Chapter 6: Shadows

A. INTRODUCTION

Sunlight and shadows affect people and their use of open space all day long and throughout the year, although the effects vary by season. Sunlight supports vegetation and enhances architectural features, such as stained glass windows and carved detail on historic structures. Conversely, shadows can affect plant growth and the sustainability of landscape features and the visibility and architectural significance of building features.

This chapter examines whether the reasonable worst-case development scenario (RWCDS) for the proposed actions would cast new shadows on any sunlight-sensitive resources and assesses the possible effects of any such new shadows. Public open spaces, historic, cultural, and natural resources are all potentially sunlight-sensitive resources, and, therefore, this chapter is closely linked to the information presented in other sections of this Final ~~Draft~~ Generic Environmental Impact Statement (~~D~~FGEIS), such as Chapter 5, "Open Space" and Chapter 7, "Historic and Cultural Resources."

According to the *City Environmental Quality Review* (*CEQR) Technical Manual* (January 2012 edition), a shadows assessment is required if a proposed project would result in structures (or additions to existing structures) of 50 feet or more, or be located adjacent to, or across the street from, a sunlight-sensitive resource. As described in Chapter 1, "Project Description," the RWCDS for the proposed actions would consist of new buildings on 9 sites with maximum heights that range from 80 feet to 315 feet (including the rooftop mechanical). Therefore, a shadows assessment was conducted for the proposed actions.

PRINCIPAL CONCLUSIONS

To ensure a conservative shadow analysis, the maximum zoning envelope was used for each of the nine sites that would be redeveloped with new structures. The ultimate development as constructed on each site would be subject to the results of the environmental review, the results of developer(s)' response(s) to a Request for Proposal (RFP) process, and further discussion with stakeholders, among other factors. Each of the zoning envelopes is larger in terms of height, massing, tower locations, and floor area than what could ultimately be built on each development site to allow for flexibility of design, and consequently the actual developments would cast smaller shadows than what would be cast by the maximum zoning envelopes analyzed in the shadow assessment.

Three of the Schiff Mall medians, which are located along the center of Delancey Street between Ludlow and Suffolk Streets and contain rose bushes and other plantings, could experience large extents and durations of incremental shadow during the months of the growing season that would potentially affect the rose bushes' viability, particularly in March and September when the overall length of the day, and therefore the available sunlight, is shorter. However, from early May through mid-August, these medians would receive seven hours or more of direct sun.

Therefore, the plantings other than the rose bushes would not be significantly affected by the project-generated shadow. The buildings that would actually be developed on Sites 1, 2, 3, and 4 would not be as large or bulky as the maximum zoning envelopes analyzed in this conservative study, and so the actual extent and duration of incremental shadow would likely be less than what is described here, and the roses may not actually be impacted. Therefore, if a tower is constructed on these sites that would impact the roses, and the roses are still there at the time of construction, then the roses would be replaced with shade tolerant plantings as part of the project.

The P.S. 142 Playground on Delancey Street would experience a little over an hour of new shadow from the proposed actions in the late spring and summer seasons, but it would occur late in the afternoons and would not cause significant adverse impacts. Several other sun-sensitive resources in the study area would receive short durations of incremental shadow and would not be adversely impacted by the proposed actions.

The proposed publicly accessible open space on Site 5 would also experience project-generated shadow. The open space, which would be located on the Broome Street side of Site 5, would experience substantial project-generated shadow throughout the year. This analysis is conservative as it is based on the maximum zoning envelope, which could not be fully built based on the requirements of the Large Scale General Development (LSGD) approvals. The actual development on the site would be smaller than the maximum zoning envelope and would likely result in slightly less shadows on the proposed open space in the late spring and summer. However, pursuant to CEQR, shadows cast on the project's proposed open space are not considered significant.

B. DEFINITIONS AND METHODOLOGY

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:

- *Public open space* (e.g., parks, beaches, playgrounds, plazas, schoolyards, greenways, 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 water bodies, wetlands, or designated resources such as coastal fish and wildlife habitats.

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

- *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).
- *Project-generated open space.* Project-generated open space cannot experience a significant adverse shadow impact from a 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*, a preliminary screening assessment must first be conducted to ascertain whether a project's shadow 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 a simple radius around the proposed project that represents the longest shadow that could be cast. If there are sunlight-sensitive resources within this radius, the analysis proceeds to the second tier, which reduces the area that could be affected by project shadow by accounting for the fact that shadows can never be cast between a certain range of angles south of the project site 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 looking at specific representative days of the year and determining the maximum extent of shadow over the course of each representative day.

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 project, taking into account existing buildings and their shadows. The detailed analysis provides the data needed to assess the shadow impacts. The effects of the new shadows 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.

To ensure a conservative analysis, the maximum zoning envelope was used for each of the nine sites and is shown on the analysis figures. As described in Chapter 1, "Project Description" and Chapter 8, "Urban Design and Visual Resources," this ~~D~~DEGEIS analyzes a RWCDS for the proposed actions for which an illustrative massing has been prepared. The ultimate development as constructed on each site would be subject to the results of the environmental review, the results of developer(s)' response(s) to an RFP, and further discussion with stakeholders, among other factors. Existing zoning and the proposed actions would establish maximum zoning envelopes for each site that would govern development. The maximum building envelope is the three-dimensional space on the zoning lot within which a structure can be built, as permitted by applicable height, setback, and yard controls. Each of the zoning envelopes is larger in terms of height, massing, tower locations, and floor area than what could ultimately be built on each

development site to allow for flexibility of design, and they consequently would cast larger shadows than what would be cast by the actual developments.

C. PRELIMINARY SCREENING ASSESSMENT

A base map was developed showing the location of the project site and the surrounding street layout (see **Figure 6-1**). In coordination with the information regarding open space and historic and cultural resources presented in other sections of this ~~D~~FGEIS, potentially sunlight-sensitive resources were identified and shown on the map.[1]

TIER 1 SCREENING ASSESSMENT

For the Tier 1 assessment, the longest shadow that the maximum zoning envelope on each of the nine development sites could cast is calculated, and using this length as the radius, a perimeter is drawn around each site. Anything outside this perimeter, which represents the longest possible shadow, could never be affected by project-generated shadow, while anything inside the perimeter needs additional assessment.

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 4.27 times the height of the structure.

Table 6-1 summarizes the maximum height of each of the zoning envelopes for the nine developments sites and, multiplying each height by 4.27, the longest possible shadow in feet that each maximum zoning envelope could cast.

Table 6-1
Heights and Maximum Shadow Lengths of the Development Sites

Development Site	Maximum Height[1] (in Feet)	Maximum Shadow Length Factor	Longest Shadow (in Feet)
Site 1	190’	4.27	811’
Site 2	315’	4.27	1,345’
Site 3	190’	4.27	811’
Site 4	290’	4.27	1,238’
Site 5	190’	4.27	811’
Site 6	190’	4.27	811’
Site 8	80’	4.27	342’
Site 9	80’	4.27	342’
Site 10	80’	4.27	342’

Notes: Height represents height of maximum tower envelope from curb level. Longest shadow occurs on December 21 at start of analysis day. As described in Chapter 1, “Project Description,” Site 7 would not be redeveloped pursuant to the proposed actions and is, therefore, not included in this analysis.
[1] This height includes rooftop mechanical space.

[1] Although the Beth Hamedrath Hagodol Synagogue—which is a New York City Landmark (NYCL) and State and National Register-listed (S/NR) property—is located on the east side of Norfolk Street between Broome and Grand Streets adjacent to Sites 2-5, it was not included in this study, because its pointed-arch windows on the north and south façades are plain rather than stained glass and are, therefore, not considered sunlight-dependent architectural features per CEQR methodology. The west (front) façade faces away from the project and the east (rear) façade does not have windows.

Using the longest shadow distance as a radius, a perimeter was drawn around each site (see **Figure 6-1**). Since a number of sun-sensitive resources lie within the combined perimeter or longest shadow study area, the next tier of screening assessment was conducted.

TIER 2 SCREENING ASSESSMENT

Because of the path that the sun travels across the sky in the northern hemisphere, no shadow can be cast in a triangular area south of any given project site. In New York City this area lies between -108 and +108 degrees from true north. **Figure 6-2** illustrates this triangular area south of the project site. The complementing area to the north within the combined longest shadow study area represents the remaining area that could potentially experience new project-generated shadow.

A number of public open spaces are located within the remaining shadow study area, as shown in **Figure 6-2** and listed in **Table 6-2**.

Table 6-2
Public Open Spaces in Longest Shadow Study Area

Map Key	Open Spaces
1	William H. Seward Park
2	William H. Seward HS Fields/Courts
3	45 Allen St. (NYCHA)
4	Allen Malls
5	Sara Roosevelt Park
6	Schiff Mall
7	ABC Playground (near P.S. 20)
8	The Dorothy Strelsin Memorial Garden
9	Community Of Poor People In Action Garden
10	Nathan Straus Playground
11	Gompers Houses Playgrounds (NYCHA)
12	P.S. 142 Playground
13	150 Broome St. (NYCHA)
14	Bernard Downing/Luther Gulick Playground
15	Henry Street Settlement Abrons Art Center

In addition, a number of historic resources with sunlight-sensitive features are located within the remaining shadow study area. All of these resources are either churches or synagogues, and any large, decorative windows that are visible from within sanctuaries or other publicly-accessible rooms in these historic buildings are considered sun-sensitive features and must be assessed for shadows. Therefore additional assessment was undertaken to determine which facades contained sun-sensitive features, and further, whether these facades were oriented toward any of the project sites and could potentially receive project-generated shadow, or whether they faced away from the project sites.

Figure 6-3 shows the relationship between the project site and the historic resources in the longest shadow study area, and indicates which facades of the historic buildings have sun-sensitive features.

Shadows from Sites 1 and 2 would be long enough to reach the **Kehila Kadosha Janina Synagogue** (NYCL, S/NR) on Broome Street between Allen and Eldridge Streets (see **Figure 6–1**); however, these two sites are located too far north to cast shadow on the front/south facade of the synagogue. Site 5 would be the only site located far enough south to cast shadows on the

front facade of this synagogue, but the maximum envelope proposed for that site would not cast a shadow long enough to reach it.

The front/west façade of the **Anshe Chesed Synagogue** (NYCL) on Norfolk Street between Stanton and East Houston Streets has large decorative windows. Only shadows from Sites 2 and 10 could potentially be long enough to reach this façade (see **Figure 6-1**). Additional assessment of potential shadow effects is therefore necessary.

The front façade of the **Stanton Street Shul** (NR), between Clinton and Attorney Streets, contains stained-glass windows, and faces south towards the project site (see **Figure 6-3**). Shadows from Sites 2 and 4 could be potentially long enough to reach it (see **Figure 6-1**), and therefore further analysis of this resource is necessary.

The front façade of **Our Lady of Sorrows Church** (NYCL-eligible), located on Pitt Street between Stanton and Rivington Streets, faces east, away from the project sites. The front façade is the only façade that has sun-sensitive features, and therefore no further analysis of this resource is necessary.

St. Mary's Church (which is a potential historic resource) is located on Grand Street a block east of Site 5 and has large decorative windows on its west, south and east facades. The south and east facades face away from the project site but the west façade faces towards Site 5 and requires additional analysis. The other sites are too far north to cast shadow on the west façade of this church (see **Figure 6-3).**

The **Bialystoker Synagogue** (NYCL) is located on Bialystoker Place between Delancey and Grand Streets. It has decorative windows on all four facades; however only its west façade faces the project site. Site 5 is the only development site located far enough south to potentially cast shadow on the Synagogue (see **Figure 6-3**), but as **Figure 6-1** shows, shadow from the maximum zoning envelope on Site 5 would not be long enough to reach it. Therefore no further analysis of this resource is warranted.

In summary, the following historic resources have sun-sensitive features that need further assessment: **Anshe Chesed Synagogue** (west façade), **Stanton Street Shul** (south façade), and **St. Mary's Church** (west façade).

TIER 3 SCREENING ASSESSMENT

The direction and length of shadows vary throughout the course of the day and also differ depending on the season. In order to determine when project-generated shadow could fall on a sunlight-sensitive resource, three-dimensional computer mapping software is used in the Tier 3 assessment to calculate and display the proposed project's shadows on individual representative days of the year.

REPRESENTATIVE DAYS FOR ANALYSIS

Shadows on the summer solstice (June 21), winter solstice (December 21) and spring and fall equinoxes (March 21 and September 21, which are approximately the same in terms of shadow patterns) 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, generally 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

The shadow assessment considers shadows occurring between one and a half hours after sunrise and one and a half hours before sunset. At times earlier or later than this timeframe window of analysis, the sun is down near the horizon and the sun's rays reach the Earth at tangential angles, diminishing the amount of solar energy and producing shadows that are long, move fast, and generally blend with shadows from existing structures until the sun reaches the horizon and sets. Consequently, shadows occurring outside the timeframe window of analysis are not considered significant under CEQR, and their assessment is not required.

TIER 3 SCREENING ASSESSMENT RESULTS

The Tier 3 screening assessment analyzed each of the nine sites individually on the four different analysis days. The results are summarized in this section by site and then by resource. As noted above, the assessment analyzed shadows from the maximum zoning envelope for each of the nine development sites.

It is important to note that the Tier 3 assessment considered the maximum zoning envelope for each site and the potential shadow effects on sun-sensitive resources without considering intervening buildings. The purpose of the Tier 3 assessment is to identify where the potential for incremental shadow could occur, to be further analyzed in a more detailed analysis that includes intervening and surrounding buildings.

Site 1 (Figure 6-4)

Site 1 is the westernmost of the sites. The shadow from the maximum zoning envelope on Site 1 would be long enough to reach sections of the Allen Street Malls on all four analysis days. The shadow could also reach portions of Schiff Mall on Delancey Street on the March/September and December analysis days, but not on the May/August and June analysis days when shadows are short when cast northward in the middle of the day. No other sun-sensitive resources would be affected by shadow from the maximum zoning envelope on Site 1. (On March 21/September 21, the shadow would be just long enough to reach the footprint of Kehila Kadosha Janina Synagogue on Broome Street at the start of the analysis day, but the shadow would not fall on the front/south façade where the decorative window is located.)

Site 2 (Figure 6-5)

The maximum zoning envelope on Site 2 is the tallest of the zoning envelopes. Its shadow would be long enough to reach the Allen Malls on all four analysis days, and the Schiff Mall on Delancey Street on all four analysis days. In addition, at the end of the May/August analysis day, shadow from the maximum zoning envelope could reach the P.S. 142 Playground several blocks to the east; at the start of the June 21 analysis day it would fall just far enough to the southwest to reach the NYCHA-owned public open space at 45 Allen Street; at the end of the June 21 analysis day it would fall far enough to the southeast to reach the NYCHA-owned public open space at 150 Broome Street; and on December 21, again at the end of the analysis period, it would be long enough to reach the Dorothy Strelsin Memorial Garden several blocks to the northeast. On March 21/September 21, shadow from Site 2 would be long enough to reach the footprint of Kehila Kadosha Janina Synagogue on Broome Street at the start of the analysis day, but the shadow would not fall on the front/south façade where the decorative window is located.

Site 3 (Figure 6-6)

The Tier 3 assessment showed that shadow from the maximum zoning envelope on Site 3 could reach the Schiff Mall on Delancey Street on three of the four analysis days, excepting only June 21. At the end of the June 21 analysis day, the shadow could fall far enough east to reach the NYCHA-owned 150 Broome Street space.

Site 4 (Figure 6-7)

Shadow from the maximum zoning envelope on Site 4 could reach the Schiff Mall on Delancey Street on the March 21/September 21 and December 21 analysis days, but would be too short to reach it on the late spring and summer analysis days. Shadow from the maximum zoning envelope on Site 4 could reach the P.S. 142 Playground in the late afternoon of the March/September and May/August analysis days, although on the May 6/August 6 it would only reach a short distance across the southern edges of the space. On the May/August and June analysis days, the shadow could reach the NYCHA-owned 150 Broome Street space in the afternoons. On the June 21 analysis day only, the shadow could reach all the way to a small section of the Luther Gulick Playground at the end of the analysis day, likely for only a few minutes. Finally, on December 21, shadow from the maximum zoning envelope on Site 4 could reach the Nathan Straus Playground toward the end of the analysis day. It would come close, but would not reach, either the Community of Poor People in Action Garden or the front/south façade of the Stanton Street Shul.

Site 5 (Figures 6-8)

Shadow from Site 5 could reach the NYCHA-owned space at 150 Broome Street in the late afternoons of the March/September and May/August analysis days. Shadow from Site 5 could also reach far enough south to fall on a small portion of the Seward Park High School fields and ball courts early on the June 21 mornings. Finally, shadow from Site 5 could potentially reach the east façade of St. Mary's Church at the end of the June 21 analysis day.

Site 6 (Figure 6-9)

Site 6 is the westernmost of the development sites. Shadow from the maximum zoning envelope could reach the P.S. 142 Playground on the March/September and December analysis days and the 150 Broome Street space on the March/September, May/August, and June analysis days. It would also reach the Schiff Mall on Delancey Street on the December 21 day only. Shadow from the maximum zoning envelope would come close but not fall on the southeast corner of the Nathan Straus Playground in the final few minutes of the December 21 analysis day.

Site 8 (Figure 6-10)

Shadow from Site 8 would not reach any sun-sensitive resources at any time of year.

Site 9 (Figure 6-11)

Shadow from Site 9 could reach a portion of Schiff Mall on Delancey Street early on the May 6/August 6 and June 21 analysis days, and would not reach any other sun-sensitive resource at any time.

Site 10 (Figure 6-12)

Shadow from Site 10 would not reach any sun-sensitive resources at any time of year.

