7.0 Shadows

A. INTRODUCTION

This chapter assesses the potential impacts of new shadows cast by the Proposed Project on sensitive receptors. Queensbridge Park (including Vernon Playground), Queensbridge Baby Park, the open space areas at Queensbridge Houses, the East River, portions of Roosevelt Island's waterfront promenade, and the outdoor half basketball courts at Roosevelt Island's Sportspark, are the only sensitive receptors that would receive new or incremental increases in shadow as a result of the Proposed Action. The new shadows and incremental increases that would result from the Proposed Action are limited in time and area covered and would not affect aquatic resources in the East River or the usability or quality of the open space areas. Therefore, the Proposed Action would result in no significant adverse impacts due to shadows. The variations, which would be constructed in the same building envelope as the Preferred Development Program, would likewise result in no significant adverse shadow impacts.

A shadow-sensitive receptor is defined in the *CEQR Technical Manual* as a publicly accessible open space or a sunlight-sensitive natural or architectural resource. The *CEQR Technical Manual* identifies the following as situations when a significant shadow impact may occur:

- Substantial reduction in sunlight where a sensitive receptor is already subject to substandard sunlight (i.e., less than the minimum time necessary for survival);
- Reduction in sunlight available to a sensitive receptor from more than to less than the minimum time necessary for its survival;
- Substantial reduction in sunlight to a sunlight-sensitive resource; and
- Substantial reduction in the usability of public open space.

The *CEQR Technical Manual* requires that the effect of new shadows be considered on shadow-sensitive receptors within a distance of 4.3 times the building height. The proposed Silvercup West development would include a tower with a maximum EL. of 600 feet. Therefore, the Study Area chosen for the shadow analysis reaches a maximum of 2,580 feet from the base of the tallest tower. The Proposed Project would be constructed in an area that includes the Queensboro Bridge; shadows cast by the proposed Silvercup West development would, therefore, be intercepted to varying degrees by the shadows of this existing structure. To determine the potential impact of the Proposed Action on a particular resource, it is necessary to determine the incremental increase in shadow resulting from the Proposed Action, beyond any shadows already cast by existing structures.

This analysis provides an evaluation of the range of shadow effects of the Proposed Action by assessing potential impacts for four representative days of the year, namely: December 21 (winter solstice); May 6 (halfway between vernal equinox and summer solstice); June 21 (summer solstice); and September 21 (autumnal equinox). These dates represent the full range of shadows that occur throughout the year. During each of these days, the shadow analysis examines the shadow movement throughout the day, from 1½ hours after sunrise to 1½ hours before sunset, in accordance with the CEQR requirements.

B. IDENTIFICATION OF SENSITIVE RECEPTORS

1. Screening Analysis of Sensitive Resources

A screening analysis was conducted to identify the shadow-sensitive public open spaces, historic resources, and natural resources in the Study Area that could potentially be affected by the development of Silvercup West. The analysis eliminated from consideration any public open space and historic resource that: 1) would be out of shadow range of the proposed structures; 2) would not be affected by the proposed structures due to existing intervening structures (primarily Queensboro Bridge); 3) would be located in an area south of the Project Site in which no shadow would fall; or 4) does not contain sunlight sensitive features.

2. Public Open Spaces

There are eight publicly accessible open spaces located within the maximum shadow length of the proposed Silvercup West development (2,580 feet), though only five (Queensbridge Park, Queensbridge Baby Park, the open space areas at Queensbridge Houses, portions of Roosevelt Island's waterfront promenade, and the outdoor half basketball courts at Roosevelt Island's Sportspark) are assessed for potential shadow impacts, as described below (Figure 7-1).

