Chapter 6: Shadows

A. INTRODUCTION

This chapter assesses the potential for the proposed actions to result in a significant adverse shadow impact on any sunlight-sensitive resources. According to the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, sunlight-sensitive resources of concern include public open spaces, sunlight-dependent features of historic architectural resources, natural resources that depend on sunlight, and planted areas within unused portions of roadbeds that are part of the Greenstreets program. A shadow assessment is required for actions that would result in new structures or additions to existing structures at least 50 feet in height.

As described in Chapter 1, "Project Description," the proposed actions would facilitate the development of five new mixed-use towers within the Lenox Terrace superblock (the "proposed project"). The new towers would all reach maximum heights of 284 feet above street level, including rooftop mechanical equipment and bulkhead. The proposed actions also could result in the future development of Block 1730, Lot 65 (the "projected future development site") with a new, approximately 145-foot tall building and the development of Block 1730, Lots 16 and 19 (the "potential future development site") with a new, approximately 215-foot tall building. Therefore, a shadows assessment is warranted.

PRINCIPAL CONCLUSIONS

A detailed shadow analysis determined in the With Action (2026) scenario, project-generated shadows would reach 10 sunlight-sensitive resources. The majority of these new shadows would be limited in extent and duration and would typically only occur during some seasons. The short duration of new shadow that would fall on most affected resources would not substantially reduce the quantity of direct sunlight and would not significantly alter the utilization of the resources or the variety of vegetation supported within. Therefore, no significant adverse shadows impacts would occur at nine of these sunlight-sensitive resources. Project-generated shadow would result in a significant adverse shadow impact on one resource, the Howard Bennett Playground, on the December 21 analysis day. The long duration and extent of new shadow on the playground could significantly affect the usability of the resource on this winter analysis day.

The modification in the site plan described in Chapter 1, "Project Description" and the Foreword to the FEIS and illustrated on Figure 1-5 would not increase building coverage or height at any location and consequently would not result in any shadows beyond those assessed in this chapter. Therefore, the modification to the site plan would not result in any additional shadow impacts.

B. DEFINITIONS AND METHODOLOGY

This analysis has been prepared in accordance with CEQR procedures and follows the guidelines of the *CEQR Technical Manual*.

DEFINITIONS

Incremental shadow is the additional, or new, shadow that a structure resulting from a proposed project would cast on a sunlight-sensitive resource.

Sunlight-sensitive resources are those resources that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. Such resources generally include the following:

- *Public open space* such as parks, beaches, playgrounds, plazas, schoolyards (if open to the public during non-school hours), greenways, and landscaped medians with seating. Planted areas within unused portions of roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources.
- *Features of architectural resources that depend on sunlight for their enjoyment by the public.* Only the sunlight-sensitive features need be considered, as opposed to the entire resource. Such sunlight-sensitive features might include design elements that depend on the contrast between light and dark (e.g., recessed balconies, arcades, deep window reveals); elaborate, highly carved ornamentation; stained glass windows; historic landscapes and scenic landmarks; and features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as a historic landmark.
- *Natural resources* where the introduction of shadows could alter the resource's condition or microclimate. Such resources could include surface waterbodies, wetlands, or designated resources such as coastal fish and wildlife habitats.

Non-sunlight-sensitive resources include, for the purposes of CEQR:

- *City streets and sidewalks* (except Greenstreets);
- *Private open space* (e.g., front and back yards, stoops, vacant lots, and any private, non-publicly accessible open space); and
- *Project-generated open space* cannot experience a significant adverse shadow impact from the project, according to CEQR, because without the project the open space would not exist.

A significant adverse shadow impact occurs when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources. Each case must be considered on its own merits based on the extent and duration of new shadow and an analysis of the resource's sensitivity to reduced sunlight.

METHODOLOGY

Following the guidelines of the *CEQR Technical Manual*, this assessment considers shadow cast between 90 minutes after sunrise and 90 minutes before sunset (the analysis day). A preliminary screening assessment is first conducted to determine whether a project's shadow cast within this timeframe could reach any sunlight-sensitive resources at any time of year. The preliminary screening assessment consists of three tiers of analysis. The first tier determines the longest shadow study area. The longest shadow study area encompasses the site of a proposed project and a perimeter around the site's boundary with a radius equal to the longest shadow that could be cast by the proposed structure, which is 4.3 times the height of the structure and occurs on December 21, the winter solstice. If there are sunlight-sensitive resources within this study area, the analysis proceeds to the second tier, which reduces the area that could be affected by new shadow by

accounting for the fact that shadows can never be cast between a certain range of angles south of a proposed building due to the path of the sun through the sky at the latitude of New York City.

If the second tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a third tier of screening analysis further refines the area that could be reached by project shadow by determining the maximum extent of shadow on four representative analysis days.

If the third tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a detailed shadow analysis is required to determine the extent and duration of the incremental shadow resulting from the proposed actions. The detailed analysis provides the data needed to assess the shadow impacts. The effects of the new shadow on the sunlight-sensitive resources are described, and their degree of significance is considered. The results of the analysis and assessment are documented with graphics, a table of incremental shadow durations, and narrative text.

C. PRELIMINARY SCREENING ASSESSMENT

A base map was developed using Geographic Information Systems (GIS)[1] showing the location of the proposed development site and the projected and potential future development sites, and the surrounding street layout (see **Figure 6-1**). In coordination with the land use and historic and cultural resources assessments presented in other chapters of this EIS, potential sunlight-sensitive resources were identified and shown on the map.

TIER 1 SCREENING ASSESSMENT

For the Tier 1 assessment, the longest shadow that each of the proposed, projected, and potential buildings could cast throughout the year is calculated, and, using these lengths as the radii, a perimeter is drawn around the footprints of each building. Anything outside the combined perimeter could never be affected by new shadow being cast by any of the proposed, projected, or potential buildings, while anything inside the perimeter needs additional assessment.

As noted above, according to the *CEQR Technical Manual*, the longest shadow that a structure can cast at the latitude of New York City occurs on December 21, the winter solstice, at the start of the analysis day at 8:51 AM, and is equal to 4.3 times the height of the structure.

Including rooftop mechanical, the five proposed buildings on the proposed development site would all reach a maximum height of 284 feet above street level and would cast shadows up to 4.3 times as long or 1,221 feet. ~~The two new buildings at the northwest and southwest corners of the proposed development site (Proposed Buildings NW and SW) would be connected by a six-story (approximately 68-foot-tall) base; including rooftop mechanical, this structure would reach a maximum height of 78 feet above street level and would cast shadows up to 335 feet long.~~ The projected building on the projected future development site could reach an approximate height of 145 feet, including rooftop mechanical, and could cast shadow as long as 624 feet. The potential building on the potential future development site could reach an approximate height of 215 feet, including rooftop mechanical, and could cast shadow as long as 922 feet. Using the longest shadow lengths as radii, a perimeter was drawn around the proposed development site and the projected

[1] Software: Esri ArcGIS 10.3; Data: New York City Department of Information Technology and Telecommunications (DoITT) and other City agencies, and AKRF site visits.

Sunlight Sensitive Open Space Resources

- *1, 132 St Block Association Park*
- *2, Abraham Lincoln Playground*
- *3, Harlem River Park*
- *4, Howard Bennett Playground*
- *5, Seventh Ave Center Plots*
- *6, William McCray Playground*
- *7, Harlem Grown Gardens West*
- *8, Harlem Valley Community Garden*
- *9, Margrichantie Garden*
- *10, Harlem Grown East*

Historic Resources with Sunlight-Sensitive Features

- *A, Abyssinian Baptist Church*
- *B, Mother AME Zion Church*
- *C, Friendship Baptist Church*

Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Tier 1: Longest Shadow Study Area from Proposed and Potential Buildings
Tier 2: Area South of Rezoning Area that could never be shaded by Proposed or Potential Buildings

Sunlight Sensitive Open Space Resources
Historic Resources with Sunlight-Sensitive Features

0 1,000 FEET

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Tier 1 and Tier 2 Assessments
Figure 6-1

future development site (see **Figure 6-1**). Several sunlight-sensitive resources are located within the longest shadow study area. Therefore, a Tier 2 assessment is required.

TIER 2 SCREENING ASSESSMENT

In the northern hemisphere, no shadow can be cast in a triangular area south of any given structure. In New York City and within the analysis timeframe (90 minutes after sunrise to 90 minutes before sunset), this area lies between -108 and +108 degrees from true north. **Figure 6-1** illustrates this triangular area south of the proposed, projected, and potential development sites. The complementing area to the north within the combined longest shadow study area represents the remaining area that could potentially experience new shadow from the proposed actions. Within the longest shadow study area, the relative position of several sunlight-sensitive resources could allow them to be potentially cast in new shadow originating from the proposed actions. Therefore, a Tier 3 assessment is required to model shadows likely to be cast by the proposed actions on specific representative days of the year.

TIER 3 SCREENING ASSESSMENT

The direction and length of shadows vary throughout the course of the day and also differ depending on the season. Shadows move constantly but more quickly at the start and the end of the day than they do in the middle of the day. In order to determine whether shadow generated by the proposed and projected buildings could fall on a sunlight-sensitive resource, three-dimensional computer mapping software is used in the Tier 3 assessment to calculate and display the incremental shadows from the proposed and projected buildings on individual representative days of the year. A computer model was developed containing three-dimensional representations of the elements in the base map used in the preceding assessments, the topographic information of the study area, and the massing of the proposed, projected, and potential buildings.

REPRESENTATIVE DAYS FOR ANALYSIS

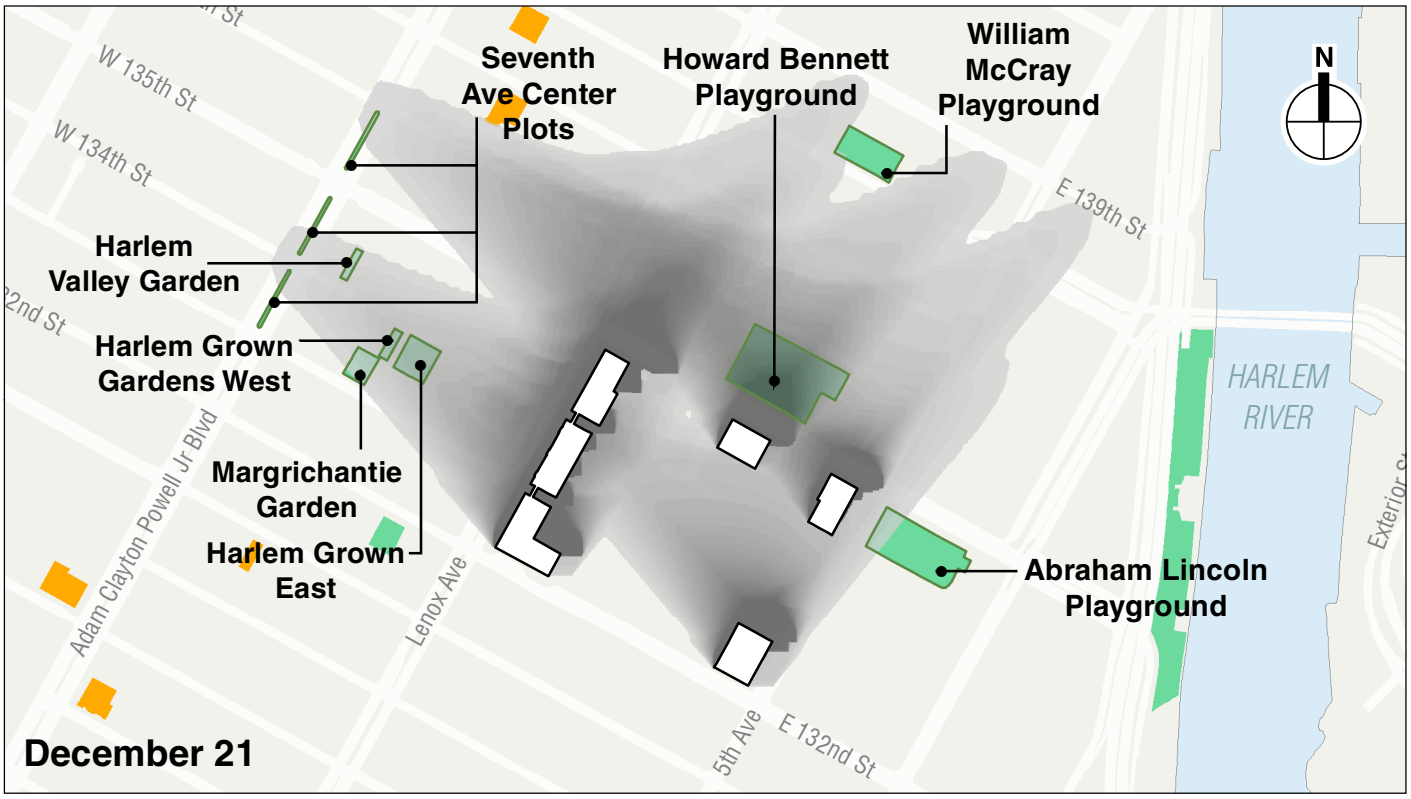
Following the guidance of the *CEQR Technical Manual*, shadows on the winter solstice (December 21), spring and fall equinoxes (March 21 and September 21, which are approximately the same in terms of shadow patterns), and summer solstice (June 21) are modeled to represent the range of shadows over the course of the year. An additional representative day during the growing season is also modeled, the day halfway between the summer solstice and the equinoxes (i.e., May 6 or August 6) which have approximately the same shadow patterns.

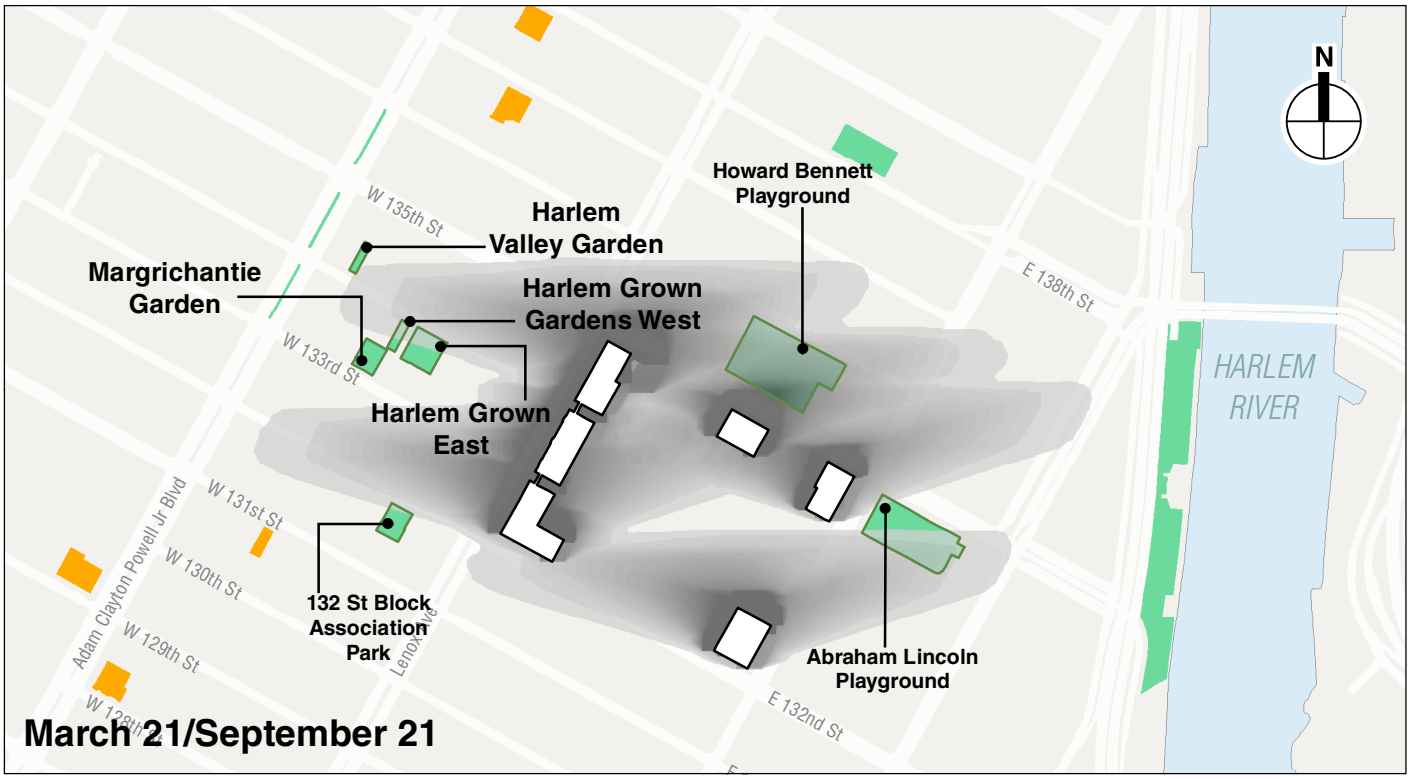
TIMEFRAME WINDOW OF ANALYSIS

As noted above, the assessment considers shadows occurring between 90 minutes after sunrise and 90 minutes before sunset. At times earlier or later than this timeframe window of analysis, the sun is low on the horizon, producing shadows that are long, move fast, and generally blend with shadows from existing structures. Consequently, shadows occurring in these two 90-minute periods are not considered significant under CEQR, and their assessment is not required.

TIER 3 SCREENING ASSESSMENT RESULTS

Figures 6-2 and 6-3 illustrate the range of shadows that would occur, in the absence of intervening buildings, from the proposed, projected, and potential buildings on the four representative analysis days. The extent of shadow is shown between the start of the analysis day (90 minutes after sunrise) to the end of the analysis day (90 minutes before sunset).

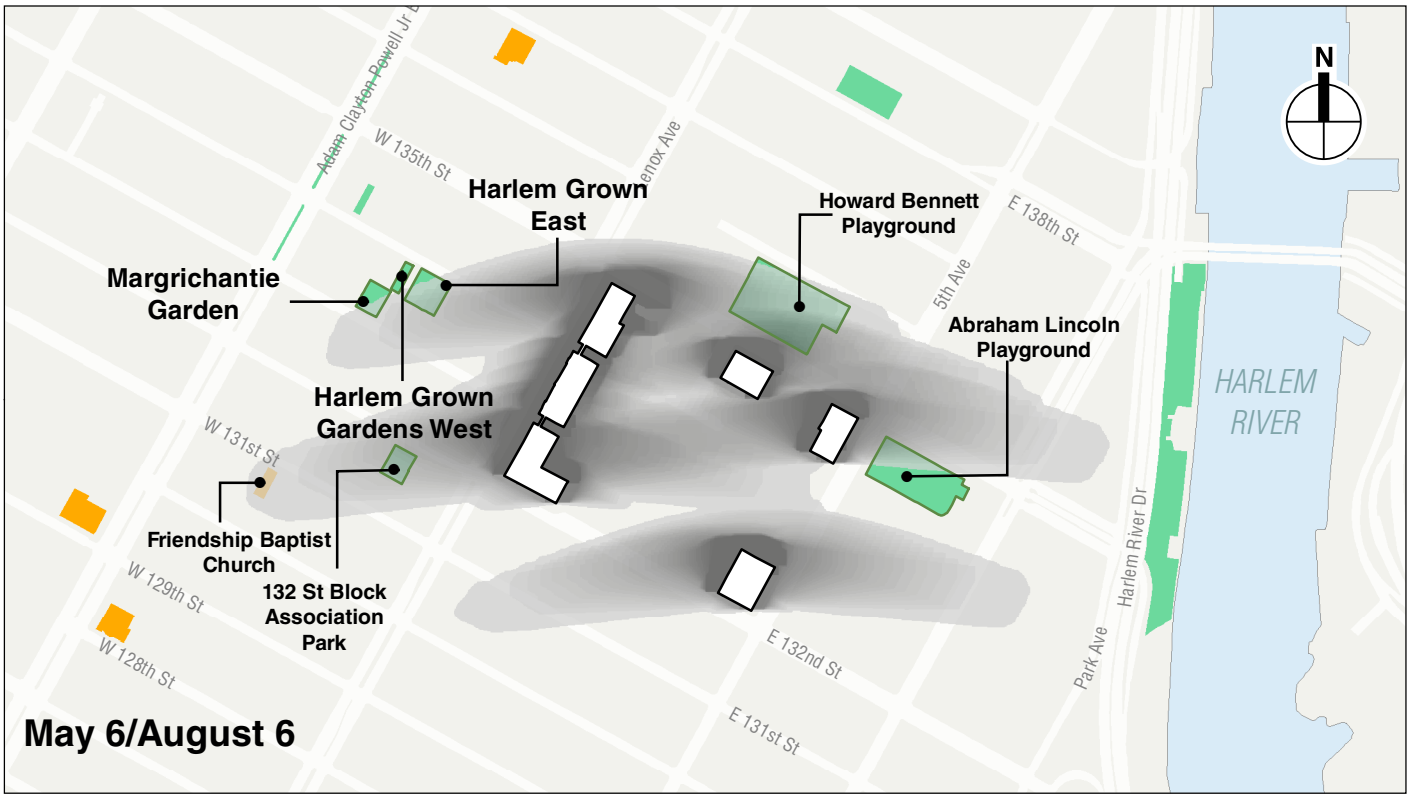


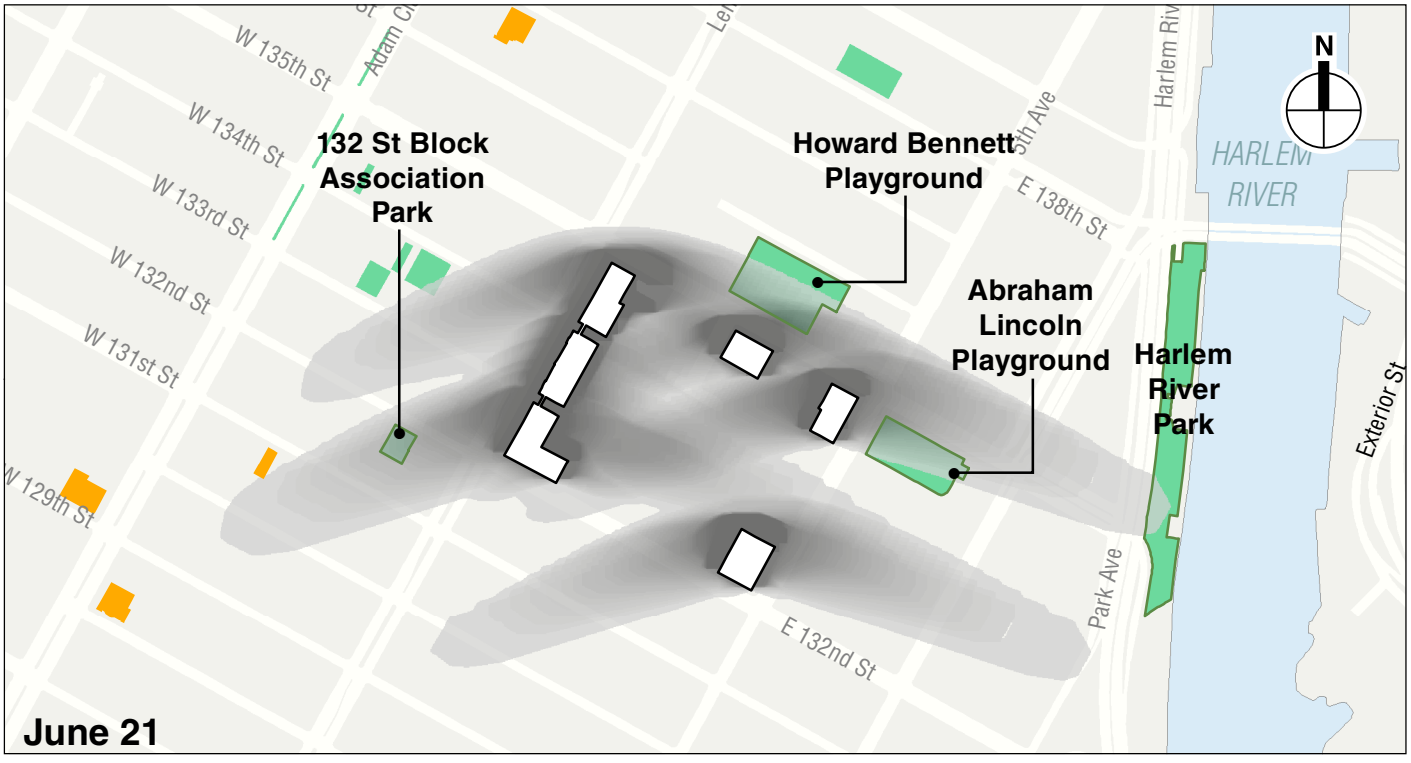


- *Proposed Buildings on Proposed Development Site*
- *Projected Future Development Site*
- *Potential Future Development Site*
- *Sunlight Sensitive Open Space Resources*
- *Historic Resources with Sunlight-Sensitive Features*
- *Daily Shadow Extent*

0 450FEET

Notes:
1. Daylight Saving Time not used.
2. Shadows are shown occurring at approximately one hour intervals from the start of the analysis day (one and a half hours after sunrise) to the end of the analysis day (one and a half hours before sunset). The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed project's shadow across the landscape, without accounting for any existing buildings and their shadows.