Summary of Tier 3 Assessment by Resource

The Tier 3 assessment showed that the following four open space resources could be affected by project-generated shadow on multiple analysis days, by multiple sites: portions of the Allen Street Malls, portions of the Schiff Mall on Delancey Street, the P.S. 142 Playground, and the NYCHA-owned space at 150 Broome Street.

The Seward Park High School ball fields and courts could be reached by shadow from the maximum zoning envelope on Site 5 early on the May/August and June analysis mornings.

The following open space resources could be affected on only a single analysis day, by a single site: the NYCHA-owned 45 Allen Street space, the Dorothy Strelsin Memorial Garden, Gulick Playground, and Nathan Straus Playground.

Finally, the east façade of St. Mary's Church could potentially be reached by shadow from the maximum zoning envelope on Site 5 late on the June 21 analysis day only.

For all of these sun-sensitive resources, the Tier 3 assessment did not eliminate the possibility that new shadows could occur, and therefore additional analysis was required.

The Tier 3 assessment concluded that the following open space resources from the Tier 1/Tier 2 assessment could not be affected by project shadow at any time and required no further analysis: Seward Park, Sara Roosevelt Park, ABC Playground (P.S. 20), the Gompers Houses playgrounds (NYCHA), and the Henry Street Settlement Abrons Art Center. The following historic resources were also eliminated by the Tier 3 assessment from further analysis: Anshe Chesed Synagogue, Stanton Street Shul, Kehila Kadosha Synagogue, and Bialystoker Synagogue.

D. DETAILED SHADOW ANALYSIS

The purpose of the detailed analysis is to determine the extent and duration of new incremental shadows that fall on a sunlight-sensitive resource as a result of the proposed project, and to assess their effects. The detailed analysis establishes a baseline condition (future No Action) that is compared to the future condition resulting from the proposed project to illustrate the shadows cast by existing (or future planned) buildings and distinguish the additional (incremental) shadow cast by the project. Because existing buildings may already cast shadows on a sun-sensitive resource, the proposed project may not result in additional, or incremental, shadows upon that resource.

In order to carry out the detailed shadow analysis, the three-dimensional computer model used for the Tier 3 screening assessment was augmented by adding the existing buildings in the study area and relevant No Action developments. A combination of data sources was used to develop the three-dimensional existing structures, including NYC DoITT GIS data, Fugro EarthData Inc., and the project applicant. Figure 6-13 shows views of the computer model used in the detailed analysis. Shadow analyses were performed for each of the representative days and analysis periods indicated in the Tier 3 assessment.

The analysis results are described below for each analysis day. **Table 6-3** summarizes the results of the detailed analysis. It shows the entry and exit times and total duration of project-generated incremental shadow on each affected resource. **Figures 6-14** through **6-40** document the results of the analysis by providing graphic representations or "snapshots" of times when incremental shadow would fall on a sun-sensitive resource. The figures illustrate the extent of additional, incremental shadow at that moment in time, highlighted in red, and also show existing shadow and remaining areas of sunlight.

Table 6-3
Incremental Shadow Durations

Sun-sensitive resources	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	December 21 8:51 AM-2:53 PM
Seward Park High School ball fields/courts	—	6:27 AM–6:45 AM Total: 18 min	5:57 AM–6:20 AM Total: 23 min	—
Allen Street Malls	—	6:35 AM–6:45 AM Total: 10 min	5:57 AM–6:10 AM Total: 13 min	8:51 AM–9:30 AM Total: 39 min
Schiff Mall (Delancey St between Orchard & Ludlow Sts)	9:00 AM–10:00 AM **Total: 1 hr**	—	5:57 AM–7:20 AM **Total: 1 hr 23 min**	8:51 AM–9:00 AM 9:20 AM–12:20 PM **Total: 3 hr 9 min**
Schiff Mall (Delancey St between Ludlow & Essex Sts)	9:10 AM–12:00 PM 1:10 PM–3:30 PM **Total: 5 hr 10 min**	6:27 AM–6:30 AM 10:40 AM–11:20 AM Total: 43 min	—	8:51 AM–11:40 AM 12:20 PM–2:20 PM **Total: 4 hr 49 min**
Schiff Mall (Delancey St between Essex & Norfolk Sts)	10:20 AM–4:29 PM **Total: 6 hr 9 min**	10:40 AM–3:50 PM **Total: 5 hr 10 min**	11:40 AM–3:20 PM **Total: 3 hr 40 min**	8:51 AM–2:53 PM **Total: 6 hr 2 min**
Schiff Mall (Delancey St between Norfolk & Suffolk Sts)	9:40 AM–4:29 PM **Total: 6 hr 49 min**	1:30 PM–5:18 PM **Total: 3 hr 48 min**	1:30 PM–5:10 PM **Total: 3 hr 40 min**	8:51 AM–2:53 PM **Total: 6 hr 2 min**
Nathan Straus Playground	—	—	—	2:20 PM–2:53 PM Total: 33 min
P.S. 142 Playground	3:20 PM–4:29 PM **Total: 1 hr 9 min**	3:50 PM–4:50 PM 5:00 PM–5:18 PM **Total: 1 hr 18 min**	—	2:30 PM–2:53 PM Total: 23 min
150 Broome Street (NYCHA)	4:00 PM–4:29 PM Total: 29 min	4:20 PM–5:18 PM Total: 58 min	—	—
Luther Gulick Playground	—	—	5:59 PM–6:01 PM Total: 2 min	—

Notes: Table indicates entry and exit times and total duration of incremental shadow for each sunlight-sensitive resource. Daylight saving time is not used.

MARCH 21/SEPTEMBER 21

MORNING

The Allen Street Mall between Delancey Street and Broome Street is in existing shadow from buildings to its immediate east during the first half-hour of this analysis day when project-generated shadow would otherwise fall there. No incremental shadow would therefore occur on the Allen Street Malls on this analysis day.

Incremental shadow from the maximum zoning envelope on Site 2 would move across the Schiff Mall on Delancey Street between Orchard and Ludlow Streets from 9:00 AM to 10:00 AM (see **Figure 6-14**), and across the adjacent Mall between Ludlow and Essex Streets from 9:10 AM to 12:00 PM (see **Figures 6-14, 6-15,** and **6-16**).

MORNING/AFTERNOON

Incremental shadow from the maximum zoning envelopes on Sites 2, 3 and 4 would move across the Schiff Mall median on Delancey Street between Norfolk and Suffolk Streets from 9:40 AM to the end of the analysis day at 4:29 PM, shading large portions of the median for

much of this period (see **Figures 6-15 to 6-20**). Incremental shadow primarily from the maximum zoning envelopes on Sites 1 and 2 would move across the Schiff Mall median between Essex and Norfolk Streets from 10:20 AM until 4:29 PM, shading large portions of the median for much of this period (see **Figures 6-15 to 6-20**).

AFTERNOON

A small shadow from the top portion of the maximum zoning envelope on Site 1 would enter the Schiff Mall median between Ludlow and Essex Streets at 1:10 PM and move across it, exiting at 3:30 PM (see **Figure 6-17**).

The P.S. 142 Playground would be mostly or completely in direct sun from morning to mid-afternoon. At 3:20 PM, shadow from the maximum zoning envelope on Site 4 would enter the west side of the Playground, and 10 minutes later at 3:30 PM shadow from the maximum zoning envelope on Site 6 would enter from the south (see **Figure 6-19**). Project-generated shadow would spread eastward, shading much of the Playground by 3:50 PM and eliminating all remaining sunlight from 4:10 PM to 4:29 PM (see **Figure 6-20**).

Shadow from the maximum zoning envelope on Site 5 would enter the NYCHA-owned open space at 150 Broome Street at 4:00 PM and move across it during the last 29 minutes of the analysis day (see **Figure 6-20**). This space would be mostly or totally in sun from morning to mid-afternoon, when existing shadows from the west and south would begin to cover large portions of it.

MAY 6/AUGUST 6

MORNING

The maximum zoning envelope on Site 9 would cast three minutes of new shadow on a small area of Schiff Mall on Delancey Street and Essex Street at the start of the analysis day.

The maximum zoning envelope on Site 5 would cast a small extent of incremental shadow of brief duration on the Seward Park High School ball fields and courts at the start of this analysis day, from 6:27 AM to 6:45 AM (see **Figure 6-21**).

The maximum zoning envelope on Site 1 would cast new shadow on a small area of the Allen Street Malls, just south of Broome Street, from 6:35 AM to 6:45 AM (see **Figure 6-21**). No other project-generated shadow would occur on the Allen Street Malls on this analysis day.

Shadow from the upper portion of the maximum zoning envelope on Site 2 would pass across a small section of the Schiff Mall between Essex and Ludlow Streets from 10:40 AM to 11:20 AM (see **Figure 6-22**).

MORNING/AFTERNOON

Shadow from the maximum zoning envelope on Site 2 would pass across the Schiff Mall median between Essex and Norfolk Streets from 10:40 AM to 3:50 PM, shading large portions of the median for much of this period (see **Figures 6-22 to 6-25**).

AFTERNOON

Incremental shadow primarily from the maximum zoning envelope on Site 2 would fall on the Schiff Mall median between Norfolk and Suffolk Streets from 1:30 PM to the end of the analysis day at 5:18 PM, shading large portions of the median for much of this period (see **Figures 6-23 to 6-27**).

Incremental shadow from the maximum zoning envelope on Site 4 would move across the southern edge of the P.S. 142 Playground between 3:50 PM and 4:50 PM, extending approximately 10 feet into the space at its greatest extent (see **Figure 6-26**). Shadow from the maximum zoning envelope on Site 2 would fall on portions of the Playground from 5:00 PM to 5:18 PM (see **Figure 6-27**).

The maximum zoning envelope on Site 5 would cast new shadow on the open space at 150 Broome Street beginning at 4:20 PM (see **Figure 6-26**); from 4:50 PM until the end of the analysis day at 5:18 PM, this shadow would eliminate the wedge of sunlight that would otherwise remain absent the proposed actions (see **Figure 6-27**).

JUNE 21

MORNING

The NYCHA-owned open space at 45 Allen Street would not receive any incremental shadow from the proposed actions, because it would be shaded by existing buildings when shadow from the maximum zoning envelope on Site 2 would otherwise fall there.

The maximum zoning envelope on Site 2 would cast a small incremental shadow on a section of the Allen Street Malls from 5:57 AM to 6:10 AM, falling in between existing shadows (see **Figure 6-28**).

The maximum zoning envelope on Site 5 would briefly cast incremental shadow on Seward Park High School's ball fields from 5:57 AM until 6:20 AM (see **Figure 6-28**).

The maximum zoning envelope on Site 9 would cast a small area of incremental shadow on the adjacent Schiff Mall median from 5:57 AM to 7:20 AM (see **Figures 6-28** and **6-29**).

MORNING/AFTERNOON

Shadow from the maximum zoning envelope on Site 2 would pass across the Schiff Mall median between Essex and Norfolk Streets from 11:40 AM to 3:20 PM (see **Figures 6-30 to 6-32**).

AFTERNOON

Shadow from the maximum zoning envelope on Site 2 would pass across the Schiff Mall median between Norfolk and Suffolk Streets from 1:30 PM to 5:10 PM (see **Figures 6-31 to 6-33**).

Shadow from the maximum zoning envelope on Site 4 would cast a small area of shadow on Luther Gulick Playground for the final two minutes of the analysis day.

The maximum zoning envelope on Site 5 would not cast incremental shadow on St. Mary's Church to the east, due to the 26-story intervening building at 410 Grand Street.

DECEMBER 21

MORNING

The maximum zoning envelope on Site 1 would cast a small area of incremental shadow on the Allen Street Mall just north of Delancey Street from 8:51 AM to 9:30 AM (see **Figure 6-34**).

MORNING/AFTERNOON

The maximum zoning envelopes on Sites 1, 2, 3 and 4 would cast new shadows on the four blocks of the Schiff Mall on Delancey Street between Orchard and Suffolk Streets. The westernmost of these medians would receive small areas of new shadow from 8:51 AM to 9:00 AM and then from 9:20 AM to 12:20 PM from the maximum zoning envelope on Site 1 (see **Figures 6-34 to 6-37**). The median between Ludlow and Essex Streets would receive new shadows of varying but occasionally large extents between 8:51 AM and 11:40 AM from the maximum zoning envelope on Site 2 (see **Figures 6-34 to 6-36**) and between 12:20 PM and 2:20 PM from the maximum zoning envelope on Site 1 (see **Figures 6-38 and 6-39**). The two medians between Essex and Suffolk Streets would receive project-generated shadow throughout the day from the maximum zoning envelopes on Sites 2, 3 and 4 (see **Figures 6-34 to 6-40**).

AFTERNOON

Incremental shadow from the maximum zoning envelope on Site 4 would fall on a portion of Nathan Straus Playground for the final 33 minutes of the analysis day, 2:20 PM to 2:53 PM (see **Figure 6-40**).

New shadow from the maximum zoning envelope on Site 6 would fall on the northwest corner of the P.S. 142 Playground for the final 23 minutes of the analysis day (see **Figure 6-40**).

No project-generated shadow would affect the Dorothy Strelsin Memorial Garden on Suffolk Street between Stanton and East Houston Streets.

E. CONCLUSIONS

According to the *CEQR Technical Manual*, a significant shadow impact generally occurs when the incremental shadow added by a proposed project falls on a sunlight sensitive resource and substantially reduces or completely eliminates direct sunlight exposure, thereby significantly altering the public's use or appreciation of the resource or threatening the viability of vegetation.

This conclusions section summarizes the extent and duration of project-generated incremental shadow and considers the potential impacts on each affected resource. The features or use of each resource are described if appropriate.

The **Seward Park High School ball fields and courts** would only experience between 18 and 23 minutes of new shadow early on the late spring and summer analysis days, and none on the March/September and December analysis days. This active recreation facility would not be adversely impacted by this limited duration of new shadow.

Portions of the **Allen Street Malls** would receive 10 to 13 minutes of new shadow on the late spring and summer analysis days; this limited duration would not adversely impact the vegetation of the malls. On the winter analysis day, the 40 minutes of new shadow would not substantially affect the vegetation, being outside the growing season.

Schiff Mall comprises medians in the center of Delancey Street that contain trees, rose bushes, and other vegetation. Four of the block-long medians located between Orchard and Suffolk Streets would experience project-generated shadow in one or more seasons. The westernmost median between Orchard and Ludlow Streets would experience the least amount of incremental shadow. On the March 21/September 21 analysis day, it would continue to receive approximately five hours of direct sunlight, and in the May/August and June seasons it would be

in direct sun through the late morning and afternoon. This median's plantings would therefore continue to receive enough direct sunlight to remain viable throughout the growing season. The other three medians between Ludlow and Suffolk Streets could experience large extents and durations of incremental shadow during the months of the growing season that would potentially affect the rose bushes' viability, particularly in March and September when the overall length of the day and available sunlight is shorter. However, from early May through mid-August, these medians would receive seven hours or more of direct sun. Therefore the plantings other than the rose bushes would not be significantly affected by the project-generated shadow. The buildings that would actually be developed on Sites 1, 2, 3, and 4 would not be quite as large or bulky as the maximum zoning envelopes for those sites, and so the actual extent and duration of incremental shadow would likely be less than what is described here, and the roses may not actually be impacted. Therefore, if a tower is constructed on these sites that would impact the roses, and the roses are still there at the time of construction, then the roses would be replaced with shade tolerant plantings as part of the project. For sites that may be under the jurisdiction of the City of New York Department of Housing Preservation & Development (HPD), additional analysis of shadows on the roses and the potential replacement of the roses will be required to be undertaken by the developer(s) through the provisions in the Land Disposition Agreement between HPD and the developer(s). For City properties that may be managed by the New York City Economic Development Corporation (NYCEDC), additional analysis of shadows on the roses and the potential replacement of the roses will be required to be undertaken by the developer(s) through provisions of a contract of sale or long-term lease, or other legally binding agreement between NYCEDC and the developer(s). Alternatively, the developer(s) could assume the findings based on the maximum building envelope presented in this FGEIS and replace the roses without conducting the additional analysis.

