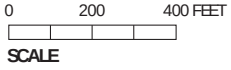


Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

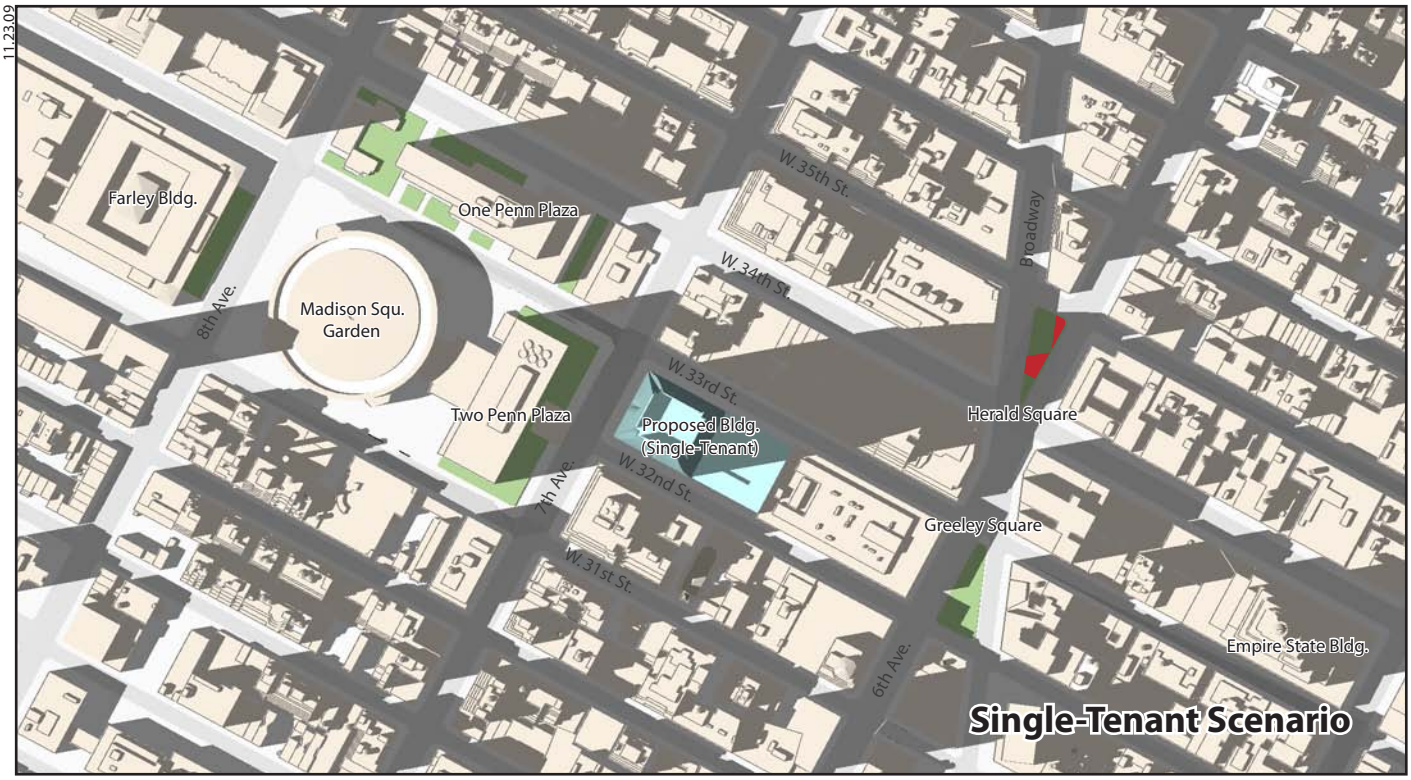




June 21 - 12:00 PM EDT

Figure 7-17

11.23.09





Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space

N

shadow angle

0 200 400 FEET

SCALE

June 21 - 4:00 PM EDT

Figure 7-18

11.23.09

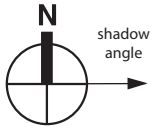


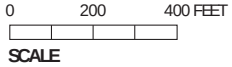


Publicly accessible open space

Existing / No Action shadow on open space

Incremental shadow on open space





June 21 - 5:00 PM EDT

Figure 7-19

Table 7-1
Incremental Shadow Durations – Single-Tenant Office 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				
Clement Clark Moore Park	—	—	6:57 AM–7:10 AM Total: 13m	—
Penn South Houses open spaces	—	7:27 AM–8:00 AM Total: 33m	6:57 AM–8:30 AM Total: 1h 33m	—
Chelsea, Elliot, and Chelsea Addition Houses	—	7:27 AM–7:50 AM Total: 23m	—	—
Chelsea Park	—	7:30 AM–8:10 AM Total: 40m	—	—
The High Line (planned)	8:36 AM–8:50 AM Total: 14m	7:27 AM–7:30 AM Total: 3m	—	—
Brookfield Manhattan West plaza (planned)	9:25 AM–9:50 AM Total: 25m	—	—	—
Farley Building steps*	—	9:15 AM–10:15 AM Total: 1h	—	—
Two Penn Plaza	8:45 AM–8:50 AM 9:30 AM–12:30 PM Total: 3h 5m[1]	8:00 AM–12:30 PM Total: 4h 30m[2]	7:30 AM–12:30 PM Total: 5h[3]	—
One Penn Plaza	10:00 AM–11:00 AM 12:00 PM–12:45 PM Total: 1h 45m[4]	11:00 AM–12:30 PM Total: 1h 30m	11:45 AM–12:30 PM Total: 45m	—
Herald Square	—	3:45 PM–4:45 PM 5:15 PM–5:30 PM Total: 1h 15m	3:30 PM–5:00 PM Total: 1h 30m	—
HISTORIC RESOURCES				
Church of the Holy Apostles	—	7:27 AM–8:00 AM Total: 33m	8:10 AM–8:15 AM Total: 5m	—