- *Queensbridge Park and Ballfields (including Vernon Playground):* Located along the East River Waterfront from Bridge Plaza North to near 40th Avenue, this 20-acre park includes softball and ad hoc fields, play equipment, passive recreation areas, and a waterfront esplanade. The park also includes a vacant concession stand and bathroom, located at the south end of the park (closest to the Project Site and the Queensboro Bridge). The waterfront esplanade is currently inaccessible.
- *Queensbridge Baby Park:* Located between the Queensboro Bridge and 41st Road, just west of 12th Street, this pocket park includes approximately 0.03 acres with six concrete handball courts and benches. The park is partially shaded by the Queensboro Bridge throughout the day.
- *Queensbridge Houses Open Space:* Located between Vernon Boulevard, 21st Street, and 40th Avenue, east of the Queensbridge Park and north of the Queensbridge Baby Park, this housing complex includes six blocks of clustered residential buildings. Each of the blocks (A through F) contain a central courtyard that includes both passive and active recreation areas, such as a children's play area, benches, trees, and landscaping. The open space courtyard areas are partially shaded by the Queensbridge Houses throughout the day.
- *Roosevelt Island's Waterfront Promenade:* Located along Roosevelt Island's perimeter, the waterfront promenade is part of an interlinked system of pedestrian paths and walkways that connect the open space areas on the Island. The southwestern and southeastern portions of the waterfront promenade are located at the south end of the island, primarily south of the Queensboro Bridge, adjacent to East Road and along the edge of the East River's West Channel and East Channel, respectively.
- *Outdoor Half Basketball Courts at Roosevelt Island's Sportspark:* Located on Roosevelt Island south of the Queensboro Bridge, the Sportspark is a large sports complex with an indoor swimming pool, NBA-sized basketball court, squash courts, and a gymnastics room, plus four outdoor half basketball courts. The outdoor half basketball courts are located on the east side of the complex, adjacent to East Road and the Island's waterfront promenade.

Open space resources located within the maximum shadow length of the proposed Silvercup West development (2,580 feet), but south of the Project Site where no shadows could reach, were removed from consideration per *CEQR Technical Manual* guidance, including: Gordon Triangle, Murray Playground, and the 44th Drive Public Pier (refer to Figure 6-1 in Chapter 6, "Open Space").

3. Historic Resources

Three historic resources were identified within the Study Area (Chapter 8, "Historic and Archaeological Resources"), but none would experience shadow impacts.

- The New York Architectural Terra Cotta Company building has no sunlight-dependent features, and is therefore eliminated from further evaluation.
- The Queensboro Bridge has no sunlight-dependent features and is therefore eliminated from further evaluation.
- The Hunters Point Historic District is located about 2,500 feet south of the Project Site and therefore would not be affected by shadows resulting from the Proposed Action. No further evaluation of this resource is necessary.

Therefore, the Proposed Action would not have any significant adverse shadow impacts on historic resources.

4. Natural Resources

The Project Site is located adjacent to the East River, the only natural resource in the Study Area, which may potentially be affected by shadows. The East River is a tidal strait, connecting the Hudson River and New York Bay with the western end of Long Island Sound. It has minimal direct freshwater input and reflects the salinity of the larger estuaries it connects. It is a Class I water body, with NYSDEC-stated use goals as secondary contact recreation and fishing, and it is habitat for numerous transient and resident fish species.

Shadows from the proposed Silvercup West development would reach the East River in the morning throughout the year. However, even in winter, when shadows are longest, the area of the river in the shadow path would remain in sunlight most of the day. In addition, sunlight-dependent organisms moving through the water would be unaffected by the shadow, since the East River flows swiftly. Likewise, because the shadow cast by the Proposed Action would not be fixed or long lasting in its effect on the water column, it would not affect aquatic organisms. Accordingly, the Proposed Action would not have significant adverse impacts on aquatic resources, and, thus, shadows on the East River are not considered in the detailed analysis below.

C. SHADOW EFFECTS

Building shadows track the movement of the sun throughout the day. The morning shadows are cast toward the west, and as the sun progresses across the sky, shadows shift toward the east. From the Project Site, morning shadows are cast toward the East River, Roosevelt Island, and Manhattan, and afternoon shadows are cast toward Queens. The position of the shadow changes throughout the year, as well, with the azimuth angle of the sun. In the winter, the sun casts longer shadows since it travels in a low arc across the southern sky, rising late in the southeast and setting early in the southwest. In the spring and fall, the sun arcs at higher angles in the sky, casting moderate length shadows as it rises earlier in the east and sets later in the west. In the summer, the sun casts shadows for longer periods than in other seasons, since it rises earlier, sets later, and travels farther, from northeast to northwest.

The potential effects of shadows on Queensbridge Park and Vernon Playground, Queensbridge Baby Park, the open space courtyard areas at Queensbridge Houses, portions of Roosevelt Island's waterfront promenade, and the outdoor half basketball courts at Roosevelt Island's Sportspark were

evaluated throughout the year for Existing conditions and the Future in 2009, with and without the Proposed Action. The shadow diagrams and analysis were developed on a base model platform at 15-minute intervals, modified to include topographical information and the maximum envelope of the proposed Project.