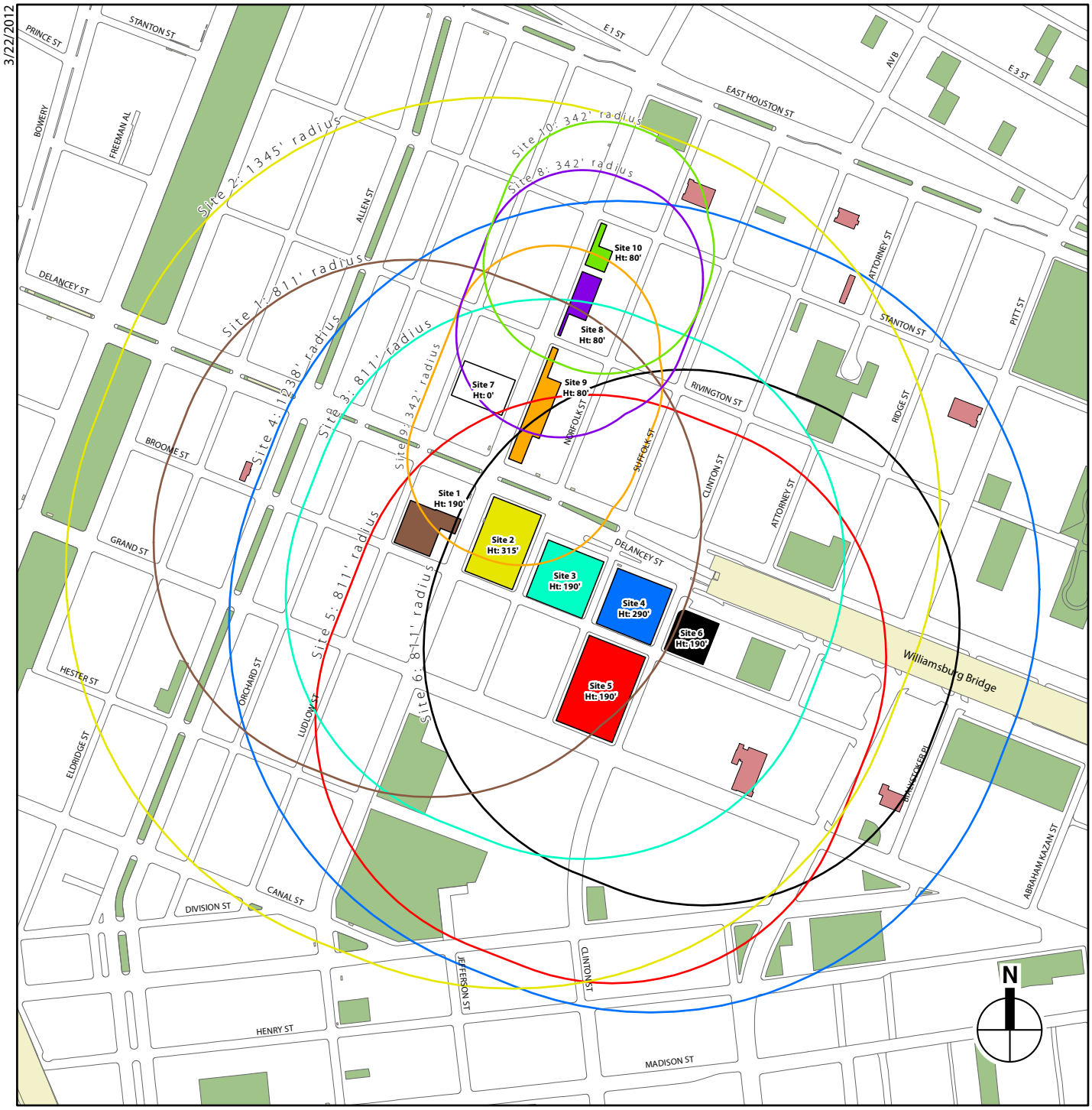
The 33 minutes of incremental shadow that would fall on **Nathan Straus Playground** at the end of the December 21 analysis day would not be substantial enough in extent or duration to result in a significant adverse impact on this space, which contains playground equipment and handball and basketball courts.

The P.S. 142 Playground would experience about an hour and ten minutes of new shadow on the March 21/September 21 analysis day. The incremental shadow would be large in extent after 3:50 PM and would eliminate all remaining sunlight from 4:10 to 4:29 PM. However, the schoolyard would be completely or mostly in sun for nearly the entire analysis day up until 3:50 PM, and the duration of incremental shadow would be too short to cause a significant adverse impact. On the May 6/August 6 analysis day, there would be a similar duration of incremental shadow but it would remain small in extent throughout this period, limited to a narrow area near the southern edge of the space, and would not cause a significant adverse impact. On December 21, the 22 minutes of incremental shadow would not be a substantial enough duration to cause a significant adverse impact to the Playground.

The NYCHA-owned public space at **150 Broome Street** contains trees, seating and tables. It would receive between a half-hour and an hour of new shadow in the spring, summer and early fall, and no new shadow in the winter. The incremental shadow would not reduce sunlight enough to threaten the health of the trees, since the space would remain in sun during the morning and early afternoon. Near the end of the May 6/August 6 day, when shadows become long and move quickly, incremental shadow would remove the remaining area of sunlight for the final half-hour of the analysis day; however this limited duration of new shadow would not be likely to alter the utility of the space substantially enough to cause a significant adverse impact.

Two minutes of incremental shadow on the June 21 analysis day would not cause a significant adverse impact to **Luther Gulick Playground**.

The publicly accessible **open space proposed for Site 5** would be located on the north side of the site on Broome Street. The proposed open space would be largely in shadow from the maximum zoning envelope on Site 5 during most of the fall, winter and early spring analysis days. In the late spring and summer, portions of the north side of the space would be in sun for much of the morning and mid-day, and in the afternoon the northwest section would be in sun; however, shadow from the maximum zoning envelope on Site 5 would shade the southern areas of the space for most of the day even on these analysis days. This analysis is conservative as it is based on the maximum zoning envelope, which could not be fully built based on the requirements of the LSGD. The actual development on the site would be smaller than the maximum zoning envelope and would likely result in slightly less shadows on the open space in the late spring and summer. However, pursuant to CEQR, shadows cast on the project's proposed open space are not considered significant. ✷



The longest shadow a structure can cast occurs on December 21 at the start of the analysis day, and its length is equal to 4.27 times the height of the structure. For the Tier 1 analysis, a radius representing this maximum shadow length was calculated and drawn for each development site (except Site 7, which would not have a new structure).

In this diagram each site and the corresponding maximum shadow length radius from each building are represented by a unique color.

Proposed building heights include rooftop mechanical.

Publicly Accessible Open Space and Greenstreets

Historic Resources with Sun-Sensitive Features

SEWARD PARK MIXED-USE DEVELOPMENT PROJECT

Tier 1 Screening Assessment

Figure 6-1

Proposed Development Sites (excluding Site 7)

Longest Shadow Study Area of RWCDS

Area that Cannot Be Shaded by Project

Publicly Accessible Open Space

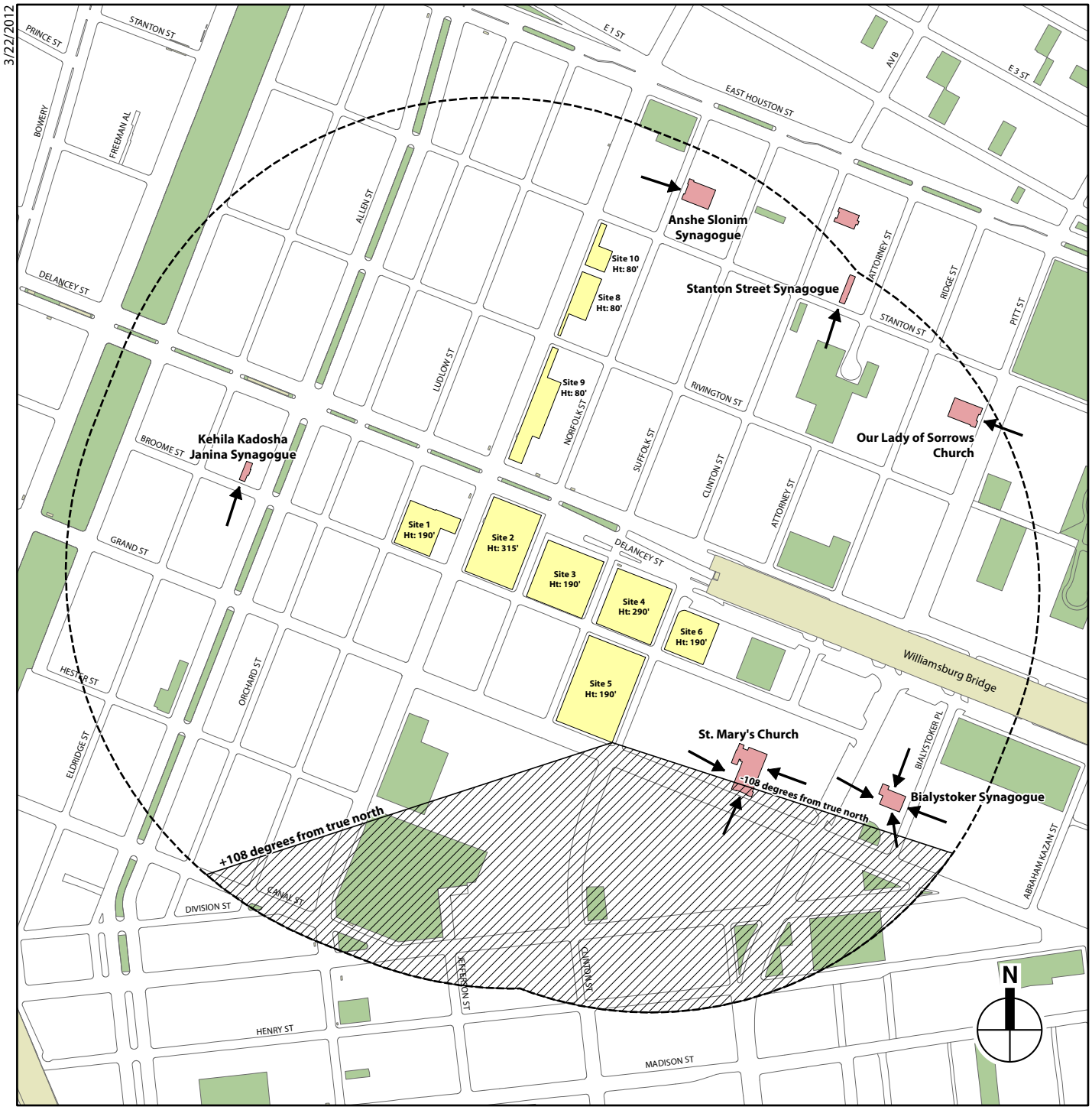
Historic Resources with Sun-Sensitive Features

0 200 400 600 800 1,000 Feet

Note: Proposed building heights include rooftop mechanical.

Tier 2 Screening Assessment - Open Spaces

Figure 6-2

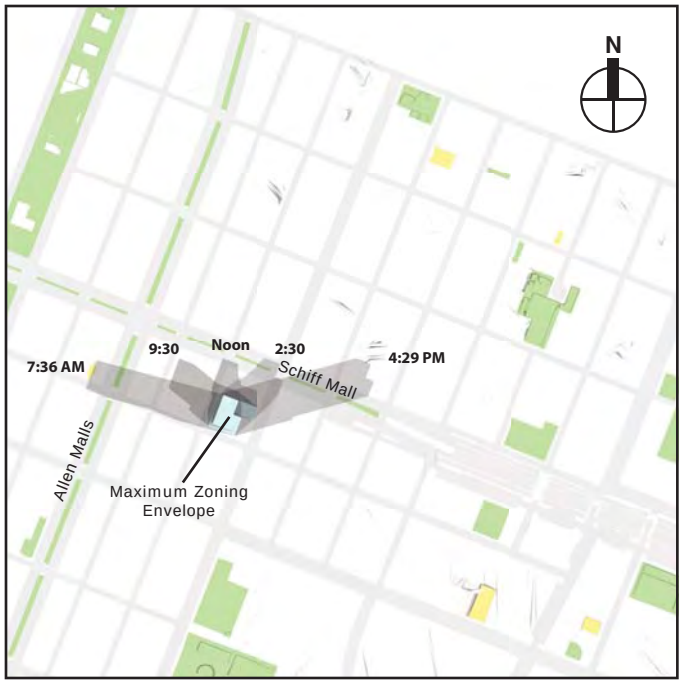


Note: Proposed building heights include rooftop mechanical.

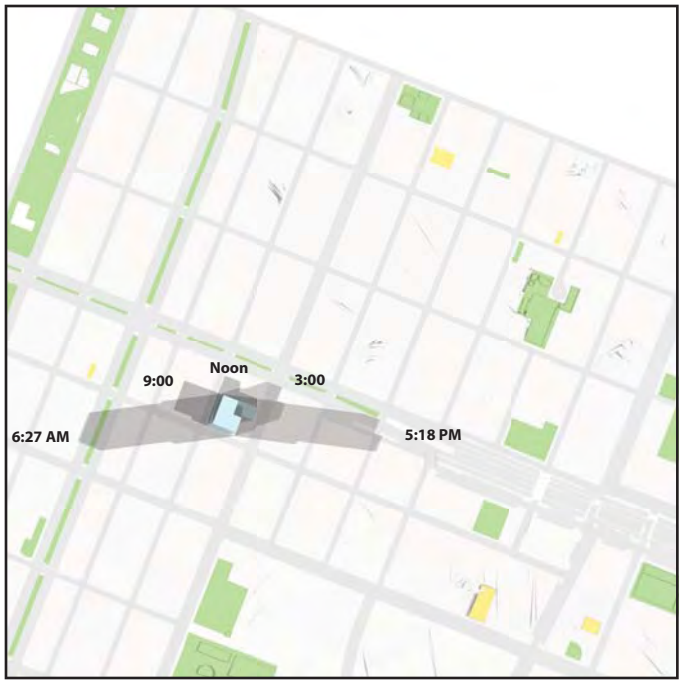
Tier 2 Screening Assessment - Historic Resources

Figure 6-3

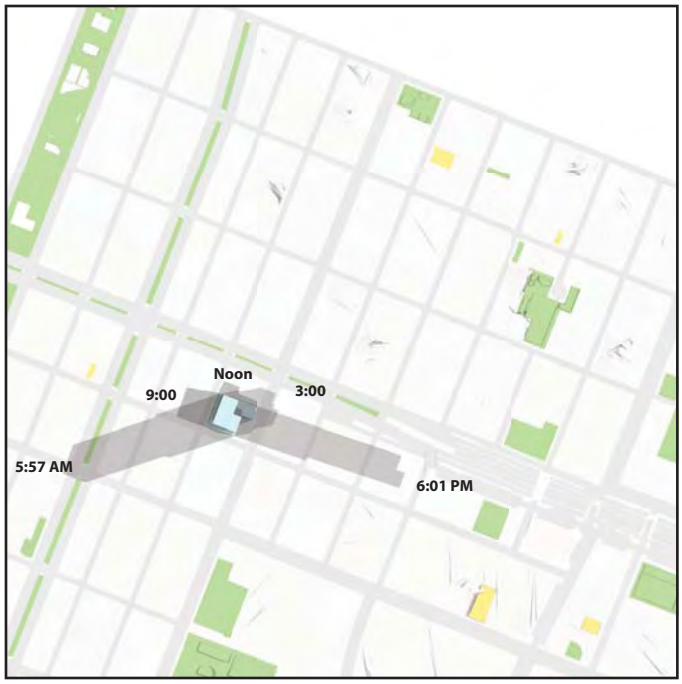
3.22.12



March 21/Sept. 21



May 6/August 6



June 21

December 21

Note: Daylight Saving Time not used.

0 200 1,000 FEET

SCALE

Publicly Accessible Open Space and Greenstreets

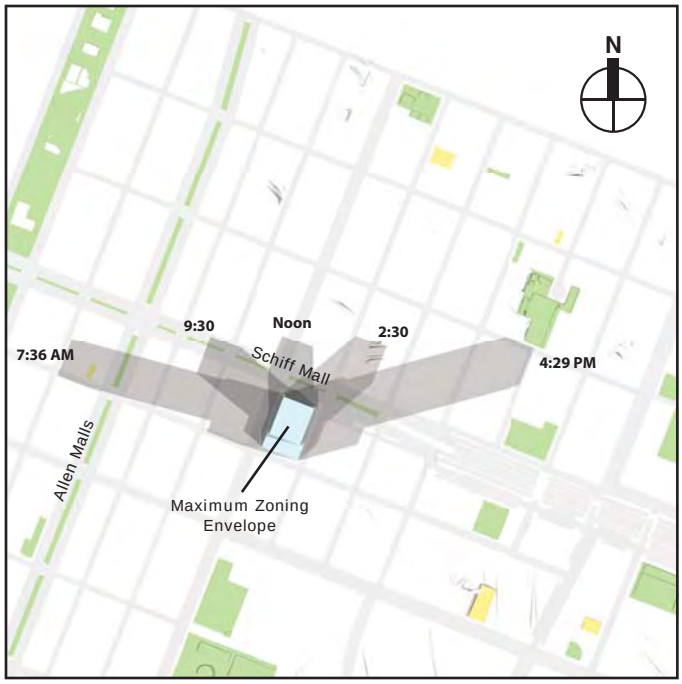
Historic Resource with Sun-Sensitive Features

Shadow

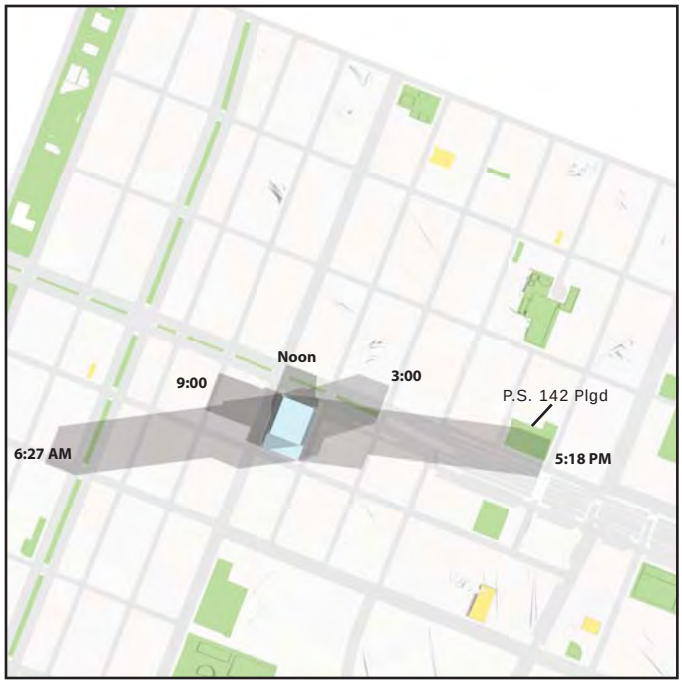
Tier 3 Assessment - Site 1

Figure 6-4

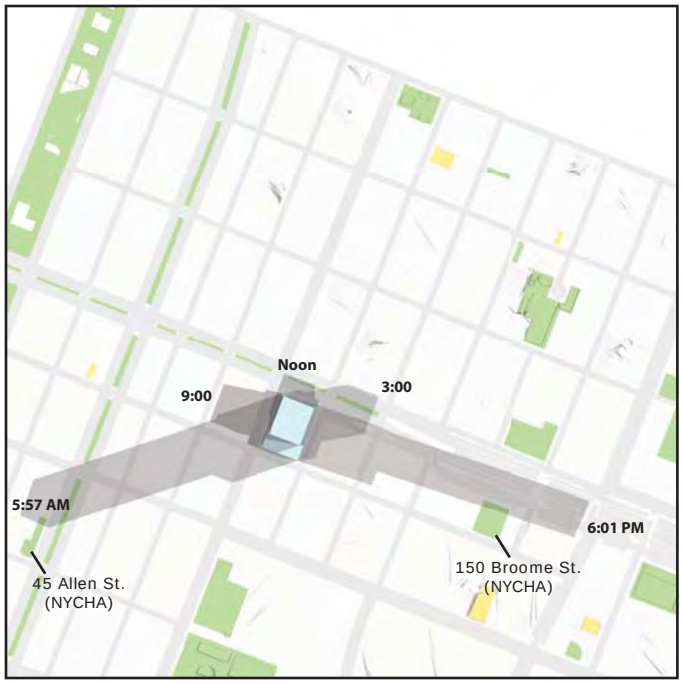
3.22.12



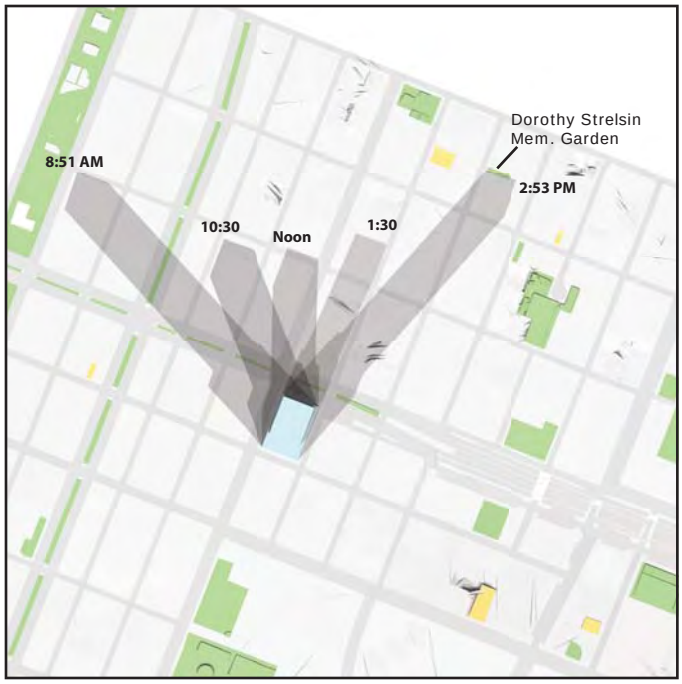
March 21/Sept. 21



May 6/August 6



June 21



December 21

Note: Daylight Saving Time not used.