Farley Building colonnade	9:30 AM–10:00 AM Total: 30m	9:15 AM–10:00 AM Total: 45m	—	—

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.
*The Farley Building steps are also considered a sun-sensitive feature of a historic resource.
[1]From 8:55 AM to 9:00 AM and 10:00 AM to 10:25 AM there would also be areas of reduced shadow.
[2]From 7:27 AM to 9:40 AM there would also be areas of reduced shadow.
[3]From 7:01 AM to 8:30 AM and 10:00 AM to 10:10 AM there would also be areas of reduced shadow.
[4]From 10:30 AM to 11:30 AM there would also be an area of reduced shadow on eastern throughblock portion.

Table 7-2
Incremental Shadow Durations – Multi-Tenant Office 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				
Clement Clark Moore Park	—	—	6:57 AM–7:10 AM Total: 13m	—
Penn South Houses open spaces	—	7:27 AM–8:05 AM Total: 38m	6:57 AM–8:30 AM Total: 1h 33m	—
Chelsea, Elliot, and Chelsea Addition Houses	—	7:27 AM–7:55 AM Total: 28m	—	—
Chelsea Park	—	7:35 AM–8:15 AM Total: 40m	—	—
The High Line (planned)	8:36 AM–8:50 AM Total: 14m	7:27 AM–7:30 AM Total: 3m	—	—
Brookfield Manhattan West plaza (planned)	9:30 AM–9:45 AM Total: 15m	—	—	—
Farley Building steps*	—	9:20 AM–10:05 AM Total: 45m	—	—
Two Penn Plaza	9:30 AM–11:15 AM Total: 1h 45m[1]	8:00 AM–11:50 AM Total: 3h 50m[2]	7:30 AM–9:30 AM 10:15 AM–12:15 PM Total: 4h[3]	—
One Penn Plaza	10:00 AM–11:15 AM Total: 1h 15m[4]	11:00 AM–12:30 PM Total: 1h 30m	11:45 AM–12:15 PM Total: 30m	—
Herald Square	—	3:15 PM–4:45 PM Total: 1h 30m	3:15 PM–4:45 PM Total: 1h 30m	—
HISTORIC RESOURCES				
Church of the Holy Apostles	—	7:27 AM–8:05 AM Total: 38m	—	—
Farley Building colonnade	9:30 AM–10:00 AM Total: 30m	9:30 AM–10:00 AM Total: 30m	—	—

