

## **A. INTRODUCTION**

The proposed action would result in significant adverse shadow impacts on two shadow resources of concern: the Church of the Guardian Angel and the General Theological Seminary (located within the Chelsea Historic District). As discussed below, there are no practicable or feasible means to reduce the impacts, therefore, they would remain unmitigated. The proposed action would not result in significant adverse shadow impacts on the remaining resources of concern discussed in this chapter.

According to the *CEQR Technical Manual*, a shadow is defined as the circumstance in which a building or other built structure blocks the sun from the land. An adverse shadow impact is considered to occur when the shadow from a proposed project falls on a publicly accessible open space, historic landscape, or other historic resource if the features that make the resource significant depend on sunlight, or if the shadow falls on an important natural feature and adversely affects its use and/or important landscaping and vegetation. In general, shadows on city streets and sidewalks or on other buildings are not considered significant under CEQR. In addition, shadows occurring within an hour and a half of sunrise or sunset generally are also not considered significant under CEQR.

This chapter assesses the reasonable worst-case development scenario for potential shadowing effects on existing light-sensitive uses, and discloses the length and duration of shadows which are likely to result from the proposed action. This assessment considers the following:

- Projected and potential development sites adjacent to existing natural resources, historic resources, and/or publicly accessible open spaces.
- If warranted, describe in shadow diagrams and text the potential effect of shadows from buildings (both projected and potential development sites) on publicly accessible open spaces, light-sensitive natural resources, or light-sensitive historic resources.

The rezoning area affected by the proposed action covers approximately 13 whole and 2 partial blocks in West Chelsea. The rezoning area is generally bounded by W. 30th Street, W. 17th Street, Tenth Avenue, and Eleventh Avenue (the rezoning area also includes the east side of Tenth Avenue between W. 16th and W. 18th Streets to a point 400 feet east of Tenth Avenue). According to the *CEQR Technical Manual*, the longest shadow a structure will cast, except for periods close to sunrise or sunset is 4.3 times its height. Projected and potential developments would range in new building heights from 120 to 390 feet and would therefore cast maximum shadows of 516 to 1,677 feet. It should be noted that a number of the projected and potential development sites involve conversion of existing buildings in which there would be no expansion in the building or only minor expansions in building height that would represent less than a 50 foot incremental increase.

Preliminary assessment of the projected and potential development sites and the shadows they would cast found that several cast shadows long enough to reach open spaces and architectural resources. Therefore, a shadow screening analysis was undertaken for the projected and potential development sites to determine whether the proposed action has the potential to result in significant shadow impacts thereby requiring a detailed shadow analysis.

The proposed action also includes the site selection and acquisition of the High Line to create a publicly accessible ~~6.7~~ 5.9-acre open space. While the conversion of the High Line may include some alterations to the existing structure, it is not expected to significantly change the coverage of shadows cast. Therefore, the creation of the High Line open space, which extends south of the rezoning area boundary to Gansevoort Street and also includes the post office spur extending east of Tenth Avenue at W. 30th Street, would have no notable shadow effects and is not analyzed as a shadow source in the chapter.

## **B. RESOURCES OF CONCERN**

In accordance with CEQR guidelines, the assessment of potential shadow impacts is limited to new shadows long enough to reach publicly accessible open space, historic resources, or important natural features. As discussed in Chapter 10, “Natural Resources,” the Hudson River, located in the study area, is considered an important natural feature. In coordination with Chapter 5, “Open Space,” and Chapter 7, “Historic Resources”, publicly accessible open spaces and architectural resources to the north, south, east, and west of the projected and potential development sites were identified, as shadows created by the proposed action could fall in the direction of these resources. The resources of concern were also assessed for their potential to be sunlight sensitive. Only those resources that are sunlight sensitive and were found to be within the shadow radius (as discussed above) of a projected or potential development site were included in the analysis. Figure 6-1 shows the location of each resource; there are 26 resources of concern in the West Chelsea shadows study area.

Each of these resources are listed below and identified by letters, which serves as a key for Figure 6-1. As a cross-reference, the Historic Resource number shown in Table 7-1 and Figure 7-1 or the Open Space resource number shown in Table 5-2 and Figure 5-2 are provided as well.

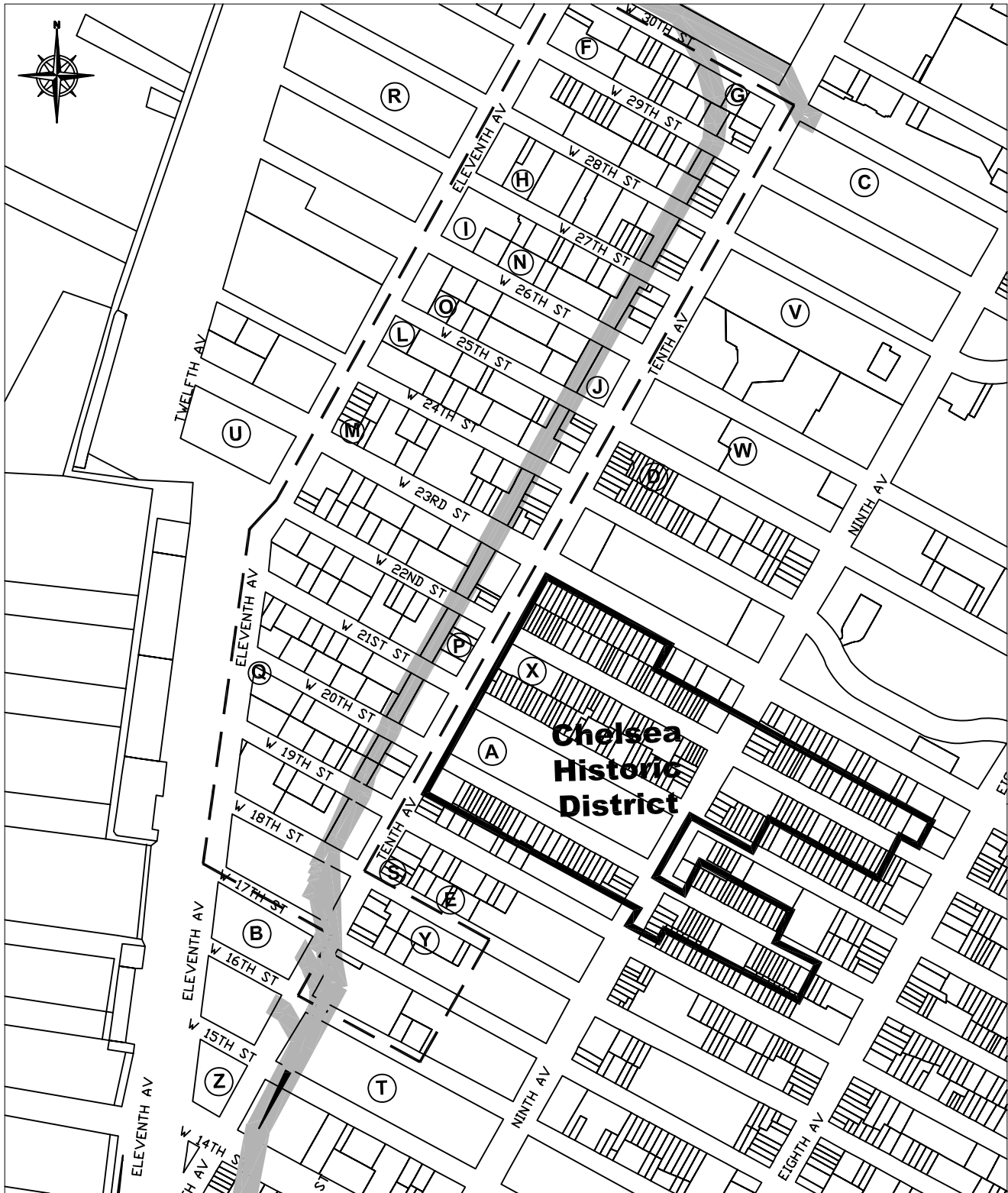
### **Historic Resources**

#### ***Designated Historic Resources***



##### **A. Chelsea Historic District (Historic Resource #18)**

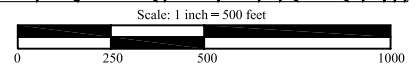
The Chelsea Historic District includes an original district designated by the New York City Landmarks Preservation Commission (LPC) in 1970, listed on the National Register (NR) in 1977 and on the State Register (SR) in 1980, as well as an expansion which was added by LPC in 1981 and listed on the State and National Registers of Historic Places (S/NR) in 1982. It encompasses all or portions of eight blocks in an area generally bounded by W. 23rd Street, Eighth Avenue, W. 19th Street, and Tenth Avenue. Most of the buildings in the district were

Figure 6-1  
Shadow Resources of Concern



**Legend:**

-  Rezoning Area Boundary
-  Resource of Concern



built from the 1830s to 1870s. The district is primarily residential although it also contains commercial and religious institution buildings. It mainly consists of Greek Revival and Italianate row houses, but also contains a few apartment buildings and federal style houses. Other architectural styles represented among the contributing resources include neo-Grec, French Second Empire, and neo-Gothic. Unlike most areas of Manhattan, some row houses in the district are set back from the street and provide front gardens. The General Theological Seminary campus, including buildings from the 1820s and 1830s as well as lawns and trees, occupies the block bounded by W. 21st Street, Ninth Avenue, W. 20th Street, and Tenth Avenue. Another notable characteristic is that the district is replete with shade trees along sidewalks in front of the area's buildings, creating a canopy along its streets and providing shade throughout the area. Besides the Seminary, the historic district includes two other religious institutions, St. Peter's Episcopal Church, 346 W. 20th Street, and St. Paul's German Lutheran Church, located on W. 22nd Street between 8th and 9th Avenues.

B. Merchants Refrigerating Company Warehouse (Historic Resource #23)

This S/NR-listed resource occupies the entire trapezoidal shaped block bounded by W. 17th Street, Tenth Avenue, W. 16th Street, and Eleventh Avenue. It is immediately adjacent to a spur of the High Line that branches off the main line near where the elevated viaduct crosses Tenth Avenue in front of the resource. It is also located across the street from Projected Development Sites 21 and 24. It was S/NR listed in 1985. It was constructed in 1916-1918 as a cold storage warehouse, representing the state of the art in this type of facility at the time. It is an 11-story building constructed of reinforced concrete with an exterior of buff-colored brick, terra cotta, granite, and cast stone designed in a simplified Renaissance revival style. The facades are divided vertically into three sections by cornices or banding, separating floors 1 to 3, 4 to 10, and 11.

C. Morgan Postal Facility (Historic Resource #24)

This S/NR listed resource occupies the entire block bounded by Ninth and Tenth Avenues and W. 29th and W. 30th Streets. Constructed in 1933 by the United States Postal Service, the building is significant as one of many postal facilities built under a New Deal-generated building program. The building was designed by James A. Wetmore. It is set on a limestone base and the upper portion of the building is faced in tan brick and articulated with alternating piers and window bays. Art Deco details ornament the ten-story Ninth Avenue portion of the building. The building is clad with a frieze above the base, a belt course with a similar geometric pattern runs above the eighth floor, with a cornice above the ninth floor. The building features sculpted eagles and carved floral blocks along the base.

D. Houses at 446-460 W. 25th Street (Historic Resource #27)

This S/NR and LPC listed resource consists of eight brick or brownstone row houses. The buildings are either three stories or three stories with a basement and all of the buildings have a common roof line. Six of the eight buildings have classic cornices. Several buildings have low stoops with cast-iron handrails. Many of the buildings have molded stone window lintils and stone window sills. One building also has window shutters.

- E. 445 W. 18th Street (Historic Resource #31)  
This S/NR and LPC listed resource is a two story brick building with a basement and an attic. There are small attic windows facing W. 18th Street. The building has a low stoop with wrought-iron handrails and a wrought-iron fence. There are stone window sills and paneled stone window lintels.

### *Eligible Historic Resources*

- F. W. & J. Sloane Warehouse and Garage (Historic Resource #2)  
This S/NR eligible resource is located at the northeast corner of W. 29th Street and Eleventh Avenue, on Projected Development Site 1. This resource consists of three contiguous buildings. It includes a 10-story red brick loft structure, with Renaissance Revival elements, consisting of two buildings which are identical in style and indistinguishable, but which were constructed at different times (1909 and 1913). It is sited around the southwest corner of the lot now occupied by a parking lot (which is not S/NR eligible). To the east of this structure, is a 4-story garage building, also with Romanesque Revival details. This was constructed in 1910.
- G. Former Hess Brothers Confectionary Factory (Historic Resource #3)  
This S/NR eligible resource, located on W. 30th Street midblock between Tenth Avenue and the High Line, is on a portion of Projected Development Site 2. It is a 7-story masonry industrial building. Its brickwork is suggestive of the Romanesque Revival style and it is notable for the columns at its base. It was constructed in 1884-1885.
- H. Warehouse at 548 W. 28th Street (Historic Resource #4)  
This S/NR eligible resource, a.k.a., 547-559 W. 27th Street, is located on a through-lot with frontage on W. 27th and W. 28th streets, midblock between Tenth and Eleventh avenues. It is on Projected Development Site 4. It is a 6-story red brick loft building, with Romanesque Revival-style details. It is also known as the Berlin and Jones Envelope Company building. It was constructed 1889-1900.
- I. Otis Elevator Building (Historic Resource #5)  
This LPC and S/NR eligible resource, located on a corner lot with frontage on W. 27th Street, Eleventh Avenue, and W. 26th Street, is on Projected Development Site 7. It is a 7-story yellow brick loft building. According to NYC Department Finance records, it was built in 1911 and altered in 1983.
- J. Williams Warehouse (Historic Resource #6)  
This LPC and S/NR eligible resource, located on a corner lot with frontage on W. 26th Street, Tenth Avenue, and W. 25th Street, is on a portion of Projected Development Site 9. It is a 10-story yellow brick loft building. According to NYC Department of Finance records, it is estimated to have been built in 1928 and was altered in 1989.