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Shadow

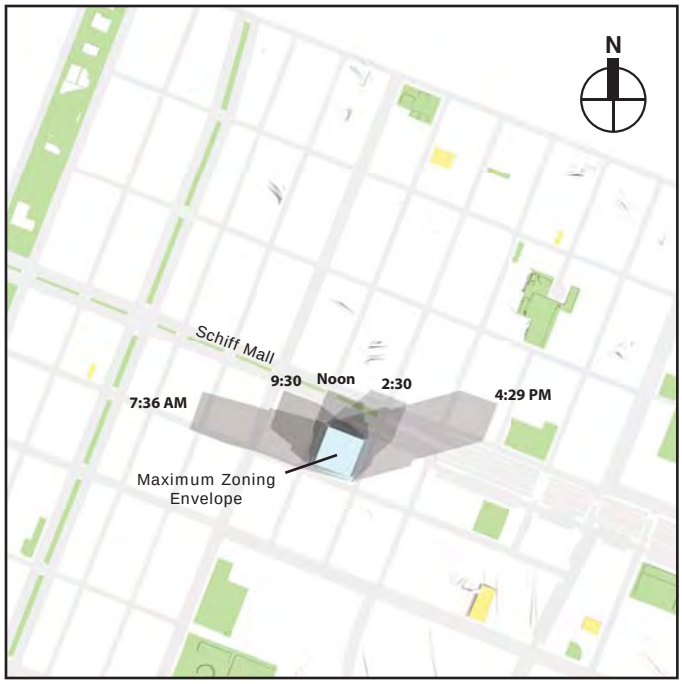
0 200 1,000 FEET

SCALE

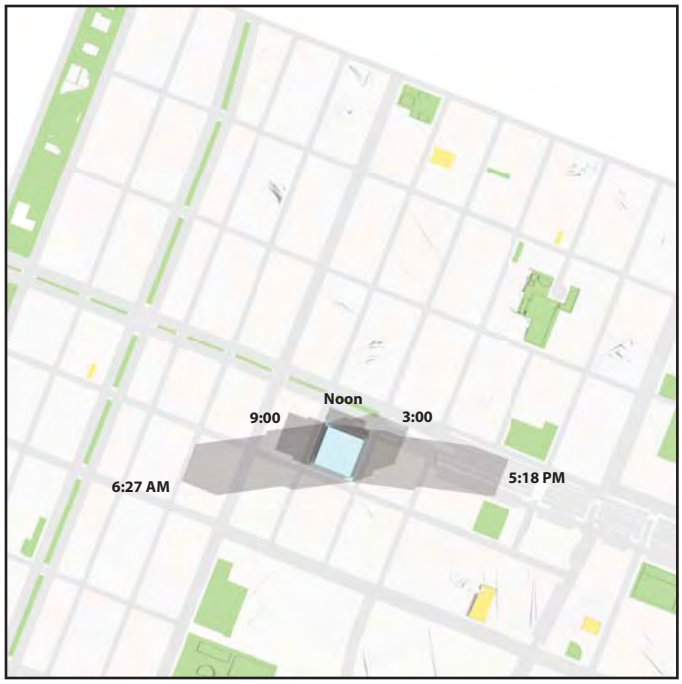
Tier 3 Assessment - Site 2

Figure 6-5

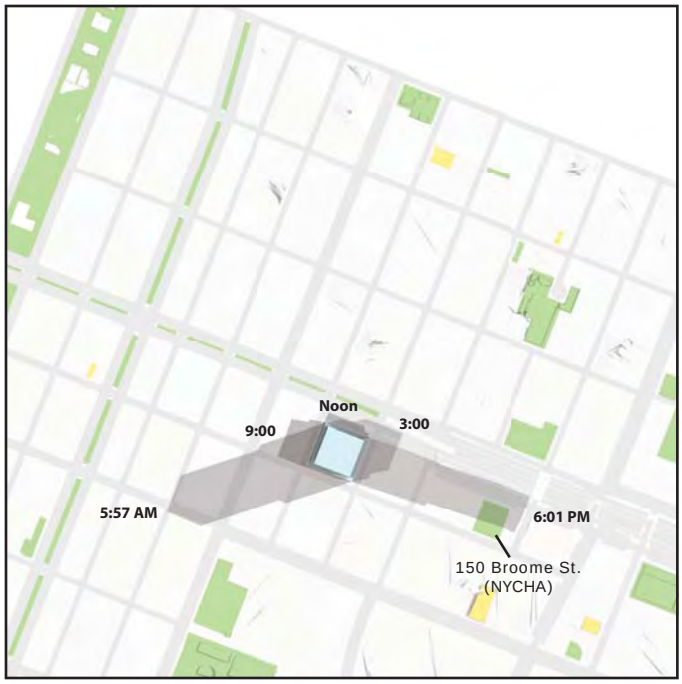
3.22.12



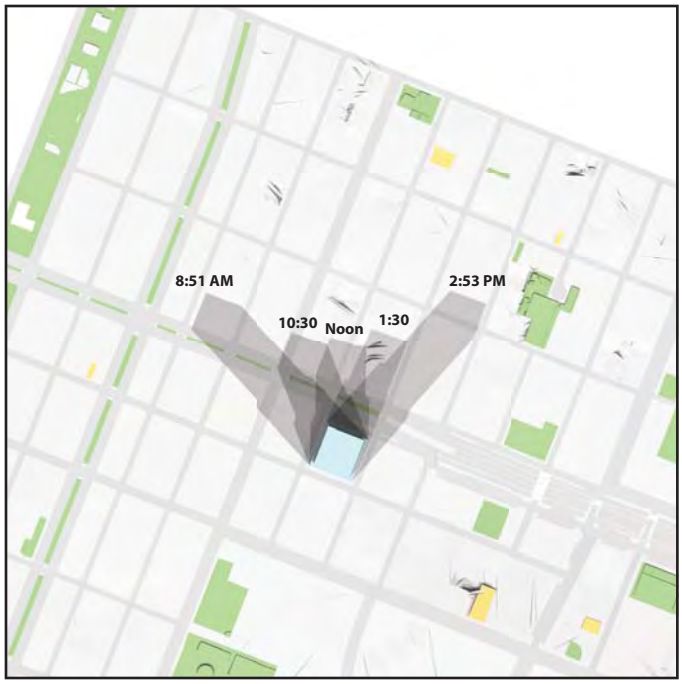
March 21/Sept. 21



May 6/August 6



June 21



December 21

Note: Daylight Saving Time not used.

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Shadow

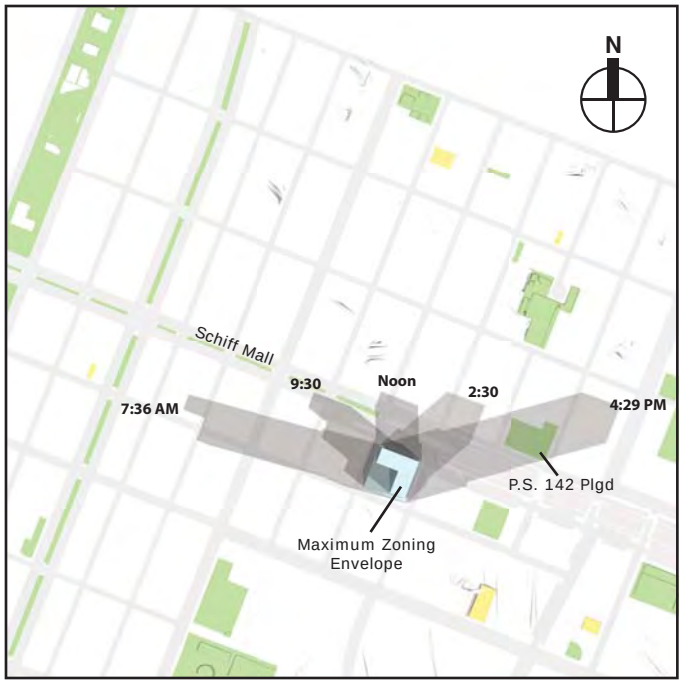
0 200 1,000 FEET

SCALE

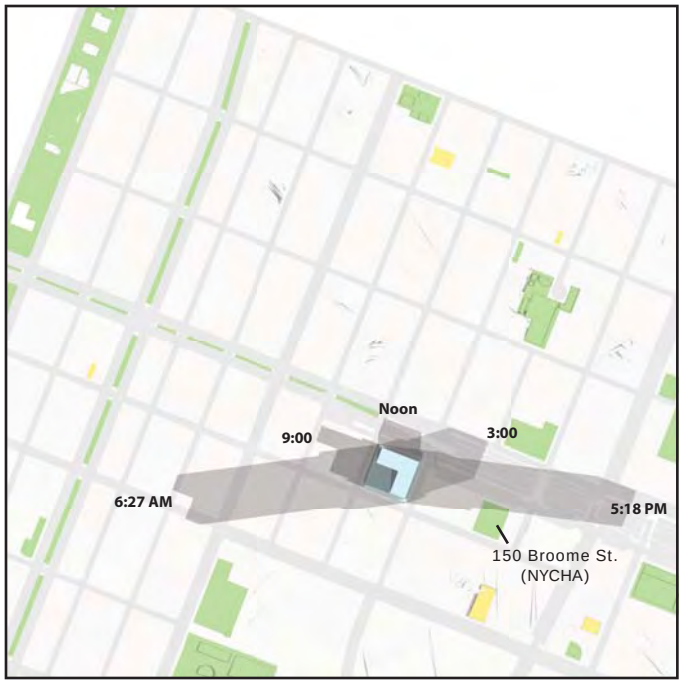
Tier 3 Assessment - Site 3

Figure 6-6

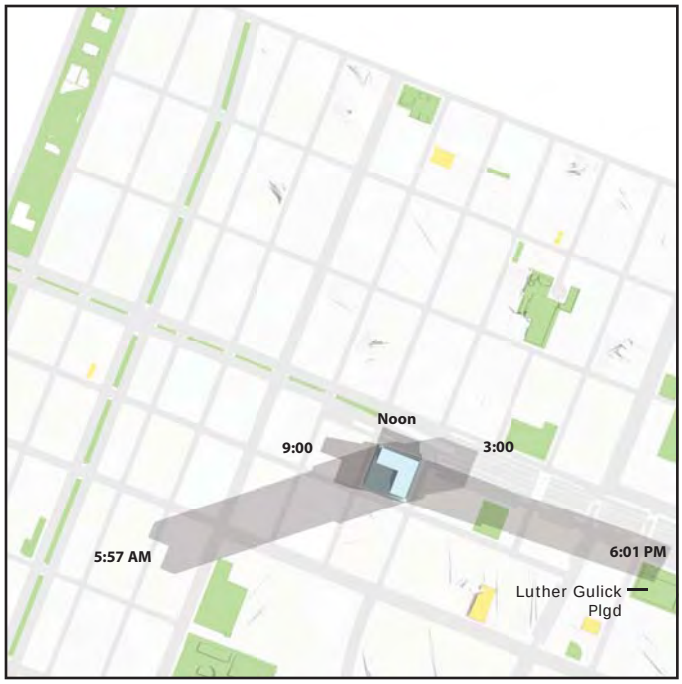
3.22.12



March 21/Sept. 21



May 6/August 6



June 21

December 21

Note: Daylight Saving Time not used.

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Shadow

0 200 1,000 FEET

SCALE

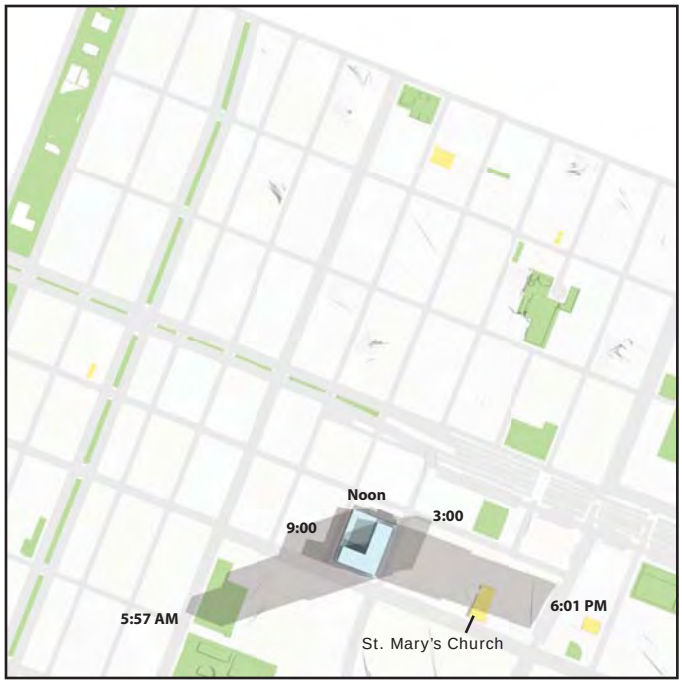
Tier 3 Assessment - Site 4

Figure 6-7

3.22.12

March 21/Sept. 21

May 6/August 6



June 21

December 21

Note: Daylight Saving Time not used.

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Shadow

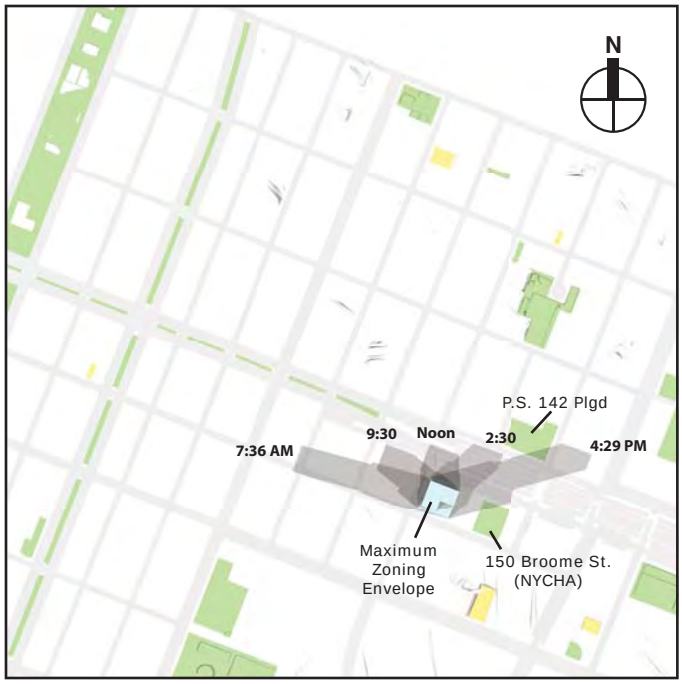
0 200 1,000 FEET

SCALE

Tier 3 Assessment - Site 5

Figure 6-8

3.22.12



March 21/Sept. 21

May 6/August 6

June 21

December 21

Note: Daylight Saving Time not used.