- *Proposed Buildings on Proposed Development Site*
- *Projected Future Development Site*
- *Potential Future Development Site*
- *Sunlight Sensitive Open Space Resources*
- *Historic Resources with Sunlight-Sensitive Features*
- *Daily Shadow Extent*

0 450FEET

Notes:
1. Daylight Saving Time not used.
2. Shadows are shown occurring at approximately one hour intervals from the start of the analysis day (one and a half hours after sunrise) to the end of the analysis day (one and a half hours before sunset). The Tier 3 assessment serves to illustrate the daily path or "sweep" of the proposed project's shadow across the landscape, without accounting for any existing buildings and their shadows.

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Tier 3 Assessment
Figure 6-3

The Tier 3 assessment determined that on the four analysis days, shadows cast by the proposed, projected, or potential buildings would, in the absence of intervening buildings, reach 10 sunlight-sensitive resources: three parks, Abraham Lincoln Playground, Harlem River Park, and Howard Bennett Playground; five community gardens, 132nd Street Block Association Park, Harlem Grown East, Harlem Grown Gardens West, Harlem Valley Community Garden, and Margrichantie Garden; one Greenstreet, Seventh Avenue Center Plots; and one architectural resource, Friendship Baptist Church. The extent and duration of incremental shadow that may fall on the resources identified in the Tier 3 assessment are determined with a detailed shadow analysis.

D. DETAILED ANALYSIS

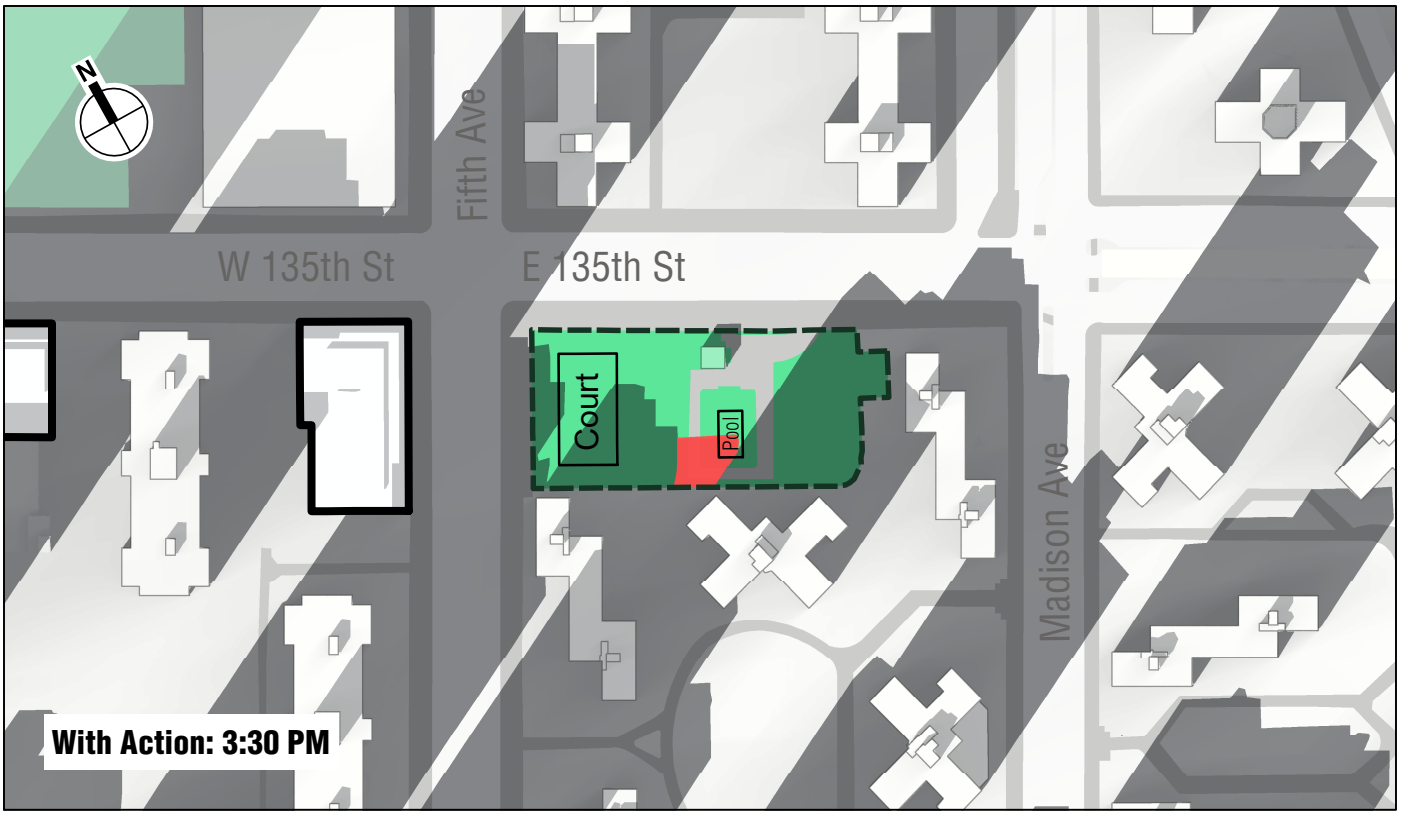
The purpose of the detailed shadow analysis is to determine the extent and duration of incremental shadows that could fall on the sunlight-sensitive resources identified in the Tier 3 assessment as a result of the proposed actions, and to assess their potential effects. A baseline or future No Action condition is established, containing existing buildings and any future developments planned in the area, to illustrate the baseline shadows. The future With Action condition with the proposed, projected, and potential buildings and their shadows can then be compared to the baseline condition, to determine the incremental shadows that would result with the proposed actions. To complete the analysis, three-dimensional representations of existing buildings and proposed or planned future developments in the surrounding area were added to the Tier 3 assessment model.

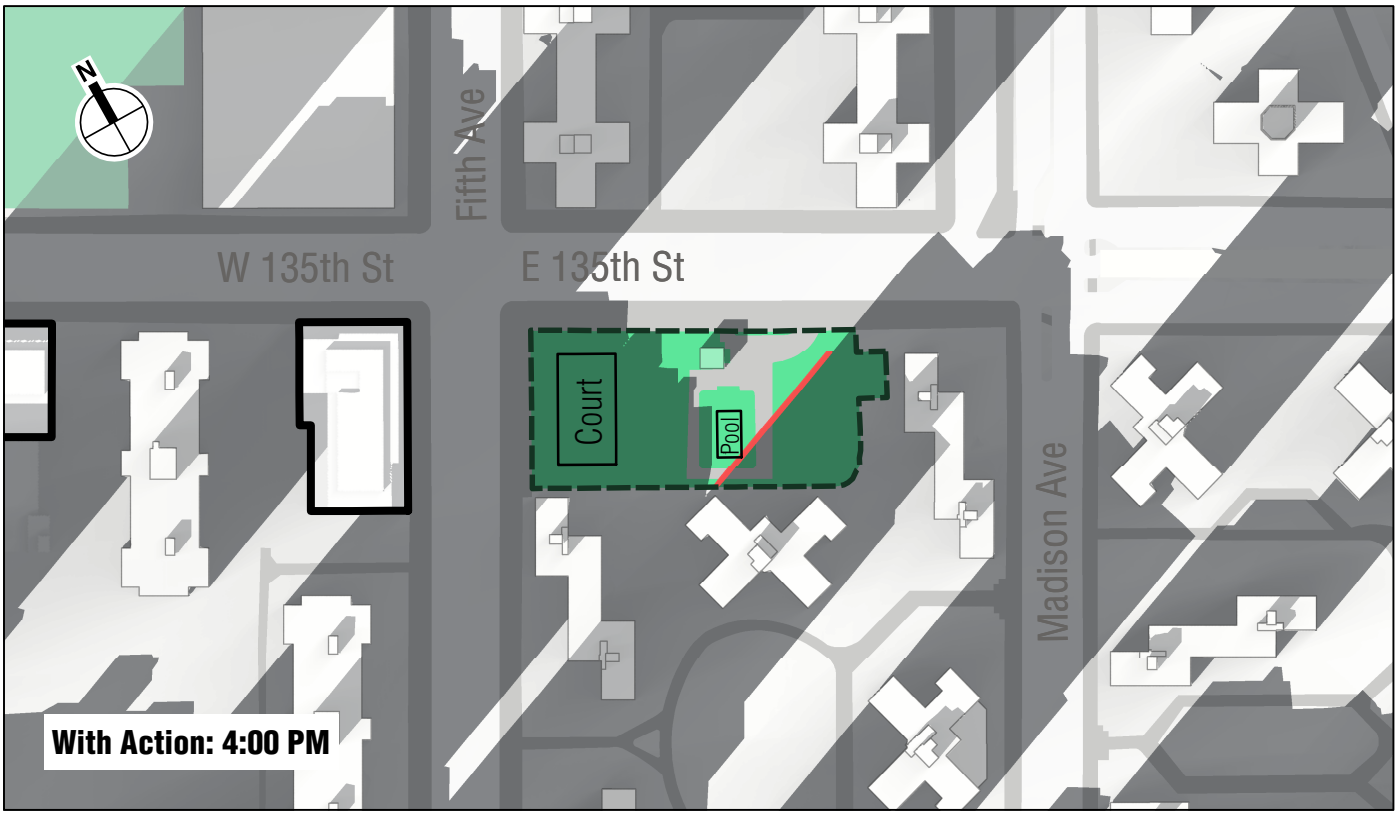
Following the analysis framework described in Chapter 1, "Project Description," the shadows assessment was performed for the analysis year of 2026, comparing proposed, projected, and potential buildings with the future No Action condition, in which the rezoning area would remain as in the existing conditions. Shadow analyses were performed for each of the representative days and analysis periods indicated in the Tier 3 assessment. **Table 6-1** shows the entry and exit times and total duration of incremental shadow on sunlight-sensitive resources originating from the proposed, projected, and potential buildings in the With Action (2026) scenario.

As shadows are in constant movement, **Figures 6-4 through 6-36** illustrate the placement of incremental and No Action scenario shadow on the affected resources at representative times of each analysis day. The area of the resource affected by incremental shadow is illustrated in red. Resources that are cast in new shadow for a total duration of more than two hours are accompanied by an additional figure illustrating the placement of incremental shadow on the resource over the course of an entire day and the total duration of sunlight received by the resource in the With Action and No Action conditions. Below is a description of each of the resources and the duration and extent of incremental shadow.

The modification in the site plan described in Chapter 1, "Project Description" and the Foreword to the FEIS and illustrated on Figure 1-5 would not increase building coverage or height at any location and consequently would not result in any shadows beyond those assessed in this chapter. Therefore, the modification to the site plan would not result in any shadow impacts beyond those disclosed below.

9/27/2018





Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Abraham Lincoln Playground
March 21/September 21

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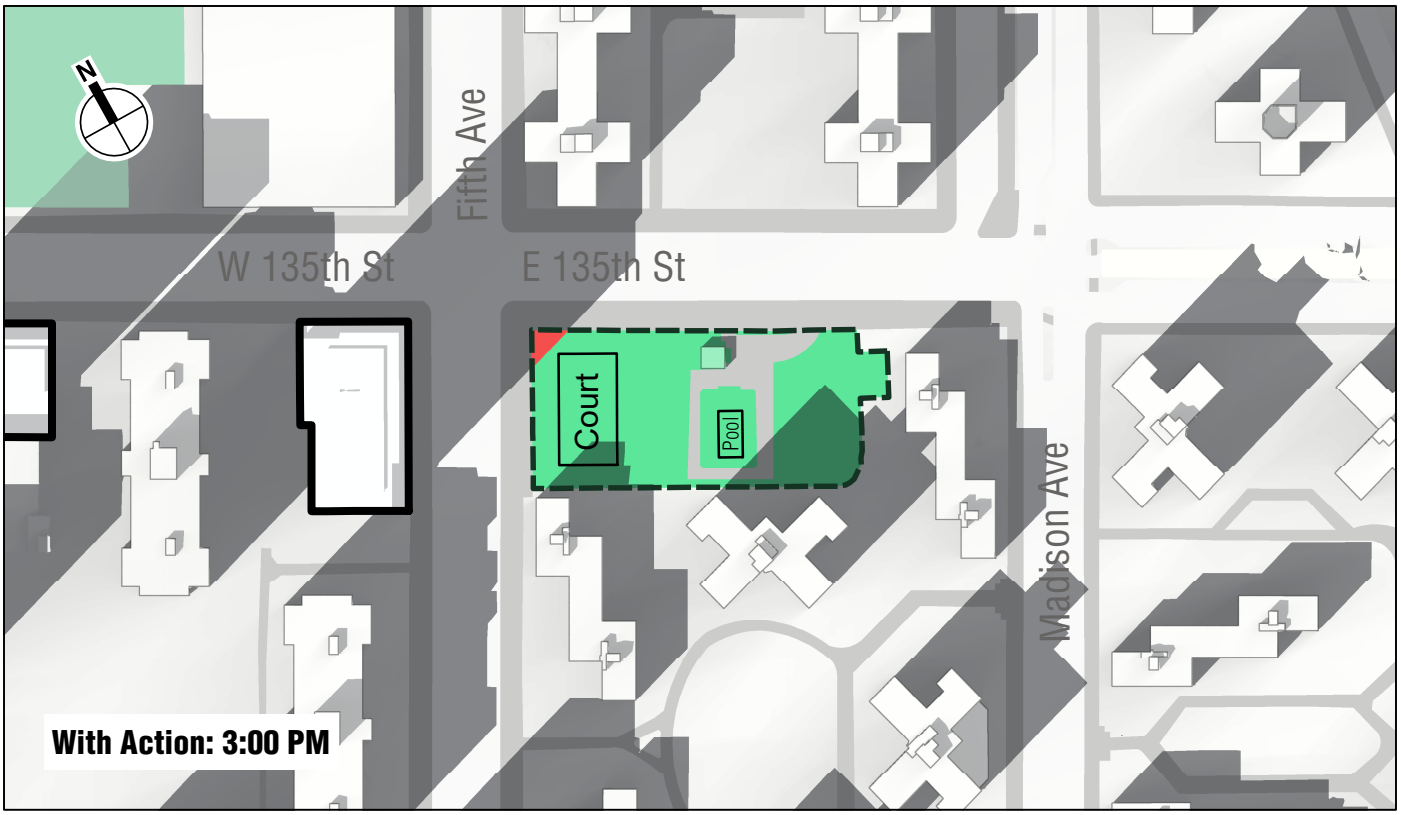
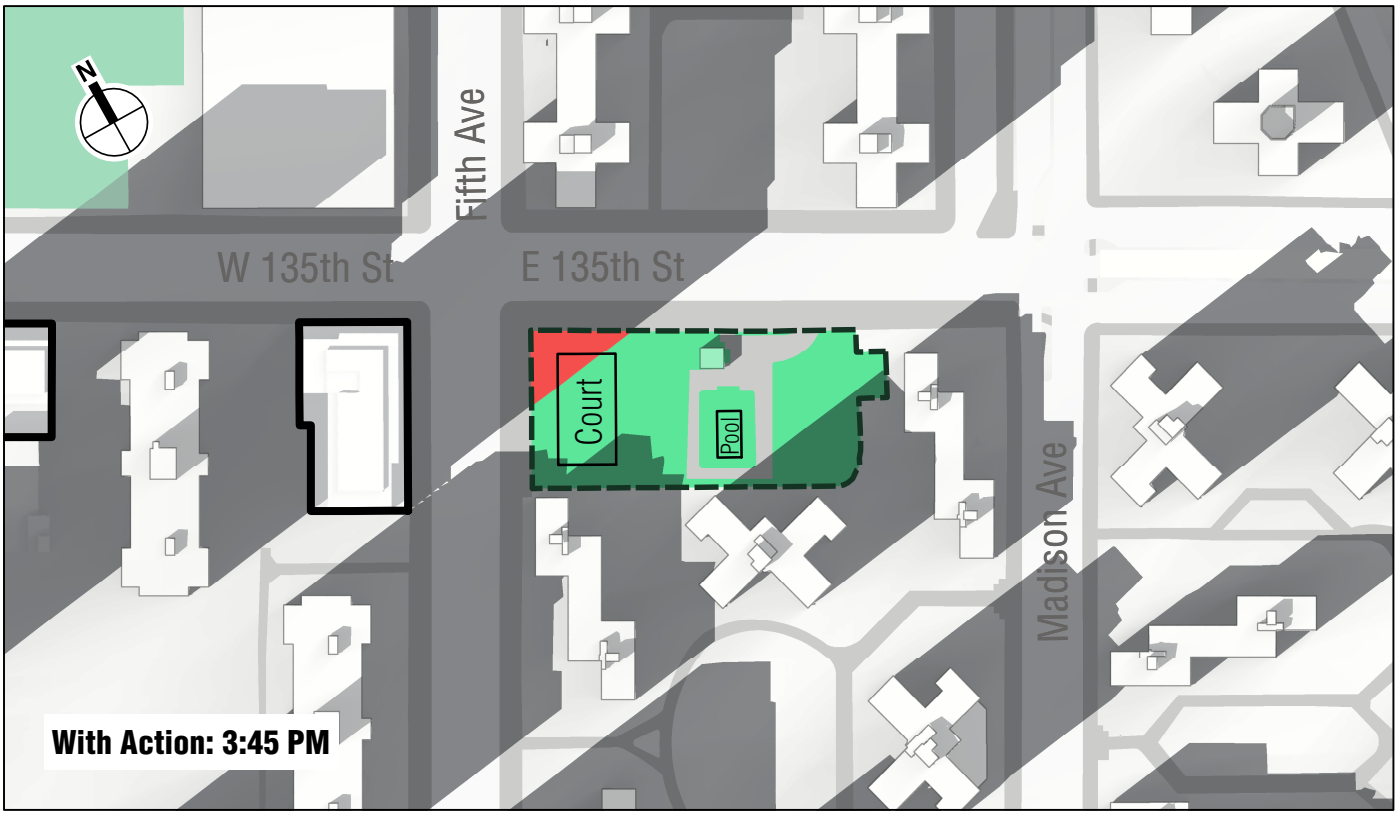
Figure 6-4

9/27/2018





Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Abraham Lincoln Playground
May 6/August 6

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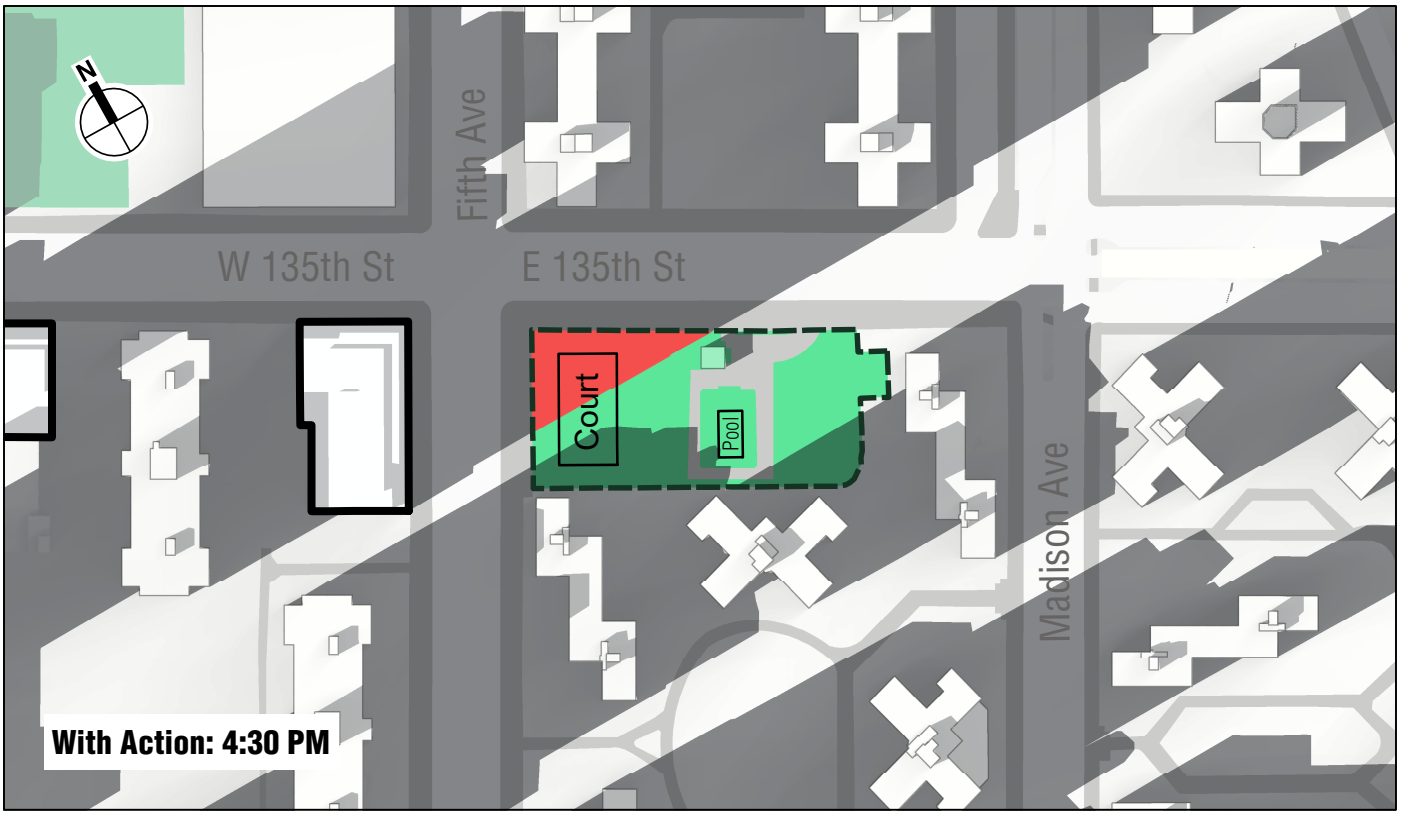
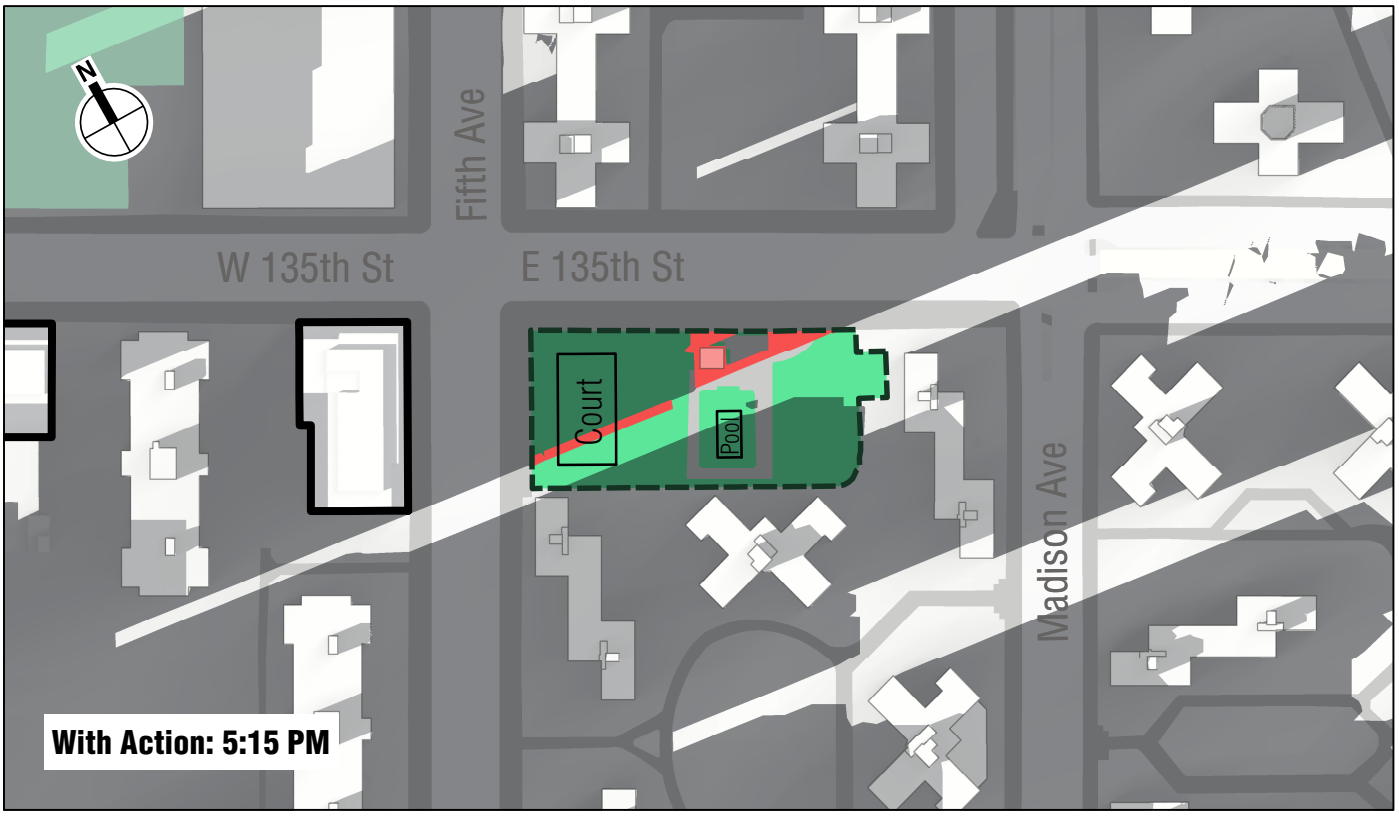
Figure 6-5