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.
*The Farley Building steps are also considered a sun-sensitive feature of a historic resource.
[1]From 8:55 AM to 9:00 AM, 10:00 AM to 10:20 AM and 11:15 AM to 12:00 PM there would also be reduced shadow
[2] From 7:27 AM to 9:00 AM and again from 11:50 AM to 12:10 PM there would also be areas of reduced shadow
[3]From 6:57 AM to 9:30 AM there would also be areas of reduced shadow
[4]From 12:00 PM to 12:30 PM there would also be an area of reduced shadow

In both scenarios, Clement Clark Moore Park would experience less than 15 minutes of incremental shadow on the June 21 analysis day only. The planned Brookfield Manhattan West plaza would experience 15 minutes (Multi-Tenant Office Scenario) or 25 minutes (Single-Tenant Office Scenario) of incremental shadow on the March 21/September 21 analysis day only. In both scenarios, small portions of the planned High Line would experience 15 minutes of incremental shadow on March 21/September 21 and just a few minutes on May 6/August 6, and no incremental shadow on the other analysis days. The brief durations of new shadow on these three resources would not cause significant adverse impacts, and they are not discussed in further detail. Potential effects are first discussed on open spaces, followed by a discussion of the project's effects on historic resources.

PENN SOUTH HOUSES

The Penn South Mutual Redevelopment Houses are located on several blocks between West 23rd and West 29th Streets and Eighth and Ninth Avenues. Penn South contains several open spaces for use by its residents and the public. Numerous sitting areas and landscaped paths are provided between the buildings, along with play equipment for children. The Penn South Playground is a New York City Department of Parks and Recreation (DPR) playground contained within the Penn South Cooperative Houses; this playground would not experience any incremental shadow from the proposed project.

In both scenarios, the proposed building's shadow would fall far enough south early on late spring and summer mornings to pass across portions of the Penn South open spaces on the superblock between West 26th and West 28th Streets. On the May 6/August 6 analysis day, project-generated shadow (both scenarios) would last for about a half-hour (see **Figure 7-7**), and on June 21, when shadows fall furthest to the south, project-generated shadow (both scenarios) would last from 6:57 AM to 8:30 AM (see **Figure 7-13**). No incremental shadow would affect the Penn South open spaces on the March/September or December analysis days in either proposed scenario.

While the extent of the incremental shadow in either scenario would briefly be large early in the late spring and summer mornings, such early morning shadows move quickly and the increment would exit the space by about 8:00 AM on May 6 and August 6 and by 8:30 AM on June 21 in both scenarios. The limited duration during the early morning would not be expected to significantly affect the health of the vegetation or the use of the space.

CHELSEA, ELLIOT, AND CHELSEA ADDITION HOUSES

The Chelsea Houses, Chelsea Houses Addition, and Elliot Houses are New York City Housing Authority (NYCHA) developments located on the two full blocks between West 25th and West 27th Streets and Ninth and Tenth Avenues. The developments are adjacent to each other and feature open spaces around and between most of the buildings comprising the developments. The spaces include jungle gyms, spray showers, benches, game tables, paths, and a garden interspersed between the buildings.

In both scenarios, small areas within these open spaces would experience about 25 minutes of new shadow early in the morning of the May 6/August 6 analysis day only. This brief period of incremental shadow would not adversely affect either the vegetation or the use of the spaces. No incremental shadow would affect the open spaces on the other analysis days.

CHELSEA PARK

The 3.91-acre Chelsea Park, which is operated by DPR, occupies an entire block between Ninth and Tenth Avenues, south of West 28th Street. Chelsea Park is largely comprised of active recreation spaces, including ball fields, basketball courts, swings and jungle gyms, and a comfort station. In addition, there are trees, planters, and lighting for passive users.

In both scenarios, portions of the park would experience 40 minutes of new shadow early in the morning of the May 6/August 6 analysis day only (see **Figure 7-7**). The extent of new shadow would briefly be large, but early morning shadows move quickly and the increment would exit the space by about 8:15 AM in both scenarios. Chelsea Park would continue to receive direct sunlight for much of the day throughout the late spring and summer. The brief periods of incremental shadow would not adversely affect either the vegetation or the use of the space,

which is primarily devoted to active recreation. No incremental shadow would affect the park on the June 21, March 21/September 21 or December 21 analysis days.