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Shadow

0 200 1,000 FEET

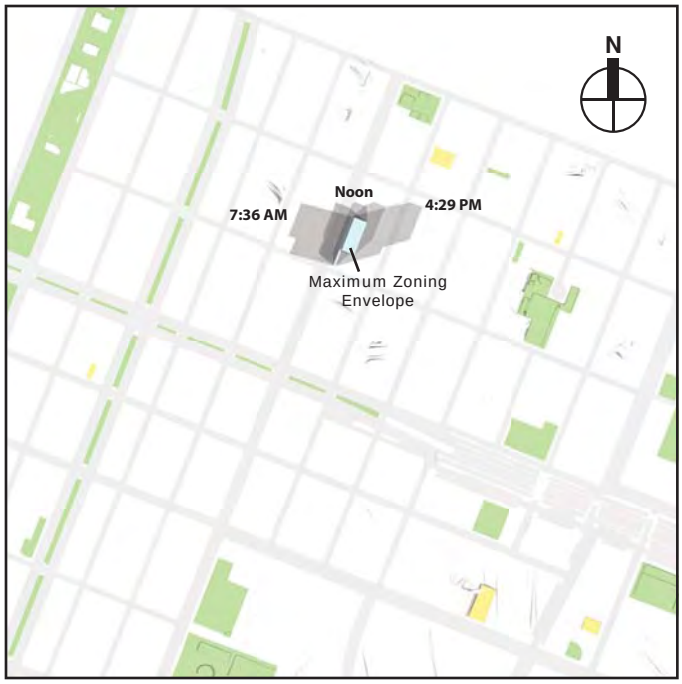
SCALE

SEWARD PARK MIXED-USE DEVELOPMENT PROJECT

Tier 3 Assessment - Site 6

Figure 6-9

3.22.12



March 21/Sept. 21

May 6/August 6

June 21

December 21

Note: Daylight Saving Time not used.

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Shadow

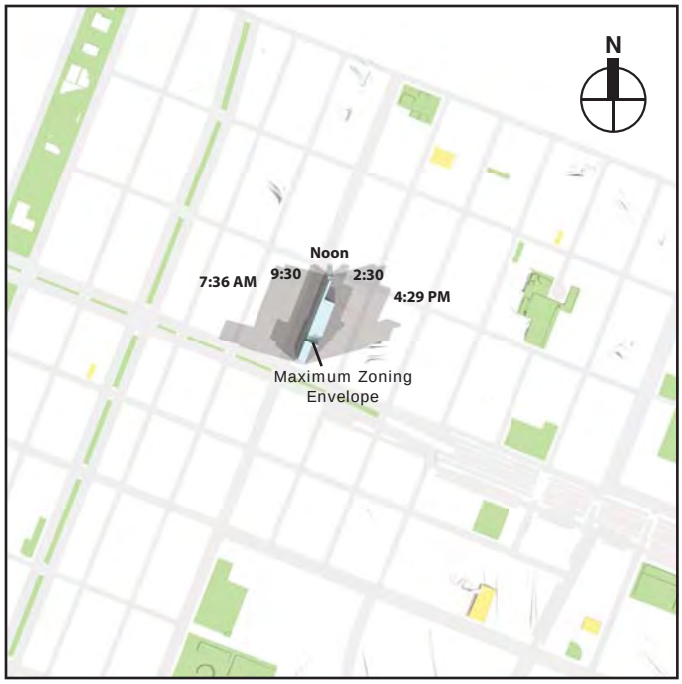
0 200 1,000 FEET

SCALE

Tier 3 Assessment - Site 8

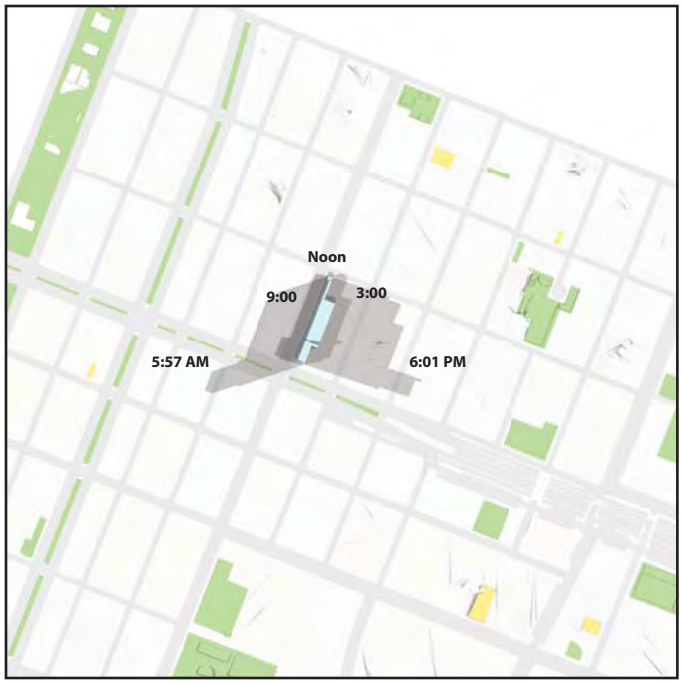
Figure 6-10

3.22.12



March 21/Sept. 21

May 6/August 6



June 21

December 21

Note: Daylight Saving Time not used.

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Shadow

0 200 1,000 FEET

SCALE

Tier 3 Assessment - Site 9

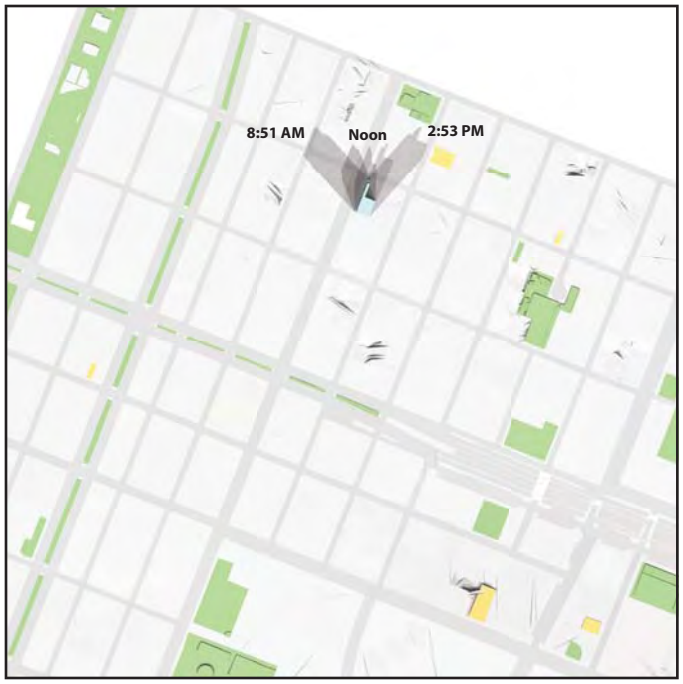
Figure 6-11

3.22.12

March 21/Sept. 21

May 6/August 6

June 21



December 21

Note: Daylight Saving Time not used.

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Shadow

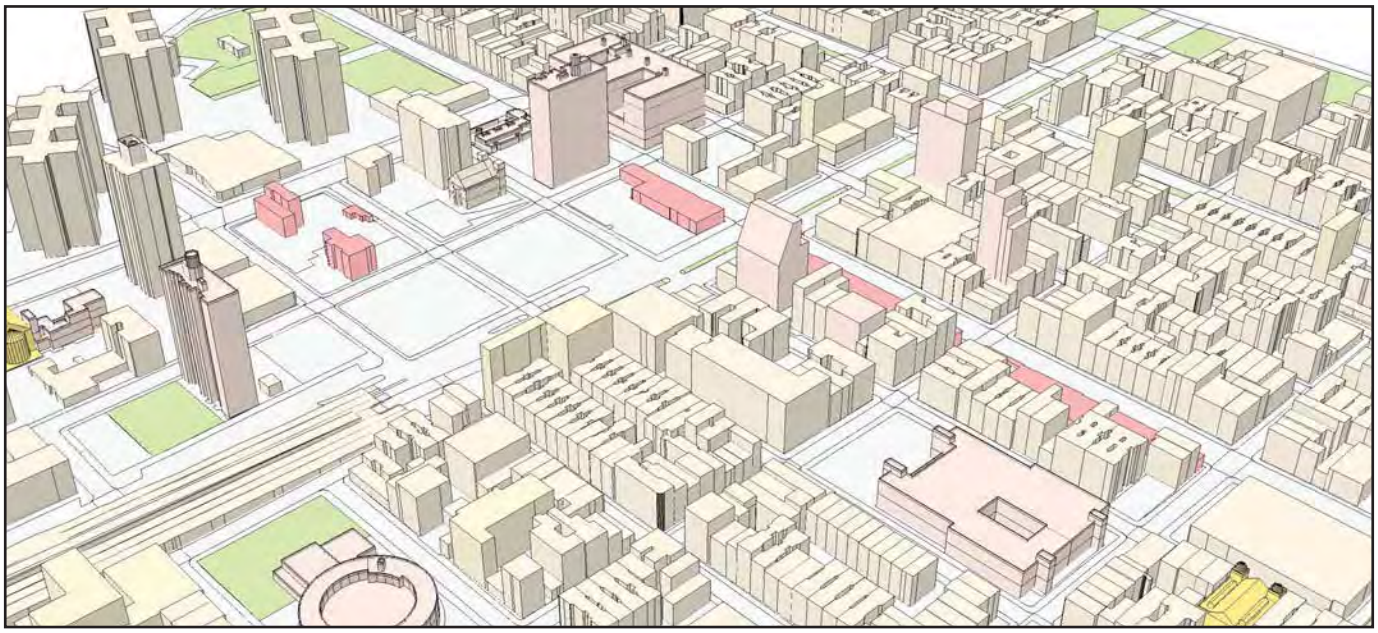
0 200 1,000 FEET

SCALE

Tier 3 Assessment - Site 10

Figure 6-12

3.22.12



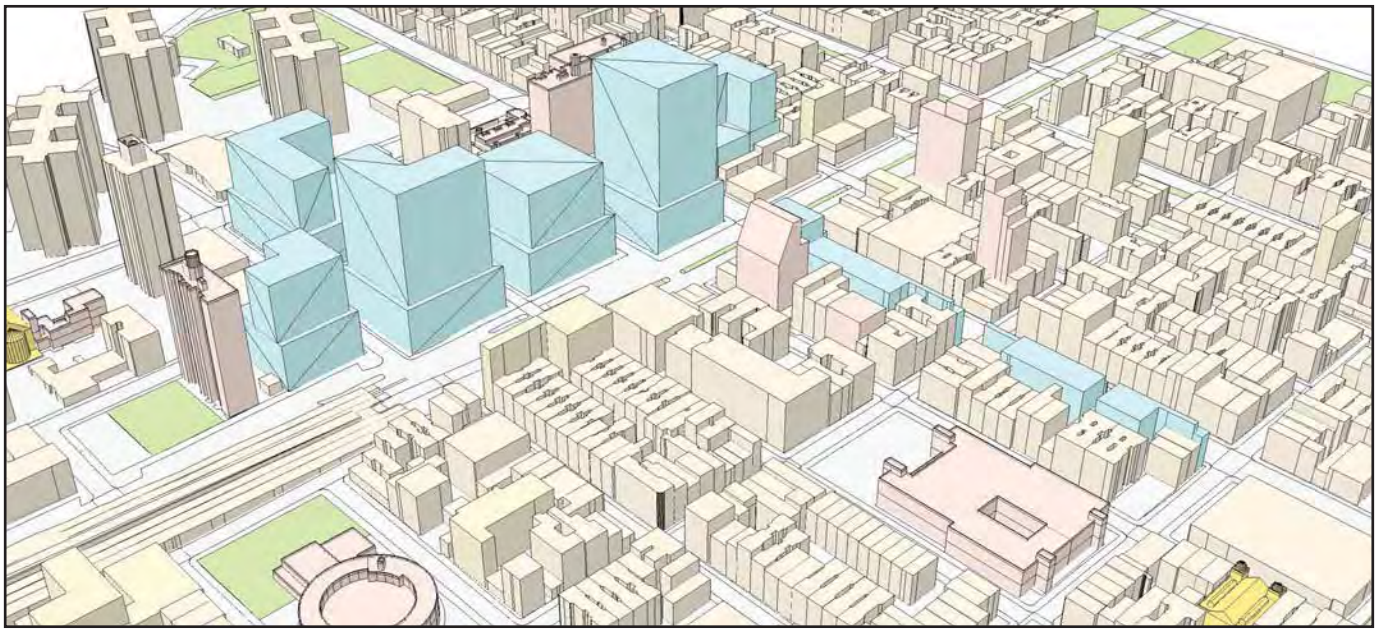
Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Existing Buildings on RWCDS Sites

No Action

ILLUSTRATIVE FOR ANALYSIS PURPOSES



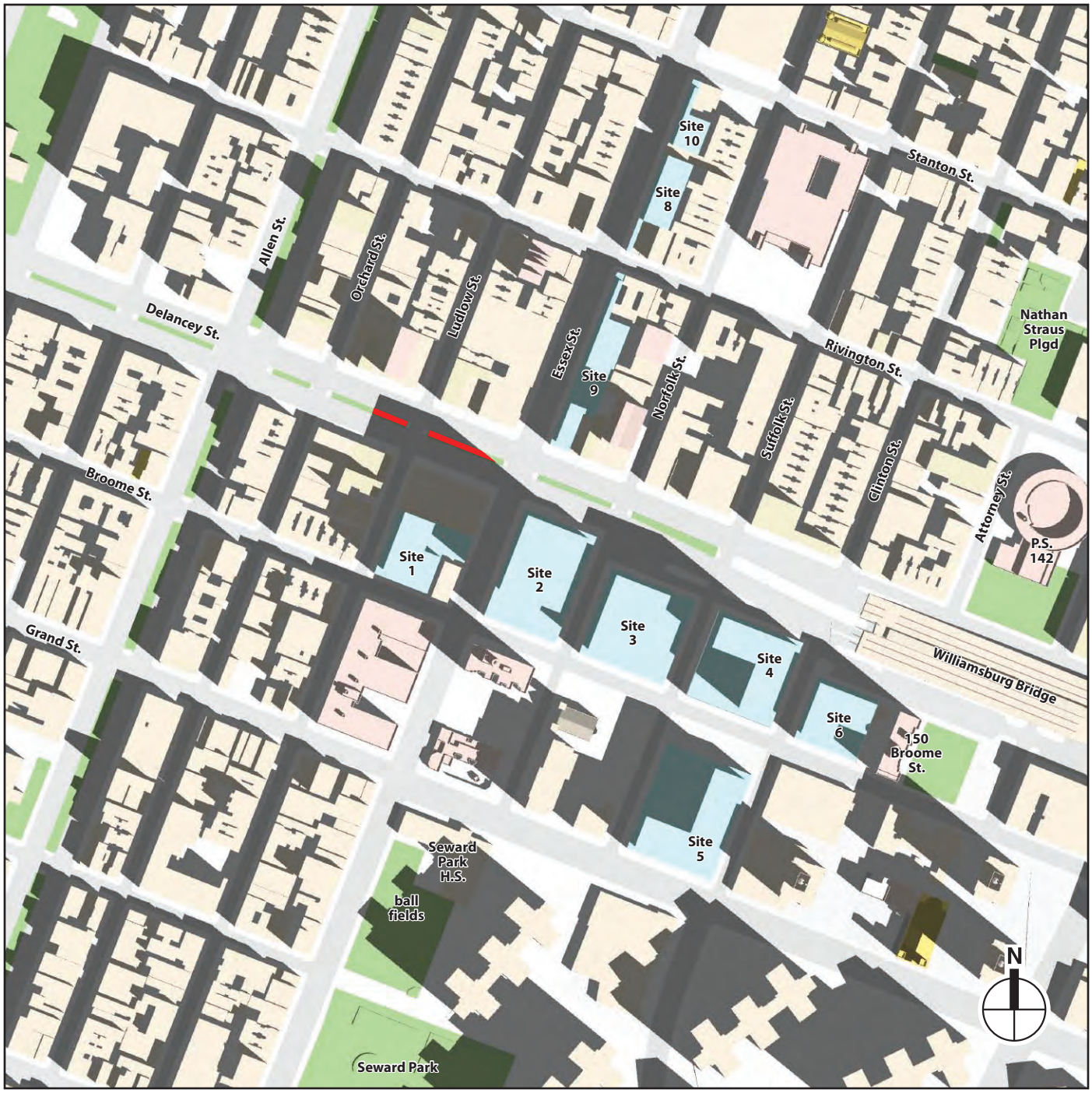
Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