D. EXISTING CONDITIONS

The southern portion of the Project Site is currently occupied by the NYPA facility. Vacant land and the New York Architectural Terra Cotta Company building are located on the northern portion of the Project Site. The DSNY utilizes a portion of 43rd Avenue for open storage of de-icing salt and sand (located along the southern edge of the Project Site); this use does not cast any shadows on any light-sensitive resource.

The primary sources of shadows on the Project Site and adjacent properties are the Queensboro Bridge, the Queensbridge Houses, and the NYPA facility. Shadows from the Queensboro Bridge are cast on Queensbridge Park (mostly in the afternoon along the southern portion of the park), Queensbridge Baby Park (throughout the day), portions of Roosevelt Island's waterfront promenade, and the four outdoor half basketball courts at Roosevelt Island's Sportspark. Shadows from the Queensbridge Houses are cast on the interior open space courtyard areas throughout the day. Shadows from the NYPA facility are cast on the New York Architectural Terra Cotta Company building; however, this historic resource does not contain any sunlight-dependent uses.

E. FUTURE CONDITIONS WITHOUT THE PROPOSED ACTION

In the Future without the Proposed Action, the Project Site is assumed to be vacant, except for the New York Architectural Terra Cotta Company building and the de-icing salt and sand pile along 43rd Avenue. The NYPA facility would be removed and would no longer cast shadows on the New York Architectural Terra Cotta Company building or the Project Site. The Queensboro Bridge would continue to cast shadows on Queensbridge Park, Queensbridge Baby Park, portions of Roosevelt Island's waterfront promenade, and the four outdoor half basketball courts at Roosevelt Island's Sportspark. The open space courtyard areas at Queensbridge Houses would continue to be shaded by the surrounding residential buildings.

F. FUTURE CONDITIONS WITH THE PROPOSED ACTION

Future Conditions with the Proposed Action would entail the complete redevelopment of the Project Site to include approximately 2.77 million gsf of residential, commercial, studio, and cultural/community facility space. The residential component would be contained within one 49-story (EL. 517.5 feet) tower and one 56-story (EL. 600 feet) tower, while the commercial component would be contained within a 37-story (EL. 537.6 feet) tower near the northern edge of the Project Site. The taller towers would be situated along the southern edge of the site, thus reducing the potential incremental shadow on areas to the north of the Project Site.

Incremental shadows resulting from the Proposed Action are those shadows that would be cast in addition to shadows that would already be cast by other, existing structures at a particular time. New

shadows resulting from the Proposed Action are those shadows cast where no shadow would otherwise be cast by nearby structures under Future Conditions without the Proposed Action.

As noted, Queensbridge Park (including Vernon Playground), Queensbridge Baby Park, the open space courtyard areas at Queensbridge Houses, portions of Roosevelt Island's waterfront promenade, and the outdoor half basketball courts at Roosevelt Island's Sportspark are the only sensitive resources potentially affected by either new or incremental shadows cast by the Proposed Action. In no case would the Proposed Action result in significant adverse impacts as a result of shadows, as described below.

This section reviews the shadows cast by the proposed Silvercup West development on each analysis day. A summary of the potential extent and duration of new shadows is included in Table 7-1.

a) December 21 (Analysis Period: 8:50 AM EST to 2:50 PM EST)

In December, the southern portion of Queensbridge Park would receive shadows from the Project starting at 11:40 AM, continuing throughout the day. Incremental shadows cast by the Proposed Project, beyond shadows already cast by the bridge, would first shade the southern, then central, then northern portion of Queensbridge Park, including Vernon Playground in the northeast corner of the Park. The maximum shadow coverage would occur at 2:50 PM (Figure 7-1). The maximum incremental shadow cast by the Proposed Project would affect only 60 percent of the park area between late morning and early afternoon in winter. Queensbridge Baby Park and the open space courtyard areas at Queensbridge Houses would not receive any shadows from the Proposed Project during this analysis period.