9/27/2018





Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

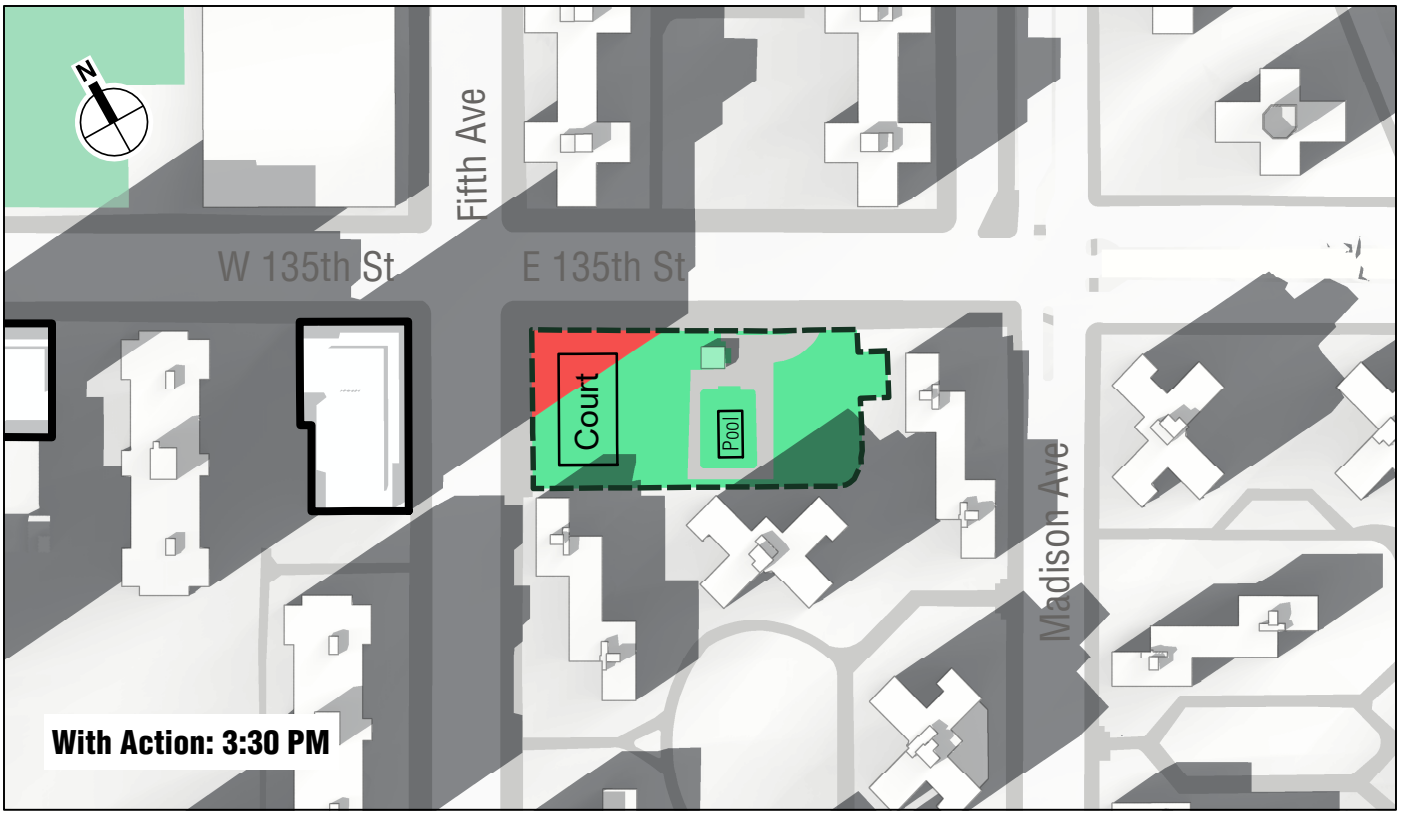
0 200 FEET

Abraham Lincoln Playground
May 6/August 6

LENOX TERRACE

Figure 6-6

9/27/2018



Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Abraham Lincoln Playground
June 21

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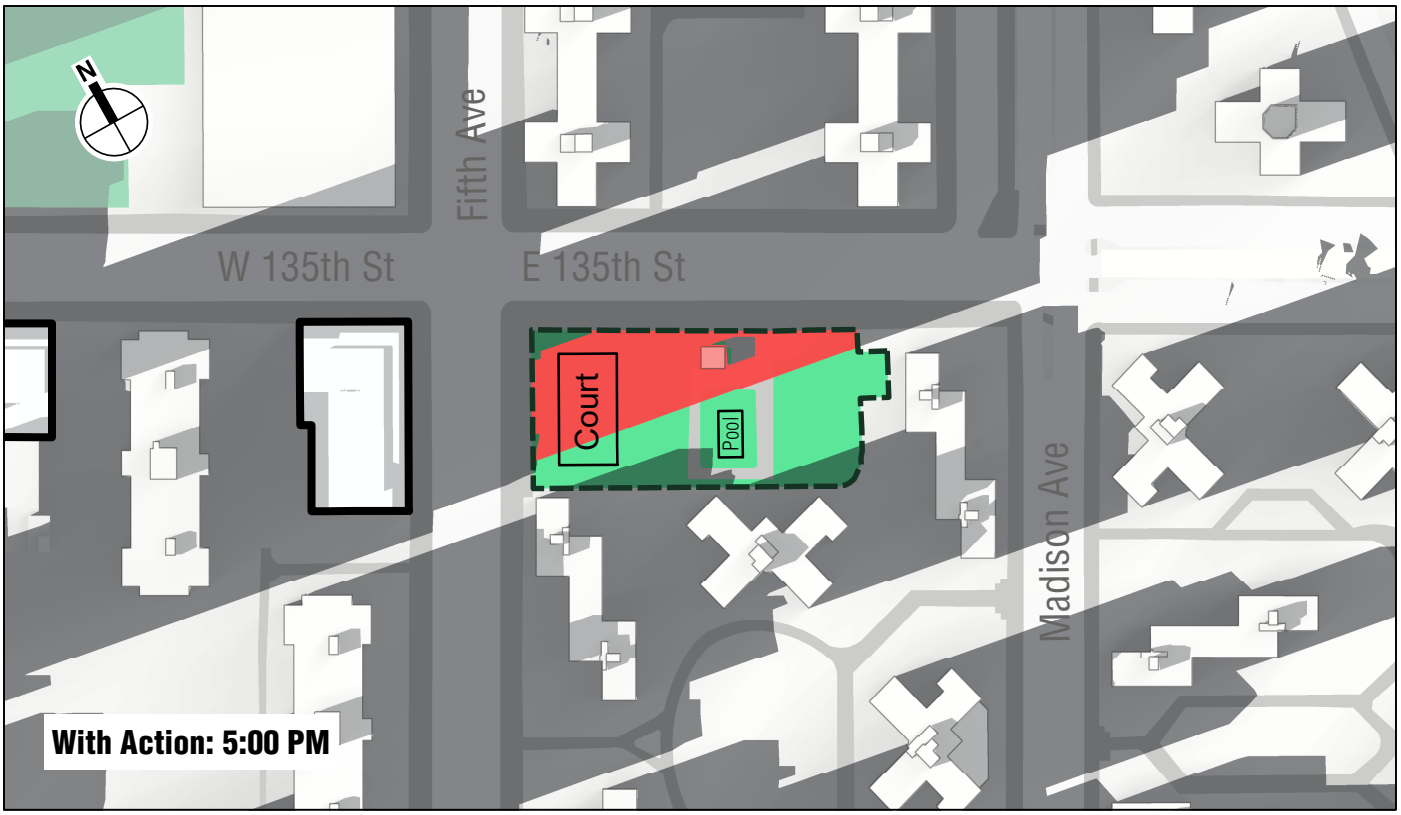
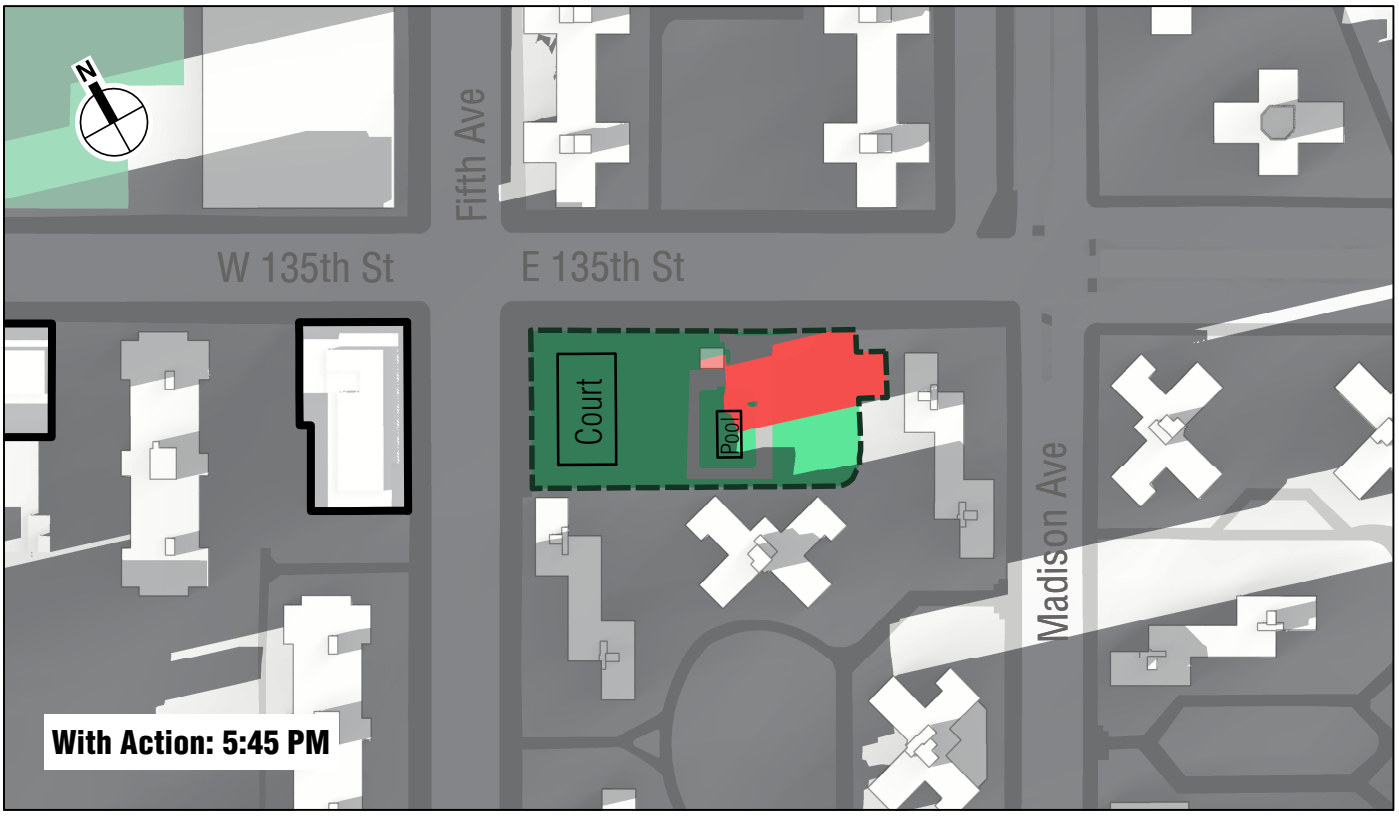
Figure 6-7

9/27/2018





Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Abraham Lincoln Playground
June 21

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Figure 6-8

9/27/2018

Proposed Buildings on Proposed Development Site

Projected Future Development Site

Potential Future Development Site

Open Space Boundary

Solar Exposure Analysis
Abraham Lincoln Playground
May 6/August 6

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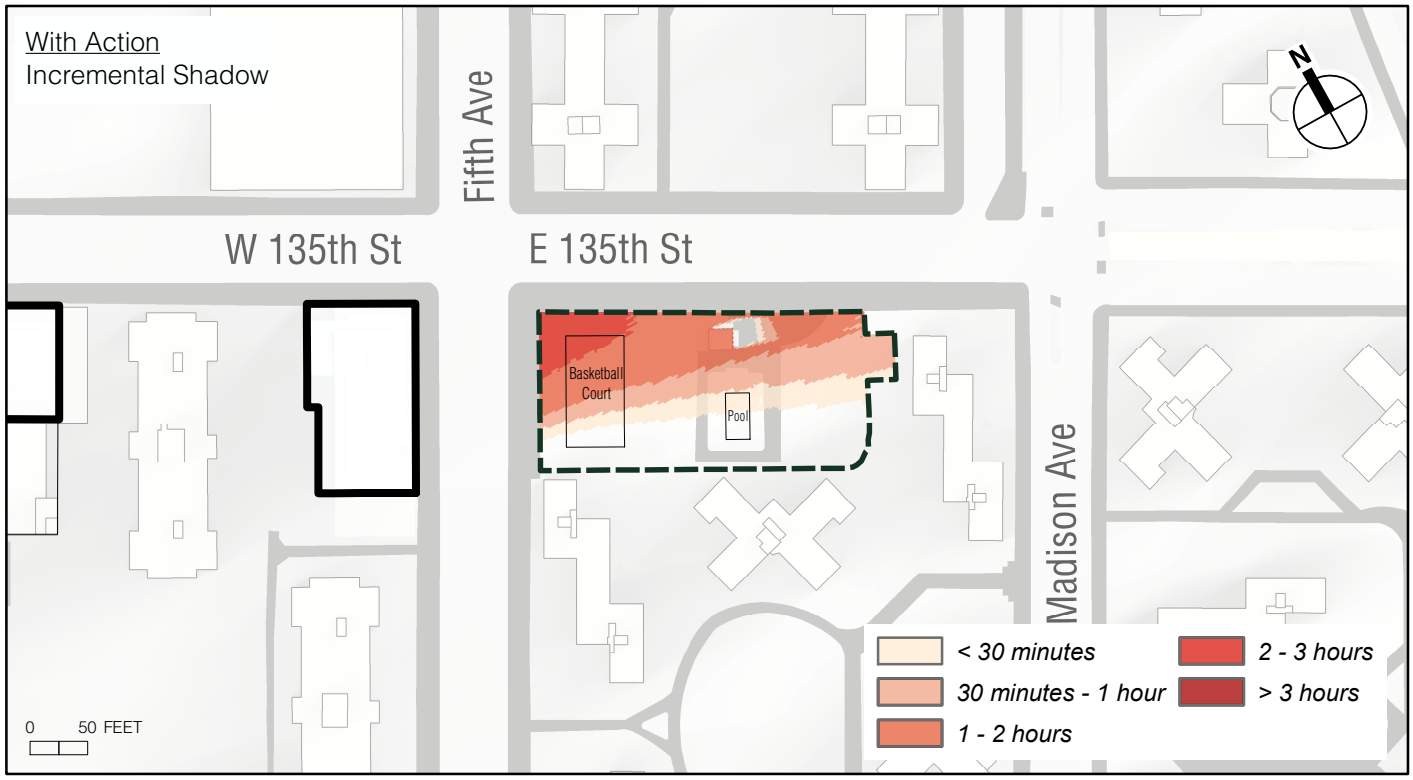
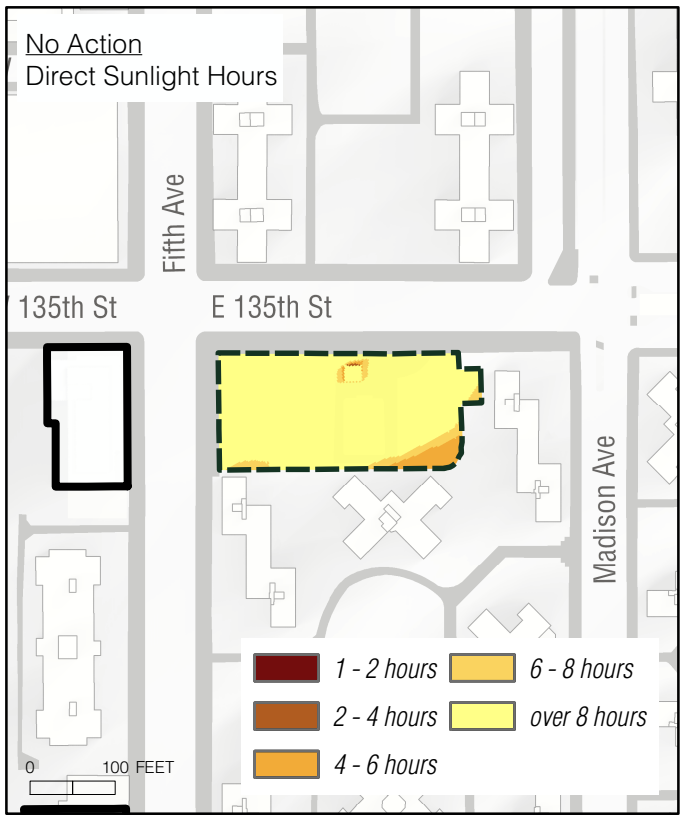
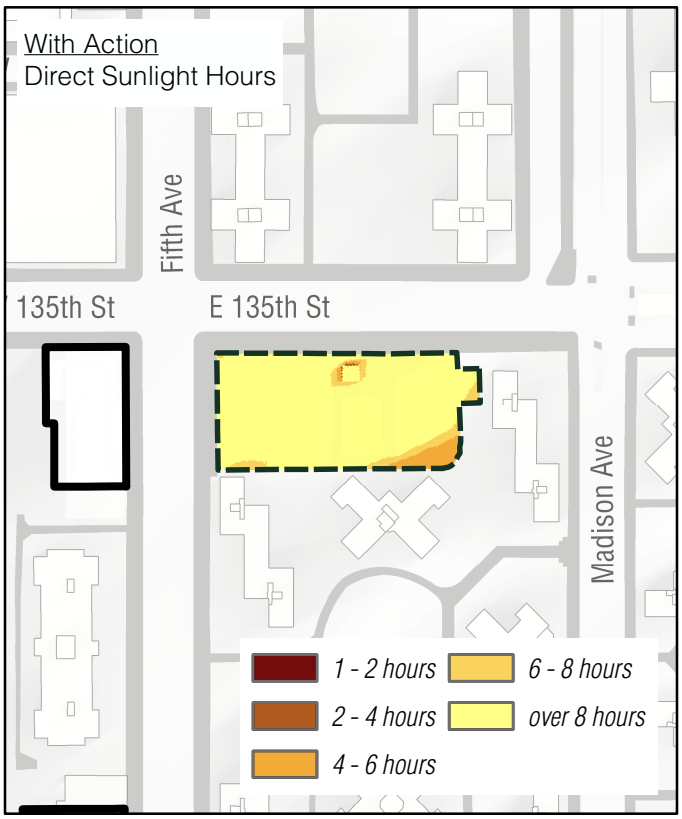
Figure 6-9

9/27/2018







Proposed Buildings on Proposed Development Site

Projected Future Development Site

Potential Future Development Site

Open Space Boundary

Solar Exposure Analysis
Abraham Lincoln Playground
June 21

Figure 6-10

9/27/2018

Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Howard Bennett Playground
December 21