With Proposed Project

Illustrative Three-Dimensional Computer Model
View Southwest
Figure 6-13



Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

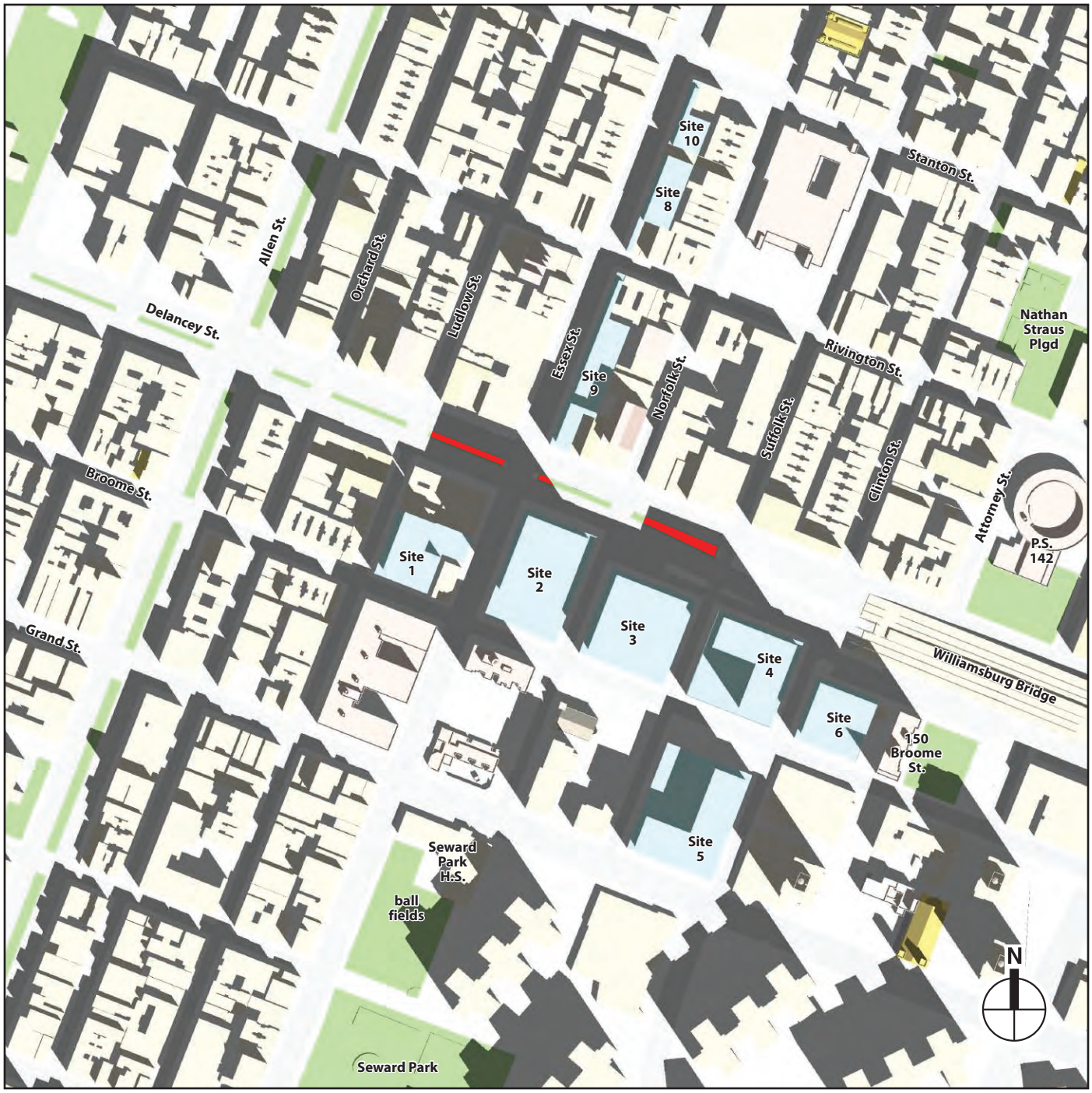
0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

March 21/September 21 - 9:30 AM

Figure 6-14



Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

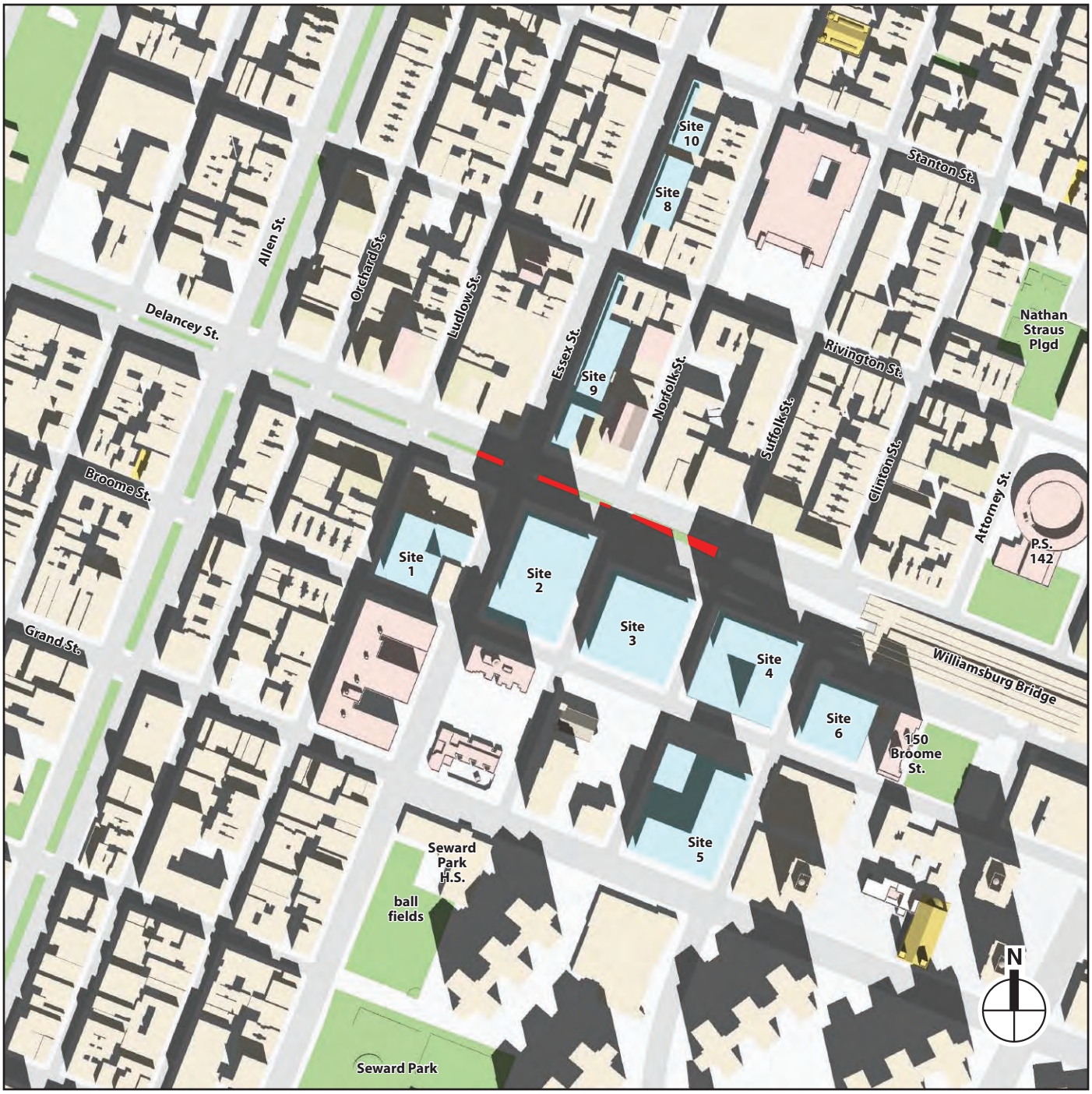
SCALE

Note: Daylight Saving Time not used.

March 21/September 21 - 10:30 AM

Figure 6-15

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

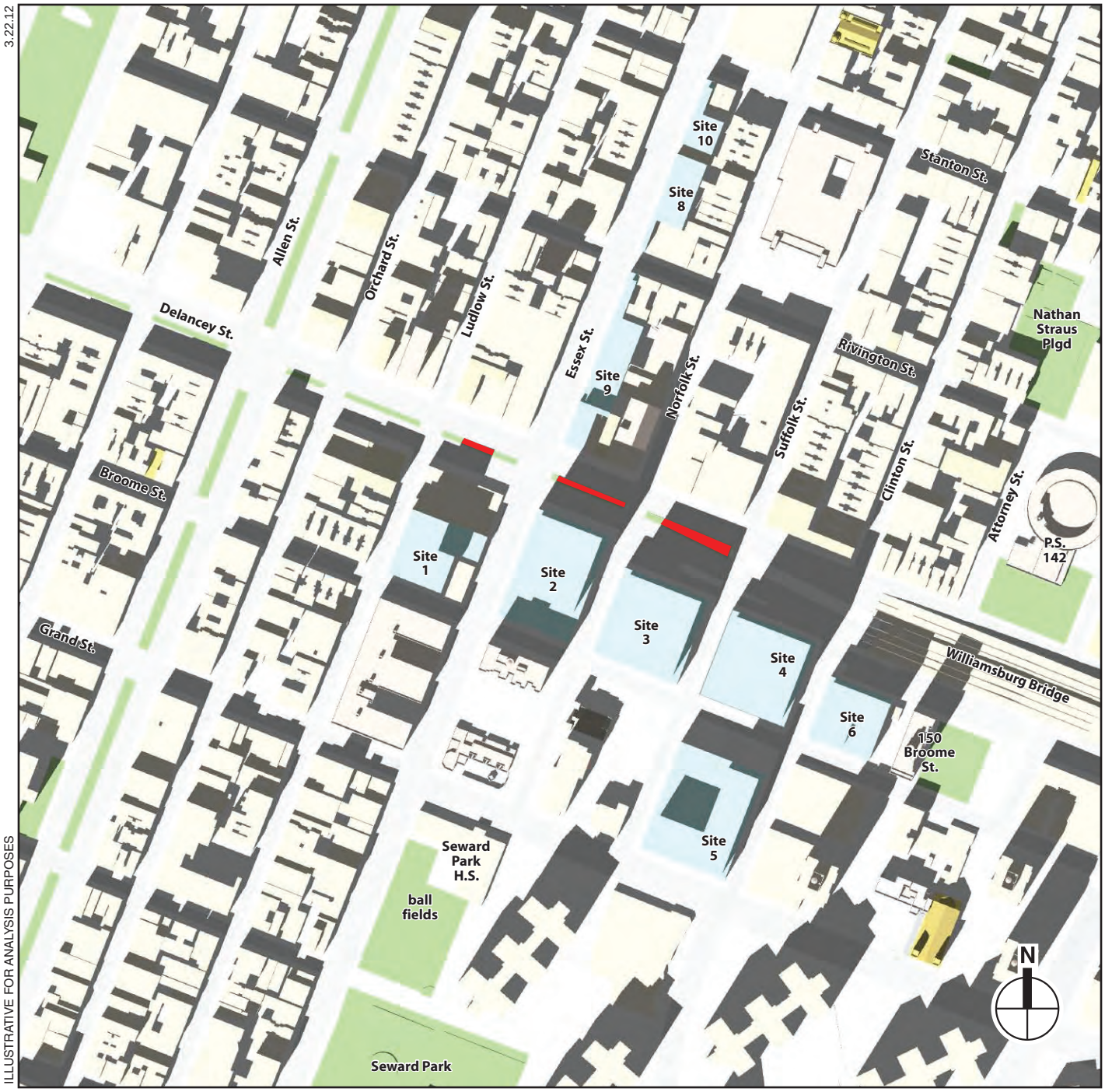
0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

March 21/September 21 - 11:30 AM

Figure 6-16

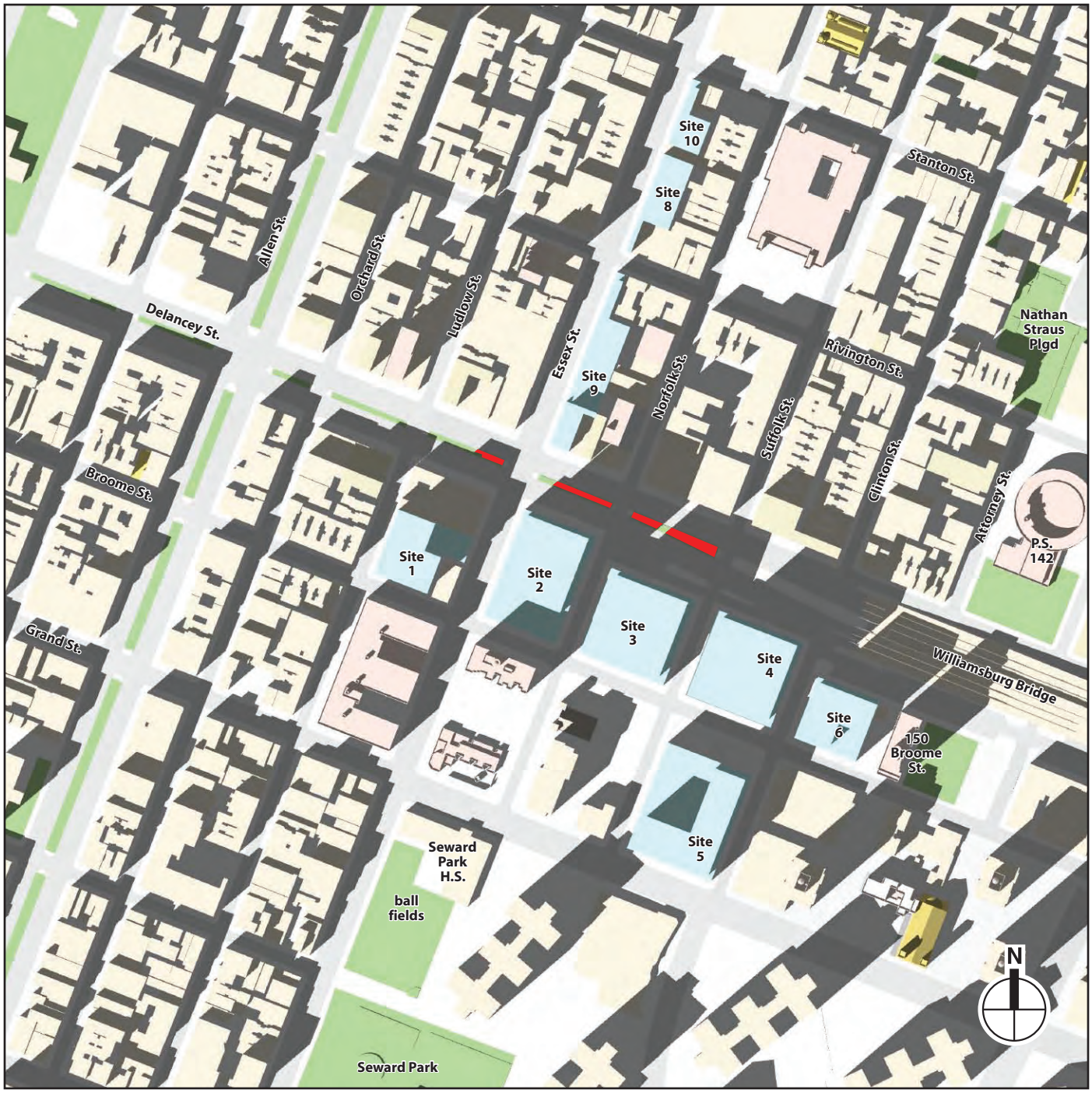


Note: Daylight Saving Time not used.

March 21/September 21 - 1:30 PM

Figure 6-17

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

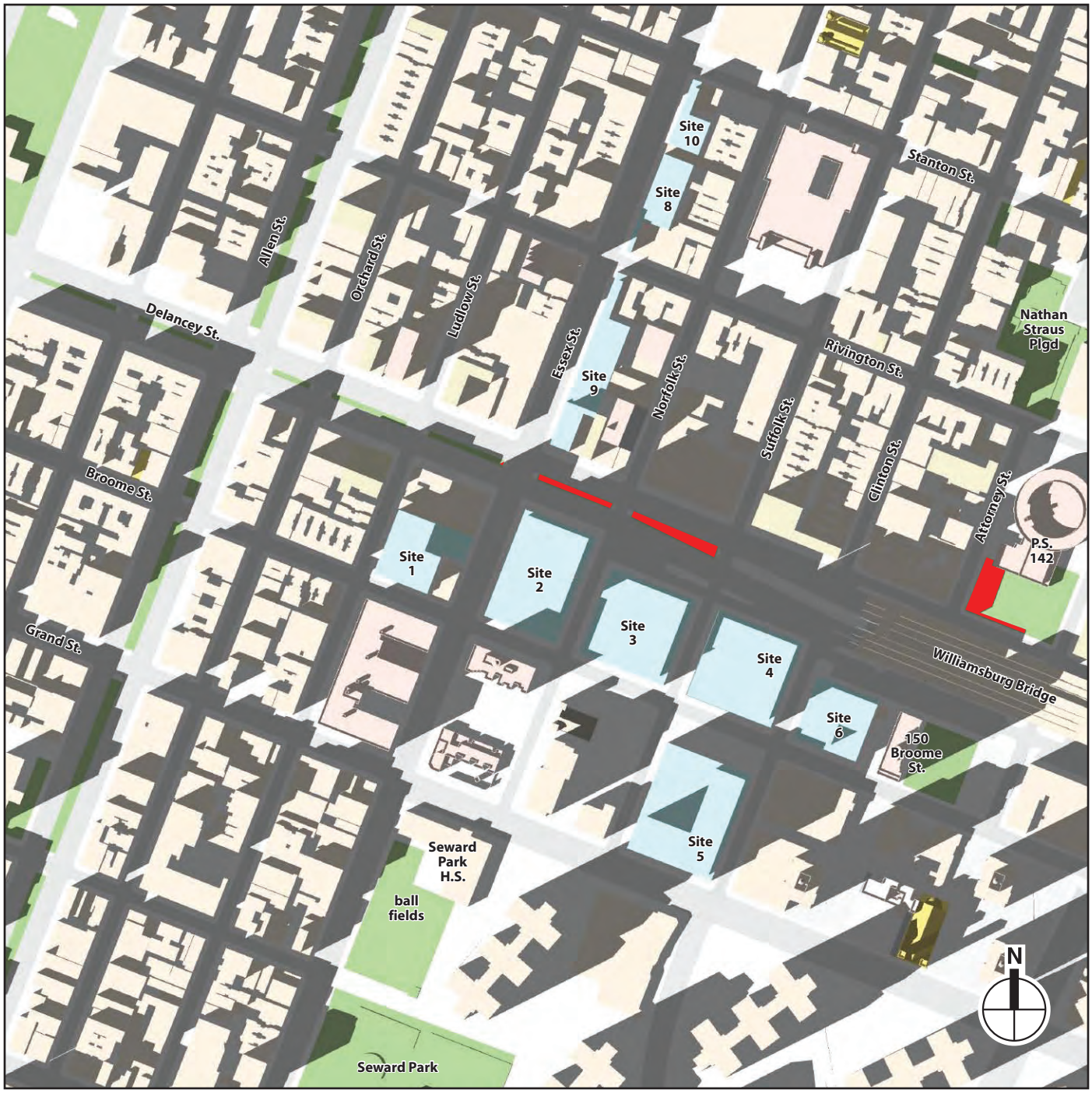
SCALE

Note: Daylight Saving Time not used.