- K. Charles P. Rogers & Company Building (Historic Resource #7)  
This S/NR eligible resource, located on W. 29th Street midblock between Tenth and Eleventh avenues, is on a portion of Potential Development Site 29. It is a 6-story red brick building, although the easternmost portion of the building is 2 stories with a vehicle entrance. It was built in 1903.
- L. 216 Eleventh Avenue (Historic Resource #10)  
This S/NR eligible building, a.k.a., 210 Eleventh Avenue and 564 W. 25th Street, located on a corner lot with frontage on both W. 25th Street and Eleventh Avenue, is on Potential Development Site 40. It is also known as the Zinn Building. It is a 12-story concrete and steel Renaissance Revival style building, with brick, stone, and terra cotta exterior. According to NYC Department of Finance records, it was built in 1911 and altered in 1989.
- M. Terminal Hotel (Historic Resource #11)  
This S/NR eligible resource, located at the northeast corner of W. 23rd Street and Eleventh Avenue, is on Potential Development Site 47. It is a 4-story brick and stone Italianate building. It was constructed about 1860.
- N. Garage at 537-547 W. 26th Street (Historic Resource #12)  
This S/NR eligible resource, a one-story garage built in 1912, is notable for its gabled facade and interior steel truss.
- O. Cornell Ironworks, a.k.a., Standard Oil Offices (Historic Resources #14)  
This LPC and S/NR eligible resource, located at 555 W. 25th Street (adjacent to Potential Development Site 39), is a red brick building built in 1891 by the eponymous company which manufactured decorative and structural iron implements, and, after 1908, used as offices and warehouse space by Standard Oil.
- P. Church of the Guardian Angel (Historic Resource #16)  
This LPC and S/NR eligible resource, located at 185 Tenth Avenue (across the street from Projected Development Site 15), a 1930 brick and limestone structure. It is a Roman Catholic parish church. Of note, it includes a number of stained glass windows along its south, east, and north facing facades.
- Q. Seamen's House (Historic Resource #17)  
This S/NR eligible resource is located at 118 Eleventh Avenue (adjacent to Projected Development Sites 16 and 17 and across the street from Projected Development Site 13). It is a 9-story Art Deco-style building constructed in 1930-1931 as a YMCA facility for sailors whose ships docked at the Hudson River piers and is now used as the Bayview Correctional Facility, housing female inmates.
- R. Terminal Warehouse Company (Historic Resource #25)  
This S/NR eligible resource was constructed between 1890 and 1912. The Central Stores occupy the block between Eleventh and Twelfth avenues and W. 27th and W. 28th streets. The

complex is comprised of 25 storage buildings of the same design. The brick buildings range in height from seven- to nine-stories and they feature arched window openings and corbelled cornices. Along Eleventh Avenue the facade features a large, central-arched entrance and some terra cotta ornamentation. The terminal complex is recognized for its association with the development of Manhattan's waterfront and for its architectural features.

S. 461 W. 18th Street (Historic Resource #30)

This S/NR listed, LPC listed resource is a two story building with a pitched roof and a brick facade. There are small attic windows facing W. 18th Street and full-size attic windows on the side of the building. Stone window lintils and stone window sills frame the two second-story windows and the large ground-floor window along W. 18th Street.

T. Nabisco Complex (now Chelsea Market), 69-83 Ninth Avenue (Historic Resource #32)

This S/NR eligible resource was the first of West Chelsea's start-up industries to become a major national corporation. The initial factory began in 1887 and by 1932 the Nabisco Complex consisted of seventeen buildings on three blocks. Many of the brick structures employ a simplified industrial classicism enhanced with terra cotta cornices, moldings and trim. In 1995, one full block of the complex was adapted into the Chelsea Market.

The details of the features of the above mentioned historic resources, which are not the primary historic characteristics resulting in their designation or potential designation as historic resources, are not dependent on sunlight during the day to the extent that shadows would diminish their significance. Therefore, while the proposed action could potentially cast shadows on the above listed structures, such shadow effects do not require further assessment of these historic resources. However, the *CEQR Technical Manual* cites stained glass windows as an example of sunlight sensitive features. The Church of the Guardian Angel contains stained glass windows and as such, has the potential to be impacted by shadows cast by new buildings resulting from the proposed action. In addition, the Chelsea Historic District contains three churches with stained glass windows and also has the potential to be impacted by shadows cast by new buildings resulting from the proposed action. As such, further shadow assessment of these two historic resources is necessary.

### High Line

As discussed in Chapter 7, "Historic Resources," the High Line is eligible for listing on the S/NR. The High Line was designed and constructed in the early 1930s by the New York Central Railroad to remove freight train traffic from an at-grade street right-of-way. It is a steel frame structure with a concrete reinforced deck with gravel ballast, double-track railroad line, and metal railings. As it has not been used for freight rail since 1980, the rails are in varying states of dilapidation and the deck has become overgrown with vegetation in many locations. The deck is located approximately 30 feet above street level. From approximately W. 29th Street to W. 18th it extends parallel to and approximately 100 feet west of Tenth Avenue and it crosses Tenth Avenue at W. 17th Street and extends south to Gansevoort Street where it is immediately west of Washington Street (see Figure 6-1 for location of High Line). Although the High Line is a S/NR eligible resource, details of the features of the High Line, which are not the primary historic characteristics resulting in its potential

designation as a historic resource, are not dependent on sunlight during the day to the extent that shadows would diminish its significance. Therefore, while the proposed action could potentially cast shadows on the High Line, such shadow effects do not require further assessment of this eligible historic resource.

### ***Open Space Resources***

According to the *CEQR Technical Manual*, some open spaces contain facilities that are not sensitive to sunlight. These are usually paved (such as handball or basketball courts), contain no sitting areas, and no vegetation, no unusual or historic plantings, or contain only unusual or historic plantings that are shade tolerant. Facilities such as children's playgrounds and sprinklers, swimming pools, sitting or sunning areas, ballfields and other play areas that are covered with turf do require direct sunlight for some part of the day or at some times of the year.

Most open space resources within the proposed action area and surrounding areas are small and accommodate paved sitting areas, basketball courts, and/or playgrounds which contain scattered plants and/or trees that are shade tolerant. As shown in Table 5-2 in Chapter 5, "Open Space," most of the open spaces in the area are paved and contain shade tolerant plants and/or trees. As such, the RWCDs development would not be expected to create any significant new incremental shadows which would adversely affect any of these resources. In addition, many of these open space resources fall outside the shadow radius of any projected or potential developments. Six open space resources were identified as falling within the shadow radius of projected or potential developments and may contain sunlight sensitive features which require detailed technical analysis to identify any incremental shadows created by the RWCDs development. These resources are briefly discussed below.

- U. Chelsea Waterside Park, a.k.a. Thomas F. Smith Park (Open Space Resource #8)  
Chelsea Waterside Park, formerly known as Thomas F. Smith Park, is a 2.50 acre facility evenly divided between active and passive recreation space. It is bounded by W. 24th Street, Eleventh Avenue, and Twelfth Avenue (Route 9A). (Eleventh and Twelfth avenues intersect at approximately W. 22nd Street.) The park contains a basketball court, a soccer field (for use by permit only), a dog run, as well as benches, trees, and plantings. It is under the jurisdiction of the Hudson River Park Trust, although it is separated from Hudson River Park by Route 9A.
  
- V. Chelsea Park (Open Space Resource #1)  
Chelsea Park is a full-block, 3.9 acre active and passive recreation space. It is bounded by W. 28th Street, Ninth Avenue, W. 27th Street, and Tenth Avenue. The park includes several basketball courts, ball fields, playground equipment, a walkway, benches and a comfort station.
  
- W. Chelsea Houses Open Space (Open Space Resource #5)  
This is a 0.34-acre open space on the grounds of the Chelsea Houses public housing complex. It is located on a block bounded by W. 26th Street, Ninth Avenue, W. 25th Street, and Tenth Avenue. This open space is predominately comprised of active recreation space and includes playground equipment, chess tables, trees, and benches.



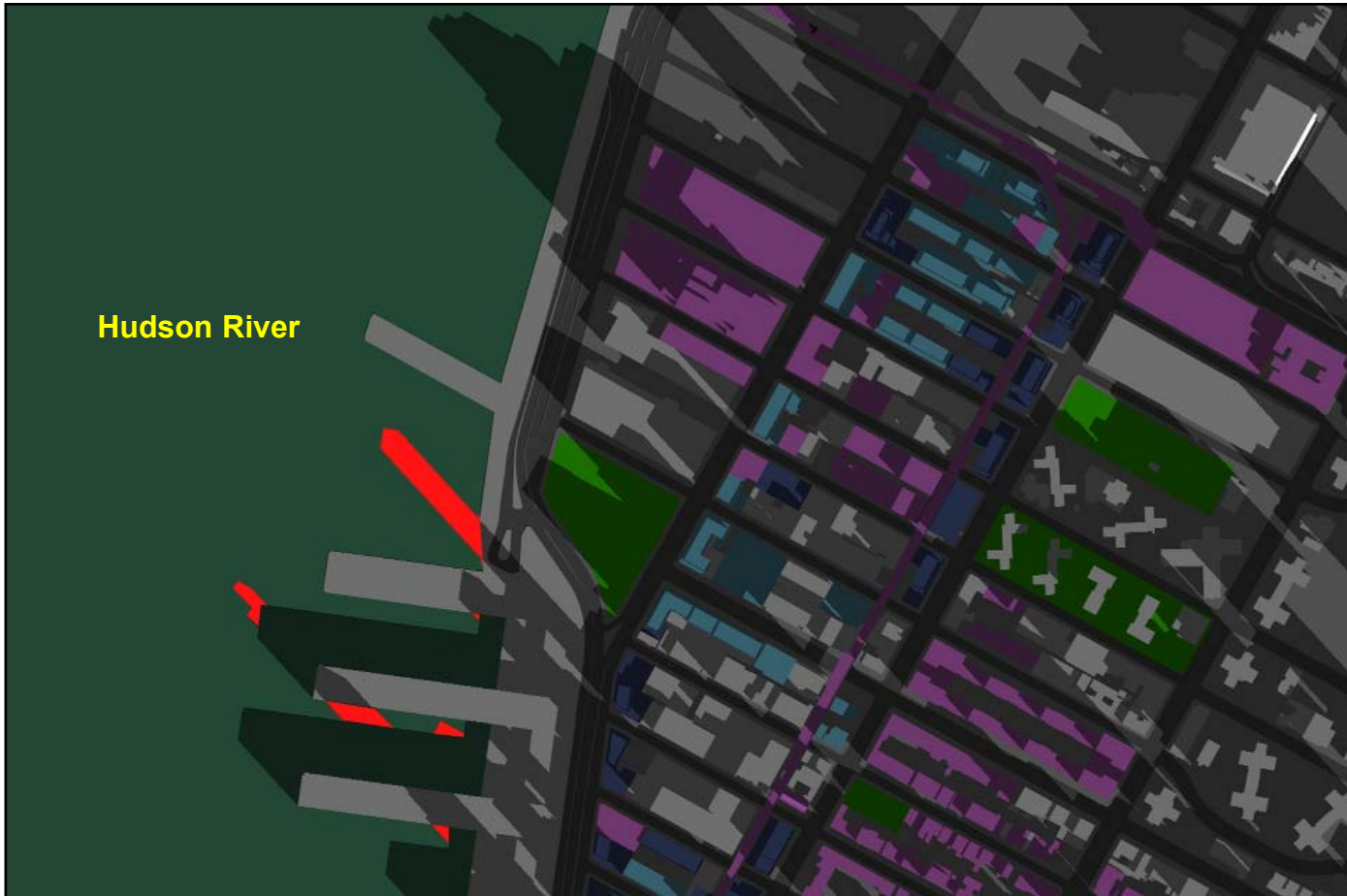
- X. Clement Clarke Moore Park (Open Space Resource #9)  
This is a 0.49-acre park is located at the southeast corner of W. 22nd Street and Tenth Avenue. It is predominately comprised of active recreation space and includes playground equipment, paved walkways, benches, jungle gyms, trees, and planters.
  
- Y. Robert S. Fulton Houses Open Space (Open Space Resource #10)  
This is a 0.28-acre open space evenly divided between active and passive recreation space. It is located on the grounds of the Fulton Houses public housing complex, along W. 19th Street between Ninth and Tenth avenues. It includes paved walkways, benches, jungle gyms, trees, and planters.
  
- Z. 14th Street Park (Open Space Resource #14)  
This is a 0.80-acre park devoted entirely to passive recreation. It is located on the block bounded by W. 15th Street, Tenth Avenue, W. 14th Street, and Eleventh Avenue. It includes benches, trees, and lawn.

A preliminary screening analysis found that shadows cast by the projected/potential development would not reach PS 11/ William J. Harris School (Open Space #13 on Figure 5-2) and the 14th Street Park (Open Space #14 on Figure 5-2) and therefore, further shadow analysis of these open space resources is not necessary. Additionally, Pier 57 has been screened out of the shadows analysis. While sunlight sensitive open space is planned in conjunction with the redevelopment of Pier 57, action-generated shadows only would be cast on this resource very early in the morning (5:57 am) on the June 21 analysis date. Even then, shadows are only cast on the northeastern corner of the site for a few minutes. Although the final program for this planned open space resource has not been finalized, it is unlikely that the shadow would be cast on a sunlight sensitive area.

Shadows cast by the projected/potential development would extend into the Hudson River, which, as discussed above, is considered an important natural resources. A preliminary shadow analysis found that the worst case scenario for the length and duration of shadows cast by the projected/potential development would be on the December 21 analysis day, when shadows would be cast in morning and be the longest. As shown in Figure 6-2, shadows cast on this day would be narrow and would not extend far into the River. In December, shadows are the longest, but move rapidly, and, as discussed further in Chapter 11, “Natural Resources,” because the structures are not built directly over the Hudson River, the shadows generated by the action-induced buildings would be diffused. As such, the proposed action would not have significant adverse impacts on the biotic communities in the Hudson River and therefore, further shadow analysis of this resource is not necessary.