FARLEY BUILDING STEPS

The Farley Building (New York City Landmark [NYCL], State and National Register of Historic Places [S/NR]) on Eighth Avenue between West 31st and West 33rd Streets has two features that are considered shadow-sensitive. One of these features, the wide flight of steps, is considered to be publicly accessible open space and provides an estimated 0.38 acres of passive open space. The steps are typically used as seating and as a general gathering place. The other feature is the Eighth Avenue façade, which is described below in the historic resources section.

In both scenarios, the Farley Building steps would experience some mid-morning shadow from the proposed building on the May 6/August 6 analysis day only. In the Single-Tenant Office Scenario, incremental shadow would move across the steps between 9:15 AM and 10:15 AM, covering nearly half the steps area for some of this period (see **Figure 7-9**). In the Multi-Tenant Office Scenario, in which the proposed tower is 26 feet taller but set about 73 feet further east, incremental shadow would pass across the steps for a slightly shorter period, between 9:20 AM and 10:05 AM (see **Figure 7-9**). No incremental shadow in either scenario would fall on the steps on the March/September, June, or December analysis days.

The limited extent and duration of incremental shadow would not result in a significant adverse impact to the steps of the Farley Building.

TWO PENN PLAZA

Two Penn Plaza is located between West 31st and West 33rd Street in the superblock formed by Madison Square Garden (MSG), Pennsylvania Station, and the Two Penn Plaza office tower. The urban plaza that rings the Two Penn Plaza building on three sides—its Seventh Avenue frontage and north and south sides—provides some seating and gathering areas. At an April 2008 site visit, the south side was inaccessible due to extensive New Jersey Transit renovations, and most of the southern portion of the Seventh Avenue frontage was behind a permanent, locked gate, and a sign indicated that the area was for private resident use only.

With tall buildings surrounding it, including the Two Penn Plaza office building itself, this urban plaza remains largely shaded for much of the day under existing conditions, particularly in the fall, winter, and spring.

The Single-Tenant Office Scenario would add between three and five hours of new shadow during spring, summer, and fall mornings. However, the new areas of shadow would come primarily from the additional bulk on the sides of the proposed tower, as compared to the No Action building's more slender tower portion, rather than the additional height. The extent of incremental shadow would consequently be small through most of the affected period (see **Figures 7-4, 7-5, 7-6, 7-9, 7-10, 7-11, 7-14, 7-15, 7-16, and 7-17)**. Additionally, due to the No Action building's slightly wider podium and different tower location, there would also be areas of reduced shadow on the plaza at times with the Single-Tenant Office Scenario, ranging in duration between 30 minutes and two-and-a-quarter hours, depending on the season (see **Figures 7-3 and 7-15)**.

The Multi-Tenant Office Scenario would also cast incremental shadow on the plaza in the spring, summer, and fall, but because its tower is set back farther away from Seventh Avenue and the plaza, it would cast about an hour less of shadow than the Single-Tenant Office Scenario. Similar to the Single-Tenant Office Scenario (and as shown in the same figures), the extent of new shadow would

generally be small, coming primarily from the sides of the tower massing where it would be bulkier than the No Action tower. As with the Single-Tenant Office Scenario, there would also be some reduction in shadow in comparison with the No Action building (see **Figures 7-3, 7-11, and 7-14)**.

Given the generally very small extent of incremental shadow, and the fact that it would occur in the morning (until just after noon in some seasons) when this office plaza is only lightly used, significant adverse shadow impacts would not occur with either scenario.

ONE PENN PLAZA

The main public plaza at One Penn Plaza is located near the western end of the block. There is a paved through-block passage near the eastern end of the block, with planters and seating. There are also two small areas along the north and south sides of the One Penn Plaza office building, around the entrances to the building, featuring planters with trees and bushes and ledges that provide seating space.