The open space resources on Roosevelt Island would receive limited shadows from the Proposed Project during the winter. A small portion of Roosevelt Island's southeastern and southwestern waterfront promenade would receive shadows from the Proposed Project in the morning, from 8:50 AM to 10:50 AM and from 8:50 AM to 9:15 AM, respectively, and the four outdoor half basketball courts at the Sportspark would be in and out of shadow from 8:50 AM to 10:10 AM (Figure 7-1). The maximum shadow coverage on the waterfront promenade (less than 400 feet) would occur at 8:50 AM, lasting only about 10 minutes; less of the promenade would be covered in morning shadow as the sun progressed across the sky.

b) May 6 (Analysis Period: 7:30AM EDT to 6:20PM EDT)

In May, the southern and southeastern portions of Queensbridge Park would receive new shadow cast by the Proposed Project alone from 1:10 PM to 3:40 PM; before and after this time, the Queensboro Bridge would also cast a shadow. The new shadow from the Proposed Project would be limited to the vacant concession stand/bathroom and a 0.30-acre grassy area to the east and west of it (Figure 7-2). At no point during this analysis period would shadows be cast from the Proposed Project onto Vernon Playground in the northeast corner of the park.

The southern portion of Queensbridge Baby Park currently receives shadow from the Queensboro Bridge for almost the entire afternoon from 12:20 PM to 6:20 PM. In the Future with the Proposed Action, Queensbridge Baby Park would also receive shadows from 5:00 PM through 6:20 PM; the effect of Project shadow at this time, in addition to bridge shadow, would result in complete shading of the park at about 6:00 PM (Figure 7-2).

TABLE 7-1: POTENTIAL EXTENT AND DURATION OF INCREMENTAL AND TOTAL NEW SHADOWS

	Pertinent Sensitive Receptors															
	December 21 (EST)				May 6 (EDT)				June 21 (EDT)				September 21 (EDT)			
	Enter	Exit	Max Increment %[1]	Max Total %[2]	Enter	Exit	Max Increment %	Max Total %	Enter	Exit	Max Increment %	Max Total %	Enter	Exit	Max Increment %	Max Total %
Queensbridge Park & Ballfields (incl. Vernon Playground)	10:20 AM	2:50 PM	60%	67%	11:30 AM	4:50 PM	2.5%	10%	12:20 PM	4:40 PM	<1%	2.5%	11:10 AM	5:20 PM	10%	15%
Queensbridge Baby Park	N/A				5:00 PM	6:20 PM	80%	100%	4:50 PM	7:00 PM	60%	100%	N/A			
Queensbridge Houses Open Space	N/A				5:15 PM	6:20 PM	<5%	40%	N/A				4:00 PM	5:20 PM	25%	40%
Eastside Portion of Roosevelt Island's Waterfront Promenade	8:50 AM	10:50 AM	<1%	<1%	7:30 AM	7:45 AM	<1%	<1%	N/A				8:20 AM	9:20 AM	<1%	<1%
Westside Portion of Roosevelt Island's Waterfront Promenade	8:50 AM	9:15 AM	<1%	<1%	N/A				N/A				N/A			
Outdoor Half Basketball Courts at Roosevelt Island's Sportspark	8:50 AM	10:10 AM	100%	100%	N/A				N/A				N/A			

Notes:

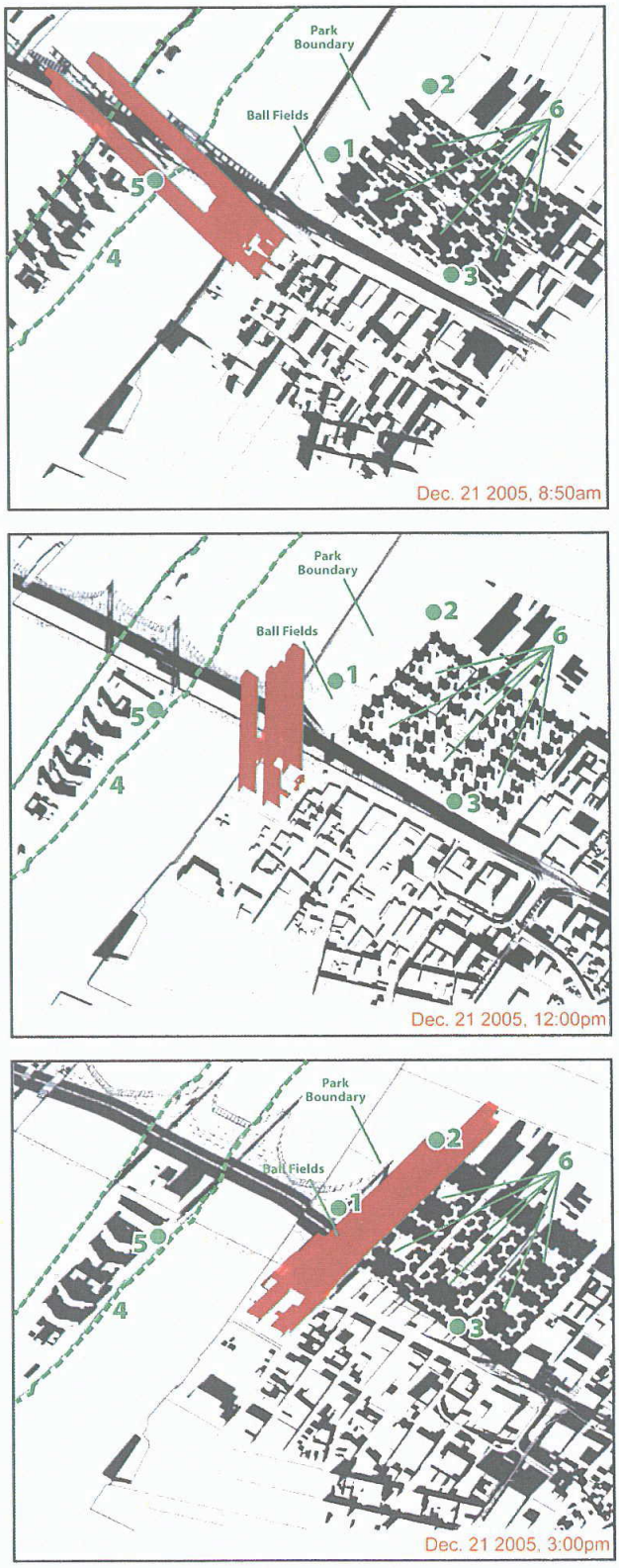
[1] Max Increment % is an estimate of the highest percentage of the open space that would be covered by new, incremental shadows from the Proposed Action.

[2] Max Total % is an estimate of the highest percentage of the potentially affected open space that would be cumulatively covered by new shadows from the Proposed Action and existing shadows from existing buildings in the vicinity of the Project Site during the referenced time period.

EST = Eastern Standard Time

EDT = Eastern Daylight Time

N/A = New shadows from the Proposed Action would not affect open space during this analysis period.



1 *Queensbridge Park*
2 *Vernon Playground*
3 *Queensbridge Baby Park*
4 *Roosevelt Island Waterfront Promenade*
5 *Outdoor Basketball Practice Court*
6 *Queensbridge Houses Open Space*

Figure 7-1:
Shadows - December



1 *Queensbridge Park*
2 *Vernon Playground*
3 *Queensbridge Baby Park*
4 *Roosevelt Island Waterfront Promenade*
5 *Outdoor Basketball Practice Court*
6 *Queensbridge Houses Open Space*

Figure 7-2: Shadows - May

The open space courtyard areas within the Queensboro Houses currently receive shadows from the surrounding residential buildings throughout the day. In the Future with the Proposed Action, the courtyard area within the southeastern most block of the Queensboro Houses complex (Block B) would receive additional shadows from approximately 5:15 PM to 6:20 PM. The effect of Proposed Project's incremental shadow at this time would be minimal (less than five percent), given the shadows cast by the existing residential buildings that surround the courtyard (Figure 7-2).

A small portion of Roosevelt Island's southeastern waterfront promenade would receive shadows from the Proposed Project in the morning, from approximately 7:30 AM to 7:45 AM (Figure 7-2). The island's southwestern waterfront promenade and the four outdoor half basketball courts at the Sportspark would not receive any shadows from the Proposed Action during this analysis period.

c) June 21 (Analysis Period: 6:50AM EDT to 7:00PM EDT)

In June, the southeast corner of Queensbridge Park would receive new shadow cast by the Proposed Project alone from 1:10 PM to 3:40 PM; during the remaining time, the Queensboro Bridge currently casts a shadow. The maximum new shadow cast by the Proposed Action would occur at 3:10 PM and be limited to the vacant concession stand/bathroom and a 0.15-acre grassy area at the southeast corner of the park (Figure 7-3). At no point during this analysis period would shadows be cast from the Proposed Project onto Vernon Playground.

The southern portion of Queensbridge Baby Park currently receives shadows from the Queensboro Bridge from 2:30 PM through 7:00 PM. In the Future with the Proposed Action, the northern portion of Queensbridge Baby Park would receive new afternoon shadows from 4:50 PM through 7:00 PM; the effect of Project shadow at this time, in addition to bridge shadow, would result in complete shading of the park at about 5:30 PM (Figure 7-3).