## C. FUTURE WITHOUT THE PROPOSED ACTION

In the future without the proposed action, the majority of the proposed rezoning area, which is currently zoned M1-5 with a maximum permitted FAR of 5.0, would have no height limits. The MX



Legend:

- Projected Development Site
- Potential Development Site
- Open Space Resource
- Historic Resource
- Shadow Increment on Resource of Concern

*(This figure has been modified for the FEIS)*

December 21 - 8:51 AM

mixed use districts along both sides of W. 23rd Street, which are mapped with contextual zoning districts, are governed by height limits.

As discussed in Chapter 1, “Project Description,” a reasonable worst-case development scenario (RWCDS) for No-Action and With-Action conditions has been developed for the projected and potential development sites. Although some development is expected to occur on these sites under No-Action conditions, it is not considered likely that any buildings on the projected or potential development sites would be taller than those which could be built under the proposed action. As discussed in Section D below, the proposed action would allow higher density than the existing M1-5 zoning districts to be rezoned to C6-2, C6-3, and C6-4 districts and the MX districts would be rezoned to R6-2A and R6-3A districts that would have the same height limits and bulk regulations as the existing zones they replace.

In addition, in the future without the proposed action, five new open space resources associated with the Hudson Yards redevelopment are proposed to be developed by the year 2010. The proposed open spaces are listed below.

- Midblock Park & Boulevard System - W. 33rd to W. 34th Streets, Tenth to Eleventh avenues
- Eastern Caemmerer Yard - W. 30th to W. 33rd Streets, Tenth to Eleventh avenues
- Full Block Open Space - W. 33rd to W. 34th Streets, Eleventh to Twelfth avenues
- Block 675 - W. 29th to W. 30th Streets, Eleventh to Twelfth avenues
- Convention Center Roof - W. 34th to W. 41st Streets, Eleventh to Twelfth avenues

A more detailed discussion of the above listed proposed open space resources is provided in Chapter 5, “Open Space.” Although the above listed open spaces are proposed to be developed by 2010, at this time, the design and specific program for these new open space resources have not been planned. However, these resources have the potential to be affected by shadows resulting from the proposed action, and as such, a detailed shadow analysis for these resources has been provided below.

#### **D. FUTURE WITH THE PROPOSED ACTION**

The shadow analysis considers the times when the projected and potential developments would increase shadows falling on open space or historic resources. As the sun travels across the sky during the day, shadows fall in a curve on the ground opposite the sun. When the sun rises, shadows fall to the west. As the sun travels across the southern part of the sky throughout the day, shadows move clockwise until they stretch east, as the sun sets in the west. Midday shadows are always shorter than those at other times of the day because the sun is highest in the sky then. Further, because of the tilt of the earth’s axis, the angle at which the sun’s rays strike the earth varies throughout the year, so that during the summer, the sun is higher in the sky and shadows are shorter than during the winter. Winter shadows, although longest, move the most quickly along their paths (because of the earth’s tilt) and do not affect the growing season of outdoor trees and plants.

Under the RWCDs for With-Action conditions, 20 of the 25 projected and 18 of the 28 potential development sites would be developed with new buildings. For analysis purposes these new buildings are expected to maximize FAR, while complying with the height and setback regulations of the Special West Chelsea District. As directed by the *CEQR Technical Manual*, shadow analyses were performed for four days of the year: March 21, May 6, June 21, and December 21. The *CEQR Technical Manual* defines the temporal limits of a shadow analysis period to fall between an hour and a half after sunrise to an hour and a half before sunset.

Table 6-1 provides the starting and ending times of incremental new shadows that would be cast by the projected/potential development on the resources of concern on the analysis days discussed above, and shows the estimated duration of those new incremental shadows. The start times shown in the table represent the time that the shadows first enter any part of the element being considered, and the end time represents the time that the shadows leave that element completely.

~~As shown in Table 6-1, a resource could be affected by more than one site, yielding multiple entries and exits.~~ Figures 6-3 through 6-6 show the new incremental shadows cast on resources of concern by the projected/potential development resulting from the proposed action. As shown in the figures, the portions of new incremental shadows from projected/potential development cast on a resource of concern are represented in red.

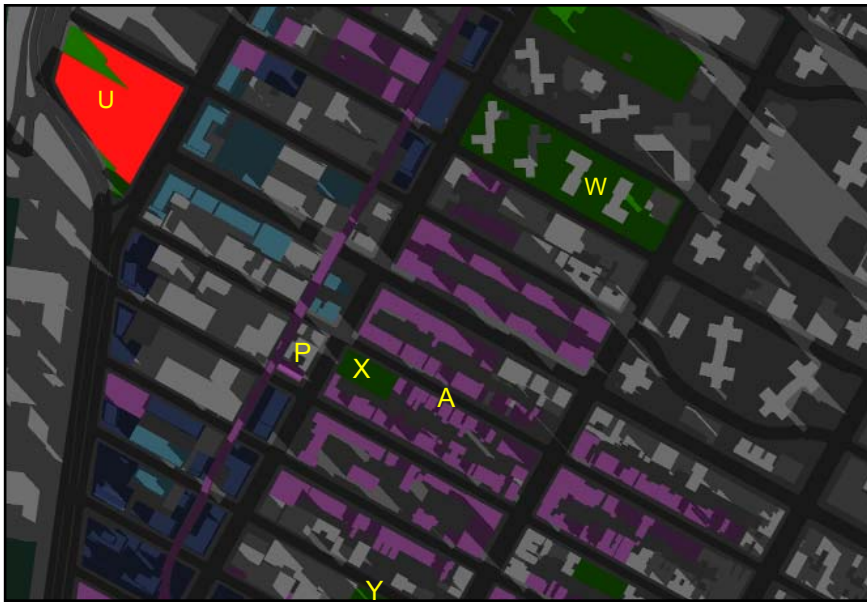
The proposed action would cast shadows on two No-Action resources of concern: the Eastern Caemmerer Yard and Block 675. The proposed action would not cast shadows long enough to reach the remaining No-Action resources of concern, and therefore, these resources are not included in the detailed shadow analysis.

The following provides a discussion of each of the analyzed time periods.

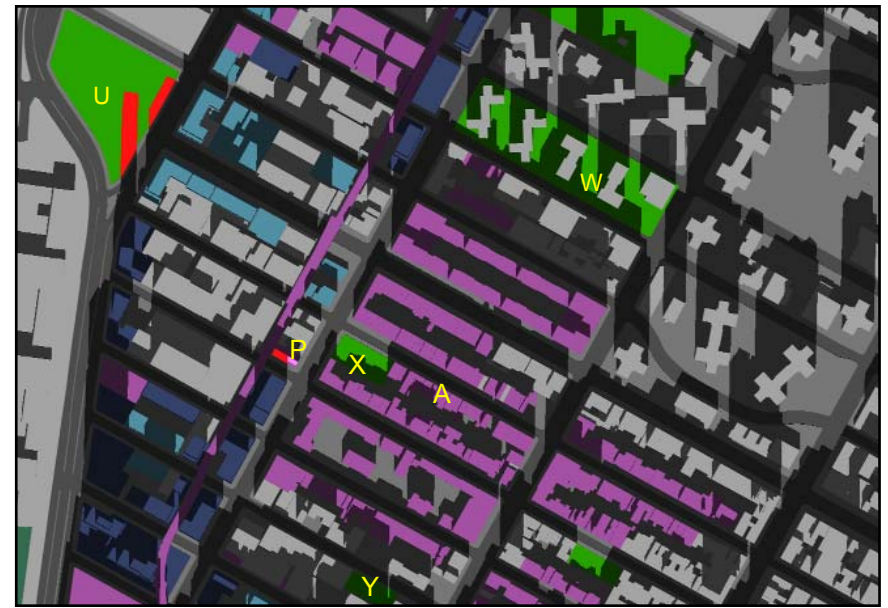
### **December 21**

On the shortest day of the year, shadows are longest, but move rapidly. The incremental shadows created by the projected/potential development on this day would be cast on the Chelsea Historic District, the Church of the Guardian Angel, and Chelsea Waterside Park (see Figure 6-3). New incremental shadows would enter the Chelsea Historic District at 2:32 PM and exit at 2:53 PM for a duration of 21 minutes.

The incremental shadows cast would be limited to the northeast corner of Tenth Avenue and West 21st Street and a small area midblock on West 20th Street between Ninth and Tenth Avenues (see Figure 6-3). New incremental shadows would enter the Church of the Guardian Angel at 10:12 AM and exit at 2:53 PM for a duration of 4 hours and 41 minutes. As shown in Figure 6-3, new incremental shadows would be cast on the south facade of the church. New incremental shadows cast by new development would also enter Chelsea Waterside Park ~~twice~~ on this day. The ~~first~~ shadow would enter at 8:51 AM and ~~exit at 9:46 AM for a duration of 55 minutes.~~ The shadows ~~would then enter again at 10:15 AM and exit at 1:03~~ 1:06 PM for a duration of ~~2~~ 4 hours and ~~48~~ 15 minutes. ~~A small area of the southeast portion of the park would be cast in shadow on this day (see~~



December 21 - 8:51 AM



December 21 - 12:00 PM



December 21 - 2:53 PM

Legend:

- Projected Development Site
- Potential Development Site
- Open Space Resource
- Historic Resource
- Shadow Increment on Resource of Concern

U Resource of Concern (refer to Table 6-1)

*(This figure has been modified for the FEIS)*

Figure 6-3). As shown in Figure 6-3, a large portion of the park would be cast in shadow beginning at 8:51 AM. The coverage of the shadow decreases throughout the morning and by 12 PM two small portions of the park would be cast in shadows. By 1:06 PM the project-generated shadows would no longer cast on the park. New incremental shadows would enter Block 675 at 8:51 AM and exit at 10:54

**Table 6-1, Results of Shadows Analysis**

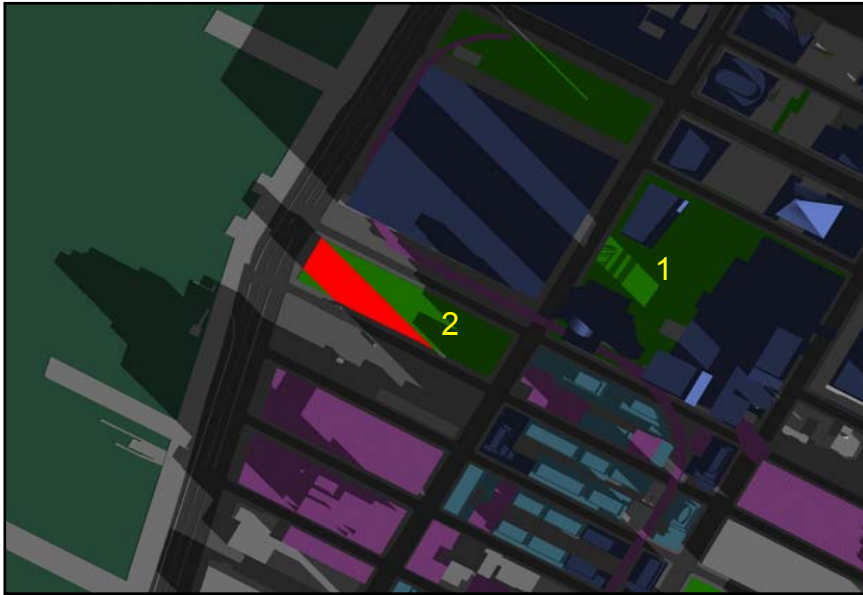
Map ID	Resource	Project Shadow Increment 12/21	Project Shadow Increment 3/21	Project Shadow Increment 5/6	Project Shadow Increment 6/21
A.	Chelsea Historic District	Enter: 2:32 pm Exit: 2:53 pm Duration: 21m <b>Total for Analysis Day: 21m</b>	Enter: 3:40 pm Exit: 4:29 pm Duration: 49m <b>Total for Analysis Day: 49m</b>	Enter: 3:48 pm Exit: 5:18 pm Duration: 1h30m <b>Total for Analysis Day: 1h30m</b>	Enter: 4:50 pm Exit: 6:01 pm Duration: 1h11m <b>Total for Analysis Day: 1h11m</b>
P.	Church of the Guardian Angel	Enter: <u>10:01am</u> Exit: 2:53 pm Duration: <u>4h52m</u> <b>Total for Analysis Day: <u>4h52m</u></b>	Enter: <u>10:51am</u> Exit: 4:08 pm Duration: <u>5h17m</u> <b>Total for Analysis Day: <u>5h17m</u></b>	None	None
U.	Chelsea Waterside Park/Thomas F. Smith Park	Enter: 8:51 am Exit: <u>1:06 pm</u> Duration: <u>4h15m</u> <b>Total for Analysis Day: <u>4h15m</u></b>	Enter: 7:36 am Exit: <u>11:00 am</u> Duration: <u>3h24m</u> <b>Total for Analysis Day: <u>3h24m</u></b>	Enter: 6:27 am Exit: <u>9:45 am</u> Duration: <u>3h18m</u> <b>Total for Analysis Day: <u>3h18m</u></b>	Enter: 5:57 am Exit: <u>9:16 am</u> Duration: <u>3h19m</u> <b>Total for Analysis Day: <u>3h19m</u></b>
V.	Chelsea Park	None	Enter: 3:04 pm Exit: 4:29 pm Duration: 1h25m <b>Total for Analysis Day: 1h25m</b>	Enter: 3:07 pm Exit: 5:18 pm Duration: 2h11m <b>Total for Analysis Day: 2h11m</b>	Enter: 3:15 pm Exit: 6:01 pm Duration: 2h46m <b>Total for Analysis Day: 2h46m</b>
W.	Chelsea Houses Open Space	None	Enter: 3:04 pm Exit: 4:29 pm Duration: 1h25m <b>Total for Analysis Day: 1h25m</b>	Enter: 3:00 pm Exit: 5:18 pm Duration: 2h18m <b>Total for Analysis Day: 2h18m</b>	Enter: 3:05 pm Exit: 6:01 pm Duration: 2h56m <b>Total for Analysis Day: 2h56m</b>
X.	Clement Clarke Moore Park	None	Enter: 3:13 pm Exit: 4:29 pm Duration: 1h16m <b>Total for Analysis Day: 1h16m</b>	None	Enter: 5:44 pm Exit: 6:01 pm Duration: 17m <b>Total for Analysis Day: 17m</b>
Y.	Robert S. Fulton Houses Open Space	None	Enter: 3:43 pm Exit: 4:29 pm Duration: 46m <b>Total for Analysis Day: 46m</b>	None	None
<i>No-Action Resources of Concern</i>					
1.	Eastern Caemmerer Yard	Enter: 8:51 am Exit: 2:53 pm Duration: 6h2m	Enter: 10:05 am Exit: 4:29 pm Duration: 6h24m	Enter: 10:50 am Exit: 4:40 pm Duration: 5h50m	Enter: 11:52 am Exit: 4:05 pm Duration: 4h13m
2	Block 675	Enter: 8:51 am Exit: 10:54 am Duration: 2h3m	Enter: 10:45 AM Exit: 11:55 AM Duration: 1h10m	None	None