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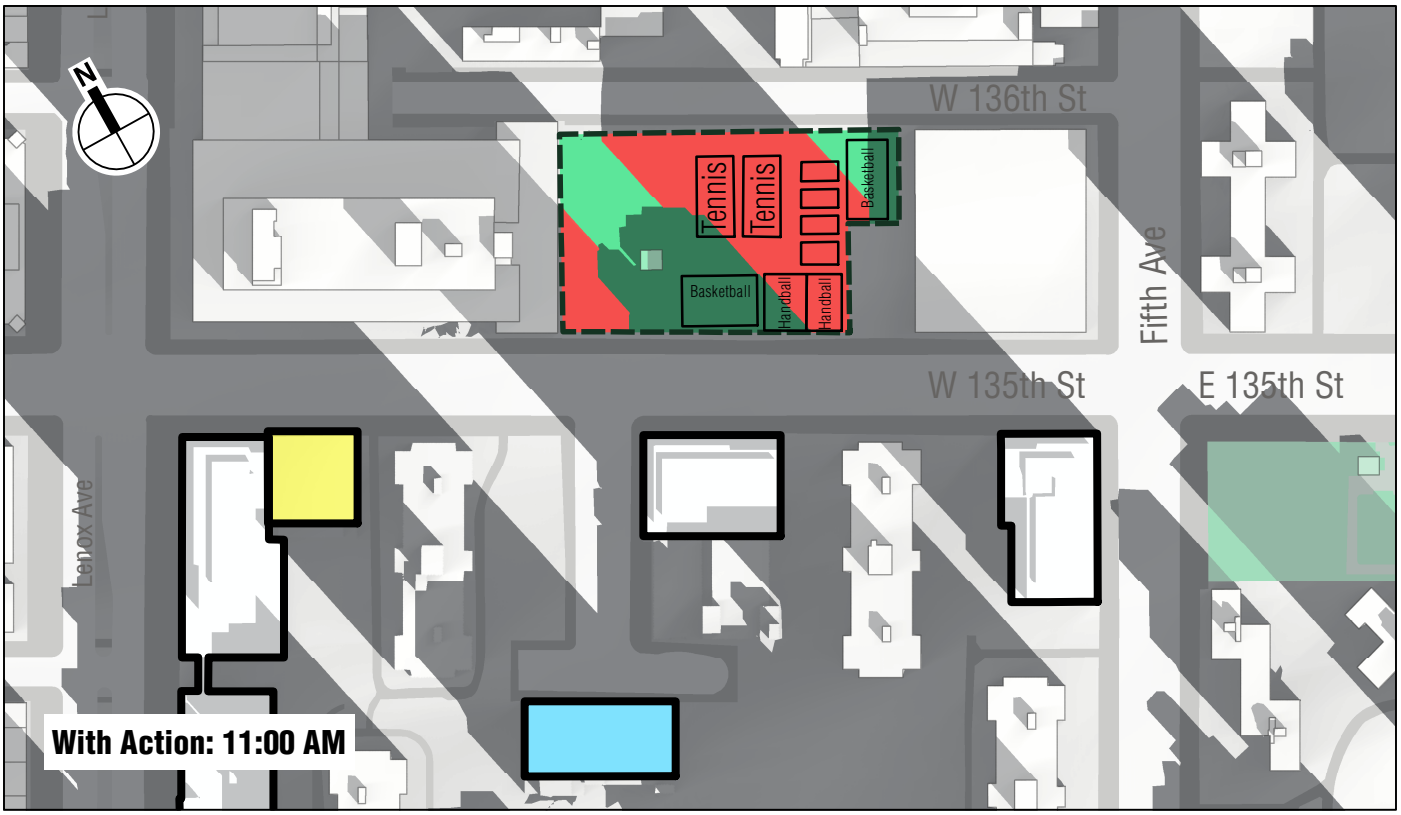
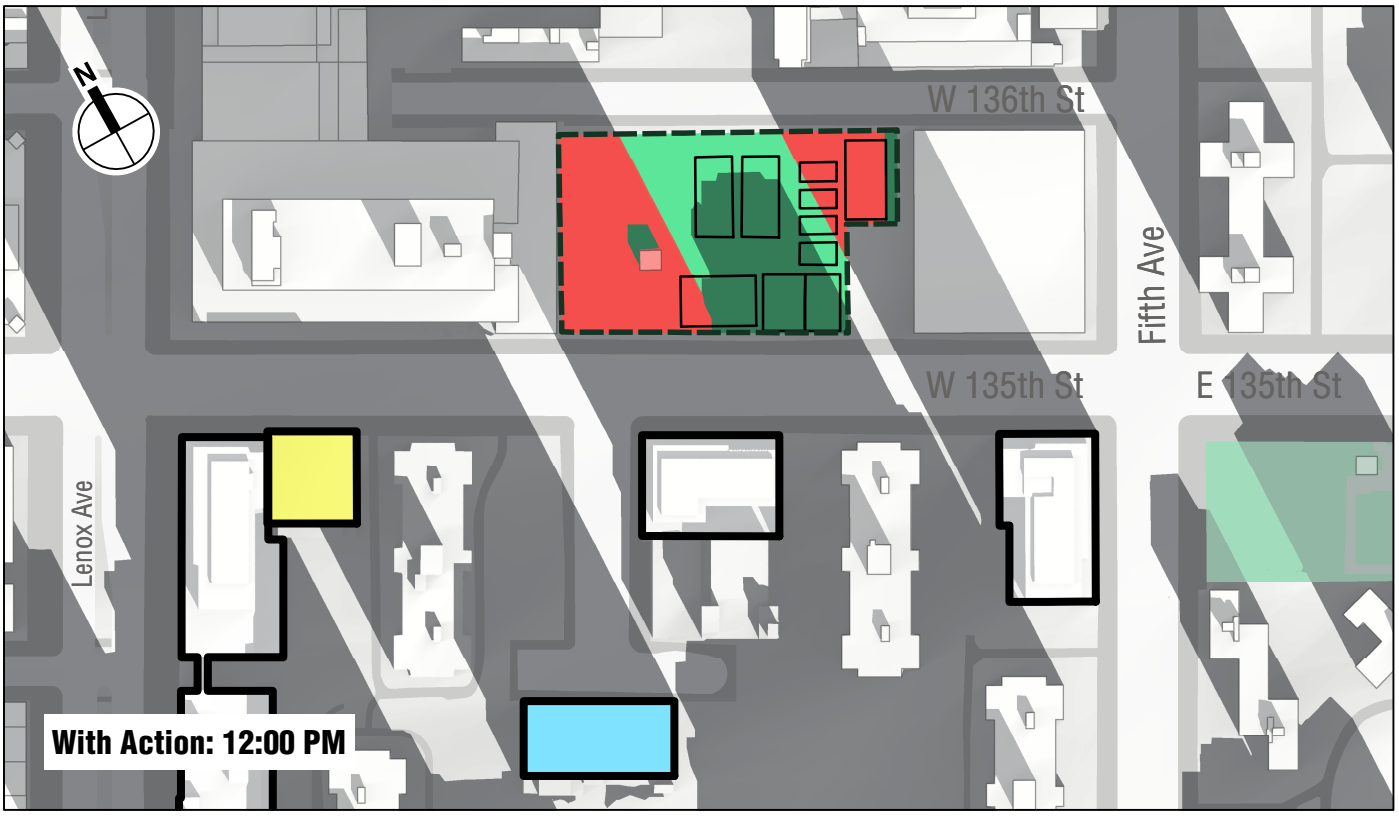
Figure 6-11

9/27/2018





Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary

Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Howard Bennett Playground
December 21

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Figure 6-12

9/27/2018

Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Howard Bennett Playground
December 21

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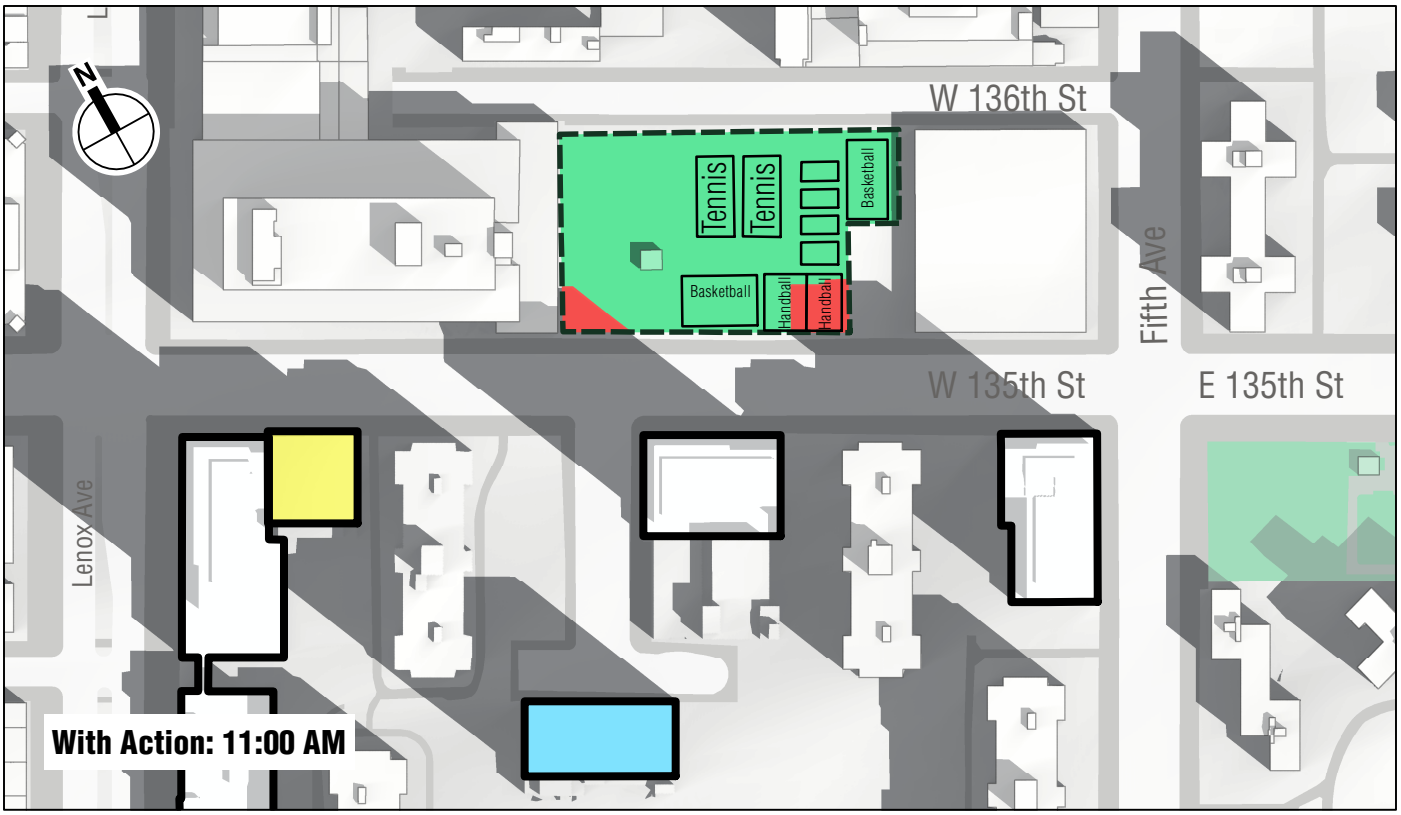
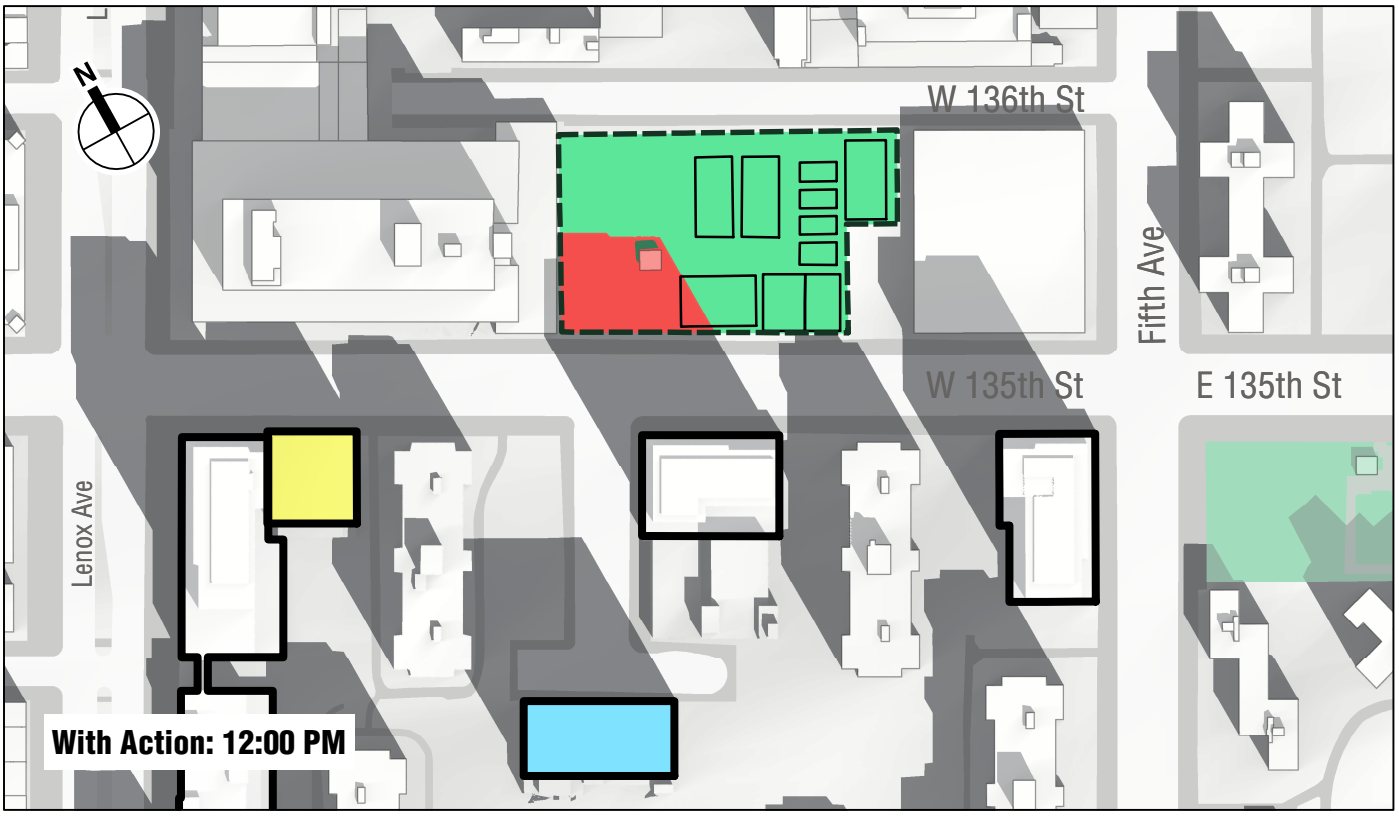
Figure 6-13

9/27/2018





Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Howard Bennett Playground
March 21/September 21

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Figure 6-14

9/27/2018

Howard Bennett Playground
March 21/September 21

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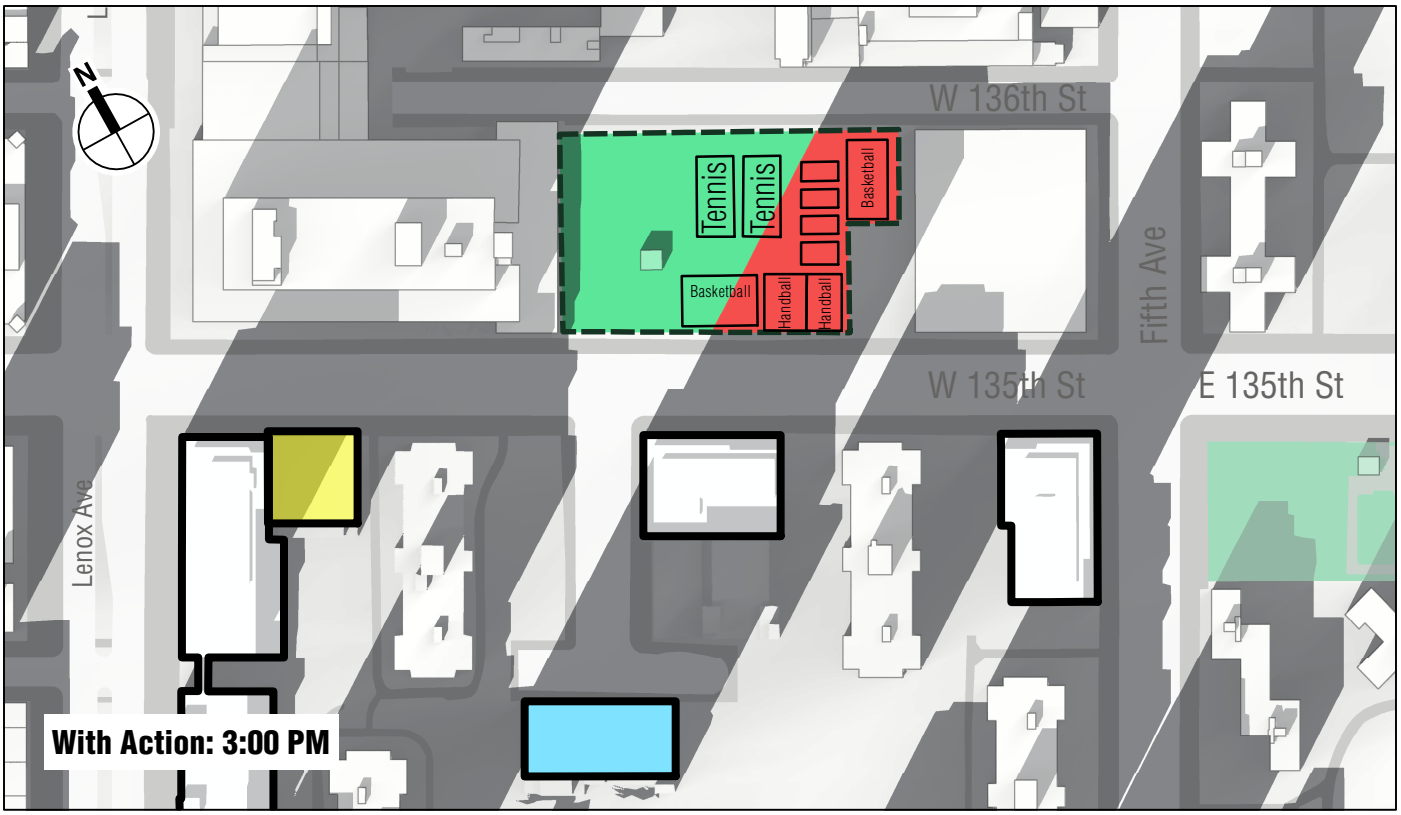
Figure 6-15

9/27/2018



Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Howard Bennett Playground
March 21/September 21

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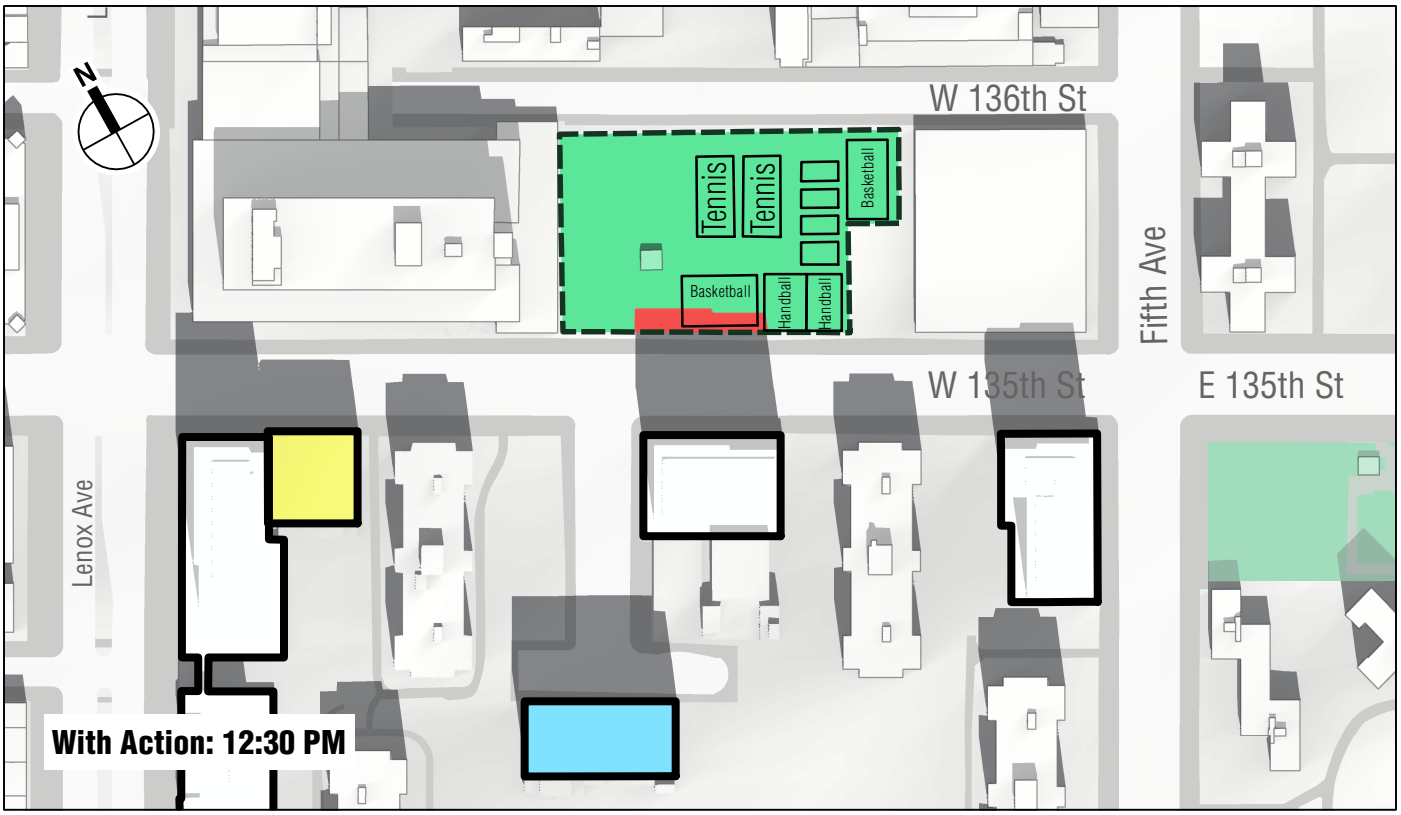
Figure 6-16

9/27/2018



Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Howard Bennett Playground
May 6/August 6

LENOX TERRACE

Figure 6-17

9/27/2018

Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Howard Bennett Playground
May 6/August 6