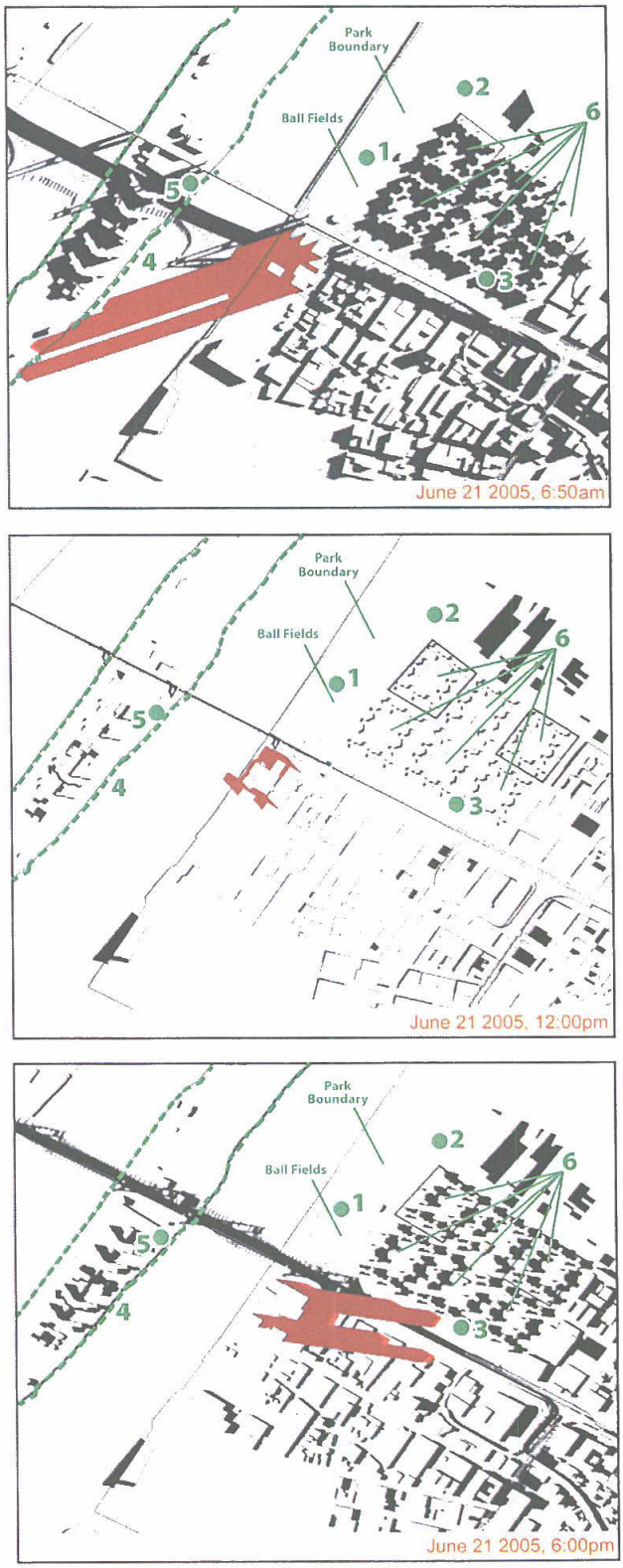
The open space resources on Roosevelt Island would not receive any shadows from the Proposed Project during this analysis period.

d) September 21 (Analysis Period: 8:20AM EDT to 5:20PM EDT)

At the equinox, the southern and southeastern portions of Queensbridge Park would receive new shadow cast by the Proposed Project alone from 11:30 AM to 5:00 PM; before and after this time, the Queensboro Bridge currently casts a shadow. The most extensive casting of new Project shadow would occur between 12:50 PM and 2:50 PM, with a maximum coverage at 2:50 PM (Figure 7-4), during which time it would cover the southern portion of the softball fields (central portion of the park). At no point during this analysis period would Project shadows be cast onto Vernon Playground.