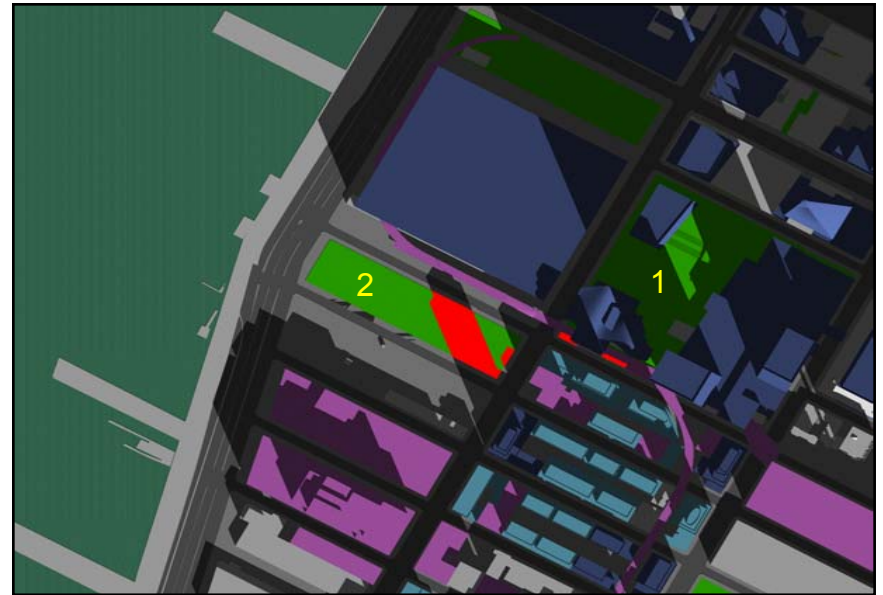
AM for a duration of 2 hours and 3 minutes. As shown in Figure 6-3a, the new incremental shadows would be cast across the proposed open space at the start of the analysis period, with a small portion of the northeast corner cast in shadow just before the shadow exits. New incremental shadows from the proposed action would enter the Eastern Caemmerer Yard at 8:51 AM and exit at 2:53 PM for a duration of 6 hours and 2 minutes. As shown in Figure 6-3a, shadows would be cast along the southwest edge of the proposed open space in the morning. Shadows would then stretch across the proposed open space at the end of the analysis period, just before the shadow exits (see Figure 6-3a).

### ***March 21***

On the spring equinox, as shadows grow shorter, the projected/potential development would cast incremental shadow on all resources of concern (with the exception of the 14th Street Park). The development would cast shadows on the Chelsea Historic district in the afternoon that enters at 3:40 PM and exits at 4:29 PM for a duration of 49 minutes and would be mostly limited to small areas in the southern portion of the historic district (see Figure 6-4a). New incremental shadows from the proposed development on the Church of the Guardian Angel would enter at ~~11:37~~ 10:51 AM and exit at 4:08 PM for a duration of ~~4 hours~~ 5 hours and 17 minutes ~~31 minutes~~. As shown in Figure 6-4a, the shadows would be cast on the east facade of the Church, along Tenth Avenue. The incremental shadows from the proposed new development would enter Chelsea Waterside Park at 7:36 AM and exit at ~~7:52~~ 11:00 AM for a duration of 3 hours and 24 ~~16~~ minutes. Three buildings cast shadows on three areas of the park on this day (see Figures 6-4 and 6-4a). A small area of the southeast corner of this park would be cast in shadows on this day As shown in the Figures, a small area at the northern limit of the park would be cast in shadows, as would a small portion at the southeast portion of the park. Additionally, a project-generated shadow would be cast on a portion of the center of the park. New incremental shadows would enter both the Chelsea Park and Chelsea Houses open space at 3:04 PM and exit both at 4:29 PM for a duration of 1 hour and 25 minutes. As shown in Figure 6-4, small areas of the southwest portions on both parks would be cast in shadow at approximately 3:30 PM, while larger areas of the parks would be cast in shadow at approximately 4:29 PM, just before the shadows exit. New incremental shadows would enter Clement Clarke Moore Park at 3:13 PM and exit at 4:29 PM for a duration of 1 hour and 16 minutes. As shown in Figure 6-4a, a very small area of the southwest portion of the park would be cast in shadow at approximately 3:30 PM, while a slightly larger portion of the park would be cast in shadow at approximately 4:29 PM. New incremental shadows would enter the Robert S. Fulton Houses open space at 3:43 PM and exit at 4:29 PM for a duration of 46 minutes. New incremental shadows would enter the proposed open space on the Eastern Caemmerer Yards at approximately 10:05 AM and exit at 4:29 PM for a duration of 6 hours and 24 minutes. As shown in Figure 6-4b, a very small area of the southwest edge of the proposed open space would be cast in shadow on this day. New incremental shadows would enter the proposed open space on Block 675 at approximately 10:45 AM and exit at 11:55 AM for a duration of 1 hour and 10 minutes. As shown in Figure 6-4b, a very small area of the southwest edge of the proposed open space would be cast in shadow on this day.



December 21 - 8:51 AM



December 21 - 10:30 AM

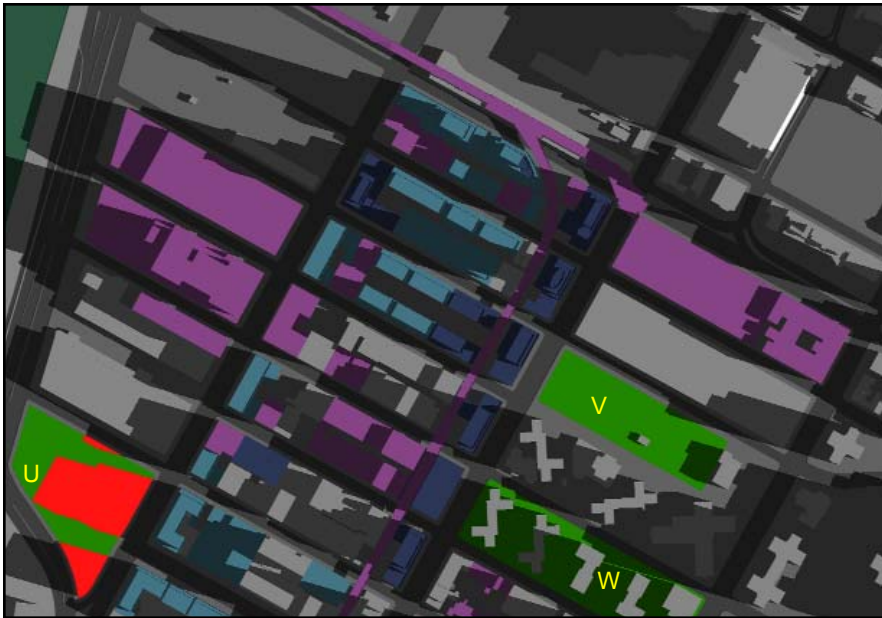


December 21 - 2:53 PM

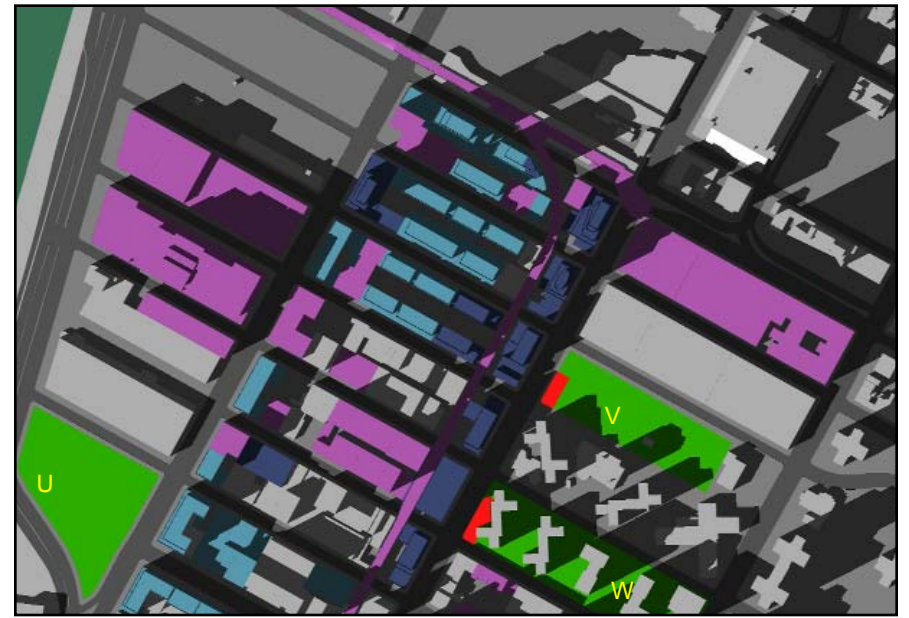
Legend:

- Projected Development Site
- Potential Development Site
- Open Space Resource
- Historic Resource
- Shadow Increment on Resource of Concern
- 1 Resource of Concern (refer to Table 6-1)

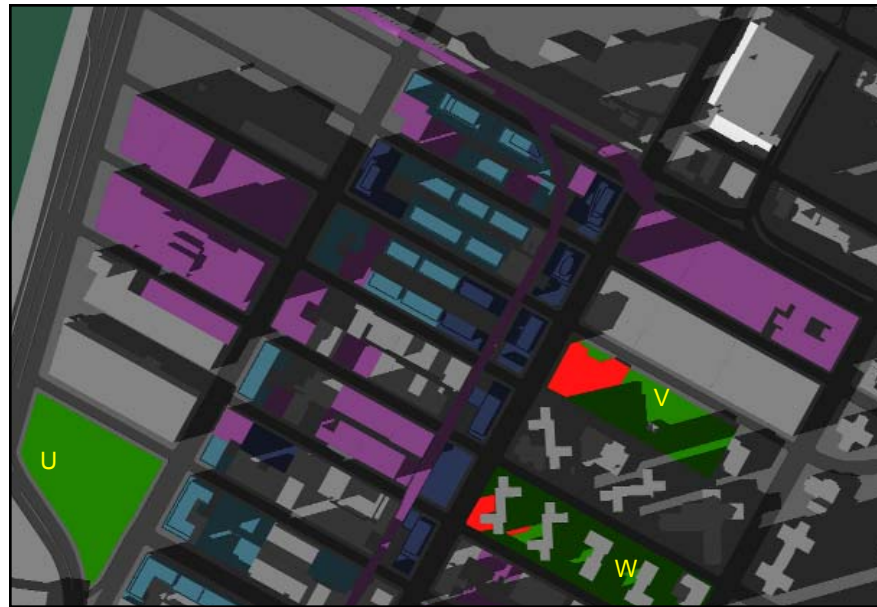




March 21 - 7:42 AM



March 21 - 3:30 PM

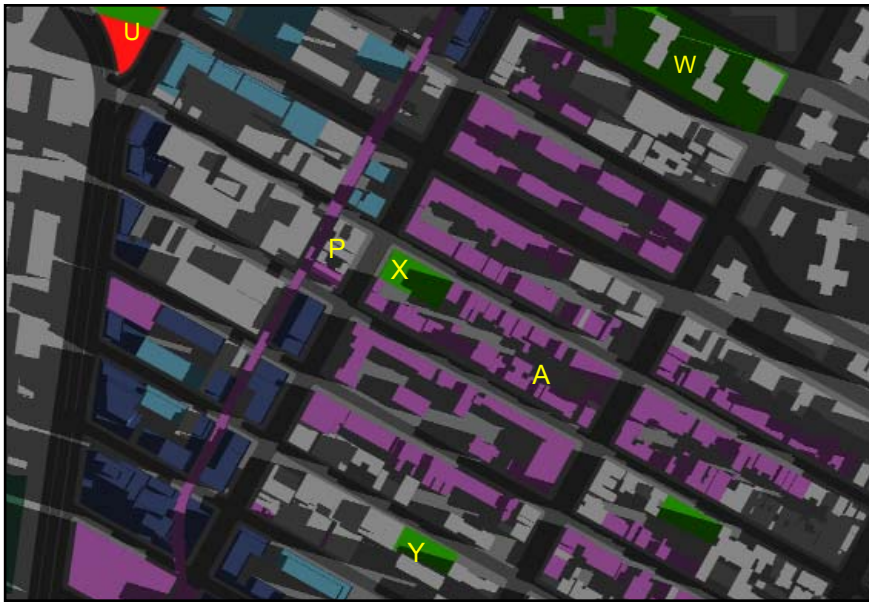


March 21 - 4:29 PM

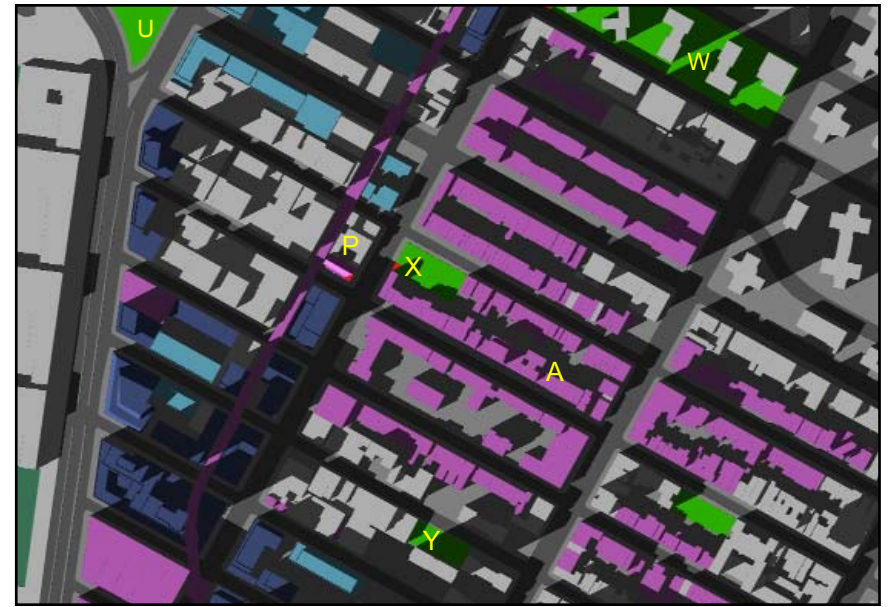
Legend:

- Projected Development Site
- Potential Development Site
- Open Space Resource
- Historic Resource
- Shadow Increment on Resource of Concern
- U      Resource of Concern (refer to Table 6-1)

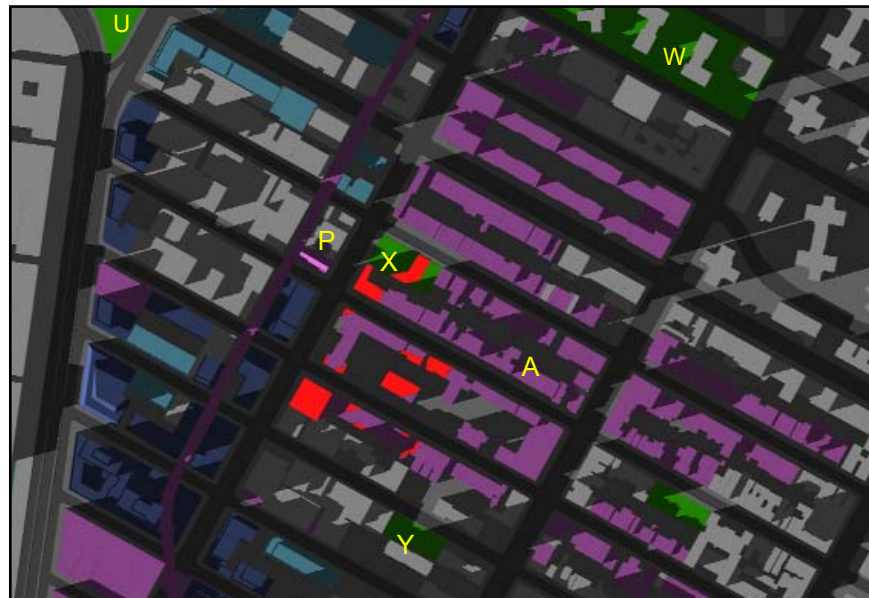
*(This figure has been modified for the FEIS)*



March 21 - 7:42 AM







March 21 - 3:30 PM



March 21 - 4:29 PM

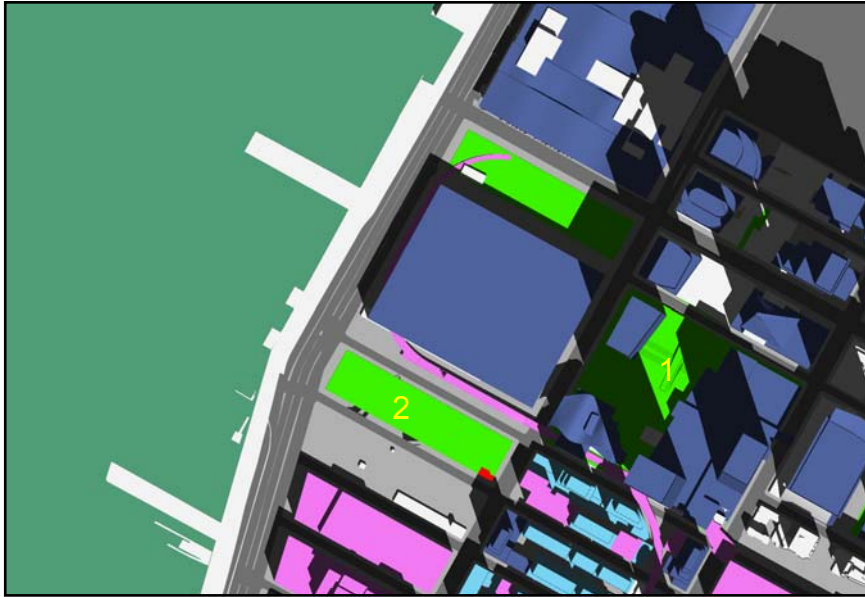
Legend:

-  Projected Development Site
-  Potential Development Site
-  Open Space Resource
-  Historic Resource
-  Shadow Increment on Resource of Concern

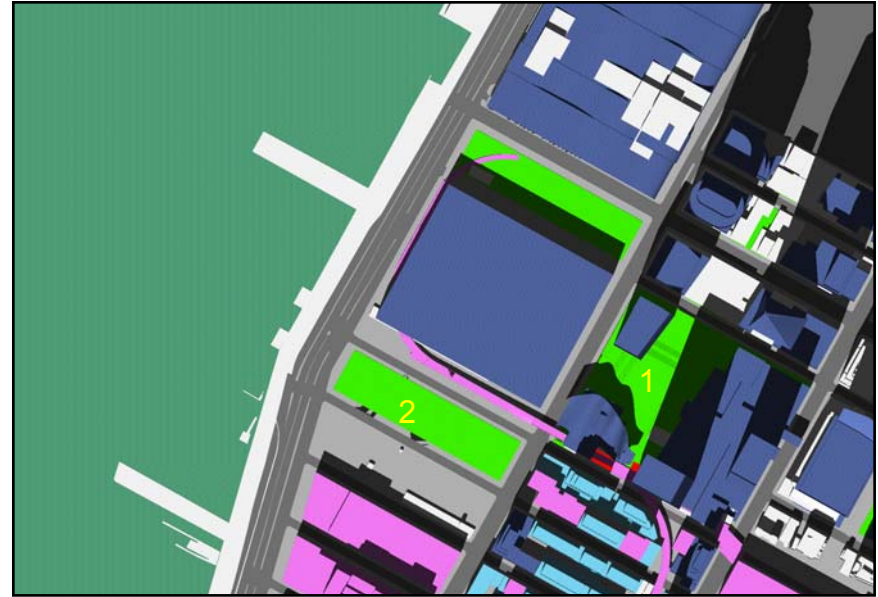
U Resource of Concern (refer to Table 6-1)

*(This figure has been modified for the FEIS)*

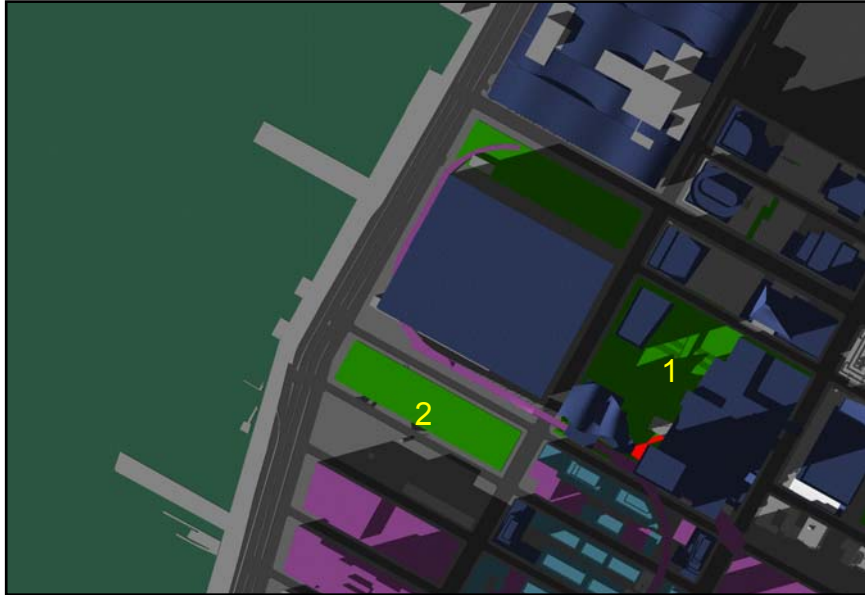




March 21 - 11:15 AM



March 21 - 1:00 PM



March 21 - 4:29 PM

Legend:

- Projected Development Site
- Potential Development Site
- Open Space Resource
- Historic Resource
- Shadow Increment on Resource of Concern

1 Resource of Concern (refer to Table 6-1)

## *May 6*

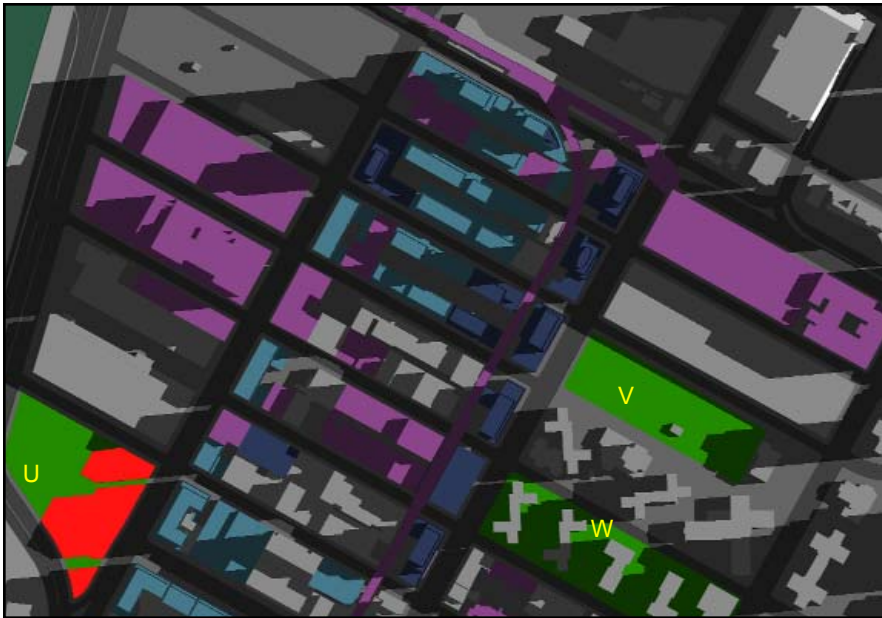
On May 6, which is halfway between the summer solstice and equinoxes, the projected/potential development would cast incremental shadows on the Chelsea Historic District, Chelsea Waterside Park, Chelsea Park, and Chelsea Houses open space. The development would cast incremental shadows in the late afternoon on the Chelsea Historic District which would enter at 3:48 PM and exit at 5:18 PM for a duration of 1 hour and 30 minutes, which would be limited to small areas of the district along Tenth Avenue (see Figure 6-5a). In the morning, new incremental shadows would enter Chelsea Waterside Park at 6:27 AM and exit at ~~7:58~~ 9:45 AM for a duration of ~~1 hour~~ 3 hours and ~~31 minutes~~ 18 minutes. ~~A small area in the northeast~~ The eastern portion of the park would be cast in shadows at approximately 6:40 AM (see Figure 6-5). Incremental shadows cast by the projected/potential development would enter Chelsea Park at 3:07 PM and exit at 5:18 PM for a duration of 2 hours and 11 minutes, with small areas of the park cast in shadow in the late afternoon (see Figure 6-5). Incremental shadows from the projected/potential development would enter the Chelsea Houses open space at 3:00 PM then exit at 5:18 PM for a duration of 2 hours and 18 minutes, with a small portion of the open space cast in shadow in the late afternoon (see Figure 6-5). New incremental shadows would enter the proposed open space on the Eastern Caemmerer Yard at 10:50 AM and exit at 4:40 PM for a duration of 5 hours and 50 minutes, with a small portion of the southwest edge cast in shadow on this day (see Figure 6-5b).

