Chapter 20: Mitigation

A. INTRODUCTION

In accordance with the *New York City Environmental Quality Review Technical Manual*, where significant adverse impacts are identified, mitigation to reduce or eliminate the impacts to the fullest extent practicable is developed and evaluated.

As described in Chapter 6, "Shadows," and Chapter 7, "Historic Resources," as compared with the Previously Approved Project, the proposed project would result in significant adverse shadow impacts on one historic resource with sun-sensitive features—the Fifth Avenue Presbyterian Church—on the June 21 analysis day. (The proposed project would not result in any significant adverse shadows impacts as compared with the Expanded Development Scenario.)

On the June analysis day, incremental shadow would fall across one or more stained-glass windows on the south façade of the Fifth Avenue Presbyterian Church for a total duration of an hour and 20 minutes (see Figures 6-15, 6-16, and 6-19, in Chapter 6, "Shadows"). The extent and duration of the incremental shadow would cause a significant adverse impact to this resource. Incremental shadows on this resource would not cause a significant adverse impact on the May 6 analysis day, and no incremental shadows would fall on the church on the March 21, September 21, and December 21 analysis days.

Since publication of the DEIS, potential mitigation measures have been studied, as described below. Material for this description has been taken, in part, from a report prepared by Quentin Thomas Associates (see Appendix E).

ALTERNATIVE DESIGN CONFIGURATIONS

A reduction in the proposed building's height was explored, and as stated in Chapter 21, "Alternatives," the building would have to be no taller than 600 feet to eliminate the shadow increments associated with the proposed project. Any development on the project site with a streetwall similar to that of the proposed project and a height of approximately 600 feet would generate some incremental shadows on the Fifth Avenue Presbyterian Church; however, the incremental shadows would be less than those from the proposed project. A building of this size and configuration would not meet the applicant's goals and objectives for the proposed project (see Chapter 1, "Project Description"). Specifically, it would not add to the Midtown Manhattan skyline and complement the architectural heritage represented on West 53rd Street.

In terms of potentially repositioning the tower to reduce the shadow impact, it is not possible to move the tower to another location given the small size of the site (18,560 sf with a width of approximately 97 feet on West 54th Street and only 87 feet on West 53rd Street).

ARTIFICIAL LIGHTING ON THE EXTERIOR

The provision of artificial lighting can be used to mitigate shadow impacts by simulating sunlight conditions on stained glass windows. Exterior lighting, diffuse in nature and color-corrected so that it would be similar to sunlight, could be directed at the stained glass windows. This would require that lighting be mounted on a nearby building or on the façade of the church itself.

Lighting directed from another building has been used in cases where buildings were in the range of 20 feet apart and the building on which the lights were placed was owned by the project sponsor. In this case the only buildings from which exterior lighting could be directed are at least 60 feet away, across West 55th Street, and are owned by third parties, and thus are not under the control of the project sponsor. Lighting from across the street also raises issues with regard to energy efficiency and light pollution. Given these considerations this mitigation measure is not considered practicable.

Lighting could be installed on the exterior of the church; however, the façade design provides no locations (e.g., cornice lines or sills) to place the lighting fixtures where they would not be obtrusive (see **Figure 20-1** and **20-2**). Therefore, lighting of the exterior would not be in keeping with the design of the Church and would not be considered a practicable solution.

INTERIOR LIGHTING

Interior lighting was also considered for the church sanctuary because of its unique construction with an outer stone exterior wall and an interior wall—each with windows. The inner windows are of decorative stained glass and the outer windows are clear leaded art glass with inserts of smaller colored borders. There is an air space in between of about 15 inches (except on the corners of the sanctuary walls, which are curved, creating a larger space in between the interior and exterior). This double glazing system, which functions as a sound and insulation barrier, represented an innovative solution for its time period and has significance from both an engineering and aesthetic standpoint. The system provides effective sound and temperature insulation to this day. The south-facing rear window of the church chapel also affected by shadows from the proposed project is single-glazed and does not have this cavity and, thus, interior lighting for this window is not practicable.