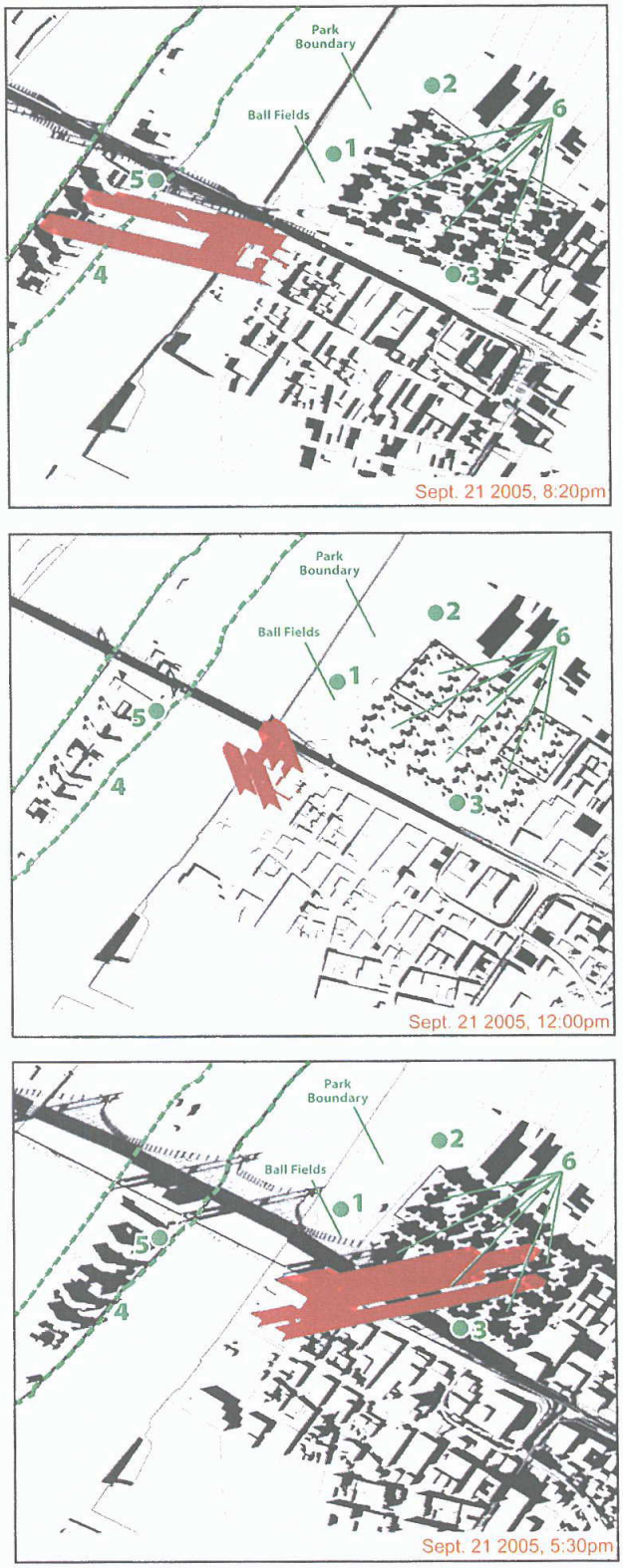
Queensbridge Baby Park currently receives shadows from the Queensboro Bridge from 9:40 AM through 5:20 PM, and is completely within shadow from 4:10 PM through the end of the day. In the Future with the Proposed Action, Queensbridge Baby Park would receive no new afternoon shadows as a result of the Project.

The open space courtyard areas within the Queensboro Houses currently receive shadows from the surrounding residential buildings throughout the day. In the Future with the Proposed Action, four of the open space courtyard areas within the Queensboro Houses complex (Blocks A, C, D, and F) would receive additional shadows from approximately 4:00 PM to 5:20 PM. The maximum incremental shadow cast by the Proposed Project would affect approximately 25 percent of the courtyard areas overall, during the late afternoon (Figure 7-2).



1 *Queensbridge Park*
2 *Vernon Playground*
3 *Queensbridge Baby Park*
4 *Roosevelt Island Waterfront Promenade*
5 *Outdoor Basketball Practice Court*
6 *Queensbridge Houses Open Space*

Figure 7-3: Shadows - June



1 *Queensbridge Park*
2 *Vernon Playground*
3 *Queensbridge Baby Park*
4 *Roosevelt Island Waterfront Promenade*
5 *Outdoor Basketball Practice Court*
6 *Queensbridge Houses Open Space*

Figure 7-4:
Shadows - September

Two small portions of Roosevelt Island's southeastern waterfront promenade would receive shadows from the Proposed Project in the morning, from 8:20 AM to 9:20 AM. The southwestern waterfront promenade and the four outdoor half basketball courts at the Sportspark would not receive any shadows from the Proposed Project during this analysis period.