March 21/September 21 - 2:30 PM

Figure 6-18

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

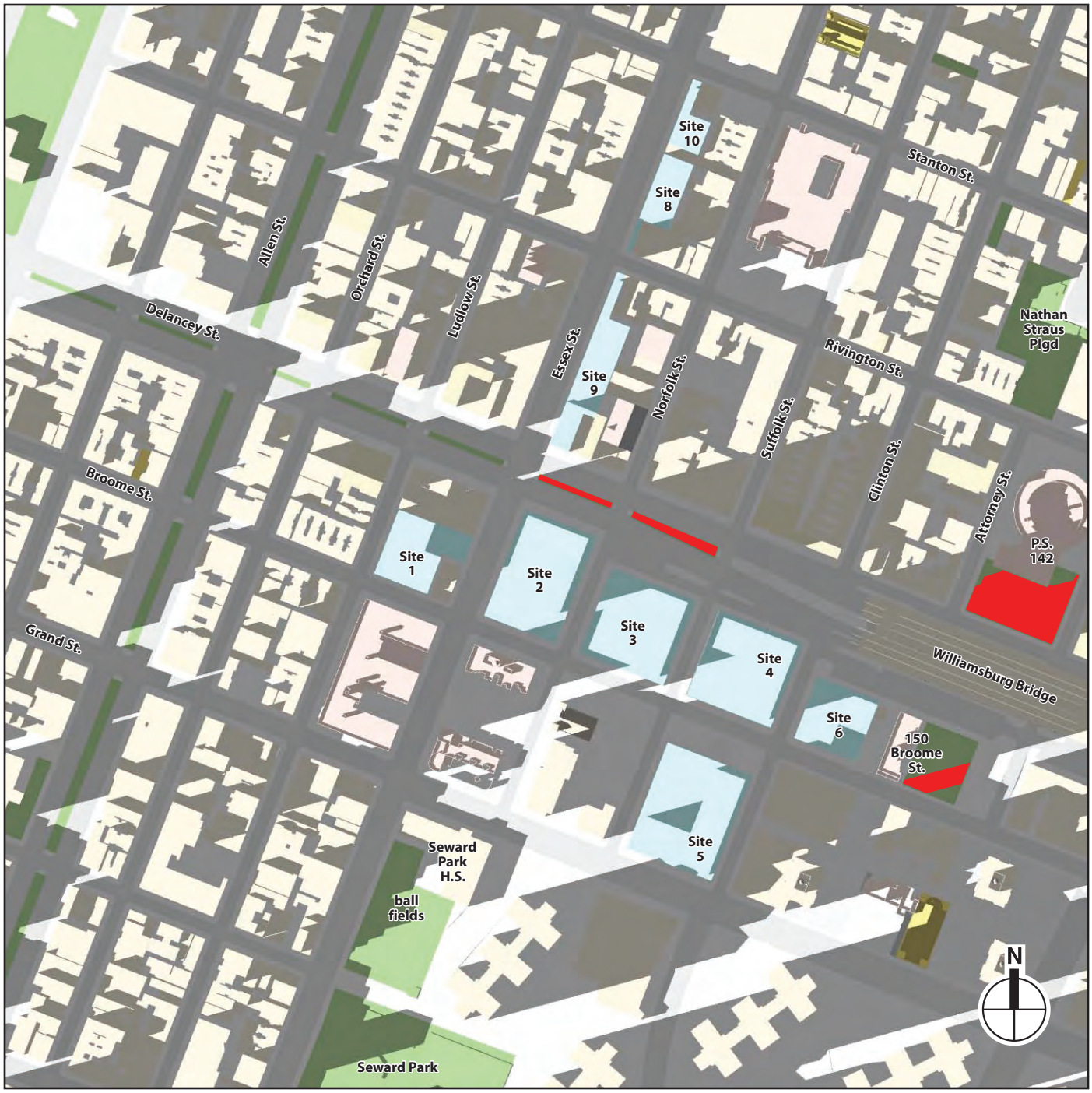
0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

March 21/September 21 - 3:30 PM

Figure 6-19



Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

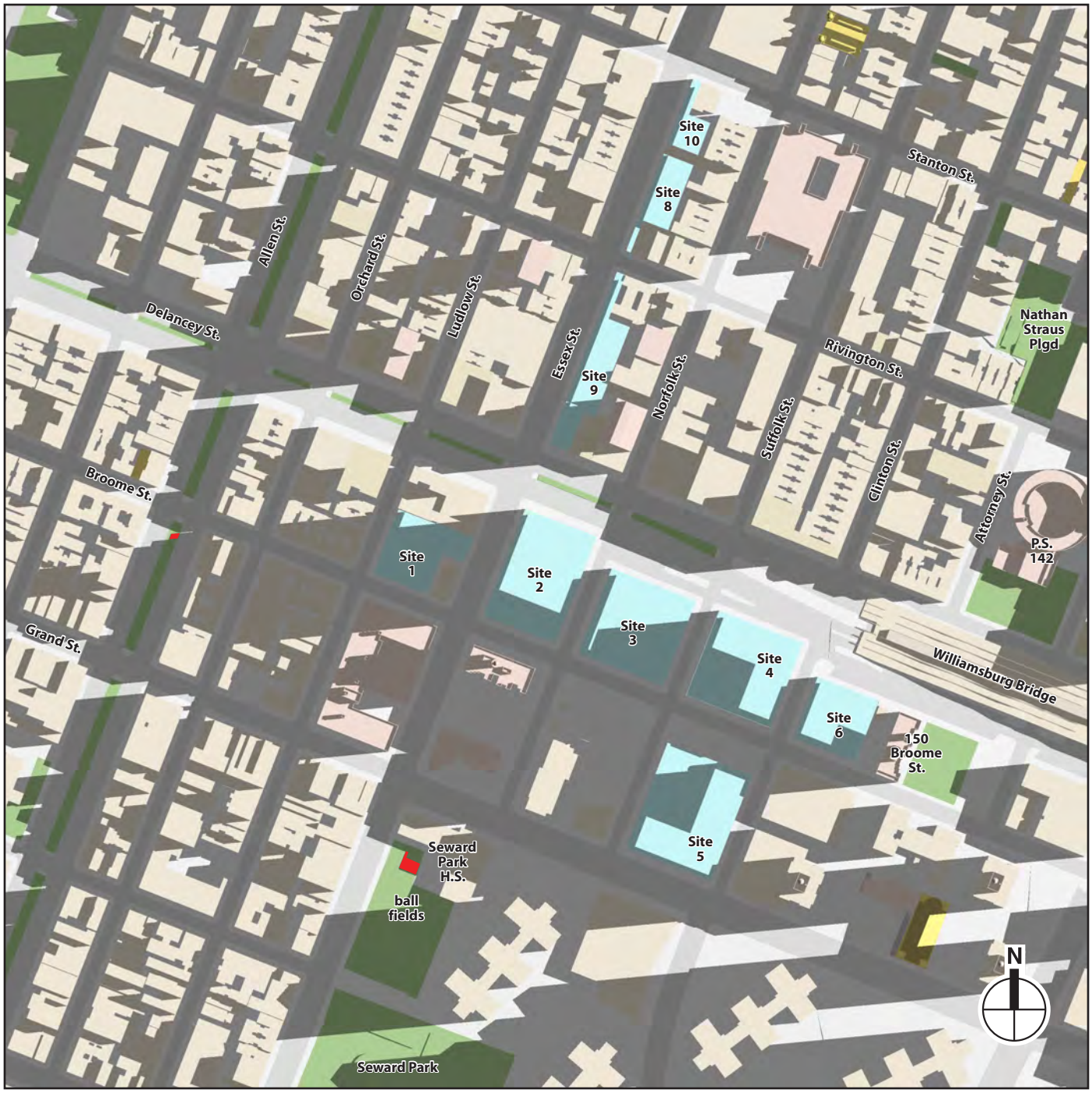
SCALE

Note: Daylight Saving Time not used.

March 21/September 21 - 4:29 PM

Figure 6-20

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

May 6/August 6 - 6:40 AM

Figure 6-21

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

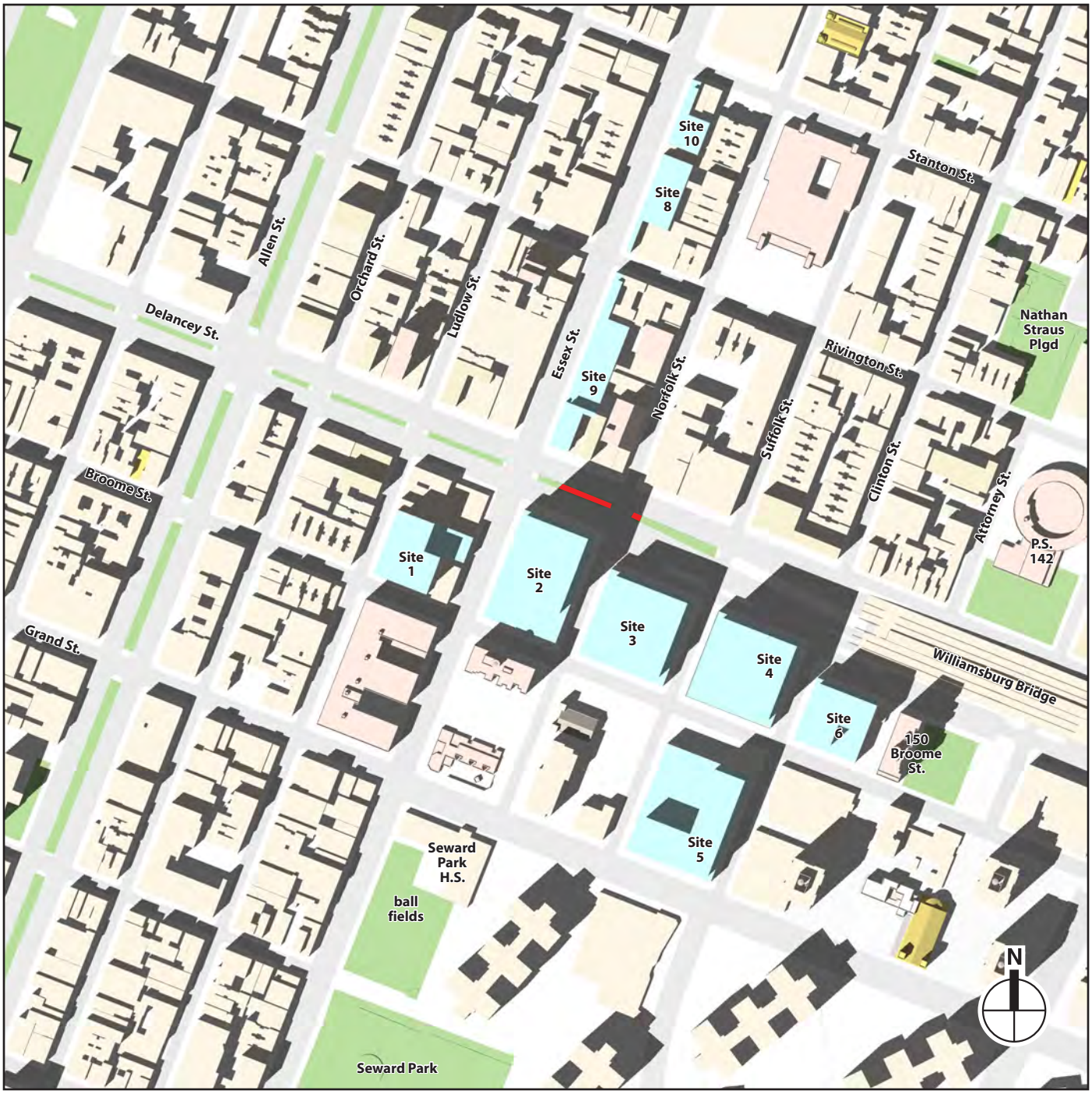
0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

May 6/August 6 - 11:00 AM

Figure 6-22



Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

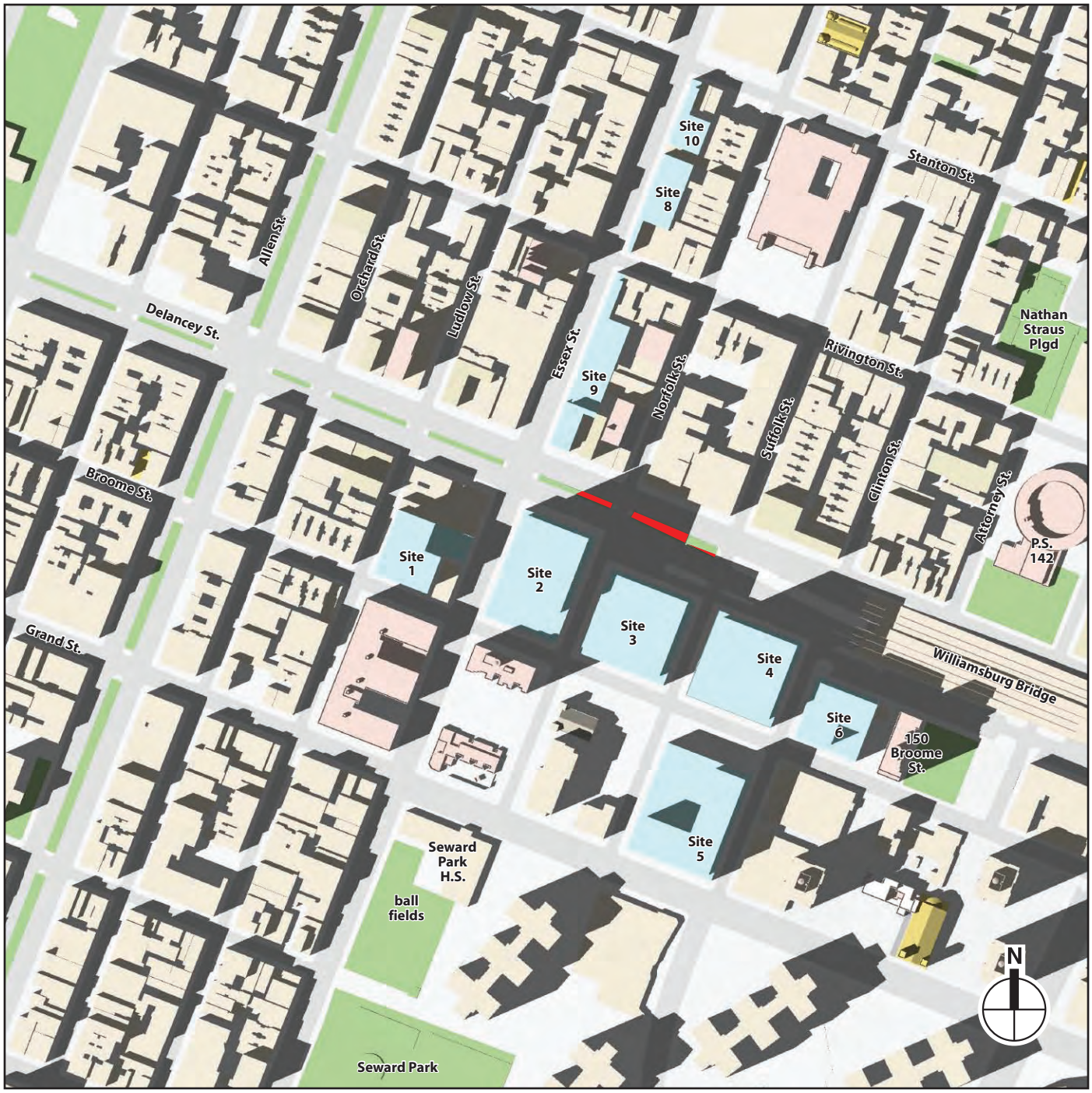
0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

May 6/August 6 - 1:30 PM

Figure 6-23



Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

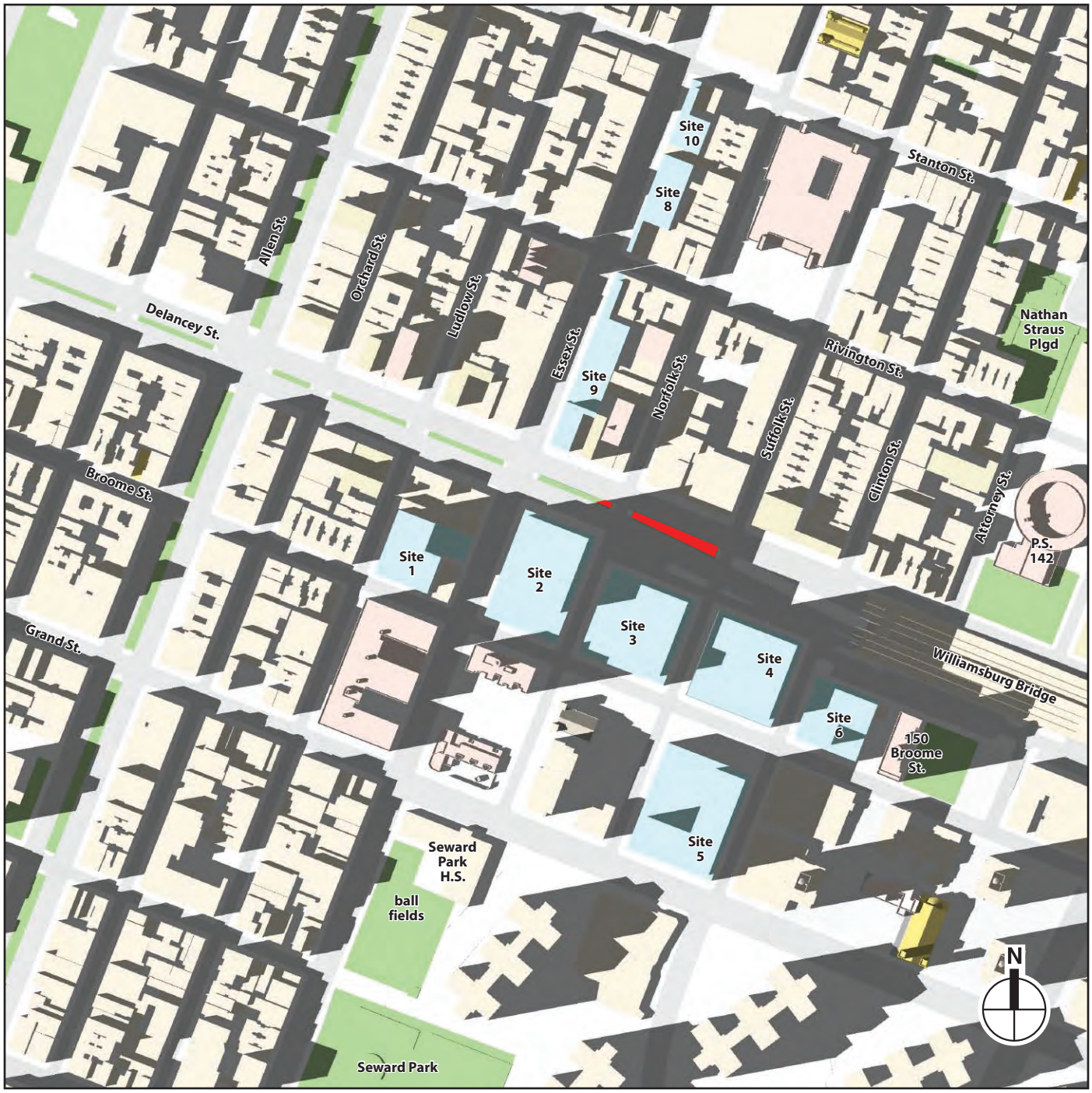
SCALE

Note: Daylight Saving Time not used.