## *June 21*

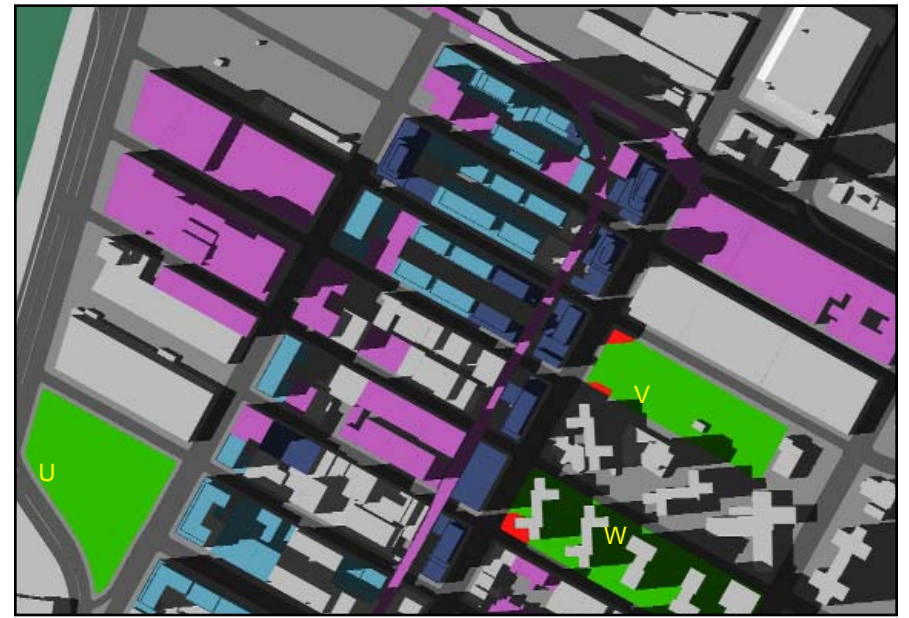
On the longest day of the year, the sun is most directly overhead and shadows are shortest. The projected/potential development would cast incremental shadows on all resources of concern, with the exception of the Church of the Guardian Angel and the Robert S. Fulton Houses open space. Incremental shadows cast by the projected/potential development would enter the Chelsea Historic District on this day at 4:50 PM and exit at 6:01 PM for a duration of 1 hour and 11 minutes and again, would be limited to small areas of the district along the east side of Tenth Avenue (see Figure 6-6a). Incremental shadows created by the projected/potential development would enter Chelsea Waterside Park at 5:57 AM and exit at ~~6:27~~ 9:16 AM for a duration of 3 hours and 19 ~~30~~ minutes, with a small area of the ~~northeast~~ eastern portion of the park cast in shadow (see Figure 6-6). New incremental shadows would enter Chelsea Park at 3:15 PM and exit at 6:01 PM for a duration of 2 hours and 56 minutes. A small area of the northwest portion of the park cast in shadow at approximately 3:30 PM, with a larger area of the park cast in shadow at approximately 5:30 PM. New incremental shadows would enter Clement Clarke Moore Park at 5:44 PM and exit at 6:01 PM for a duration of 17 minutes. New incremental shadows would enter the proposed open space on the Eastern Caemmerer Yard at 11:52 AM and exit at 4:05 PM for a duration of 4 hours and 13 minutes, with a very small portion of the southwest edge cast in shadow on this day (see Figure 6-6b).

## **E. BASE FAR SCENARIO**

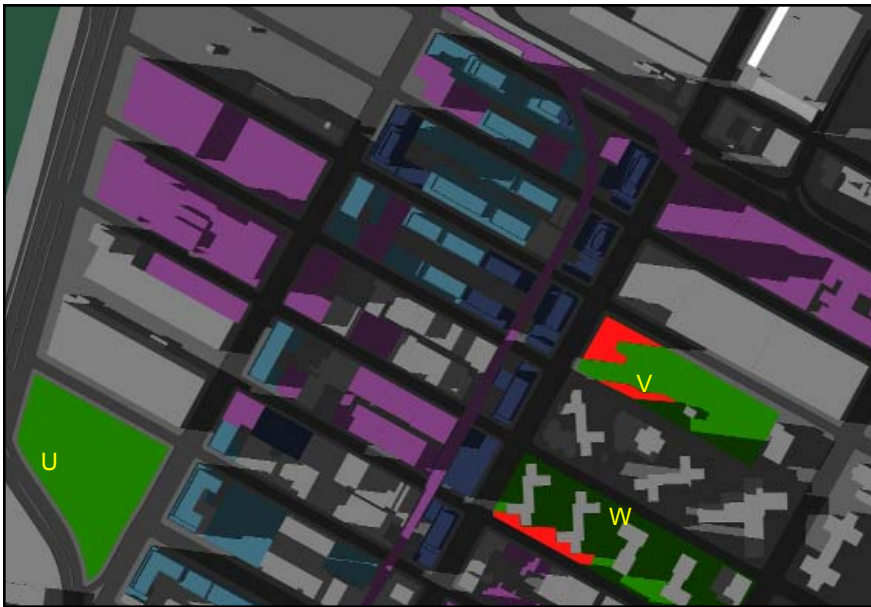
The Base FAR Scenario is expected to result in less residential development than the proposed action, as it would permit lower density development. As discussed in Chapter 1, “Project



May 6 - 6:40 AM








May 6 - 4:00 PM



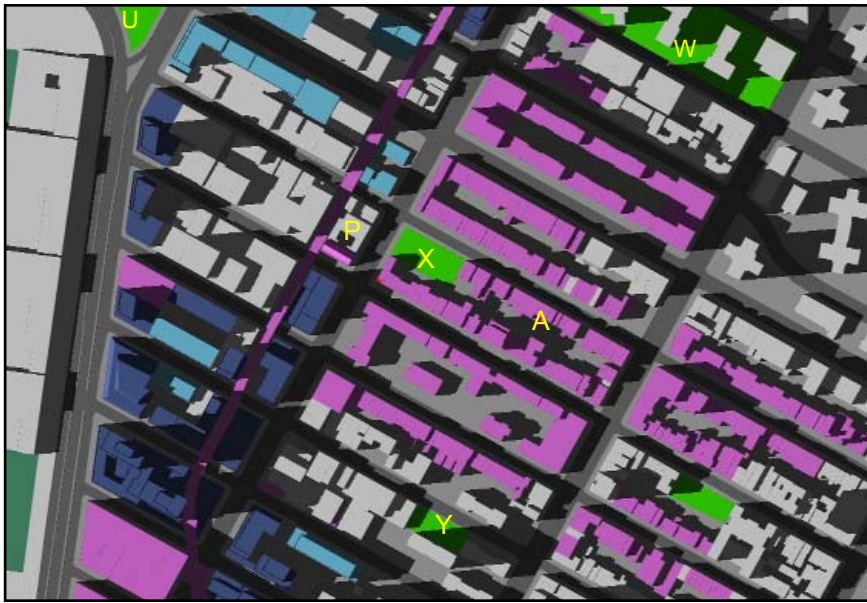
May 6 - 5:18 PM

Legend:

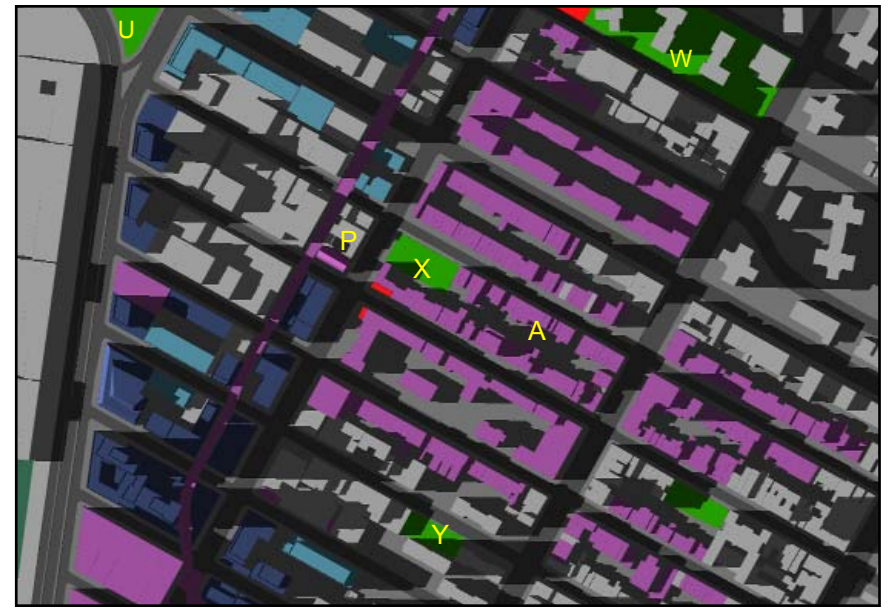
-  Projected Development Site
-  Potential Development Site
-  Open Space Resource
-  Historic Resource
-  Shadow Increment on Resource of Concern
- U      Resource of Concern (refer to Table 6-1)

*(This figure has been modified for the FEIS)*

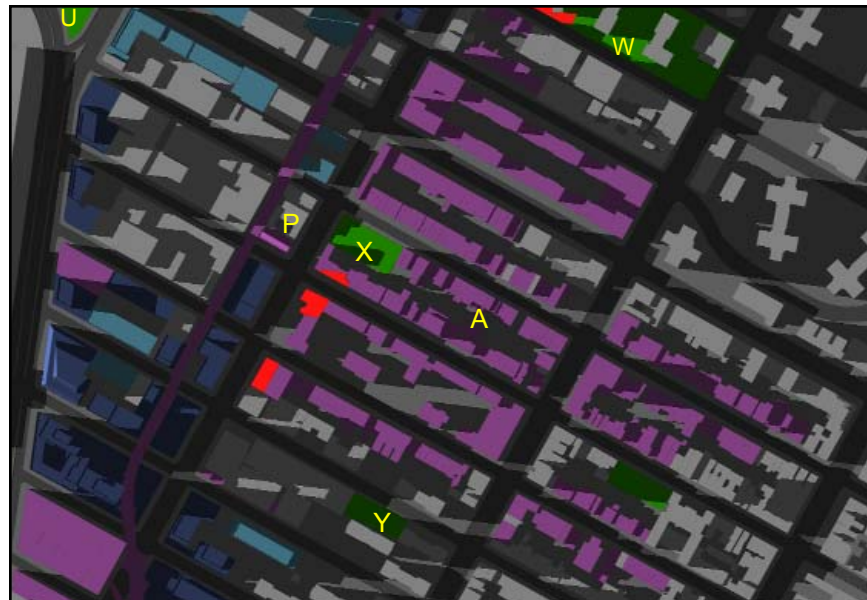




May 6 - 4:00 pm



May 6 - 4:40 PM

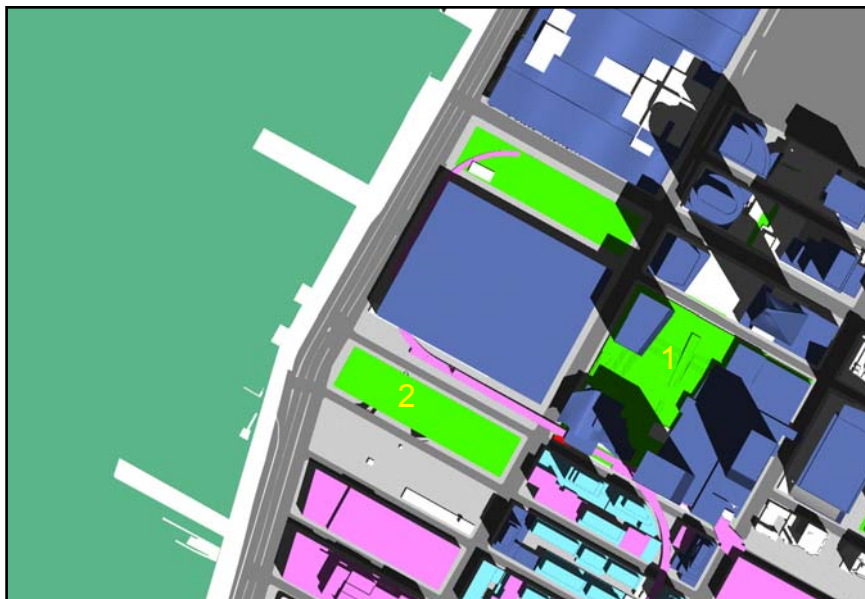


May 6 - 5:18 PM

Legend:

- Projected Development Site
- Potential Development Site
- Open Space Resource
- Historic Resource
- Shadow Increment on Resource of Concern
- U Resource of Concern (refer to Table 6-1)

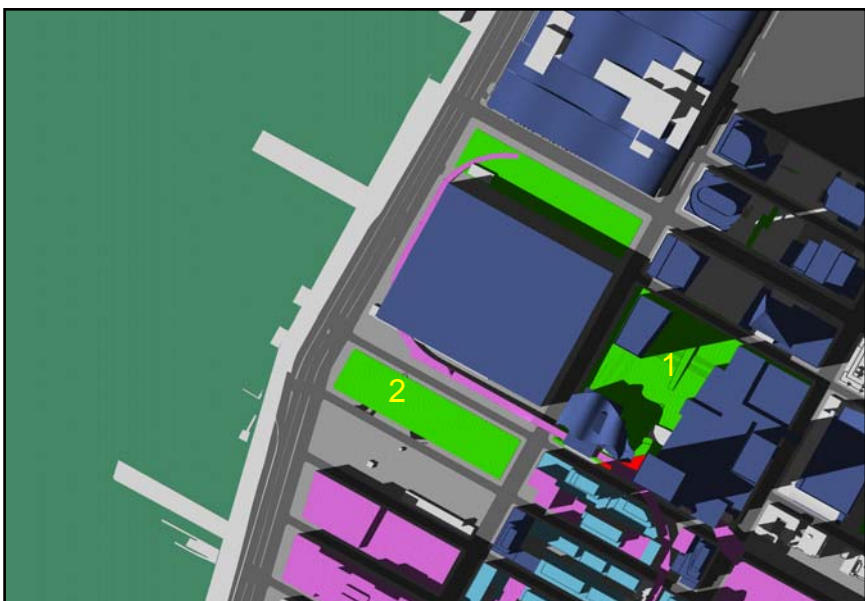
*(This figure has been modified for the FEIS)*