The Single-Tenant Office Scenario would add 45 minutes of new shadow on June 21, and up to an hour and 45 minutes of new shadow in the spring and fall. As can be seen in **Figures 7-4, 7-5, 7-6, 7-10, 7-11, and 7-17**, the extent of incremental shadow would generally be quite small. Additionally, because the incremental shadow would pass across the western and southern plazas for a time, and then subsequently move across a portion of the eastern through-block passage, each area would experience only a portion of the total duration. Furthermore, on the March 21/September 21 analysis day a reduction in shadow would occur on an area of the eastern through-block passageway, for about an hour (see **Figure 7-5**).

The Multi-Tenant Office Scenario would add slightly less new shadow to One Penn Plaza than the Single-Tenant Office Scenario, between 30 minutes and an hour and 15 minutes, depending on the season. It would also similarly result in an area of reduced shadow on the eastern through-block passageway on March 21 and September 21.

The limited extent and duration of new shadow would not cause significant adverse impacts to this urban plaza.

HERALD SQUARE

Herald Square is a triangular park formed by the intersection of Sixth Avenue, Broadway, and West 34th Street. The park was named for the New York Herald, which had its headquarters just to the north. The park includes seating, landscaping, a clock that formerly was on the top of the Herald Building, and a National Register-eligible monument honoring James Gordon Bennett, the founder of the New York Herald, and his son.

Both scenarios would add approximately an hour-and-a-half of new shadow on late spring and summer afternoons around 4:00 PM (see **Figures 7-12**, **7-18**, and **7-19**). Much of the square is already shaded by existing buildings at this time of day. At times during the affected period, the incremental shadow in both scenarios would remove the small remaining area of sunlight. At other times during the affected period the extent of new shadow would be very small.

The square would continue to experience direct sunlight from late morning through mid-afternoon during the late spring and summer, and the late afternoon incremental shadow from either scenario would not be expected to significantly impact either the landscaping or the use of the space.

PROBABLE IMPACTS ON HISTORIC RESOURCES

CHURCH OF THE HOLY APOSTLES

The Church of the Holy Apostles at 300 Ninth Avenue, on the west side of the superblock occupied by the Penn South houses, features round-arched windows and a large tower, belfry, and spire composition. The one-story building contains several stained glass windows on its north façade, which is the only façade that could be affected by new shadows from the project. This increment would occur on late spring and summer mornings. There is an approximately 80-foot-tall residential building abutting the eastern façade of the church. As a result, no part of the church's east façade experiences sunlight at any time under existing conditions.

With both scenarios, the proposed building would cast new shadow on the windows of the north façade of the church for approximately 35 minutes early on May 6 and August 6 (see **Figure 7-7**). The incremental shadow would be gone by about 8:00 AM, after which the windows on the north façade would be in sunlight until the sun passes into the southern half of the sky later in the morning. The Single-Tenant Office Scenario would cast five minutes of new shadow early on June 21, while the Multi-Tenant Office Scenario would not cast any new shadow on June 21.

The limited duration of new shadow early in the late spring and summer mornings would not result in significant adverse impacts with either scenario.

FARLEY BUILDING COLONNADE

The Farley Building (NYCL, S/NR) on Eighth Avenue between West 31st and West 33rd Streets has two features that are considered shadow-sensitive. As noted above, the wide flight of steps on Eighth Avenue is considered to be publicly accessible open space. Additionally, the Eighth Avenue façade (the primary façade) at the top of the steps consists of a shallow portico raised high above the street and features twenty 53-foot-tall, fluted Corinthian columns. The play of sunlight and shadow on this façade contributes to the architectural significance of this landmark, and therefore an assessment of incremental shadow on the façade is warranted.

With the Single-Tenant Office Scenario, a small area of new shadow would fall across the upper portion of the colonnade for 30 minutes on the morning of the March 21 and September 21 analysis day (see **Figure 7-4**), and for 45 minutes on the May 6 and August 6 analysis day (see **Figure 7-9**). With the Multi-Tenant Office Scenario, new shadow would occur for 30 minutes on both the March/September and May/August mornings. In both scenarios some sun would continue to fall on the other portions of the colonnade during the affected period, and the façade would be fully in sun from later in the morning through early afternoon. No incremental shadow would occur on the June 21 and December 21 analysis days in either scenario, and the limited extent and duration of new shadow during the March to May and August to September periods would not significantly impact this architectural resource. ✷