In the sanctuary there are six groupings of three windows each above the balcony on both the north and south sides of the sanctuary (see **Figures 20-3** and **20-4**). On the lower level six groupings of two windows line up below the upper windows as seen from West 55th Street; however, the westernmost pairs of windows are at least not visible on the interior of the sanctuary. In some of the upper windows, the shadow of radiators, which stand in the cavities several feet above the sills, also can be seen. To varying degrees through the day the shadow of the exterior walls can be seen on the interior windows. This is particularly visible in the southwest and southeast corner windows with the deeper recesses. On the north side the east and west corner windows are also darker, with the east being particularly dark due to the recent installation of air conditioning ducts and the building to the north being closer. In general, the windows on the sanctuary's north elevation are muted due to the proximity of the adjacent buildings, while the windows on the south elevation are significantly brighter as a result of direct sunlight along with ambient light contributed by reflected light from adjacent buildings.

Given the existence of the cavities, the potential for installing lighting in between the windows was considered. However, the cavities of the lower windows are only accessible through one

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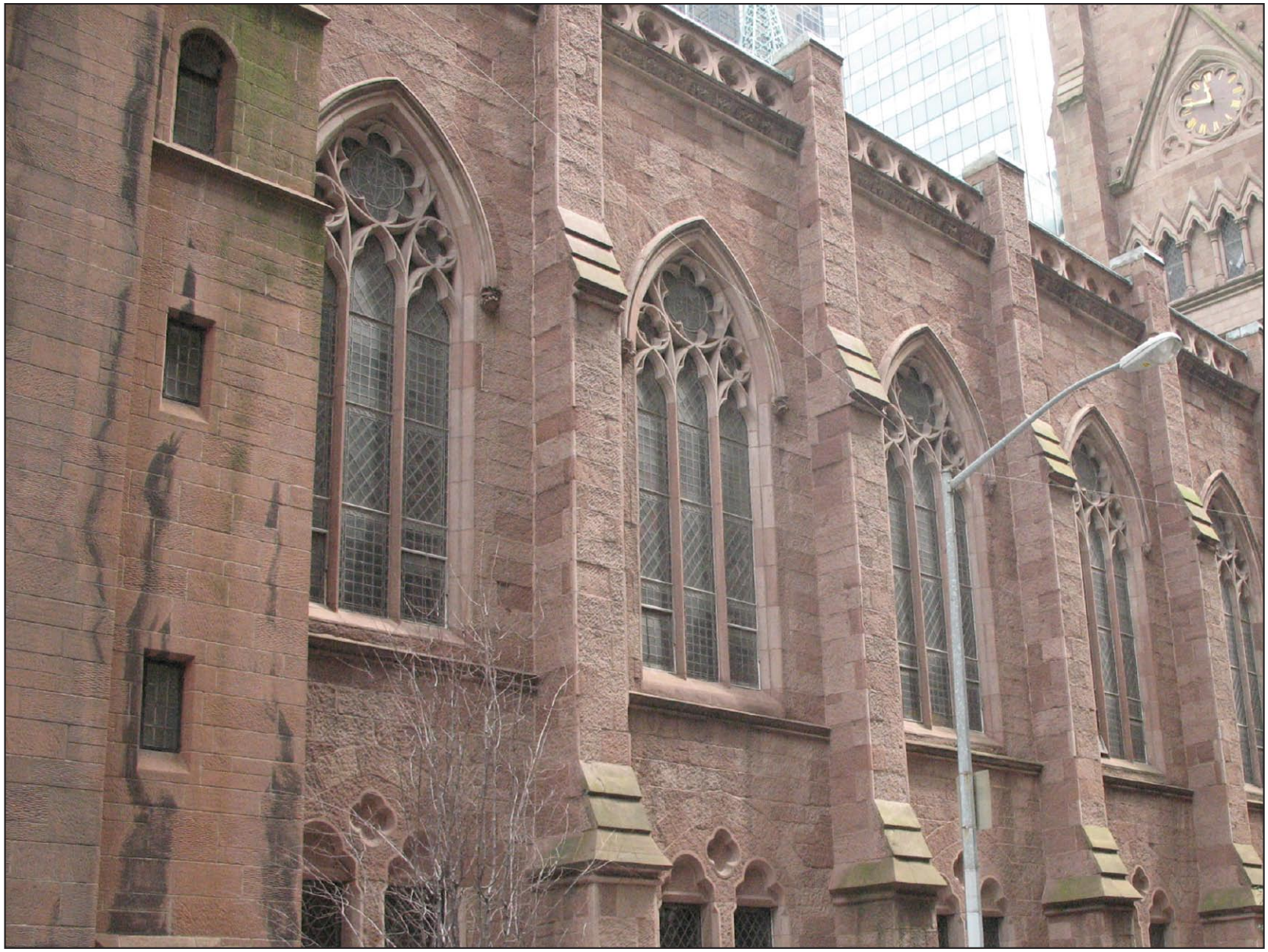