May 6 - 11:00 AM



May 6 - 2:00 PM

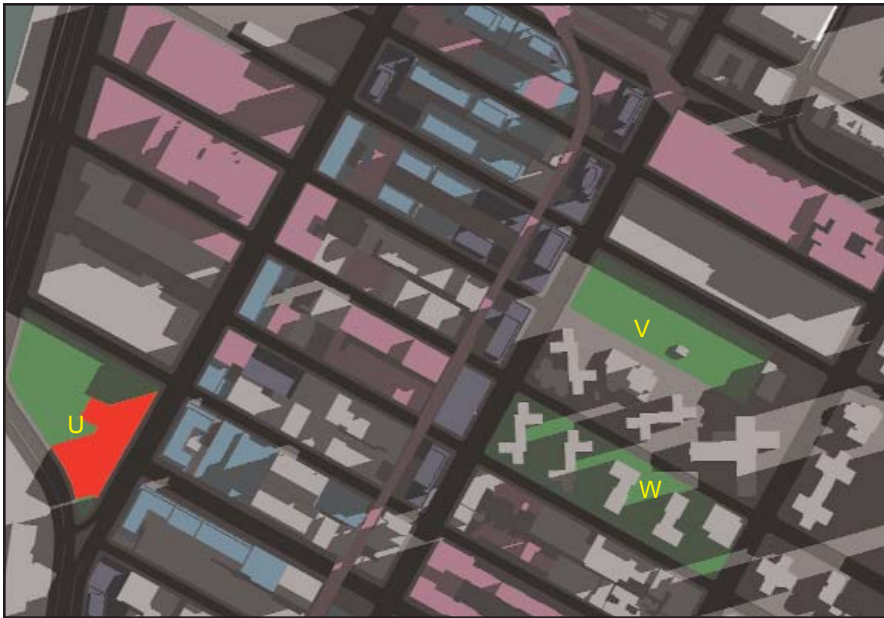


May 6 - 3:30 PM

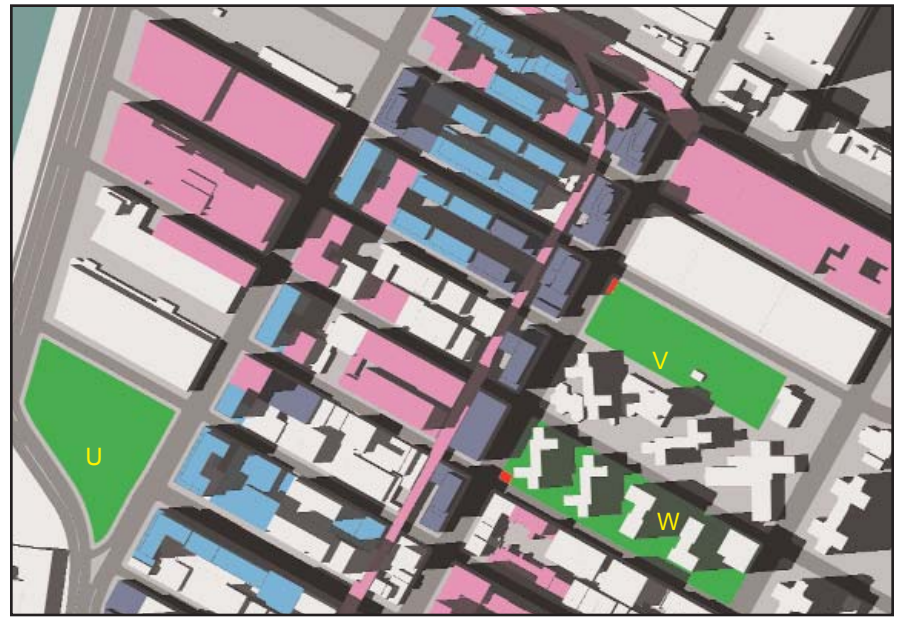
Legend:

- Projected Development Site
  - Potential Development Site
  - Open Space Resource
  - Historic Resource
  - Shadow Increment on Resource of Concern
- 1     Resource of Concern (refer to Table 6-1)

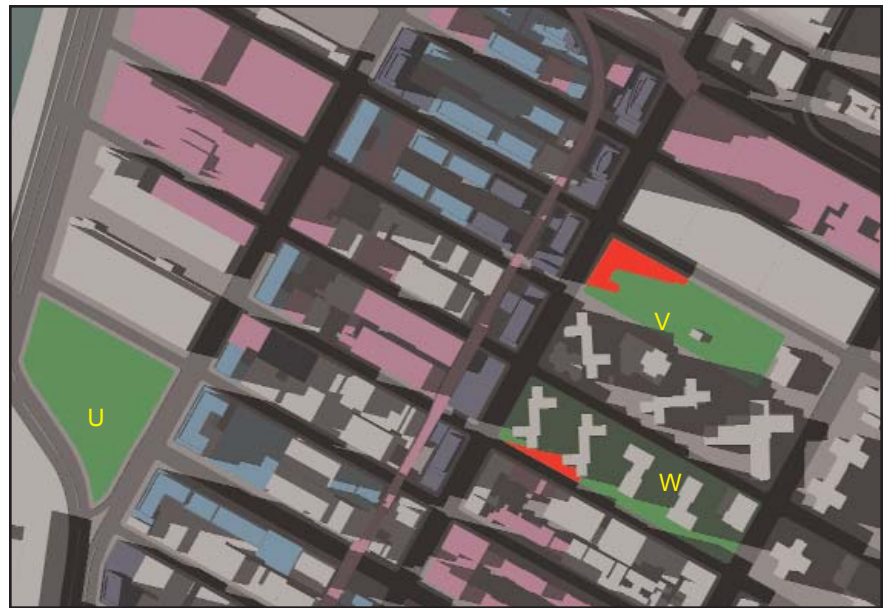




June 21 - 6:15 AM



June 21 - 3:30 PM



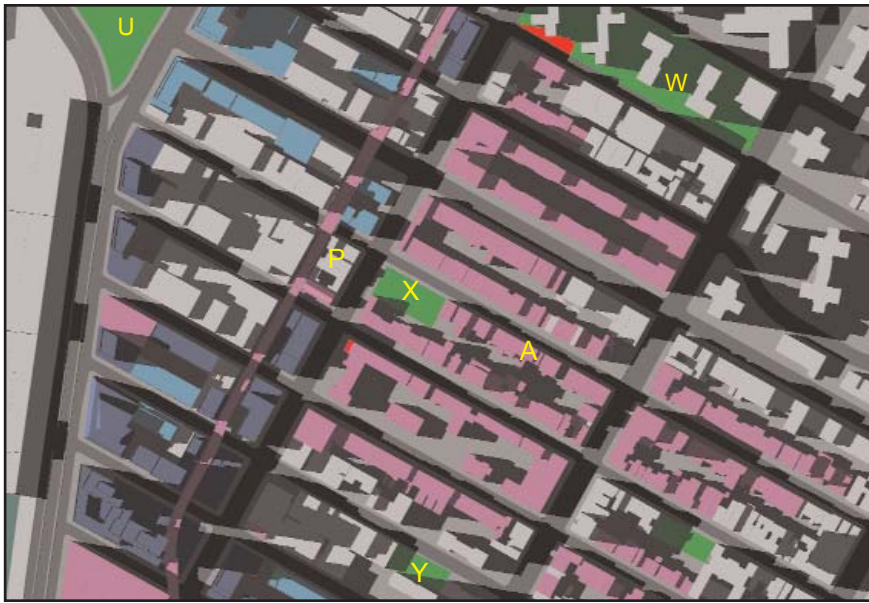
June 21 - 5:30 PM

Legend:

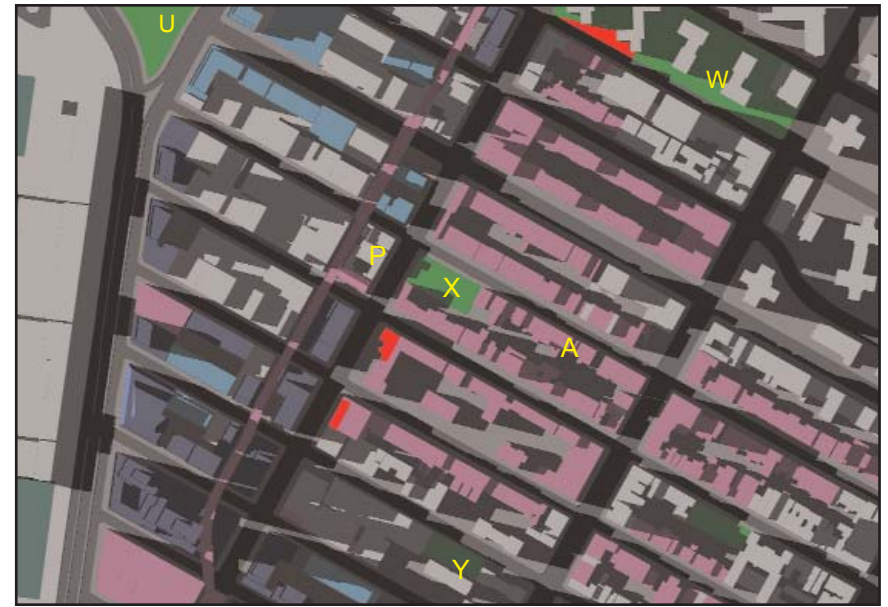
- Projected Development Site
- Potential Development Site
- Open Space Resource
- Historic Resource
- Shadow Increment on Resource of Concern
- U     Resource of Concern (refer to Table 6-1)

*(This figure has been modified for the FEIS)*





June 21 -5:00 PM



June 21 - 5:30 PM

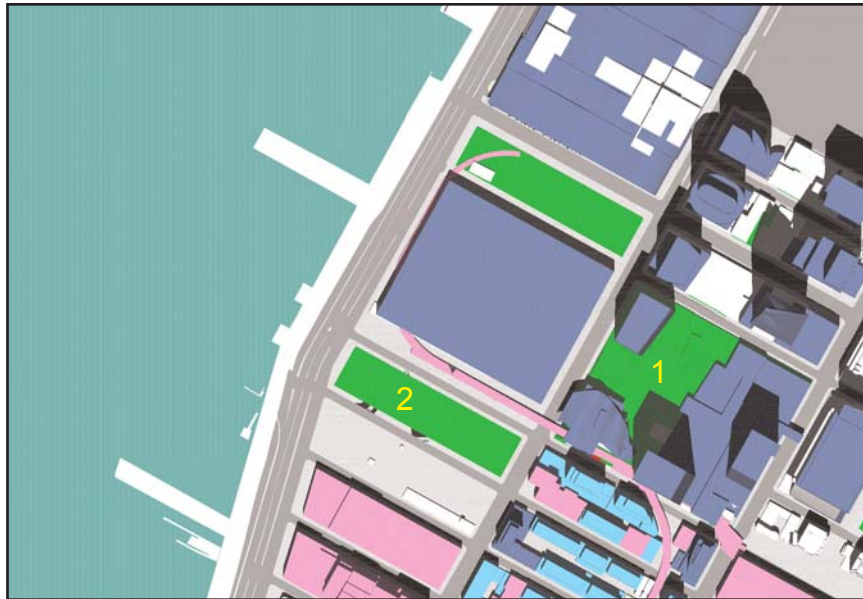


June 21 -6:01 PM

Legend:

- Projected Development Site
- Potential Development Site
- Open Space Resource
- Historic Resource
- Shadow Increment on Resource of Concern
- U Resource of Concern (refer to Table 6-1)

*(This figure has been modified for the FEIS)*



June 21 - 12:00 PM



June 21 - 2:00 PM



June 21 - 3:30 PM

Legend:

- Projected Development Site
  - Potential Development Site
  - Open Space Resource
  - Historic Resource
  - Shadow Increment on Resource of Concern
- 1 Resource of Concern (refer to Table 6-1)

**SPECIAL WEST CHELSEA DISTRICT REZONING AND HIGH LINE OPEN SPACE EIS**

**Figure 6-6b**  
**Shadow Diagram - June 21 (No-Action Resources of Concern)**

Description,” under the Base FAR Scenario RWCDs, some of the projected and potential development sites would have a lower permitted FAR than they would under the proposed action. The remaining development sites would have same permitted FAR under the Base FAR Scenario as under the proposed action. The Base FAR Scenario is expected to result in buildings with similar height and bulk or smaller than the proposed action. As a result, the Base FAR Scenario would generate incremental shadows of the same or lesser magnitude and duration than the proposed action. Therefore the effects of the Base FAR Scenario would be generally similar to the proposed action. Similar to the Proposed Action, the Base FAR also would result in significant adverse shadow impacts on the Church of Guardian Angel and the General Theological Seminary.

## F. CONCLUSION

### *Assessment*

According to the *CEQR Technical Manual*, a shadow is defined as the circumstance in which a building or other built structure blocks the sun from the land. An adverse shadow impact is considered to occur when the shadow from projected/potential development falls on a publicly accessible open space, historic landscape, or other historic resource if the features that make the resource significant depend on sunlight, or if the shadow falls on an important natural feature and adversely affects its use and/or important landscaping and vegetation. The uses and vegetation in an open space establish its sensitivity to shadows. Uses that rely on sunlight include passive use, such as sitting or sunning, and such activities as gardening, or children's wading pools and sprinklers. Vegetation requiring sunlight includes the tree canopy and flowering plants. Where lawns are actively used, the turf also requires extensive sunlight. For these activities and plants, four to six hours a day of sunlight, particularly in the growing season, is often a minimum requirement. In general, shadows on city streets and sidewalks and on other buildings are not considered significant under CEQR. The following reviews each resource and assesses the shadows created by the proposed action.

### Chelsea Historic District

As shown in Table 6-1, the projected/potential development would cast incremental shadows on the Chelsea Historic District. The largest shadow areas would be cast during the summer months, but these shadows would last for short durations. The projected/potential development would cast shadows along the southern portion of the historic district, along the east side of Tenth Avenue (see Figure 6-6a). According to the *CEQR Technical Manual*, sensitive features on a historic structure include details or characteristics that make the resource significant. Examples of sensitive features include stained glass windows and highly carved ornamentation. As described in Chapter 7, “Historic Resources,” the majority of structures within the Chelsea Historic District are Greek Revival and Italianate row houses, but it also contains a few apartment buildings and federal houses, which are not considered sunlight sensitive. Other architectural styles represented among the contributing resources include neo-Grec, French Second Empire, and neo-Gothic. As such, the



shadow effects caused by the projected/potential development would not be considered significant adverse impacts as the above mentioned structures do not contain sunlight sensitive features.