In the case of Queensbridge Park and Vernon Playground, the Proposed Project would cast incremental shadows ranging from one to ten percent cover during the higher utilization seasons (spring, summer, and fall). These minor increases in shading would be limited to a small portion of the park near the Queensboro Bridge, would not affect Vernon Playground, and would not affect the usability or quality of the park. The larger increase in new shadows would occur during the winter, when the park is least utilized. Therefore, the Proposed Action would result in no significant adverse impacts on Queensbridge Park and Vernon Playground as a result of new shadows.

Queensbridge Baby Park is located further inland and situated nearly beneath the Queensboro Bridge, along its northern edge; as a result, it is shaded much of the time by the bridge. The Proposed Project would cast new shadows on Queensbridge Baby Park in the late afternoon during the spring and summer when the shadow from the bridge would actually extend beyond the park itself and sunlight would reach the park beneath the bridge without the Proposed Action. The Proposed Project would cause the park to be entirely shaded for up to two hours. The six concrete handball courts and benches (used primarily by patrons waiting to play on the courts), however, would be sufficiently useable without direct sunlight at this time. Likewise the quality of the park overall would not be diminished by this change in conditions, since much of the park is shaded by the elevated Queensboro Bridge structure during the day, and park features are not particularly light dependant. Therefore, the Proposed Action would result in no significant adverse impacts on Queensbridge Baby Park as a result of new shadows.

The open space courtyard areas within each block of the Queensbridge Houses are partially shaded throughout the day by the surrounding residential buildings. The Proposed Project would cast new shadows on some of the open space courtyard areas located within the Queensboro Houses for less than 1½ hours in the late afternoon during the spring and fall. At no time would the Proposed Project cause any of the courtyards to be entirely shaded. The play areas, trees, benches, and landscaping would be sufficiently useable without direct sunlight during this limited time period. Likewise, the quality of the open space courtyard areas would not be diminished by this change in conditions, since portions of the courtyards are already shaded by the surrounding residential buildings throughout the day, and the open space features are not particularly light dependant. Therefore, the Proposed Action would result in no significant adverse impacts on the open space courtyard areas at Queensbridge Houses as a result of new shadows.

A small portion of Roosevelt Island's southeastern and southwestern waterfront promenade (estimated at less than 1 percent of the entire pedestrian pathway system) would receive morning shadows from the Proposed Action. The small southeastern portion of the promenade would receive morning shadows for less than two hours during the winter, spring, and fall, and the small southwestern portion of the promenade would receive morning shadows for less than 15 minutes during the winter, only. The four outdoor half basketball courts at the Sportspark would be in and out of shadow cast by the Proposed Action for less than 1½ hours in the morning during the winter only, when the courts would be least utilized. Because visitors to the promenade usually walk along it rather than staying in one place, and the vast majority of its length would remain unaffected, and because the basketball courts would be affected only in cold winter months, shadows cast by the Proposed Action on these open spaces would not affect the usability or quality of the resources. Therefore, the Proposed Action would result in no significant adverse impacts on these Roosevelt Island open space resources as a result of new shadows.

G. CONCLUSIONS

Based on the four impact criteria described in the *CEQR Technical Manual*, shadows from the Proposed Project are expected to have a minimal impact on publicly accessible open spaces, historic resources, and natural resources within the vicinity of the Project Site. New and incremental shadows cast by the Proposed Project onto nearby open space resources would not diminish the overall quality or usability of the resources, since the additional shadow would be of short duration, none of the affected open space areas are particularly light dependant, and most of the areas already receive shadows from nearby structures, including the Queensboro Bridge and the Queensbridge Houses. None of the historic resources identified within the Study Area that would be affected by shadows from the Proposed Project have sunlight-dependant features. New shadows that would be cast onto the East River as a result of the Proposed Project would be limited in time and area covered and would not adversely affect aquatic resources in the river. The Proposed Action would therefore not result in any significant adverse impacts due to shadows.

H. VARIATIONS

Since the Preferred Development Program and all three variations would be developed in accordance with the Restrictive Declaration and Special Permits described in Chapter 1, "Project Description," the resulting development would have the same building envelope and would result in the shadow-related effects as described in Section F. Therefore, the variations, like the Preferred Development Program, would result in no significant adverse shadow impacts.