South Facade–
Fifth Avenue Presbyterian Church
Figure 20-1

53 West 53rd Street

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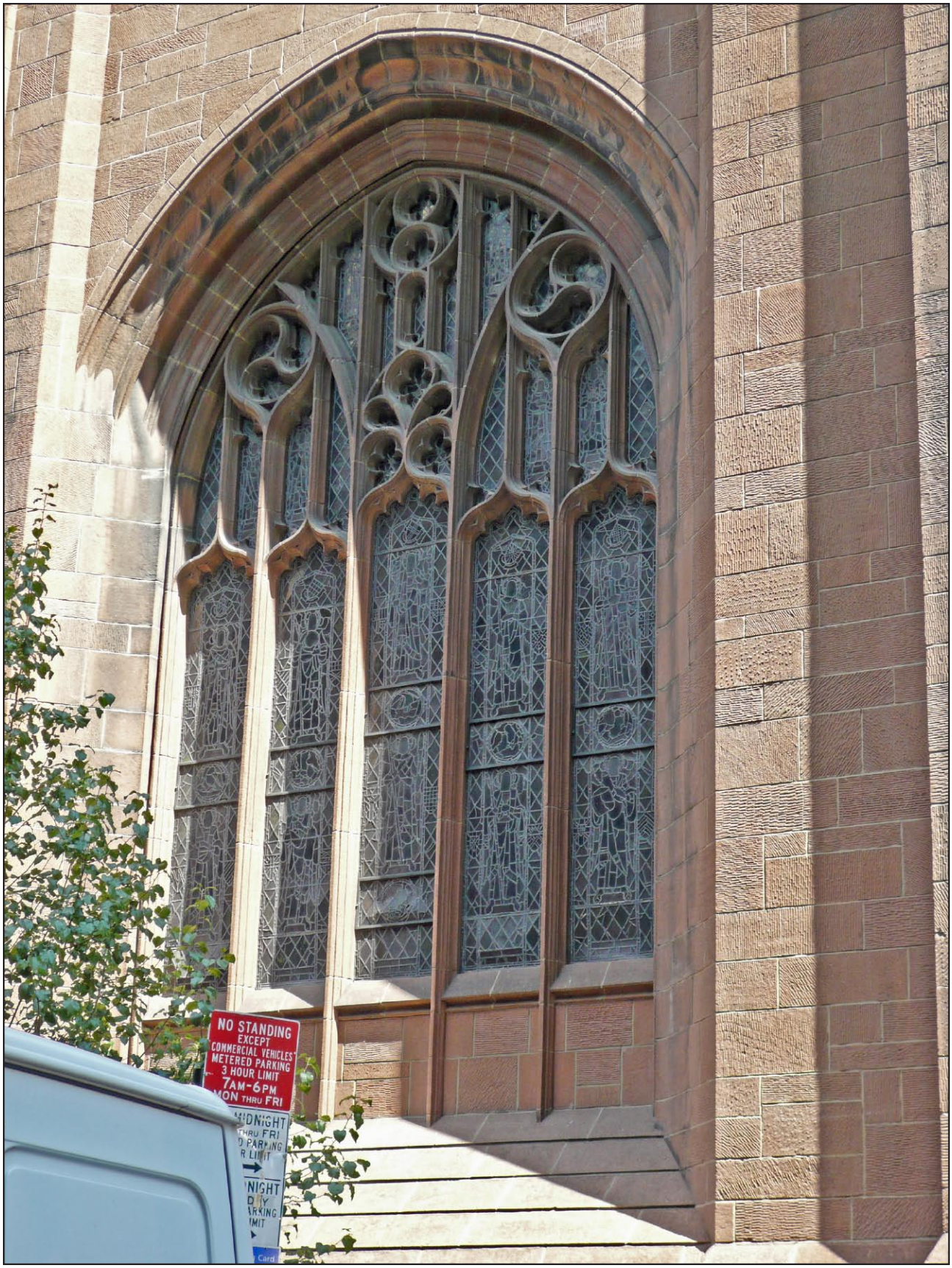

South Window Chapel of
Fifth Avenue Presbyterian Church
Figure 20-2

53 West 53rd Street

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View Southeast

View Southwest

South Wall–
Fifth Avenue Presbyterian Church
Figure 20-3

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View Northwest

View Northeast

53 West 53rd Street

North Wall–
Fifth Avenue Presbyterian Church
Figure 20-4

hinged partial casement per pair. Therefore, the only way to access these window cavities for installation or maintenance would be to remove sections of the stained glass each and every time.