LENOX TERRACE

Figure 6-18

9/27/2018

Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

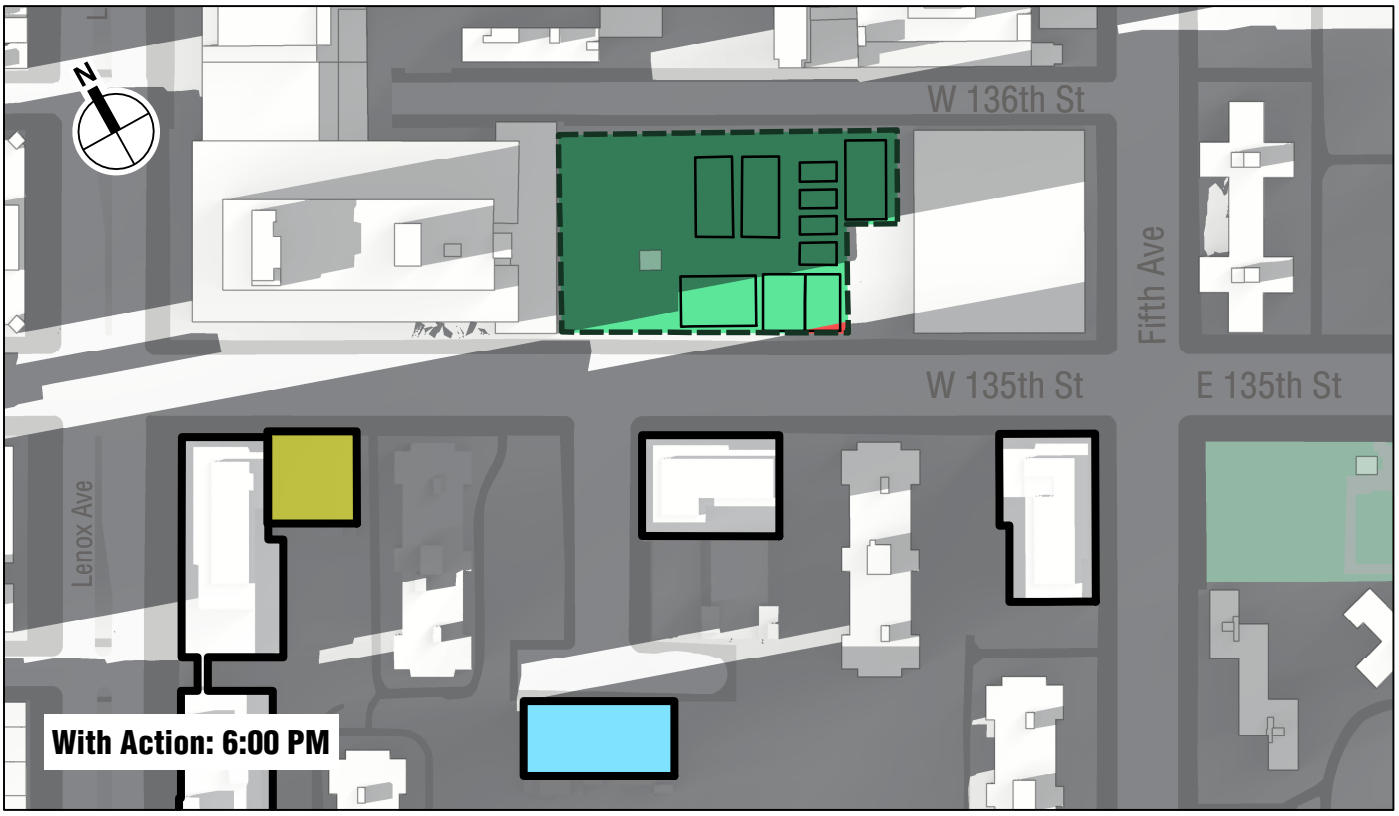
0 200 FEET

Howard Bennett Playground
June 21

LENOX TERRACE

Figure 6-19

9/27/2018



Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

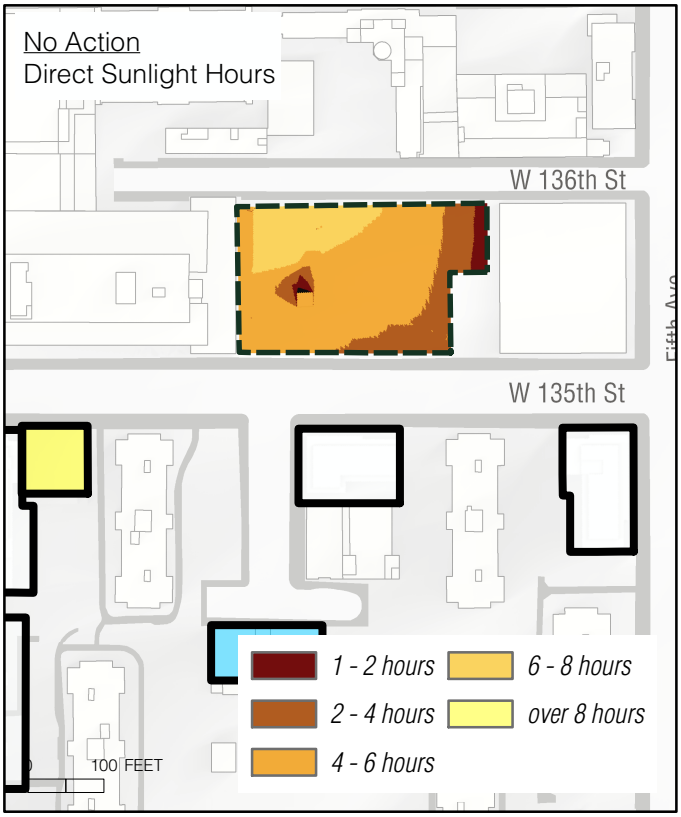
0 200 FEET

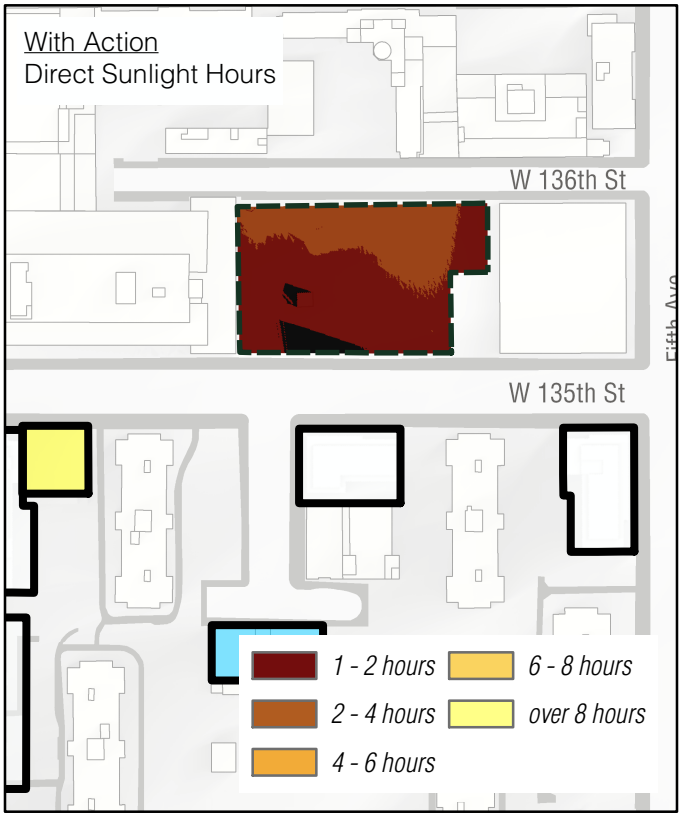
Howard Bennett Playground
June 21

LENOX TERRACE

Figure 6-20

9/27/2018





Proposed Buildings on Proposed Development Site

Projected Future Development Site

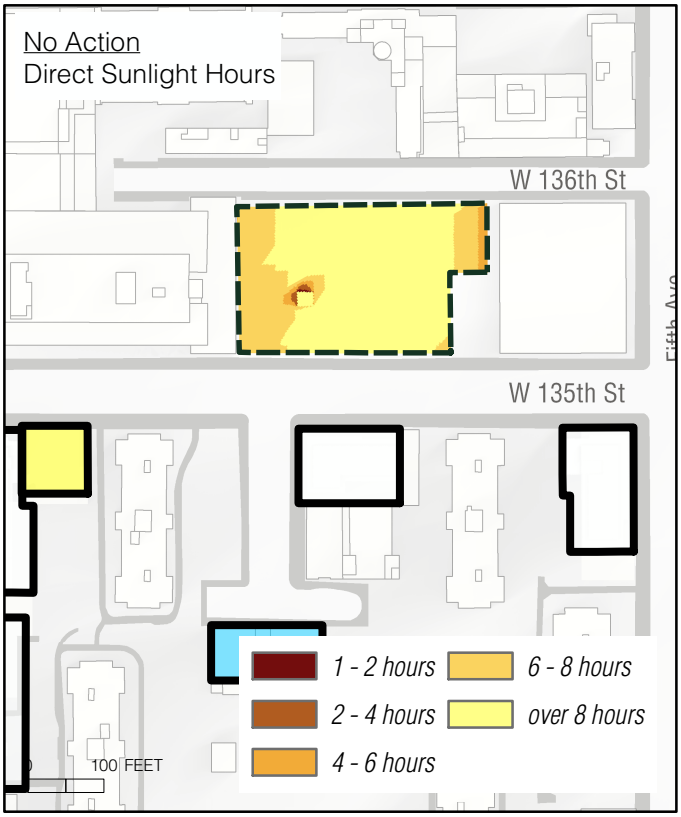
Potential Future Development Site

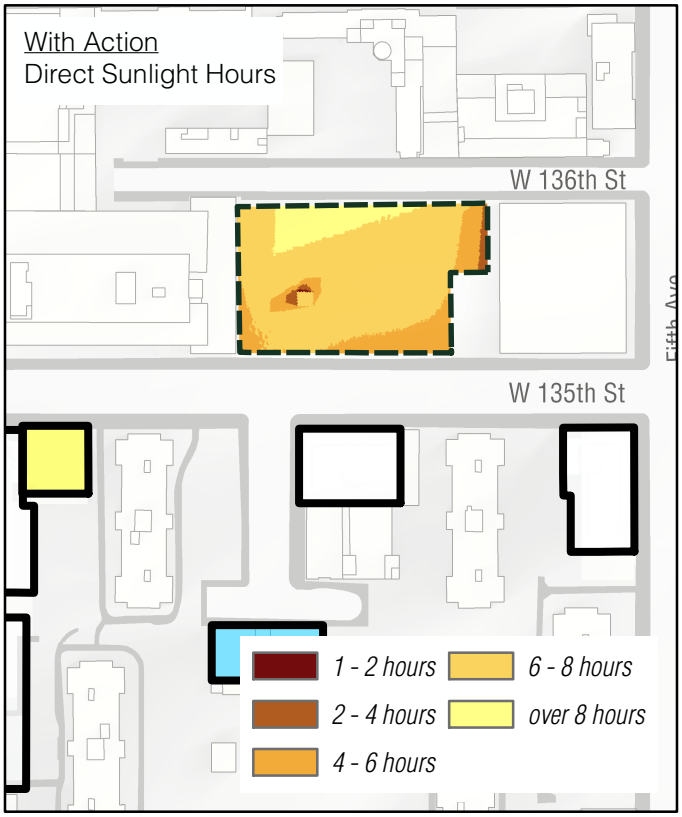
Open Space Boundary

Solar Exposure Analysis
Howard Bennett Playground
December 21

Figure 6-21

9/27/2018





Proposed Buildings on Proposed Development Site

Projected Future Development Site

Potential Future Development Site

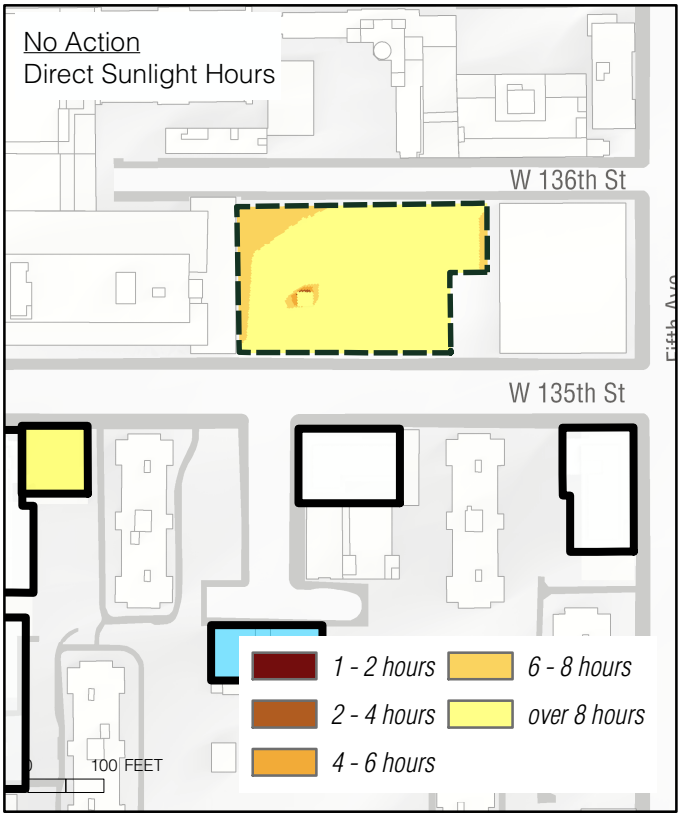
Open Space Boundary

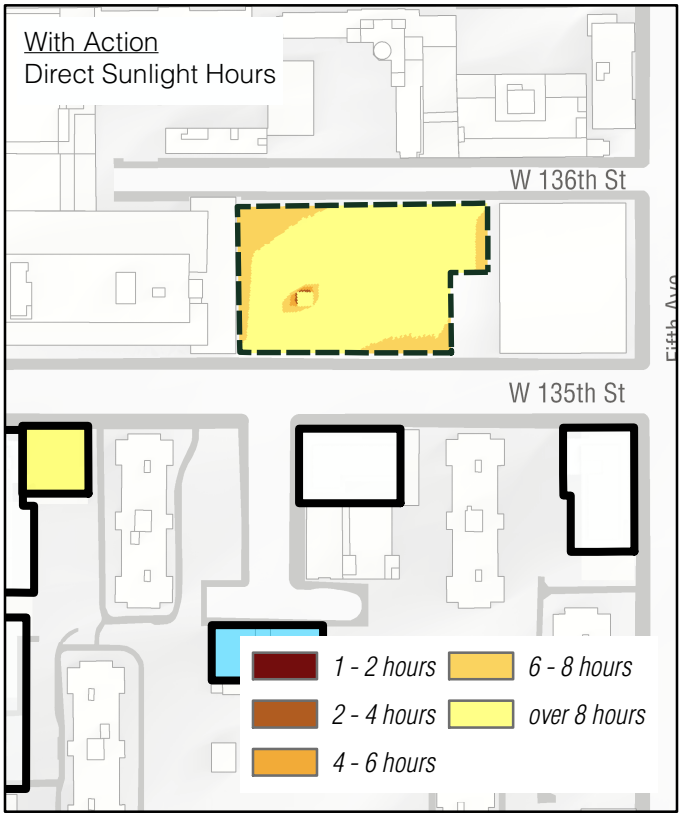
Solar Exposure Analysis
Howard Bennett Playground
March 21/September 21