However, there are three churches that contain stained glass located within the historic district. St. Paul's Church and St. Peter's Church, located on W. 22nd Street and W. 20th Street, respectively, between Eighth and Ninth avenues, contain stained glass windows, although shadows from the projected/potential development would not be long enough to reach them. Incremental shadows from Projected Development Site 15 would be cast on the General Theological Seminary which occupies an entire block between West 20th and West 21st Streets, between Ninth and Tenth avenue. There are stained glass windows located on the building on the northwest corner of Tenth Avenue facade. Shadows from Projected Development Site 15 would be cast on this building on three of the analysis days. On March 21, the projected/potential development would cast an incremental shadow on small portions of the north and southwest corners of the church, as well as a portion of the south facade in the midblock (see Figure 6-4a). As shown in Table 6-1, on March 21, shadows from the projected development are cast in the mid- and late afternoon for a relatively short duration (approximately a total of 49 minutes). On May 6, as shown in Figure 6-5a, shadows would enter a small portion of the northwest corner of the church at approximately ~~4:40~~ 3:48 PM, while a larger portion of the church would be cast in shadow at approximately at 5:18 PM, just before the end of the analysis period. The shadow would be of very short duration on this day (approximately 1 hour and 30 ~~38~~ minutes). On June 21, as shown in Figure 6-6a, the northwest corner of the church would again be cast in shadow in the early evening. As shown in Table 6-1, the shadows would be cast on the church just before the end of the analysis period for a duration of approximately 1 hour and 11 minutes. The incremental shadows resulting from the proposed action are considered to be a significant adverse impact. As described in Chapter 22, "Mitigation," because there are no practicable or feasible means to reduce or eliminate the impact, it would remain unmitigated.

#### Church of the Guardian Angel

As discussed in Chapter 7, "Historic Resources," the Church of the Guardian Angel is eligible for designation as a New York City Landmark and to be listed and the State and National Registers of Historic Places. Built in 1930, it is a brick and limestone structure that was modeled after the Clunio Abbey of Saint Peter in France. The Church features lavish sculpture and an ornate portal that contains a large rose window on the east facade along Tenth Avenue (see Figure 6-7). The south facade (along West 21st Street) contains smaller stained glass windows (see Figure 6-7). The church has frontages on Tenth Avenue and West 21st Street.

The projected development would cast new incremental shadows on the church on two of the analysis days. On December 21, Projected Development Sites 15, 18, 19, and 21 would cast an incremental shadow on the church. As shown in Table 6-1, shadows from the projected development would be cast in the late morning and mid-afternoon. As shown in Figure 6-3, the western portion of the church would be cast in shadow at approximately 10:01 AM ~~12:00 PM~~ and the entire south facade would be covered at 2:53 PM, just before the end of the analysis period on this day. On March 21, new incremental shadows from Projected Development Site 15 would be cast on the south facade of the church during the mid-day ~~afternoon~~. As shown in Figure 6-4a, ~~towards the end of~~

~~the analysis period~~, at approximately 10:51 ~~3:30~~ PM, a small portion of the southeast corner of the church would be cast in shadow.

The church holds services at 5:00 PM on Saturday, and 9:00 AM and 12:00 PM on Sunday. As such, shadows cast by the projected/potential development on the two analysis days would not detract from the morning and evening services at the church. However, new incremental shadows would be cast on the church during the 12:00 PM services. Therefore, new incremental shadows cast on the church may detract from the church's functions and architectural significance and impact the enjoyment of the stained glass windows by parishioners. As such, this would be considered a significant adverse shadow impact. Apart from eliminating the projected development site that would cast shadows upon the church from the proposed action, there are no reasonable or feasible means to avoid or mitigate shadow impacts upon the stained glass windows of the church, and thus would result in a significant adverse impact of the proposed action.

### Chelsea Waterside Park

The projected/potential development would cast new incremental shadows on Chelsea Waterside Park. Chelsea Waterside Park contains basketball courts, benches, sprinkler area, paved walkways, trees, planters, and a soccer field. According to the *CEQR Technical Manual*, trees, many plants, and many activities can require a minimum of four to six hours of sunlight, particularly between April and October (the growing season). Shadows cast by potential development Sites 46 and 53 on December 21 would cover small portions of the park in the ~~early~~ morning and mid-afternoon (see Figure 6-3). The *CEQR Technical Manual* indicates that winter shadows, although longest, move the most quickly along their paths and do not affect the growing season of outdoor trees and plants. As shown in Figure 6-4, new incremental shadows cast by Potential Development Sites 41 and 46 on March 21 would affect a small portion of the park in the ~~early morning and for a very short duration (approximately 16 minutes)~~. As the shadows cast during December and March would cover small portions of the park, and December and March are not within the growing season of April through October, new incremental shadows cast by the projected/potential development would not create a significant adverse impact on the park. In addition, shadows cast by the new development on Chelsea Waterside Park would not affect the usability of the passive or active open space resources, as utilization of these resources are generally low during these times of year. As shown in Figure 6-5, at approximately ~~6:40~~ 6:27 AM on May 6, Potential Development Site 41 would cast a shadow in the ~~northeast~~ eastern portion of the park; however shadows from the projected/potential development would be cast early in the morning and for a duration of (approximately ~~1 hour and 30~~ 3 hours and 18 minutes). The park would receive ~~9 hours and 20~~ 7 hours and 32 minutes of sunlight after the shadow exits on this day. On June 21, as shown in Figure 6-6, at approximately ~~6:15~~ 5:57 AM, shadows from Potential Development Site 41 would extend into the ~~northeast~~ eastern portion of the park. However, shadows cast on this day would be in the early morning and last for a duration of approximately 3 hours and 19 ~~30~~ minutes. ~~As~~ Shadows cast from the projected/potential development during the growing season would cover only small portions of the park and last for short durations, within 1 hour and 30 minutes of sunrise. As no-action developments of the same height and bulk could occur on the shadow-casting sites in the future without the proposed action, no significant adverse shadow impacts on the park are expected as a result of the proposed action.

## Chelsea Park

Chelsea Park contains basketball courts, ball fields, playground equipment, benches, and trees. Shadows cast on and March 21 would cover a small area in the southwest portion of the park at approximately 3:30 PM (see Figure 6-4). A larger area of the park would be cast in shadow just before the end of the analysis period at 4:29 PM (see Figure 6-4). However, as discussed above, as March falls outside of the period between April and October, and utilization of open space resources are generally low during these periods, new incremental shadows cast generally would not create significant adverse impacts on the park during these months. As shown in Figure 6-5, on May 6, the shadows from Projected Development Sites 6 and 8 would only affect a small portion of the park at approximately 4:00 PM; however, the shadows from the projected/potential development would affect a larger portion of the park in the late afternoon at approximately 5:18 PM, just before the end of the analysis period on this day. As incremental shadows would cover the majority of the park only in the late afternoon, and would affect a small area of the park for a duration of approximately 2 hours and 11 minutes, the incremental shadows cast by the projected/potential development on this day would not result in a significant loss of sunlight on the park. On June 21, as shown in Figure 6-6, the shadows from Projected Development Site 6 would only affect a very small area of the northwest portion of the park at approximately 3:30 PM; however, the shadows would affect a larger portion of the park in the late afternoon at approximately 5:30 PM. The park would receive approximately 9 hours and 18 minutes of sunlight on this day before the incremental shadows enter the park at 3:15 PM. As such, no significant adverse shadow impacts on Chelsea Park are anticipated as a result of the proposed action.

## Chelsea Houses Open Space

The Chelsea Houses open space features a playground, benches, chess tables, and several trees. New incremental shadows cast from Projected Development Site 11 on March 21 would enter the playground in the late afternoon and last for 49 minutes on this day (see Table 6-1). Shadows cast on March 21 would cover a small area of the open space at approximately 3:30 PM; however, shadows would affect a larger portion of the open space later in the afternoon at approximately 4:29 PM (see Figure 6-4). As discussed above, utilization of open space resources during these periods are generally low. As such, new incremental shadows cast during these periods would not create a significant adverse impact on the usability of the open space. In addition, as March falls outside of the growing period between April and October, new incremental shadows cast would not create significant adverse impacts on the trees that are located in the open space. On May 6, the shadows from Projected Development Site 11 would affect small portions of the southwest corner of the open space area at approximately 4:00 PM, with the southern edge of the open space area cast in shadow at approximately 5:18 PM, right before the shadow exits the open space (see Figure 6-5). The open space area would receive approximately 8 hours and 33 minutes of sunlight before the incremental shadows from Projected Development Site 11 enters the open space on this day. Shadows cast by Projected Development Site 11 on June 21 would cover a small area of the northwest corner of the open space at approximately 3:30 PM, while at 5:30 PM, shadows from projected development Site 11 would extend further into the open space (see Figure 6-6). On this day, the open space would receive approximately 9 hours and 8 minutes of sunlight before the incremental shadows enter the



open space area. As discussed above, trees and many activities can require a minimum of four to six hours of sunlight, particularly between April and October. As such, the incremental shadows cast on May 6 and June 21 would not result in a significant adverse impact on the open space area.

#### Clement Clarke Moore Park

Clement Clarke Moore Park features a playground, benches, paved walkways, trees, and planters. New incremental shadows cast on March 21 would enter the playground in the late afternoon and last for a short duration on this day (see Table 6-1). Shadows cast by Projected Development Site 15 on March 21 would cover a small area of the southwest corner of the park at approximately 3:30 PM; however shadows would affect a larger portion of the park later in the afternoon at approximately 4:29 PM (see Figure 6-4a). As discussed above, utilization of open space resources during these periods are generally low. As such, new incremental shadows cast during these periods would not create a significant adverse impact on the usability of the playground. In addition, as March falls outside of the growing period between April and October, new incremental shadows cast would not create significant adverse impacts on the trees that are located in the park. Shadows cast by Projected Development Site 1 on June 21 would cover a small area of the northern edge of the park at approximately 5:30 PM (see Figure 6-6a) and would last a very short duration (approximately 17 minutes). As the new incremental shadows cast on this day would cover small areas and last for a short duration, there would not be a significant adverse impact on the park.

#### Robert S. Fulton Houses Playground

The Robert S. Fulton Houses Playground features paved walkways, benches, jungle gyms, trees, and planters. New incremental shadows from Projected Development Site 45 would only be cast on the March 21 analysis day. Shadows cast on March 21 would be narrow and extend across the park, later in the afternoon at approximately 4:29 PM (see Figure 6-4a). In addition, the shadows cast would be of relatively short duration (approximately 46 minutes). As discussed above, utilization of open space resources during these periods are generally low. As such, new incremental shadows cast during these periods would not create a significant adverse impact on the usability of the playground.

#### Eastern Caemmerer Yard and Block 675

A shadow analysis was also performed for the proposed Eastern Caemmerer Yard and Block 675 open space resources. As shown in Table 6-1, the proposed Block 675 would experience incremental shadows from projected site 3 during the December and March analysis periods, while the Eastern Caemmerer Yard would experience incremental shadows from Projected Development Site 27 and potential site 26 on all analysis days. Although the specific program for the two parks is not known at the time, it is unlikely that the projected/potential development would have significant impact on the proposed parks. Therefore, the shadow analysis performed could be utilized in the planning and development phase of the proposed parks to develop a layout where features requiring sunlight would be located in areas of the park where shadows are not cast or cast for a short



duration. As such, it is unlikely that the projected/potential development would have significant adverse impacts on the proposed parks.

### High Line Open Space

In addition to the open space resources described in Section B above, the proposed action would create a new approximately ~~6.7~~ 5.9 acre publicly accessible open space on the High Line. The creation of this resource would be an integral element of the proposed action and the proposed zoning amendments have been created to ensure that the form and use of new buildings relate to the High Line open space. It is expected that project generated shadows (from development generated by the proposed action) would be cast on the High Line; however, project-generated shadows are generally not assessed for shadow impacts and the design of the High Line open space would consider the expected the shadows in its design. Therefore, as this open space would be generated under the proposed action, further analysis is not warranted.

### ***Conclusion***

The projected and potential development that could result from the proposed action would cast new incremental shadows on a number of publicly accessible open spaces and sunlight sensitive historic resources within the proposed action area, including the Chelsea Historic District, the Church of the Guardian Angel, Chelsea Waterside Park, Chelsea Park, Chelsea Houses Open Space, Clement Clarke Moore Park, and Robert S. Fulton Houses Playground, and the proposed open spaces on Block 675 and the East Caemmerer Yard.

The shadow analyses indicate that, although shadows would be cast on the above resources as a result of the proposed action, they would not affect the utilization of any of the public open spaces, nor would they affect the growth of plants within those spaces. The longest shadows cast by projected/potential development would typically occur on December 21. However, winter shadows, although longest, move the most quickly along their paths (because of the earth's tilt) and do not affect the growing season of outdoor trees and plants. According to the *CEQR Technical Manual*, trees, many plants, and many activities can require a minimum of four to six hours of sunlight, particularly between April and October. As discussed above, for all of the public open space resources analyzed, each would continue to receive a minimum of four hours of sunlight during the growing season. As such, the proposed action would not result in significant adverse shadow impacts on those open space resources. In addition, as discussed above, the proposed action would not have significant adverse impacts on the biotic communities in the Hudson River.

The analyses found that the proposed action would result in significant adverse shadow impacts on the Church of the Guardian Angel and the General Theological Seminary (located within the Chelsea Historic District) due to the incremental shadows cast by Projected Development Site 15, 18, 19, and 21. As discussed in Chapter 22, "Mitigation," there are no practicable or feasible means to reduce or eliminate the impacts, and they would remain unmitigated.

As discussed above, the proposed action could potentially cast shadows on twenty historic resources, however, eighteen of these are not dependent on sunlight during the day to the extent that shadows would affect their significance. Therefore, while the proposed action could potentially cast shadows on these structures, such shadow effects would not significantly impact these historic resources.