The cavities of the upper windows are only accessible from above and with difficulty due to the curved form of the ceiling. The cavity between these upper windows is not contiguous and quite shallow from front to back, and also shares space with heating radiators that rise above the sill to a height of around three feet. Given modern lighting technology, it is possible to install lighting fixtures at the bottom of the cavity in the upper windows. Due to the height of the taller upper windows, however, there would be a tendency for light to diminish toward the top. To augment the lighting with fixtures from the top or the side would not be acceptable because the light source would then be visible, especially from the outside through the largely clear glass of the exterior windows. Further, the clear exterior glass would not assist in any way to the distribution of light toward the interior stained glass, but would merely allow the light to pass straight through it; thus, improving the light distribution would require alterations to the historic outer art glass. To effectively light the stained glass with some degree of uniformity, it would be necessary to create a light box where the outer layer would be frosted or etched so as to catch the artificial light and return it to the stained glass. Given the shallow nature of the cavity it would be impossible to introduce such an inner layer without compromising the relationship between the inner and outer historic glazing systems. Lastly, even if long-life LED, latest technology sources were used, such sources can still experience unexpected failures; therefore, access would need to be provided for. Providing such access for maintenance would be very difficult.

Observation of the light through the south windows also showed that at no time was the light constant and even. There was a mottled random effect as direct and reflected light moved across the south windows. There were no cut-off lines between sunlight and shadow because the volume of light outside the church comprises direct light from the sun, ambient light from the sky as a whole, and reflected light from surrounding surfaces.

Any new lighting system to mitigate the projected shadows would require a sophisticated control system with multiple photo cell sensors and timed programmed sequencing to attempt a balance between the areas with shadow and without shadow. New lighting across the entire façade would produce a purely artificial effect without the regard for the location of the church and, as discussed above, is not practicable as it would not be in keeping with the exterior design of the church. In addition, it should be noted that since the church windows are largely in shadow from at least September 21 to March 21—in existing conditions—lighting these windows in the summer could appear very artificial in contrast to the appearance of these windows during the rest of the year.

HELIOSTATS

The use of sun-tracking mirrors, or heliostats, also was explored as a potential measure to mitigate the shadow impact on the Fifth Avenue Presbyterian Church. Heliostats track the sun, either by following computer-driven sequencing directions or responding to exterior-mounted sensors, and thus can be reoriented throughout the day to redirect sunlight in a single, fixed direction.

The use of multiple heliostats, mounted on a residential tower in Battery Park City, to reflect light to the south into the new south end of Teardrop Park is the first known instance of this technology to provide supplemental light to a public open space that would otherwise be lacking in sunlight. In that instance, several mirrors eight feet in diameter focus light into the park.

Because the affected windows of the Fifth Avenue Presbyterian Church face south the solution would not be so direct. Light would either have to be reflected obliquely by heliostats mounted on a building to the south of the Church or by the use of two sets of heliostats. In the latter case heliostats mounted on the church roof or above and north of the church would reflect sunlight onto heliostats mounted on buildings to the south of the Church and from there the light would be reflected back to the north onto the south facing windows of the Church.

In any case, multiple heliostats would be required as each makes a spotlight that could only shine in one place at a time. Since heliostats are generally large (approximately eight feet in diameter) they would not be considered compatible additions to the historic resources to which they might need to be mounted to work. As discussed above in regard to exterior lighting, the façade design of the church provides no locations (e.g. cornice lines or sills) to place the heliostats where they would not be obtrusive and would not detract from the appearance of the historic building. The buildings to the south of the church from which the second set of heliostats could be mounted are owned by third parties, and thus are not under the control of the project sponsor.

Further, the spotlight produced by a heliostat would be an intense beam of redirected sunlight that could only shine on a single window at a time. The potential effect on the windows from such lighting would not be an accurate simulation of natural, existing lighting conditions on the Church's stained glass windows.

For these reasons, the use of heliostats to mitigate the project's shadow impact on the Fifth Avenue Presbyterian Church is not considered to be desirable or practicable.

CONCLUSIONS

As noted above, at this time there are no practicable measures to mitigate the shadow impact on the church. Therefore, the increase in shadows on the windows of the Fifth Avenue Presbyterian Church which occurs on the summer analysis day, June 21, from 3:50 to 5:10 PM is considered an unavoidable adverse impact. ✷