LENOX TERRACE

Figure 6-22

9/27/2018





Proposed Buildings on Proposed Development Site

Projected Future Development Site

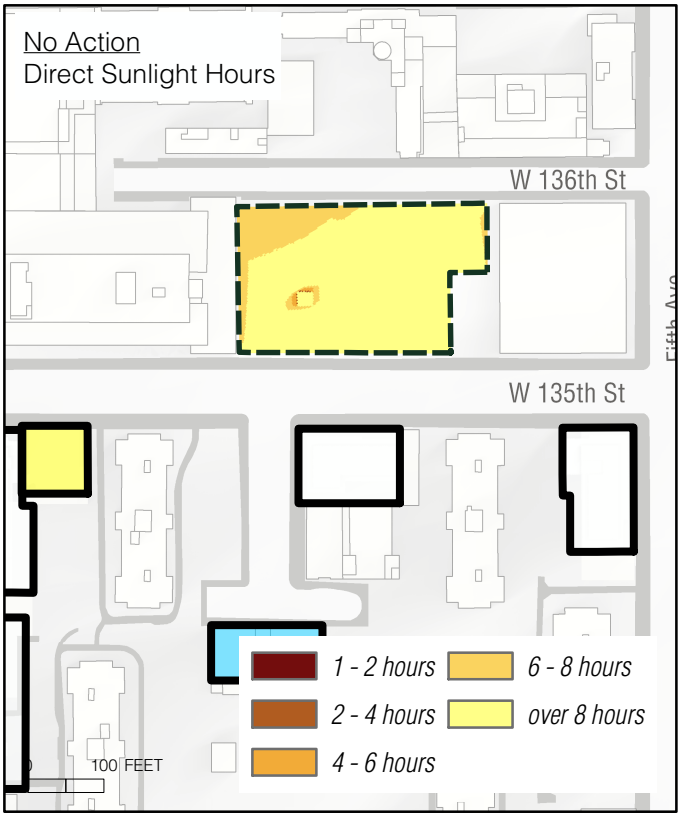
Potential Future Development Site

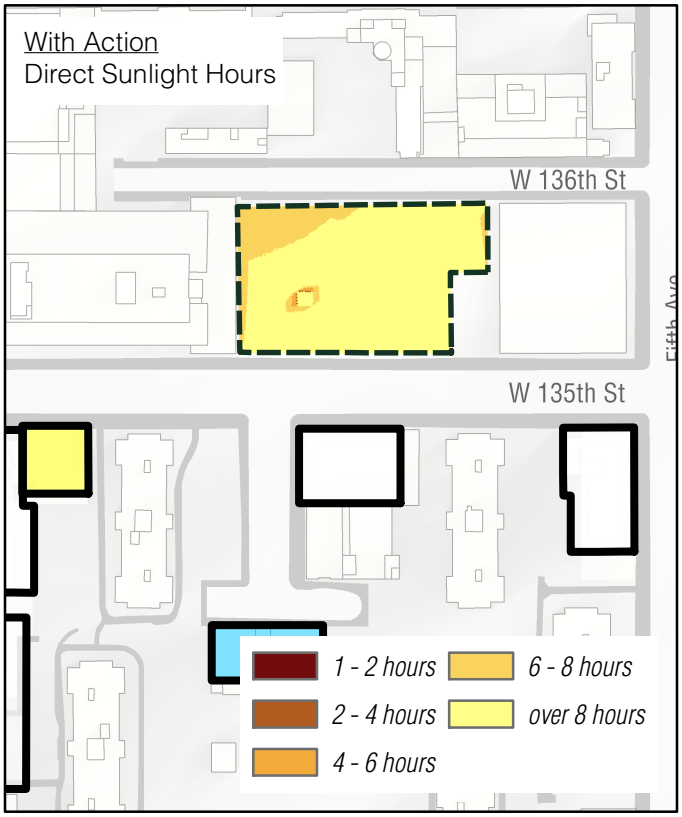
Open Space Boundary

Solar Exposure Analysis
Howard Bennett Playground
May 6/August 6

Figure 6-23

9/27/2018





Proposed Buildings on Proposed Development Site

Projected Future Development Site

Potential Future Development Site

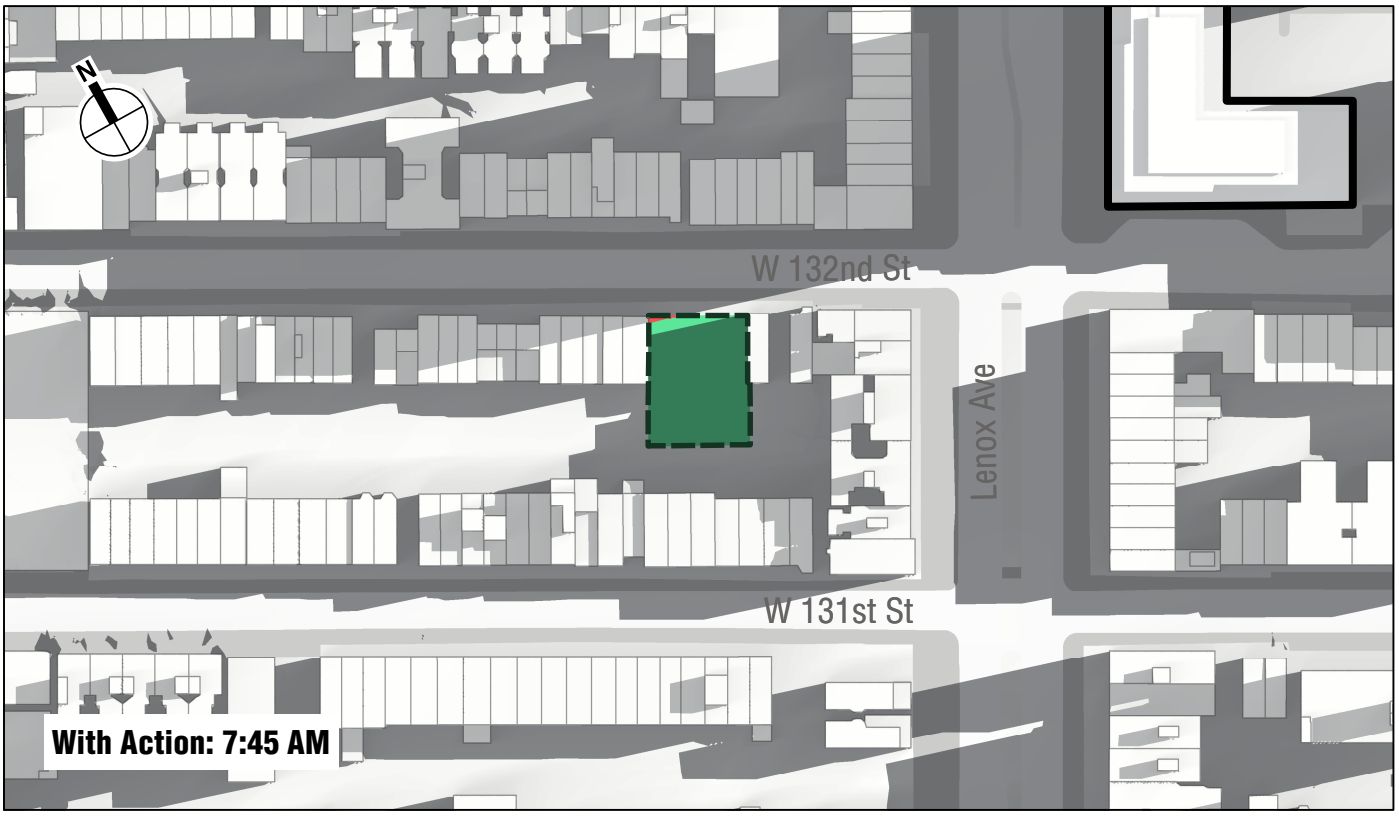
Open Space Boundary

Solar Exposure Analysis
Howard Bennett Playground
June 21

Figure 6-24

LENOX TERRACE

9/27/2018



Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

132nd St Block Association Park
March 21/September 21

LENOX TERRACE

Figure 6-25

9/27/2018

Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

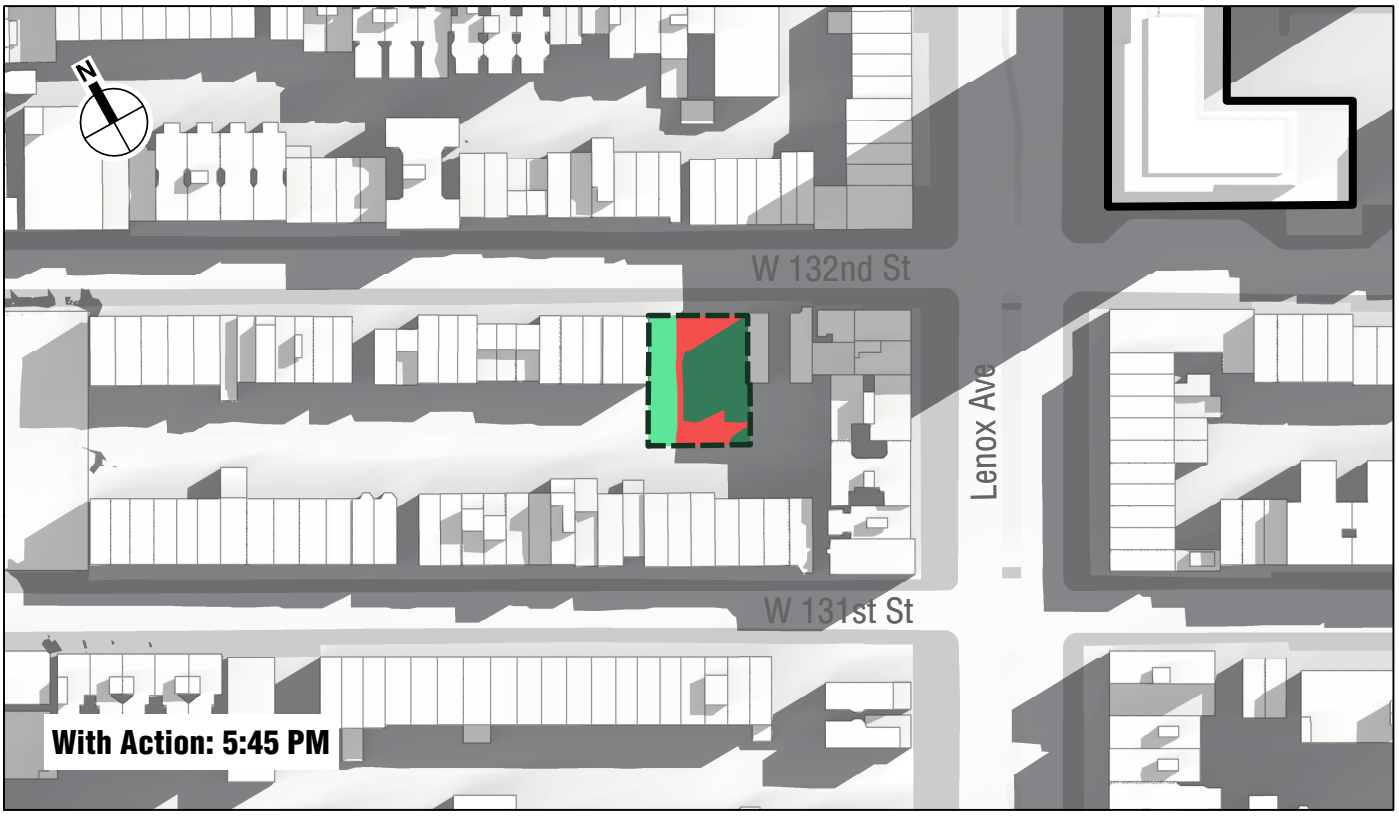
0 200 FEET

132nd St Block Association Park
May 6/August 6

LENOX TERRACE

Figure 6-26

9/27/2018



Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

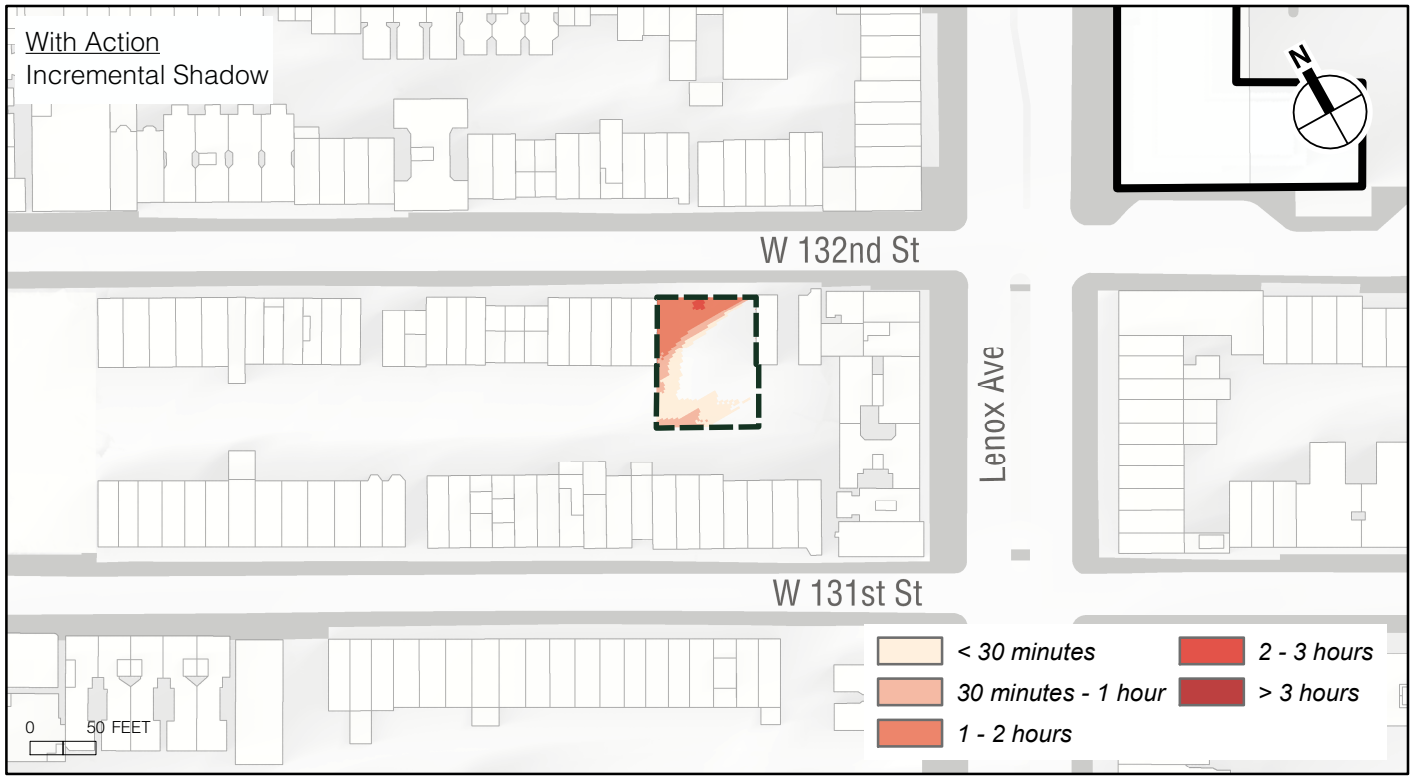
0 200 FEET

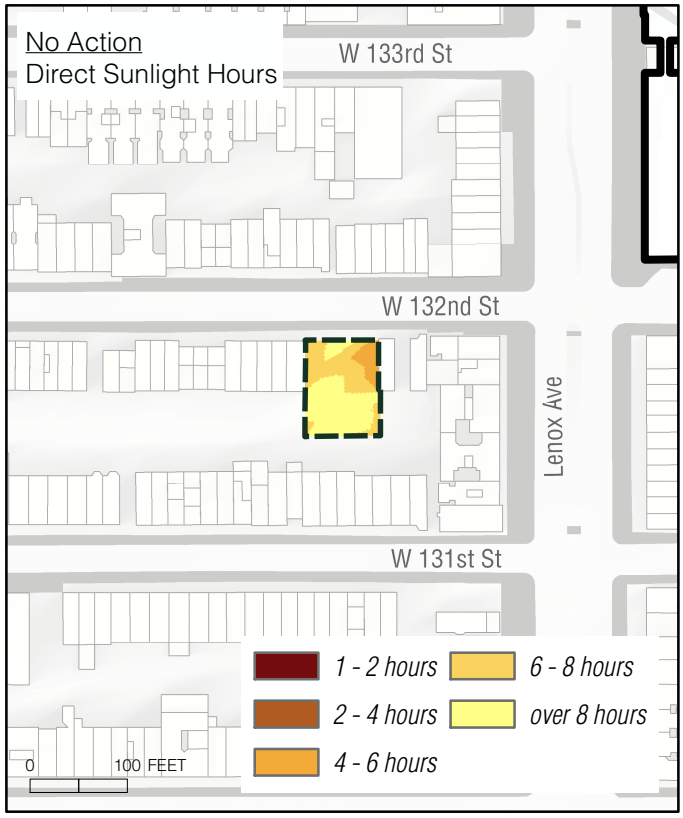
132nd St Block Association Park
June 21

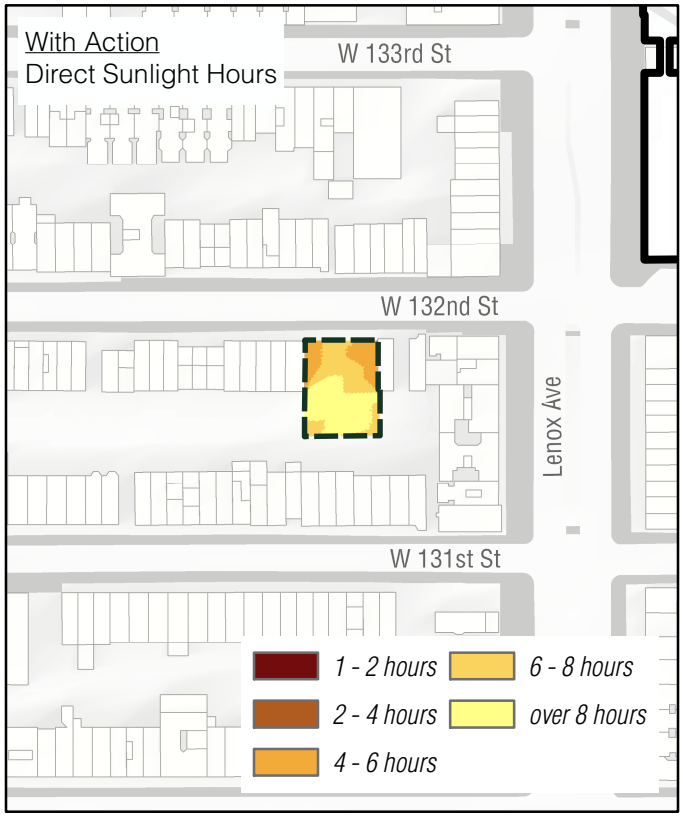
LENOX TERRACE

Figure 6-27

9/27/2018







Proposed Buildings on Proposed Development Site

Projected Future Development Site

Potential Future Development Site

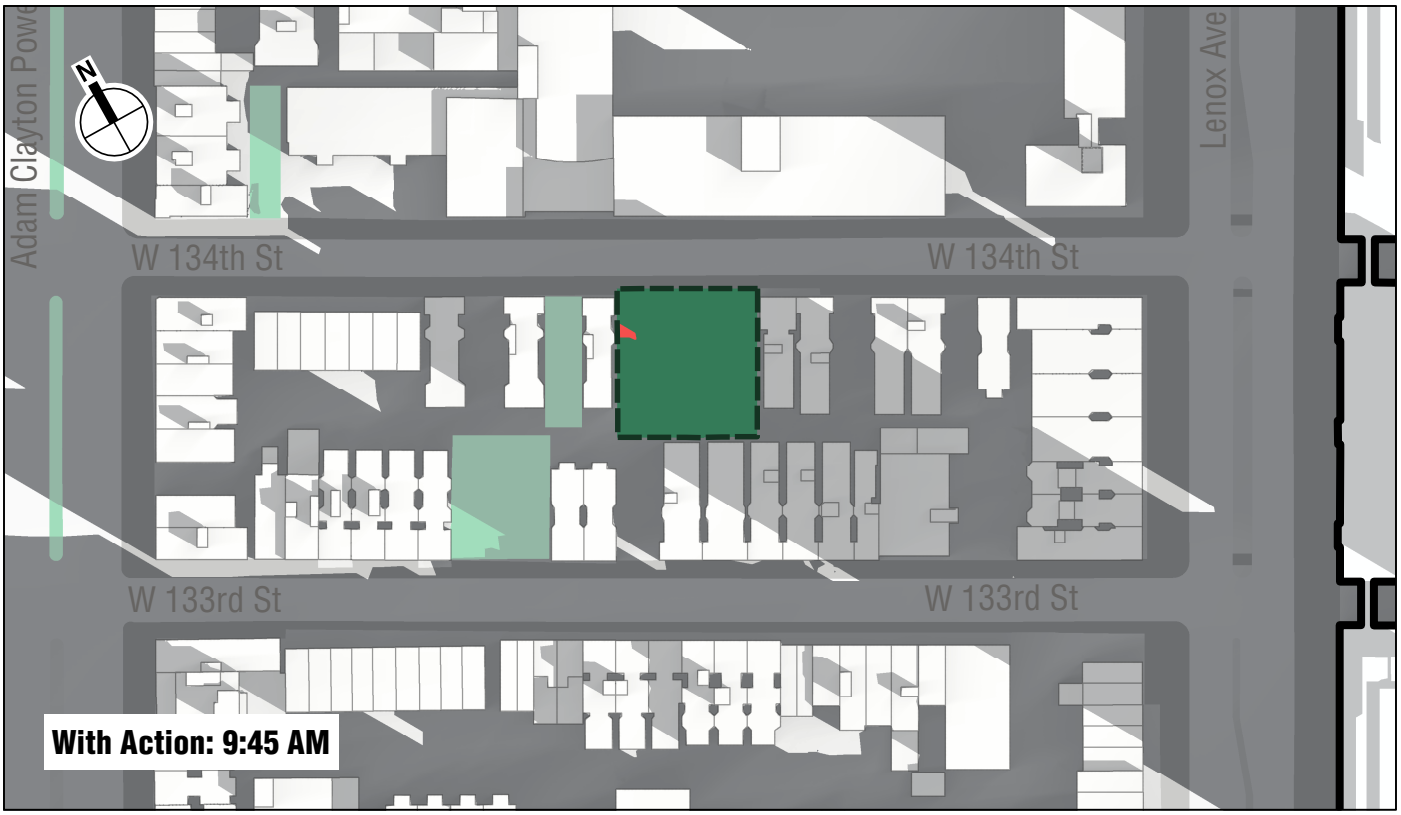
Open Space Boundary

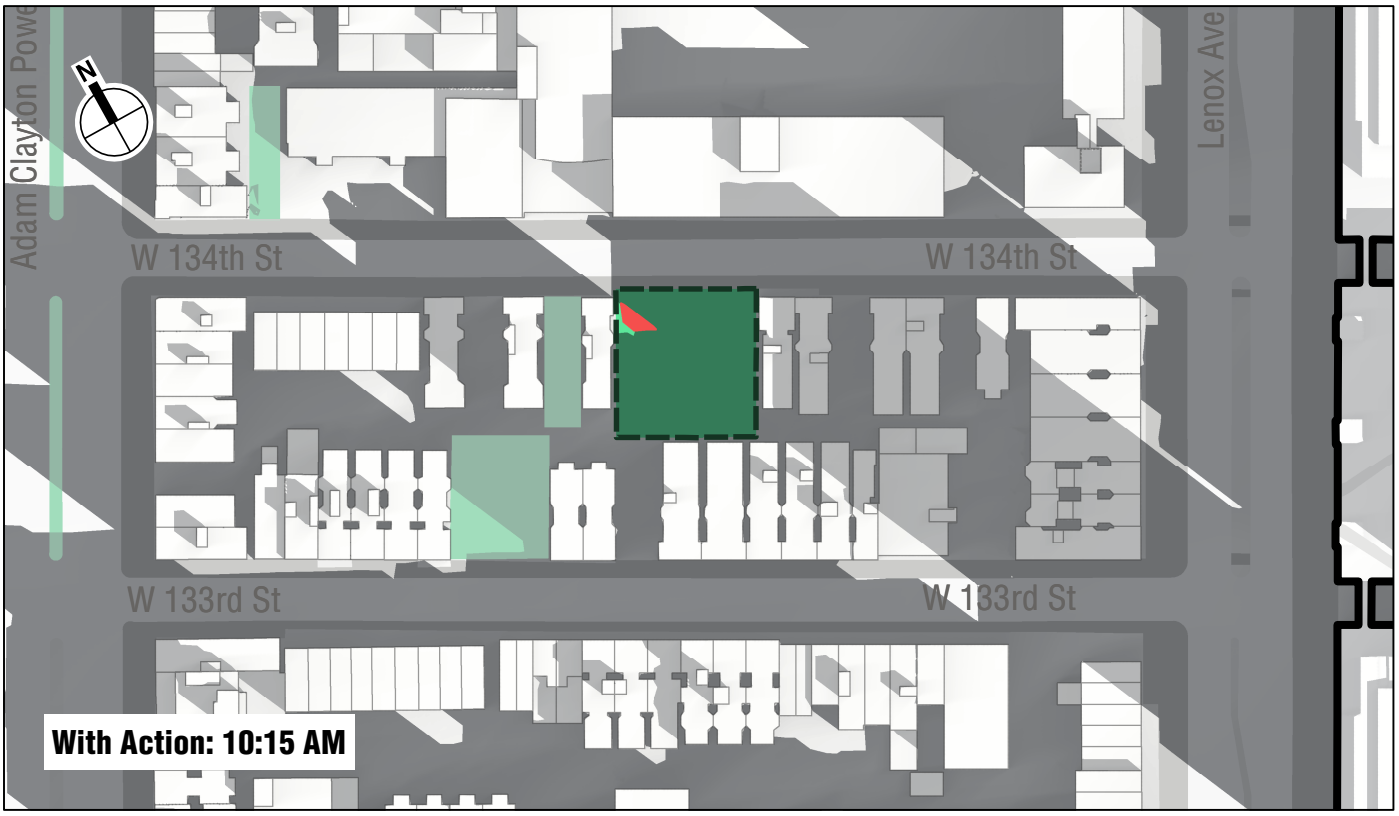
Solar Exposure Analysis
132nd St Block Association Park
May 6/August 6

LENOX TERRACE

Figure 6-28

9/27/2018





Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

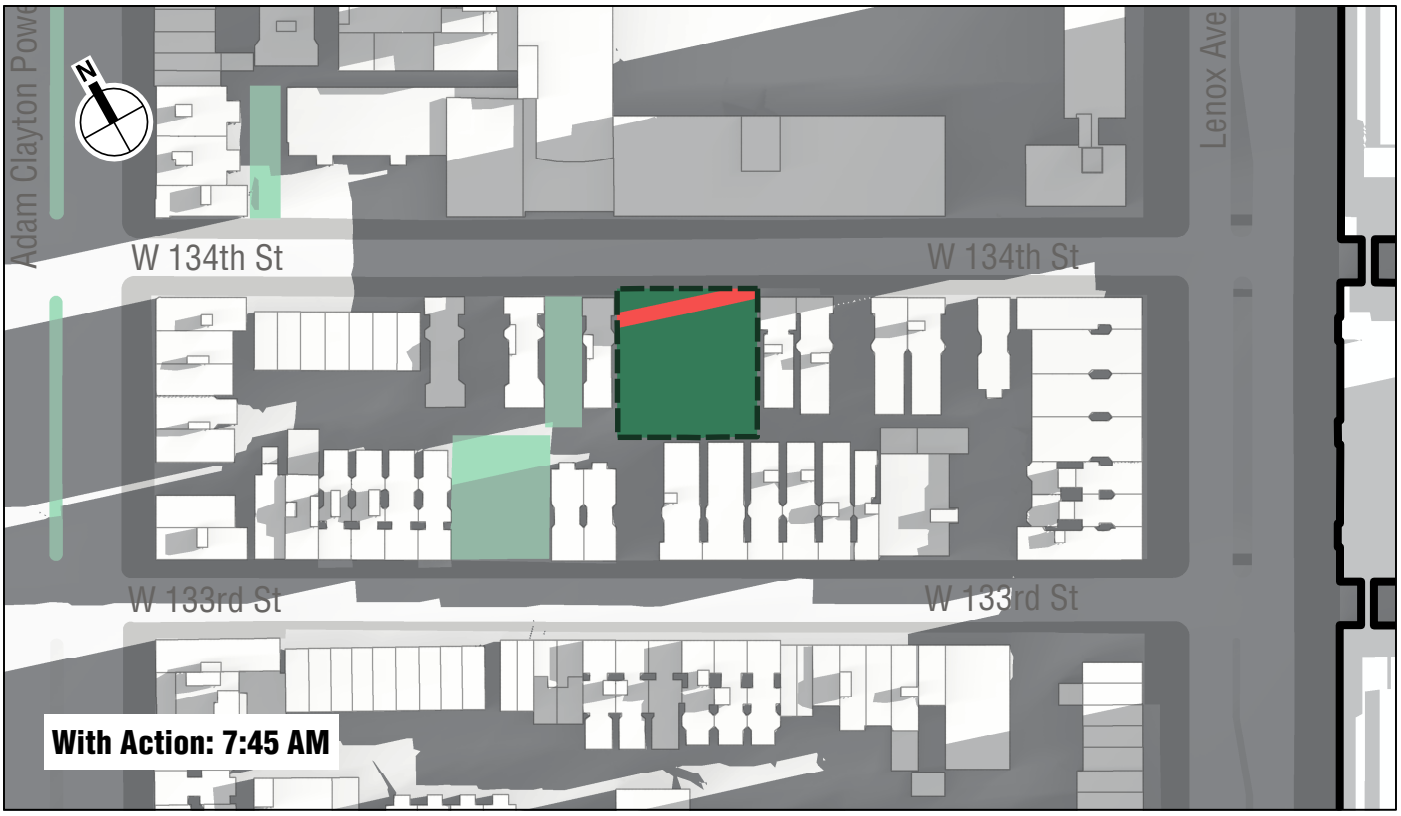
0 200 FEET

Harlem Grown East
December 21

LENOX TERRACE

Figure 6-29

9/27/2018



Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

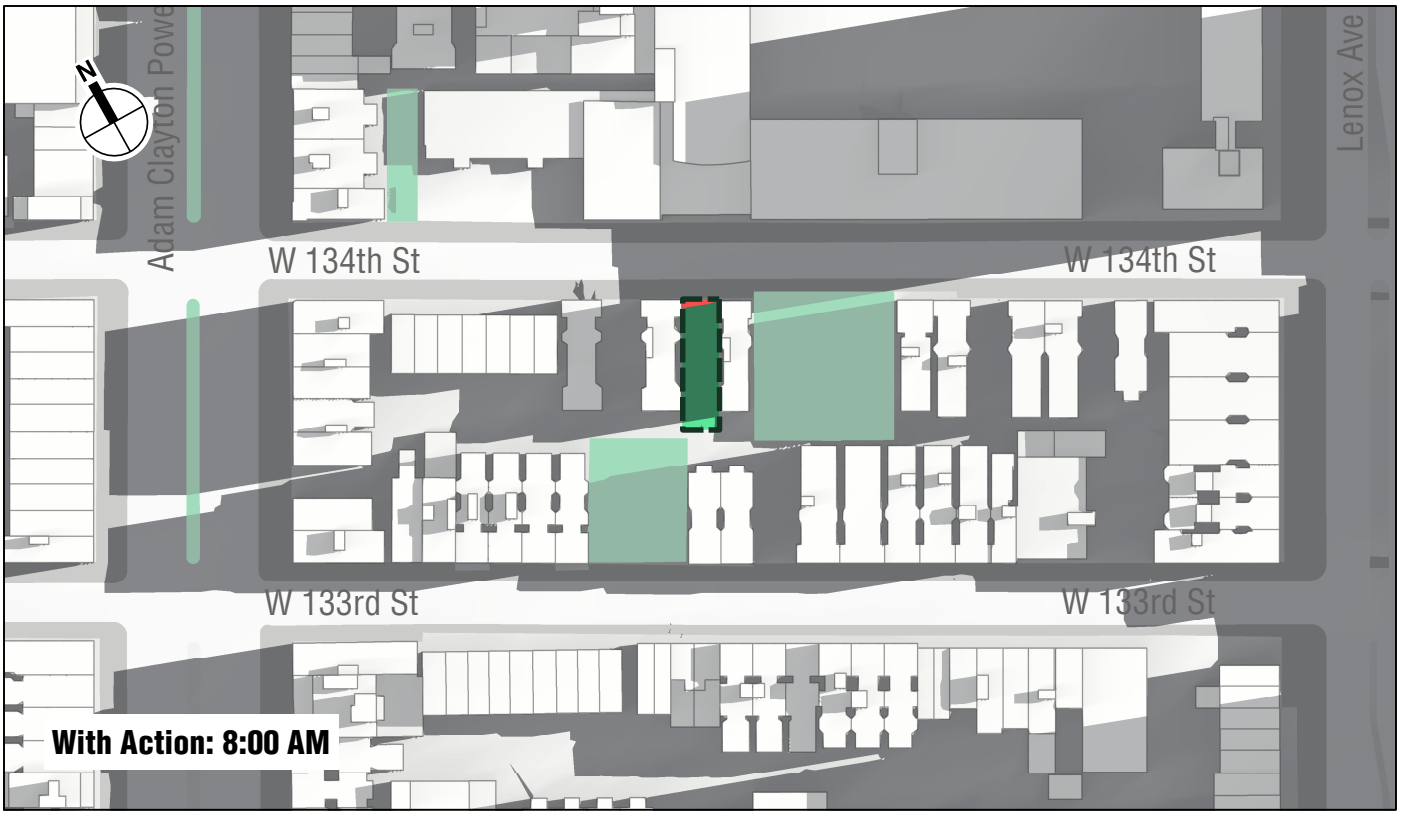
0 200 FEET

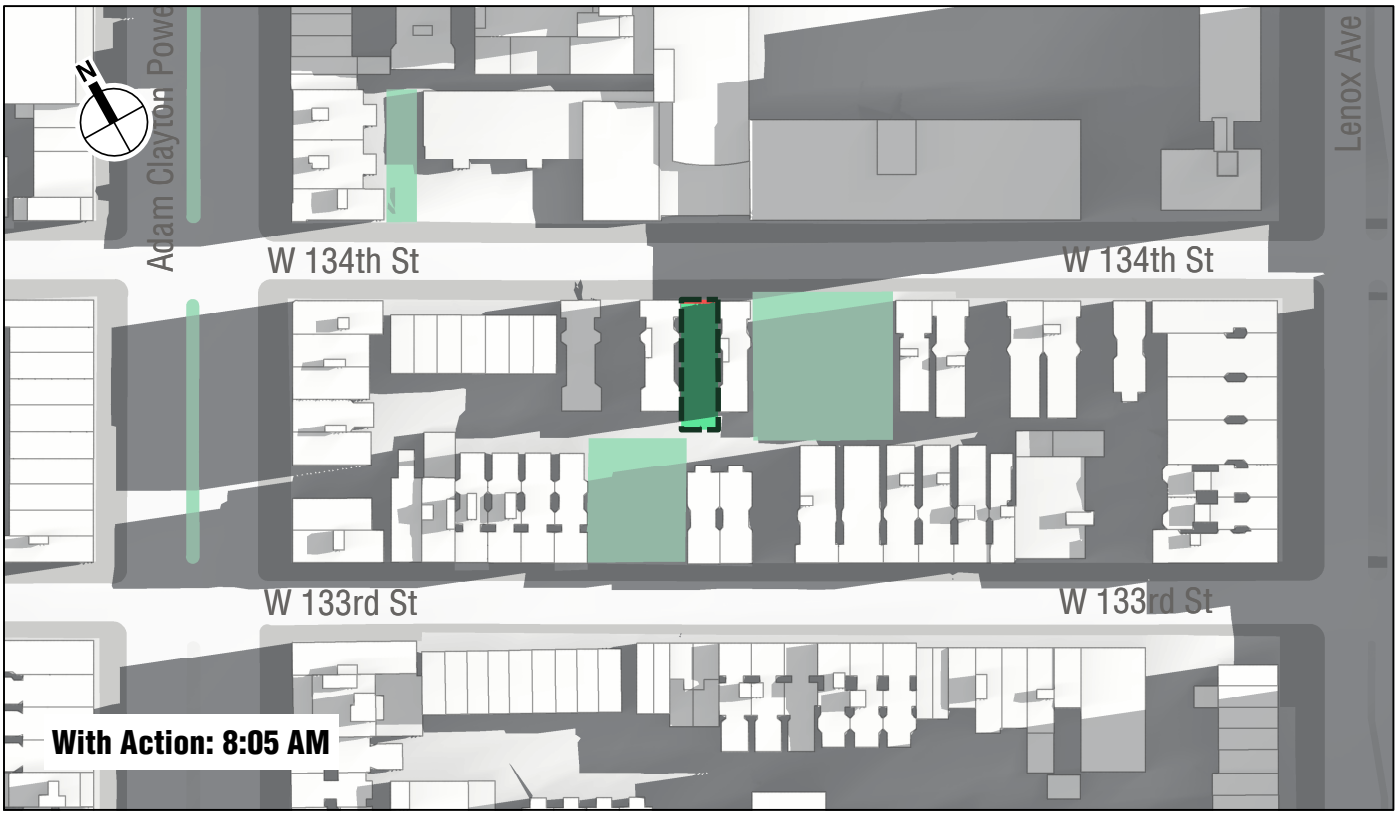
Harlem Grown East
March 21/September 21

LENOX TERRACE

Figure 6-30

9/27/2018





Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

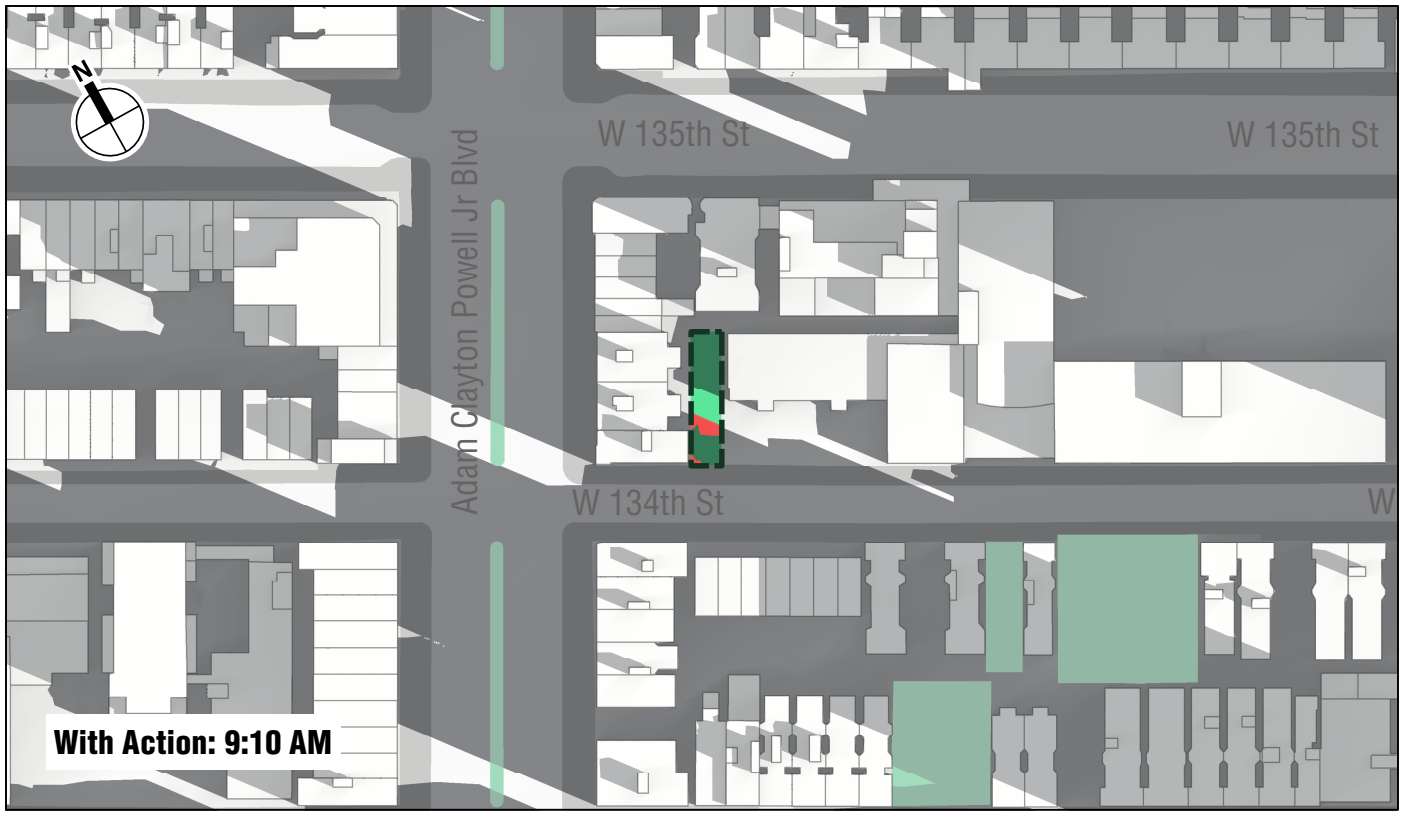
0 200 FEET

Harlem Grown Gardens West
March 21/September 21

LENOX TERRACE

Figure 6-31

9/27/2018



Proposed Buildings on Proposed Development Site

Projected Future Development Site

Potential Future Development Site

Open Space Boundary

Area of Open Space in Direct Sunlight

Area of Open Space in Existing Shadow

Area of Open Space in New Shadow

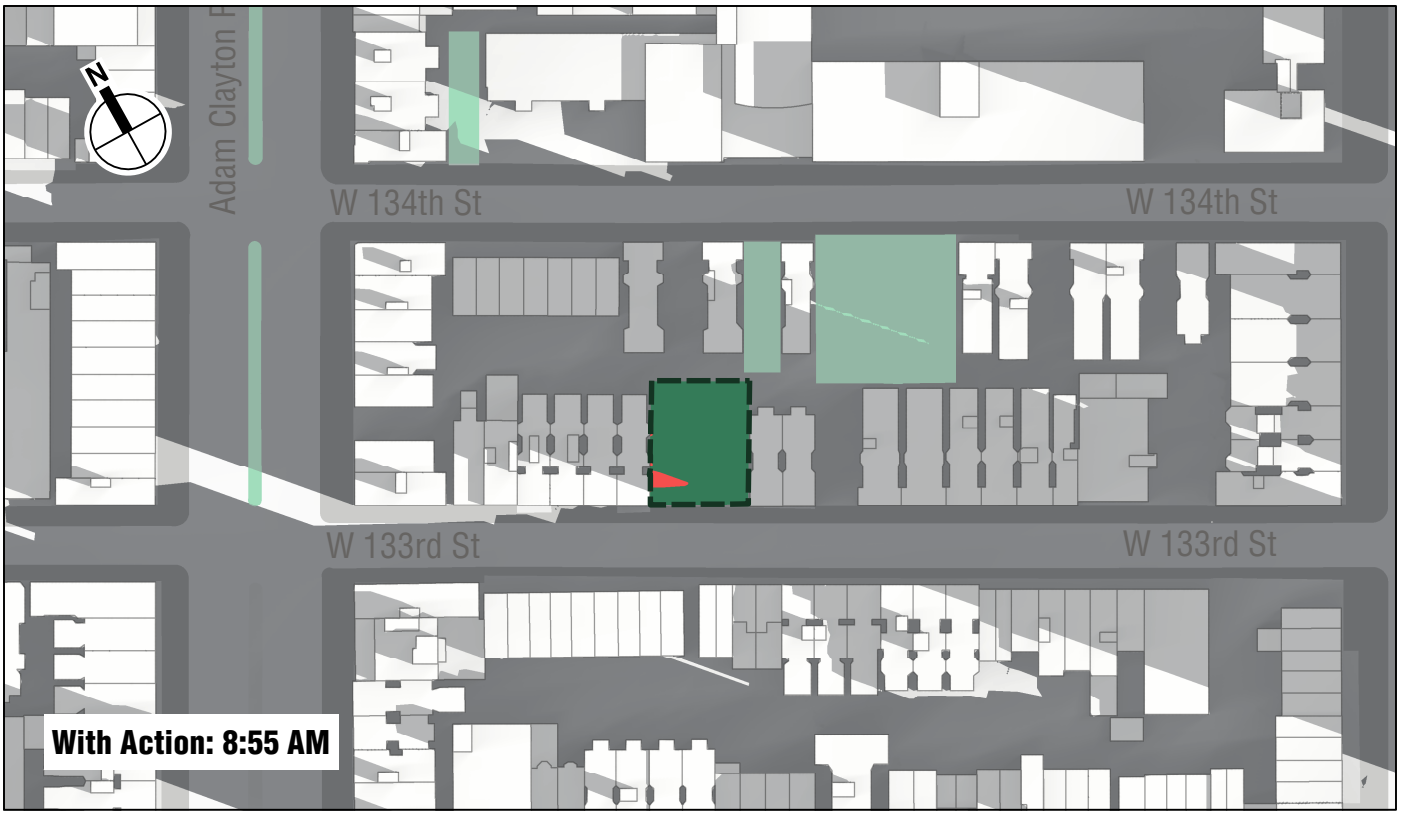
0 200 FEET

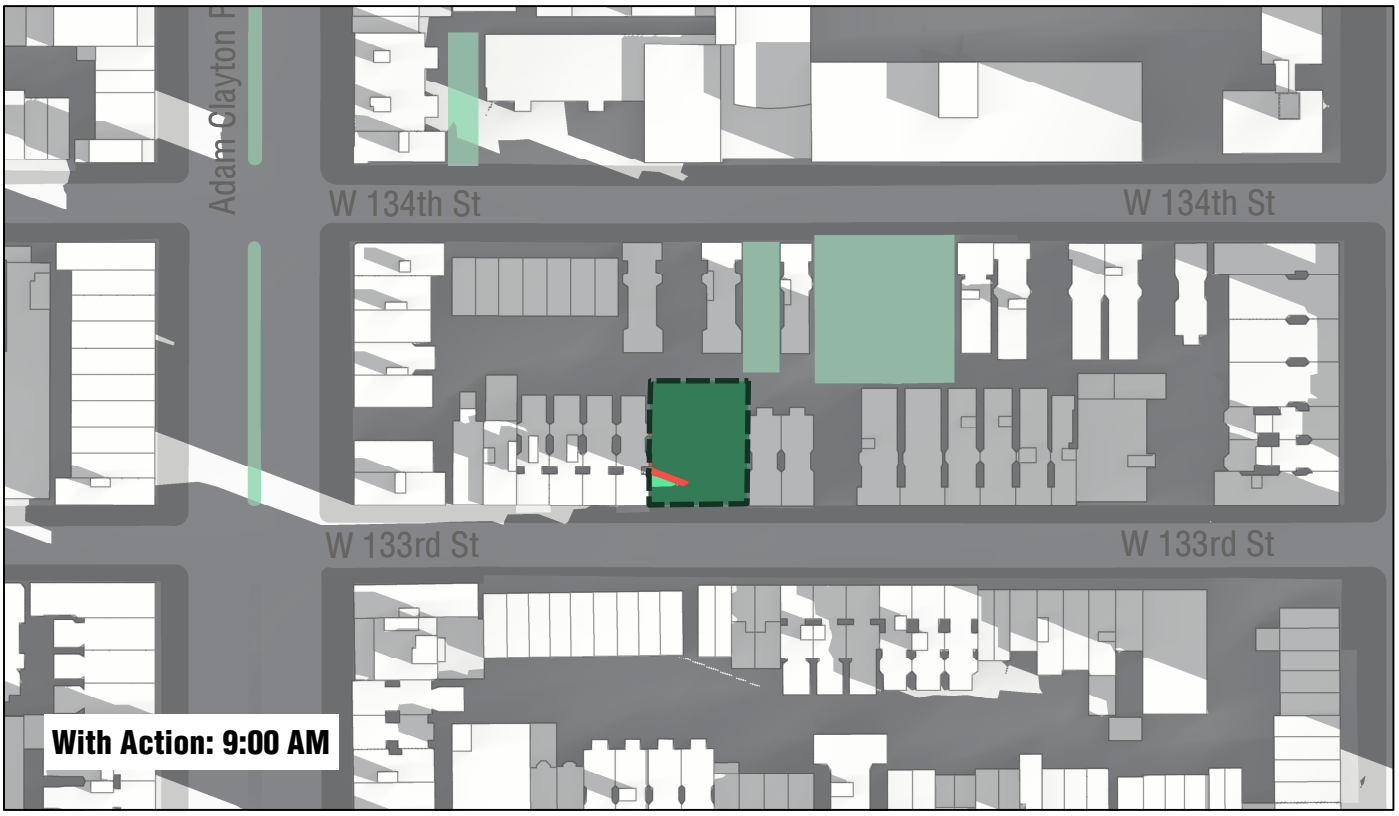
Harlem Valley Garden
December 21

LENOX TERRACE

Figure 6-32

9/27/2018





Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

Margrichantie Garden
December 21

LENOX TERRACE

Figure 6-33

9/27/2018

Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary
Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

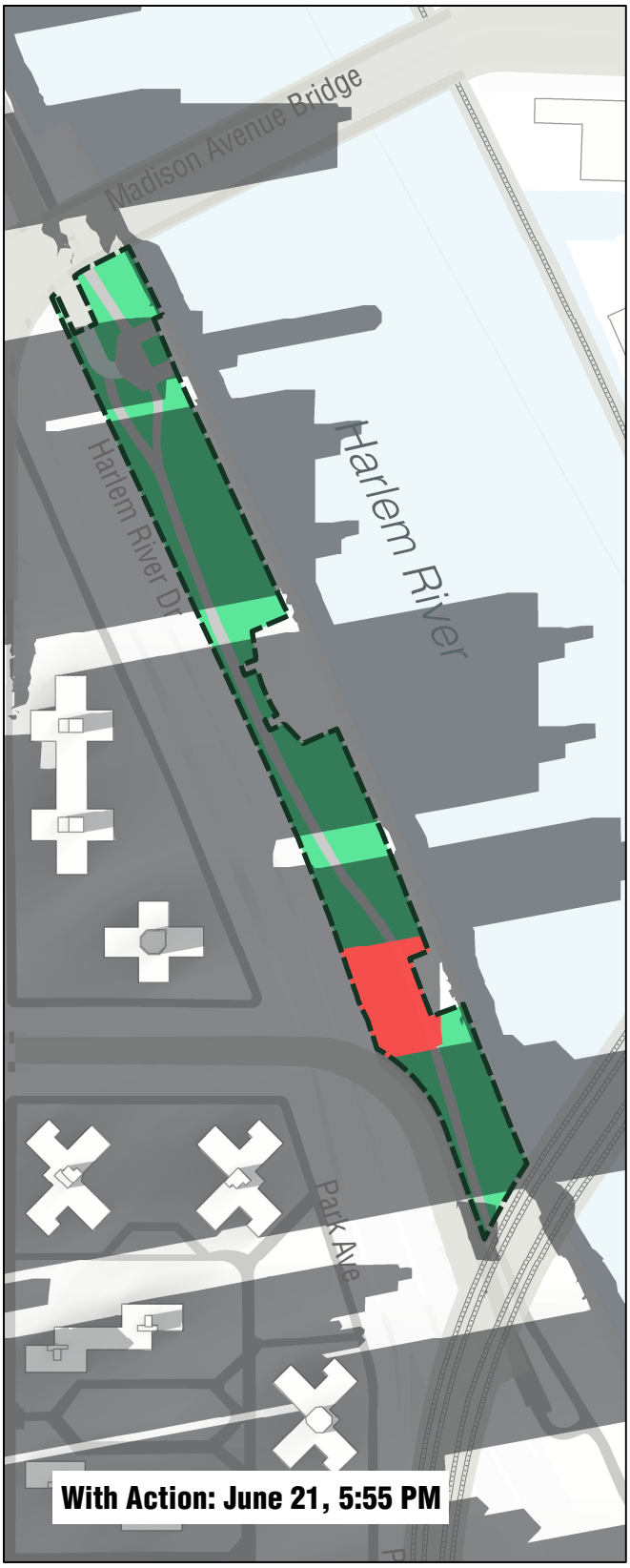
0 200 FEET

Seventh Avenue Center Plots
December 21

LENOX TERRACE

Figure 6-34

9/27/2018



Proposed Buildings on Proposed Development Site
Projected Future Development Site
Potential Future Development Site
Open Space Boundary

Area of Open Space in Direct Sunlight
Area of Open Space in Existing Shadow
Area of Open Space in New Shadow

0 200 FEET

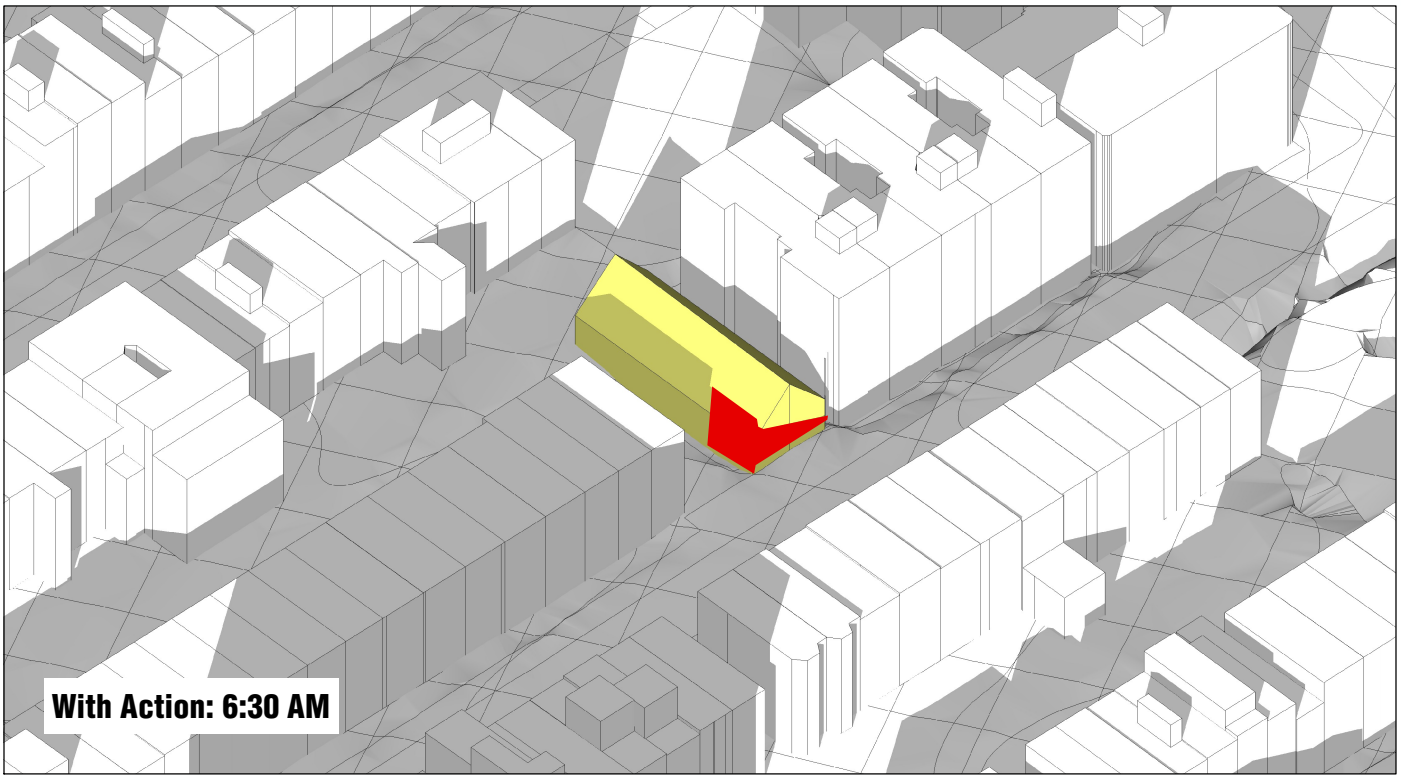
Harlem River Park
June 21

LENOX TERRACE

Figure 6-35

9/27/2018

Source: AKRF, Inc.



Friendship Baptist Church

Incremental Shadow on Sunlight-Sensitive Architectural Features

Friendship Baptist Church
May 6 / August 6

Table 6-1
Incremental Shadow Durations on Sunlight-Sensitive Resources

Analysis Day and Timeframe Window	December 21 8:51 AM–2:53 PM	March 21 / Sept. 21 7:36 AM–4:29 PM	May 6 / August 6 6:27 AM–5:18 PM	June 21 5:57 AM–6:01 PM
Parks				
Abraham Lincoln Playground	2:45 PM–2:53 PM Total Duration: 8 min	3:20 PM–4:05 PM Total Duration: 45 min	2:50 PM–5:18 PM Total Duration: 2 hr 28 min	3:20 PM–6:01 PM Total Duration: 2 hr 41 min
Harlem River Park	—	—	—	5:55 PM–6:01 PM Total Duration: 6 min
Howard Bennett Playground	8:51 AM–2:53 PM Total Duration: 6 hr 2 min	10:15 AM-4:29 PM Total Duration: 6 hr 14 min	12:00 PM-5:18 PM Total Duration: 5 hr 18 min	1:15 PM-6:01 PM Total Duration: 4 hr 46 min
Community Gardens				
132nd St Block Association Park	—	7:36 AM–7:50 AM Total Duration: 15 min	6:27 AM–8:30 AM Total Duration: 2 hr 3 min	6:45 AM–7:50 AM Total Duration: 1 hr 5 min
Harlem Grown East	9:40 AM-10:20 AM Total Duration: 40 min	7:36 AM-8:10 AM Total Duration: 34 min	—	—
Harlem Grown Gardens West	—	7:55 AM-8:10 AM Total Duration: 15 min	—	—
Harlem Valley Garden	9:10 AM-9:25 AM Total Duration: 15 min	—	—	—
Margrichantie Garden	8:51 AM–9:05 AM Total Duration: 14 min	—	—	—
Greenstreets				
Seventh Ave Center Plots	8:51 AM–9:05 AM Total Duration: 14 min	—	—	—
Historic Resources with Sunlight-Sensitive Features				
Friendship Baptist Church	—	—	6:27 AM–6:35 AM Total Duration: 0 hr 8 min	—

Notes:
Table indicates entry and exit times and total duration of incremental shadow for each sunlight-sensitive resource. Daylight savings time is not used—times are Eastern Standard Time (EDT), per *CEQR Technical Manual* guidelines. However, as EDT is in effect for the March/September, May/August, and June analysis periods, add 1 hour to the given times to determine the actual clock time.

SHADOWS AND THE FOUR SEASONS

Shadow patterns differ in each season, and their effects on vegetation, open space use and other sensitive receptors can differ as well.

December 21, representing the winter months, does not fall within the growing season. Shadow falling on vegetation in winter is not generally considered to cause a significant adverse impact, according to the *CEQR Technical Manual*. However, winter shadow can adversely affect users of open space who may seek out sunlight for warmth on otherwise cold days. Shadows are long in the winter, and move faster than in other seasons. In densely developed areas like Central Harlem, buildings create generally shady conditions throughout the study area, even in the middle of the day, and certainly at the beginning and end of the analysis period.

March is considered the beginning of the growing season in New York City, and September 21, which has the same shadow patterns as March 21, is also within the growing season. Shadows on March 21 and September 21 are of moderate length.

May 6 falls halfway between the March 21 equinox and the June 21 summer solstice. August 6 falls halfway between June 21 and the September 21 equinox, and has the same shadow patterns as May 6. The May 6/August 6 analysis day is representative of the growing season in the city. Shadows on this day are shorter than on the equinoxes, and the length of the day is longer.

June 21 has the longest amount of daylight of the year, with an analysis period of 12 hours. Shadows fall to the southwest early in the morning and to the southeast late in the afternoon, and shadows at midday on June 21 are shorter than at any other time of year. June 21 is also in the growing season.

DETERMINATION OF IMPACT SIGNIFICANCE

According to the *CEQR Technical Manual*, an incremental shadow is not considered significant when its duration is shorter than 10 minutes at any time of year and the resource continues to receive substantial direct sunlight. A significant adverse impact generally occurs when an incremental shadow of 10 minutes or longer falls on a sunlight sensitive resource and results in one of the following:

FOR VEGETATION

- A substantial reduction in sunlight available to a sunlight-sensitive feature of the resource to less than the minimum time necessary for its survival (when there was sufficient sunlight in the No Action condition).
- A reduction in direct sunlight exposure where the sensitive feature of the resource is already subject to substandard sunlight (i.e., less than minimum time necessary for its survival).

FOR SUNLIGHT-SENSITIVE HISTORIC AND CULTURAL RESOURCES

- A substantial reduction in sunlight available for the enjoyment or appreciation of the sunlight-sensitive features of an historic or cultural resource.

FOR OPEN SPACE UTILIZATION

- A substantial reduction in the usability of open space as a result of increased shadows (cross reference with information provided in Chapter 5, "Open Space," regarding anticipated new users and the open space's utilization rates throughout the affected time periods).

FOR ANY SUNLIGHT-SENSITIVE FEATURE OF A RESOURCE

- Complete elimination of all direct sunlight on the sunlight-sensitive feature of the resource, when the complete elimination results in substantial effects on the survival, enjoyment, or, in the case of open space or natural resources, the use of the resource.

ASSESSMENT OF SHADOW EFFECTS BY RESOURCE

This section presents a description of the extent and duration of project-generated incremental shadows on each affected resource, by analysis day, and an assessment of the significance of the shadows' impacts. Per *CEQR Technical Manual* guidelines, impact significance is evaluated based not only on the extent and duration of incremental shadow but also the nature and sensitivity of each individual resource and the specific context in which the impact occurs.

*ABRAHAM LINCOLN PLAYGROUND (SEE **FIGURES 6-4 THROUGH 6-10**)*

Abraham Lincoln Playground is a public open space approximately 1 acre in size, located at the southeastern corner of Fifth Avenue and East 135th Street. Sunlight-sensitive features within the

resource include basketball courts, an outdoor pool, spray showers, and a playground. This open space resource is in excellent condition and has medium utilization (see Chapter 5, "Open Space").

In the With Action (2026) scenario, Abraham Lincoln Playground would be cast in new shadow on all four analysis days.

December 21: Beginning at 2:45 PM, new shadow would fall on the basketball court and surrounding seating located in the northwest corner of the resource. Until the end of the analysis day at 2:53 PM (for a total duration of less than 10 minutes), the new shadow would move to the east and increase slightly in extent. As described above, according to the *CEQR Technical Manual*, incremental shadow is generally not considered significant when its duration is under 10 minutes. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

March 21/September 21 (see **Figure 6-4**): Beginning at 3:20 PM, new shadow would fall on the pool within Abraham Lincoln Playground. The extent of the new shadow would gradually increase over the next 44 minutes, until the end of the analysis day at 4:04 PM, when it would fall on vegetation and seating located in the resource's northeast corner. The total duration of new shadow would be short, the pool would be closed to the public on this analysis day, and any new shadow falling on the trees adjacent to the pool would not prevent them from receiving at least 4 hours of direct sunlight throughout the analysis day, which the *CEQR Technical Manual* considers a sufficient quantity to support a variety of plant life. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

May 6/August 6 (see **Figures 6-5 and 6-6**): Beginning at 2:50 PM, new shadow would enter Abraham Lincoln Playground from the northwest, falling on the resource's basketball court and surrounding seating. Over the next 2 hours, the extent of new shadow would gradually expand in size while moving south and east across the resource. By the end of the analysis day, at 5:18 PM, new shadow would cover approximately one-quarter of the resource, falling on the majority of the basketball court and the benches and trees located along East 135th Street. On this analysis day, while the total duration of new shadow would be longer, all affected areas of the resource would continue to be cast in direct sunlight throughout the morning and early afternoon, receiving at least 7 hours of direct sunlight throughout the day. The substantial quantity of direct sunlight would prevent the new shadow from significantly altering the park's usability and would be sufficient to support its vegetation. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

June 21 (see **Figures 6-7 and 6-8**): Beginning at 3:20 PM, new shadow would enter Abraham Lincoln Playground from the west, falling on the resource's basketball court and surrounding seating. Over the next 2½ hours, the extent of new shadow would gradually expand in size while moving south and east across the resource. By the end of the analysis day, at 6:01 PM, new shadow would cover approximately three-quarters of the resource, falling on nearly all of the basketball court, the playground, and the majority of the resource's benches and trees. From 5:10 until 6:01 PM, new shadow would be cast on a portion of the pool. On this analysis day, while the total duration of new shadow would be longer, the majority of affected features would not receive much over an hour of new shadow, and all affected areas of the resource would continue to be cast in direct sunlight throughout the morning and early afternoon, receiving at least 9 hours of direct sunlight throughout the day. The pool would receive at least 10 hours of direct sunlight. The substantial quantity of direct sunlight would prevent the new shadow from significantly altering the park's usability and would be sufficient to support its vegetation. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

*HARLEM RIVER PARK (SEE **FIGURE 6-35**)*

Harlem River Park is a public open space divided into two discrete sections, a triangular shaped park located at the intersection of Lexington Avenue and East 128th Street, and an esplanade running along the Harlem River between West 132nd and 138th Streets. The features of this resource include a bikeway, ballfield, basketball courts, benches and vegetation.

On the June 21 analysis day, new shadow would fall on Harlem River Park for the last 6 minutes of the analysis day, from 5:55 PM to 6:01 PM. The shadow would be cast on a seating area and esplanade adjacent to East 135th Street. On this day, all Harlem River Park area affected by new shadow would receive over 10 hours of direct sunlight. As described above, according to the *CEQR Technical Manual*, incremental shadow is generally not considered significant when its duration is under 10 minutes. Therefore, the project-generated shadow on this analysis day would not result in a significant shadow impact to this resource.

*132ND STREET BLOCK ASSOCIATION PARK (SEE **FIGURES 6-25 THROUGH 6-28**)*

The 132nd Street Block Association Garden is an approximately 0.17-acre community garden located on 132nd Street, midblock between Malcolm X and Adam Clayton Powell Jr. Boulevards. Features within the resource include garden plots, tree canopy, flowering plants, and seating areas. In the With Action (2026) scenario, the 132nd Street Block Association Garden would be cast in new shadow on three of the four analysis days.

March 21/September 21 (see **Figure 6-25**): At 7:36 AM, new shadow would fall on portions of the 132nd Street Block Association Garden. The new shadow would gradually decrease in extent before exiting the resource completely at 7:50 AM (for a total duration of less than 15 minutes). The total duration of new shadow would be short, the new shadow would fall earlier than the garden's posted hours of operation, and any new shadow falling on the garden would not prevent its vegetation from receiving at least 4 hours of direct sunlight throughout the analysis day. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

May 6/August 6 (see **Figure 6-26**): At 6:27 AM, new shadow would fall on portions of the 132nd Street Block Association Garden. Over the subsequent 2 hours and 3 minutes, the new shadow would gradually decrease in extent before exiting the resource completely at 8:30 AM. During this timeframe, no more than 30 minutes of new shadow would be cast on the vegetation and seating in the southwest corner of the garden, and up to 2 hours of new shadow would fall on the vegetation and seating located in the garden's northwest corner. On this analysis day, while the total duration of new shadow would be longer, the new shadow would fall earlier than the garden's posted hours of operation, and all garden areas affected by new shadow would continue to receive over 4 hours of direct sunlight throughout the day, a quantity sufficient to support a variety of plant species. A majority of the affected garden area would receive over 6 hours of direct sunlight throughout the analysis day. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

June 21 (see **Figure 6-27**): At 6:45 AM, new shadow would fall on portions of the 132nd Street Block Association Garden (vegetation and seating areas). Over the subsequent hour and five minutes, the new shadow would gradually decrease in extent before exiting the resource completely at 7:50 AM. On this analysis day, while the total duration of new shadow would be longer, the new shadow would fall earlier than the garden's posted hours of operation, and all garden areas affected by new shadow would continue to receive over 4 hours of direct sunlight

throughout the day, a quantity sufficient to support a variety of plant species. A majority of the affected garden area would receive over 8 hours of direct sunlight throughout the analysis day. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

HARLEM GROWN EAST

Harlem Grown East is an approximately 0.42-acre community garden located on West 134th Street, midblock between Fifth Avenue and Malcom X Boulevard. This resource includes garden plots, tree canopy, flowering plants, and seating areas. In the With Action (2026) scenario, Harlem Grown East would be cast in new shadow on two of the four analysis days.

December 21 (see **Figure 6-29**): At 8:51 AM, on the beginning of the analysis day, new shadow would fall on the northwest corner of Harlem Grown East. Over the subsequent approximately 30 minutes, the new shadow would gradually decrease in extent before exiting the resource completely at 9:20 AM. During this timeframe, new shadow would be cast on garden plots and vegetation. The new shadow would fall earlier than the garden's posted hours of operation and would fall outside the growing season, and thus would not alter the vitality of the vegetation within the resource. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

March 21/September 21 (see **Figure 6-30**): At 7:36 AM, on the beginning of the analysis day, new shadow would fall on the portion of Harlem Grown East closest to West 134th Street. Over the subsequent 34 minutes, the new shadow would gradually decrease in extent before exiting the resource completely at 8:10 AM. During this timeframe, new shadow would be cast on benches, garden plots, and vegetation. The new shadow would fall earlier than the garden's posted hours of operation, and the affected area of the garden would continue to receive between 4 and 6 hours of direct sunlight throughout the day, a quantity sufficient to support a variety of plant life. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

HARLEM GROWN GARDENS WEST

Harlem Grown Gardens West is an approximately 0.14-acre community garden located on West 134th Street, midblock between Lenox Avenue and Adam Clayton Powell Boulevard. This resource includes garden plots, tree canopy, flowering plants, and seating areas. In the With Action (2026) scenario, Harlem Grown Gardens West would be cast in new shadow on one of the four analysis days.

March 21/September 21 (see **Figure 6-31**): At 7:55 AM, new shadow would enter Harlem Grown Gardens West near its entrance. Over the subsequent 15 minutes, the new shadow would gradually decrease in extent before exiting the resource completely at 8:10 AM. During this timeframe, new shadow would be cast on benches, garden plots, and vegetation within the resource.

The new shadow would fall earlier than the garden's posted hours of operation. The affected area of the garden would continue to receive approximately 3 hours of direct sunlight throughout the day, less than the quantity sufficient to support a variety of plant life according to the *CEQR Technical Manual*, but not significantly reduced from the No Action condition. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

HARLEM VALLEY COMMUNITY GARDEN

The Harlem Valley Community Garden is located on 134th Street between Malcolm X and Adam Clayton Powell Boulevards. This resource include gardens and seating areas. In the With Action (2026) scenario, the Harlem Valley Community Garden would be cast in new shadow on one of the four analysis days.

December 21 (see **Figure 6-32**): At 9:10 AM, new shadow would begin to cross a small portion of Harlem Valley Community Garden. Over the subsequent 15 minutes, the new shadow would gradually decrease in extent before exiting the resource completely at 9:25 AM. During this timeframe, new shadow would be cast on vegetation.

The new shadow would be of short duration, would fall earlier than the garden's posted hours of operation, and would fall outside the growing season, and thus would not alter the vitality of the vegetation within the resource. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

MARGRICHANTIE GARDEN

Margrichantie Garden is located at 155-159 West 133rd Street. This resource includes plantings and seating areas. In the With Action (2026) scenario, Margrichantie Garden would be cast in new shadow on one of the four analysis days.

December 21(see **Figure 6-33**): At 8:51 AM, on the beginning of the analysis day, new shadow would fall on a small portion of Margrichantie Garden. Over the subsequent approximately 15 minutes, the new shadow would gradually decrease in extent before exiting the resource completely at 9:05 AM. During this timeframe, new shadow would be cast on vegetation within the resource. The new shadow would be of short duration, would fall earlier than the garden's posted hours of operation, and would fall outside the growing season and thus would not alter the vitality of the vegetation within the resource. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

SEVENTH AVENUE CENTER PLOTS

The Seventh Avenue Center Plots are Greenstreets areas located in the median of Adam Clayton Powell Boulevard, between West 134th and West 135th Streets. The plots contain bushes and trees. In the With Action (2026) scenario, the Seventh Avenue Center Plots would be cast in new shadow on one of the four analysis days.

December 21 (see **Figure 6-34**): At 8:51 AM, at the beginning on December 21 analysis day, new shadow would fall on the Seventh Avenue Center Plots in the vicinity of West 134th Street and Seventh Avenue. After 15 minutes, at 9:05 AM, the new shadow would move off the resource for the remainder of the analysis day. The new shadow would be of short duration, the portion of the resource affected by new shadow does not include benches and does not support passive or active recreational uses. The new shadow would fall outside the growing season and thus would not alter the vitality of the vegetation. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

*FRIENDSHIP BAPTIST CHURCH (SEE **FIGURE 6-36**)*

Friendship Baptist Church is an historic resource located at 144 West 131st Street, within the Central Harlem West 130th-132nd Street Historic District, which was recently designated by the

New York City Landmarks Preservation Commission (see Chapter 7, "Historic and Cultural Resources"). The sunlight-sensitive features of this resource are the stained-glass windows on its façades.

In the With Action (2026) scenario, the stained-glass windows of Friendship Baptist Church would be cast in new shadow on one of the four analysis days. Beginning at 6:27 AM on the May 6/August 6 analysis day, new shadow would fall on the stained-glass windows located on the church's east façade. New shadow would remain on the windows for less than 10 minutes until 6:35 AM, before moving off the church completely for the remainder of the day. According to the *CEQR Technical Manual*, an incremental shadow is not considered significant when its duration is shorter than 10 minutes at any time of year and the resource continues to receive substantial direct sunlight.

The affected stained-glass windows of this resource would be in direct sunlight for at least 6 of the remaining hours in the analysis day. Therefore, the project-generated shadow on this analysis day would not cause a significant adverse impact to this resource.

*HOWARD BENNETT PLAYGROUND (SEE **FIGURES 6-11 THROUGH 6-24**)*

Howard Bennett Playground (P.S. 197 Playground) is an approximately 1.23-acre public open space located adjacent to P.S. 197 at 2230 Fifth Avenue and directly north of the rezoning area, on the block bounded by Fifth Avenue, Malcom X Boulevard, West 135th Street, and West 136th Street. Sunlight-sensitive features within the resource include basketball courts (large and small), tennis courts (large and small), handball courts, spray showers, and playgrounds.

In the With Action (2026) scenario, Howard Bennett Playground would be cast in new shadow on all four analysis days.

December 21 (see **Figures 6-11 through 6-13**): New shadow would fall on Howard Bennett Playground for the entirety of the analysis day. At the beginning of the analysis day, new shadow would be cast solely on the benches and vegetation located in the southwest corner of the resource. The extent of new shadow on this resource would move east and gradually increase through the afternoon, eventually covering approximately three-quarters of the playground, including the tennis and handball courts, and some of its vegetation.

On the December 21 analysis day, in the No Action scenario, the majority of the playground would receive over 5 hours of direct sunlight. In the With Action (2026) scenario, new shadow would be cast on the playground for the entirety of the analysis day. Court areas that receive at least 3.5 hours of direct sunlight in the No Action scenario would receive no more than 1 hour of direct sunlight in the With Action (2026) scenario, and some court areas would receive no direct sunlight. The large tennis courts located in the center of the playground, which receive at least 5 hours of direct sunlight in the No Action scenario, would receive 1 to 3 hours of direct sunlight in the With Action (2026) scenario. Shadows cast in December fall outside of the growing season and thus would not affect vegetation growth. However, the reduction in direct sunlight on the benches, and athletic courts of Howard Bennett Playground would be substantial enough to affect the use of this resource. Therefore, project-generated shadow would result in a significant adverse impact on this resource on the December 21 analysis day.

March 21/September 21 (see **Figures 6-14 through 6-16**): Beginning at 10:15 AM, new shadow would enter the playground from the south, falling on the basketball and handball courts along the resource's southern boundary. The extent of the new shadow would gradually increase over the next several hours until 2:30 PM, when the new shadow would cover nearly half of the park area

including the majority of the athletic courts. Shadow would remain on the resource until the end of the analysis day at 4:29 PM for a total duration of over 6 hours. During this time frame, new shadow would fall on all but the extreme northwest corner of the park; however, the majority of the affected area would not be cast in new shadow for more than 1 hour and 45 minutes and thus would not experience a substantial reduction in direct sunlight. Nearly all of the playground, the large and small tennis courts, and surrounding benches would be in direct sunlight for over 6 hours; the majority of the remaining court area would receive over 5 hours of direct sunlight. All vegetation in the park would continue to receive at least 4 hours of direct sunlight, and the vegetation in approximately half the park area would receive over 6½ hours of direct sunlight. Given the remaining direct sunlight on the resource's vegetation, benches, playground, and courts, the project-generated shadow on this analysis day would not result in a significant adverse impact to this resource.

May 6/August 6 (see **Figures 6-17 and 6-18**): Beginning at 12:05 PM, new shadow would enter Howard Bennett Playground from the south, falling on benches and the basketball court immediately adjacent to West 135th Street. The extent of new shadow would gradually expand over the next several hours until 4:50 PM, when it would cover nearly half of the park area, including the small courts in totality and all of the remaining large courts partially. Shadow would remain on the resource until the end of the analysis day at 5:18 PM, for a total duration of over 5 hours. During this timeframe, new shadow would fall on most park features located within 75 feet of West 135th Street. The majority of this area, however, would be cast in new shadow for no more than 1 hour. The handball courts and surrounding trees closest to West 135th Street would experience the longest duration of new shadow, up to 3 hours on the area immediately adjacent to West 135th Street.

In the No Action scenario, the majority of the playground would receive over 10 hours of direct sunlight on this analysis day; while new shadow would be cast on portions of the playground for over 5 hours in the With Action (2026) scenario, the majority of the playground would still receive over 9 hours of direct sunlight. The handball courts, which would experience the longest durations of new shadow during this analysis day, would continue to receive over 8 hours of direct sunlight on the majority of their area. Thus, the playground's features would not experience a substantial reduction in direct sunlight. All vegetation located within the playground would continue to receive over 7 hours of direct sunlight. Given the remaining direct sunlight on the resource's vegetation and features, the project-generated shadow on this analysis day would not result in a significant adverse impact to this resource.

June 21 (see **Figures 6-19 and 6-20**): Beginning at 1:15 PM, new shadow would enter Howard Bennett Playground from the south, falling on the large basketball court. The extent of the new shadow would gradually increase over the next several hours until 5:10 PM, when new shadow would cover just over a quarter of the playground area, including nearly all of the large basketball court and handball courts. The extent of new shadow would then decrease gradually, but remain on the resource until the end of the analysis day at 5:18 PM, for a total duration of over 4 hours. During this timeframe, new shadow would fall on the sunlight-sensitive features located in nearly three-quarters of the park's area. The majority of this area, however, would be cast in no more than 45 minutes of new shadow. The handball courts and surrounding trees closest to West 135th Street would experience the longest duration of new shadow, up to 3 hours on the area immediately adjacent to West 135th Street. In the No Action scenario, the majority of the playground would receive over 10 hours of direct sunlight; while new shadow would be cast on portions of the playground for over 5 hours in the With Action (2026) scenario on this analysis day, the majority of the playground would still receive over 9 hours of direct sunlight. The handball courts, which

would experience the longest durations of new shadow during this analysis day, would continue to receive over 8 hours of direct sunlight on the majority of their area. Thus, the playground's features would not experience a substantial reduction in direct sunlight. All vegetation located within the playground would continue to receive over 7 hours of direct sunlight. Given the remaining direct sunlight on the resource's vegetation and features, the project-generated shadow on this analysis day would not result in a significant adverse impact to this resource.

PROJECT-GENERATED OPEN SPACE

As described in Chapter 1, "Project Description," the proposed actions would result in the creation of new open space within the proposed development site. This open space is likely to serve as a flexible use space for residents that is also anticipated to provide for active recreation. The open space is anticipated to include a central lawn and as well as several "pocket parks." The areas in between the surface parking on the proposed development site are expected to be landscaped with new trees interlaced with existing mature specimen trees. New pedestrian pathways are envisioned between low walls, creating paths between buildings. The remaining open areas are expected to be enhanced with a variety functions, including both recreational and passive for quiet relaxation.

As described above, project-generated open spaces are not considered sunlight-sensitive resources under CEQR guidelines; however, information on project-generated shadow is provided here for disclosure purposes.

The project-generated open space would receive the longest duration of direct sunlight in the mid-spring through mid-summer, when portions of the potential central lawn would receive up to 10 hours of direct sunlight per day. The potential "pocket parks" along Fifth Avenue would also receive substantial direct sunlight of up to 9 hours a day. The pocket parks to the north would be partially shaded, receiving, at most, 6 hours of direct sunlight a day. The most shaded areas of the project-generated open space would surround the beginning and end of the potential pedestrian pathway where it follows a path between existing and proposed buildings, The open space and vegetation in these areas would receive as little as 2 hours of direct sunlight throughout the day.

Throughout the early spring and late summer, portions of the potential central lawn would receive up to 8 hours of direct sunlight. The potential "pocket parks" would be partially shaded, with most areas being in direct sunlight for approximately half the day. Areas surrounding the potential pedestrian pathway would be the most shaded, with the majority of these areas receiving no more than 4 hours of direct sunlight within a day.

In December, when the day's length is at its shortest, only discrete areas of the potential pedestrian pathway and the portions of the potential "pocket parks" immediately adjacent to Lenox Avenue would receive more than 3 hours of direct sunlight. The majority of project-generated open space would receive less than 2 hours of direct sunlight. However, the shadow in in December would fall outside the growing season and thus would not alter the vitality of the vegetation within the project-generated open space.

NON-SUNLIGHT SENSITIVE RESOURCES

In addition to the resources detailed above, two additional resources were reviewed qualitatively. These are the Lincoln Houses Recreation Areas and P.S. 197 Harlem Grown. As described above, these resources are not considered sunlight-sensitive resources under CEQR guidelines; however, information on them is provided here for disclosure purposes, in consideration of their adjacency to the rezoning area.

LINCOLN HOUSES RECREATION AREAS

The Lincoln Houses Recreation Areas are the open spaces within the Lincoln Houses NYCHA complex, located between Park and Fifth Avenues from East 132nd Street to East 135th Street. Features within the resource include benches, courts, and playgrounds. The recreation areas are intended for use by the residents of Lincoln Houses and are not considered publicly accessible.

In the With Action (2026) scenario, the Lincoln Houses Recreation Areas would be partially cast in new shadow in spring and summer afternoons. The majority of new shadow would fall on two playgrounds that are across Fifth Avenue from the rezoning area; both would be cast in new shadow for approximately 1 hour. On the longest days of the year in June, new shadow would also fall partially on the seating areas within Lincoln Houses located east of Madison Avenue. On these days, the seating areas would be cast in new shadow for no more than 25 minutes.

P.S. 197 HARLEM GROWN GARDEN

The P.S. 197 Harlem Grown Garden is located along West 135th Street between Howard Bennett Playground and P.S. 197. The community garden includes approximately six vegetable plots intended for use by the students of P.S. 197 and is not considered publicly accessible.

The P.S. 197 Harlem Grown Garden would be cast in new shadow on all days throughout the year. The largest reductions would occur in the winter, when vegetation planted in the garden does not require direct sunlight. By March 21/September 21, new shadow would restrict direct sunlight on the garden to a maximum of just over 3 hours. Further into the spring and summer, the quantity of direct sunlight received by the garden would gradually increase until June 21, when almost all of the garden would receive over 6 hours of direct sunlight per day.

CONCLUSION

The detailed shadow analysis determined that the proposed actions would result in new shadow on 10 sunlight-sensitive resources in the shadows study area. The majority of these new shadows would be limited in extent and duration and would typically only occur during some seasons. Therefore, no significant adverse shadows impacts would occur at 9 of the sunlight-sensitive resources.

Project-generated shadow would result in a significant adverse impact on one open space resource—Howard Bennett Playground—on the December 21 analysis day. In the With Action (2026) scenario, new shadow would be cast on the playground for the entirety of the December 21 analysis day. Court areas that receive at least 3½ hours of direct sunlight in the No Action scenario would receive no more than 1 hour of direct sunlight in the With Action (2026) scenario, and some court areas would receive no direct sunlight. The large tennis courts located in the center of the playground, which receive at least 5 hours of direct sunlight in the No Action scenario, would receive 1 to 3 hours of direct sunlight in the With Action (2026) scenario. Shadows cast in December fall outside of the growing season and thus would not affect vegetation growth; however, the reduction in direct sunlight on the benches and athletic courts of Howard Bennett Playground could be substantial enough to affect the use of this resource.

The modification in the site plan described in Chapter 1, "Project Description," and the Foreword to the FEIS and illustrated on Figure 1-5, would not increase building coverage or height at any location and consequently would not result in any shadows beyond those assessed in this chapter. Therefore, the modification to the site plan would not result in any additional shadow impacts. ✷