May 6/August 6 - 2:30 PM

Figure 6-24

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

May 6/August 6 - 3:30 PM

Figure 6-25

3.22.12

ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

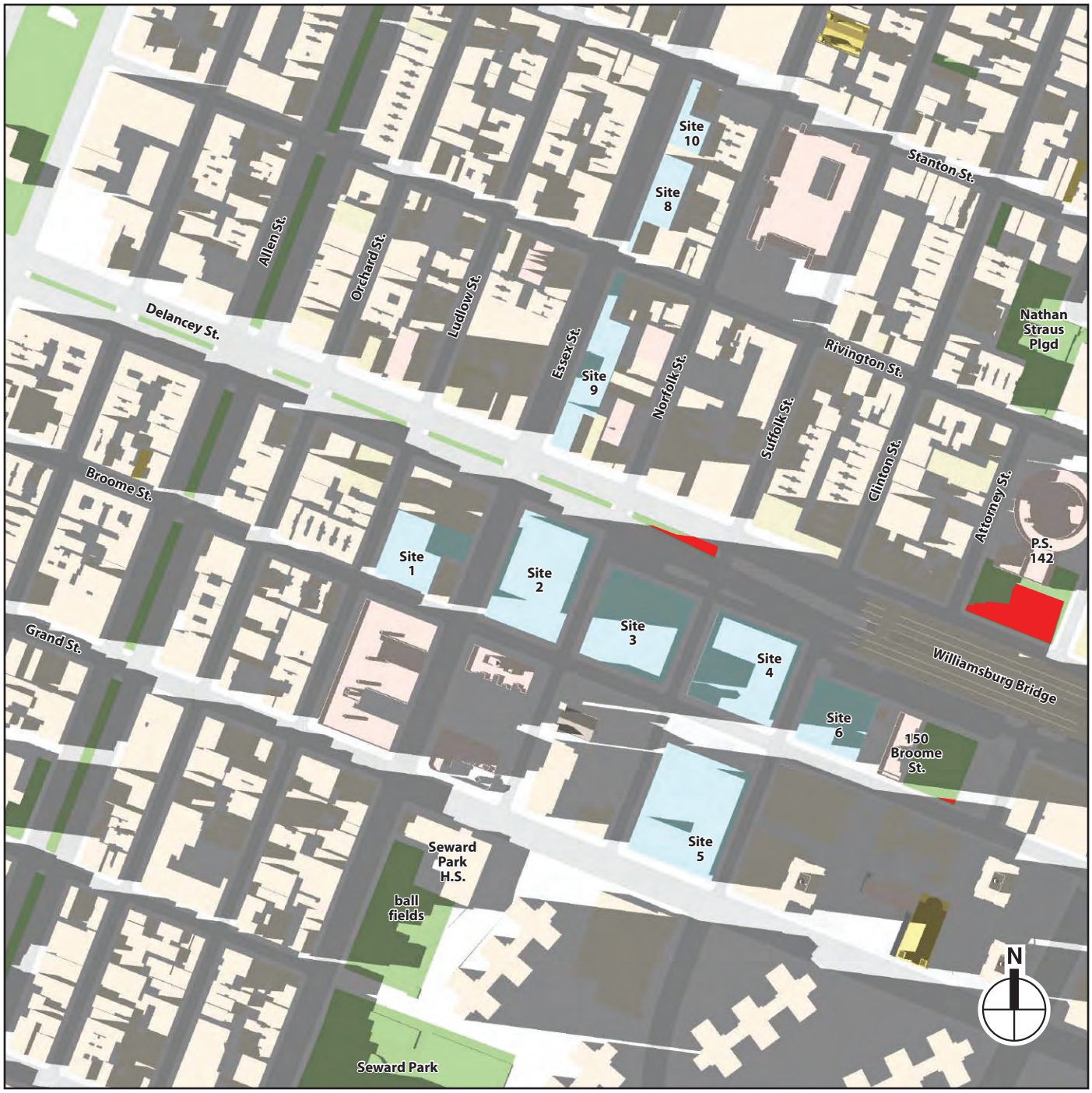
SCALE

Note: Daylight Saving Time not used.

May 6/August 6 - 4:30 PM

Figure 6-26

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

May 6/August 6 - 5:18 PM

Figure 6-27

3.22.12

ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

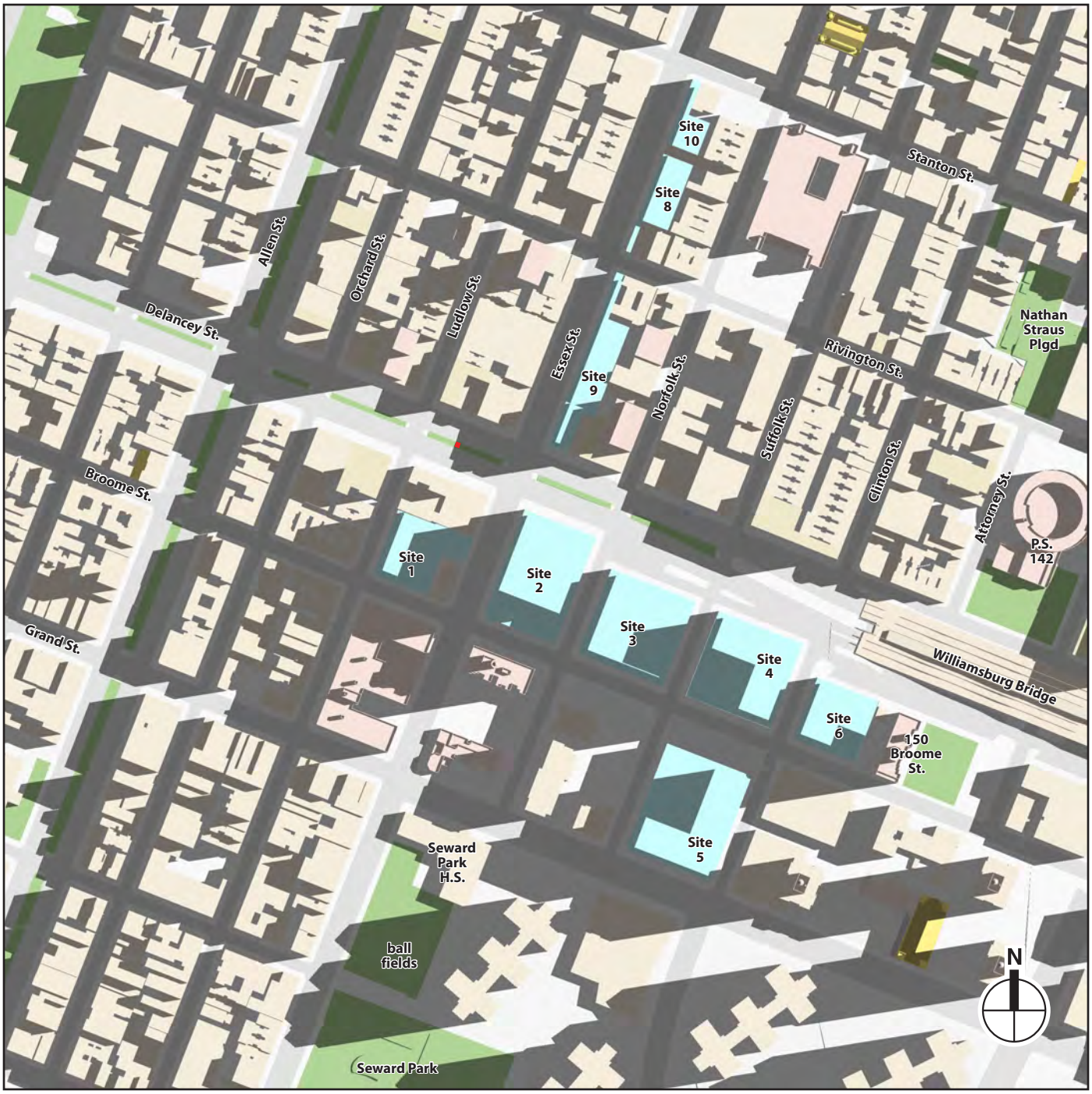
0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

June 21 - 6:00 AM

Figure 6-28



Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

June 21 - 7:00 AM

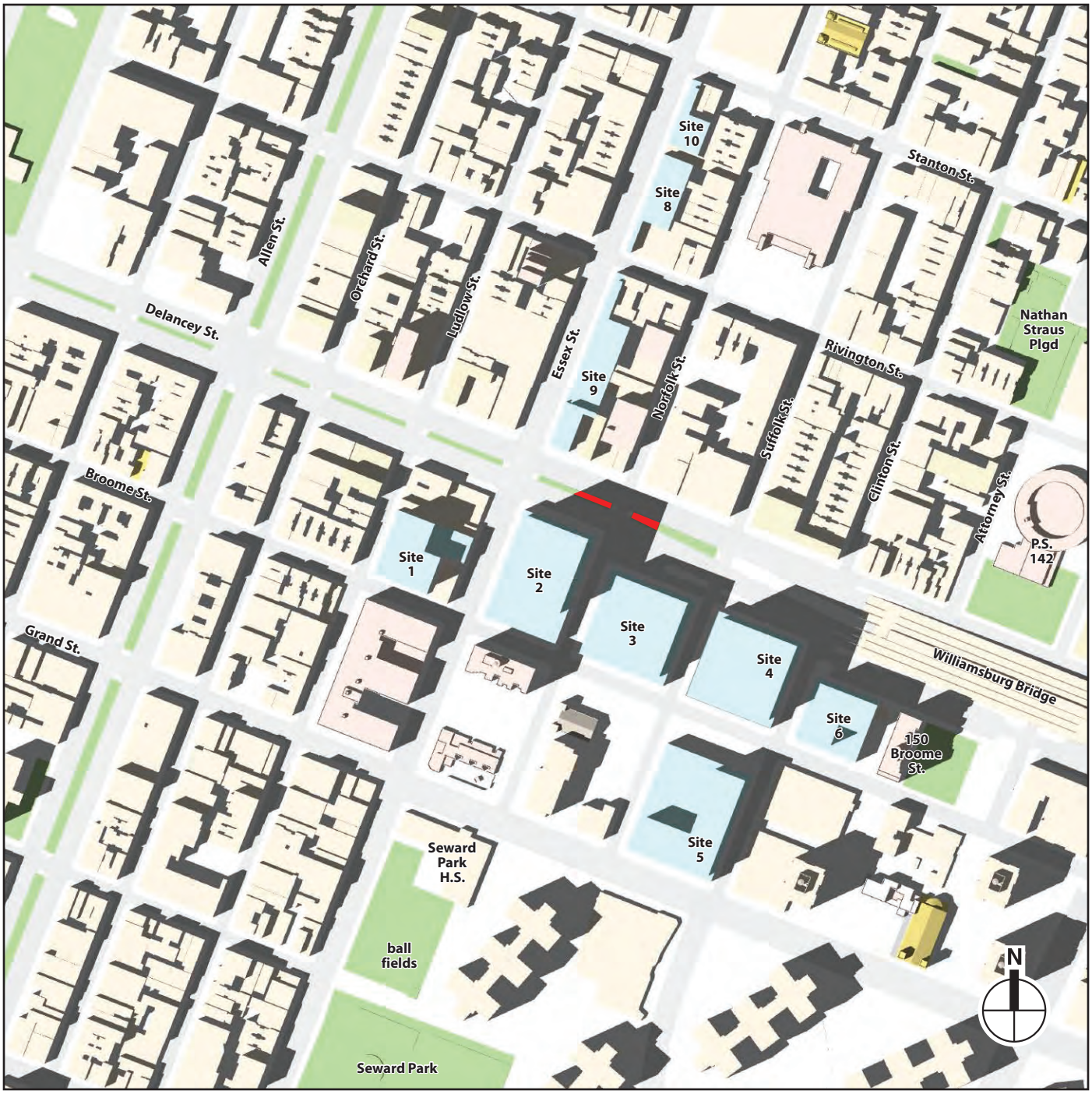
Figure 6-29

Note: Daylight Saving Time not used.

June 21 - 1:00 PM

Figure 6-30

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

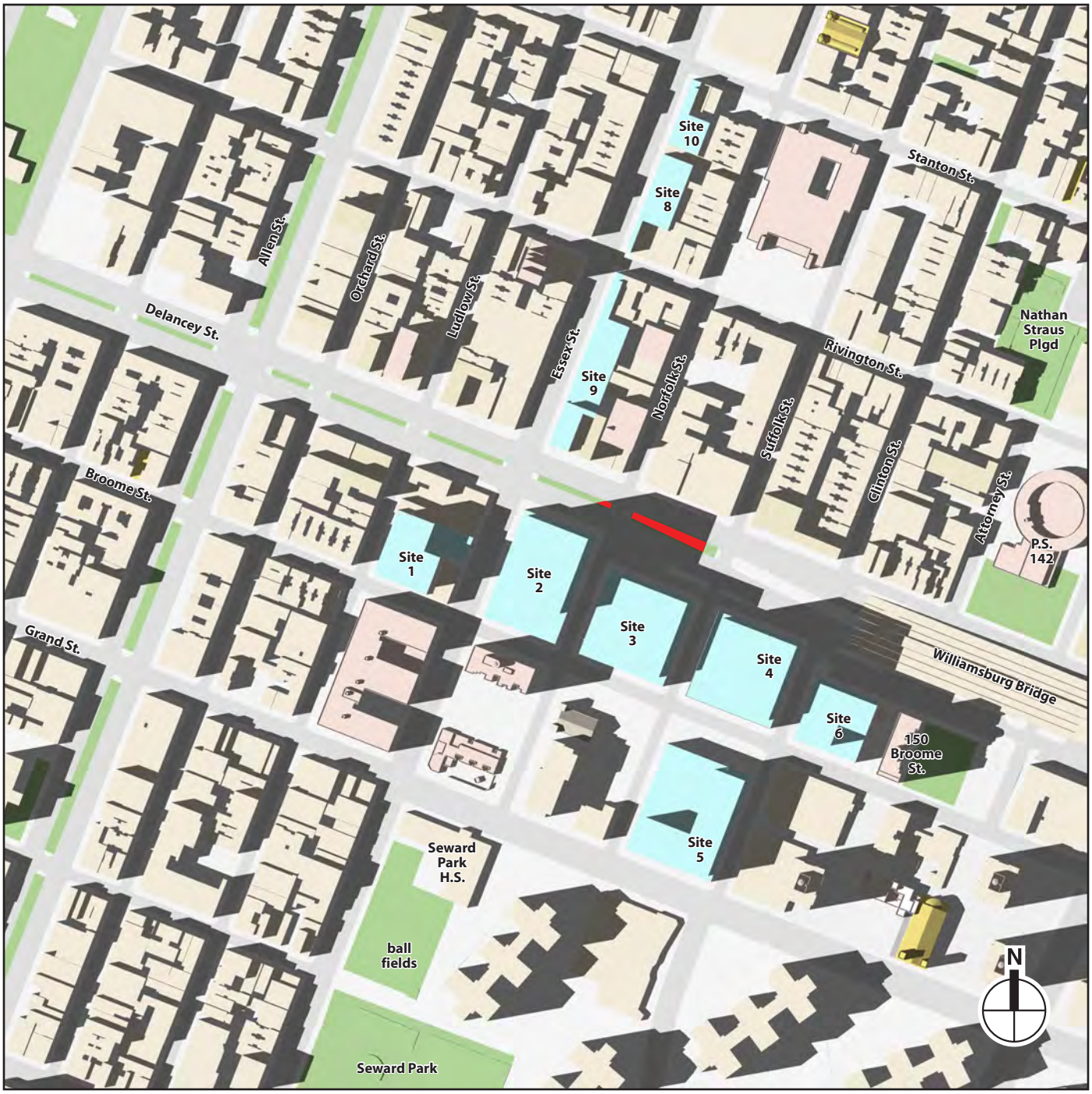
0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

June 21 - 2:00 PM

Figure 6-31



Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

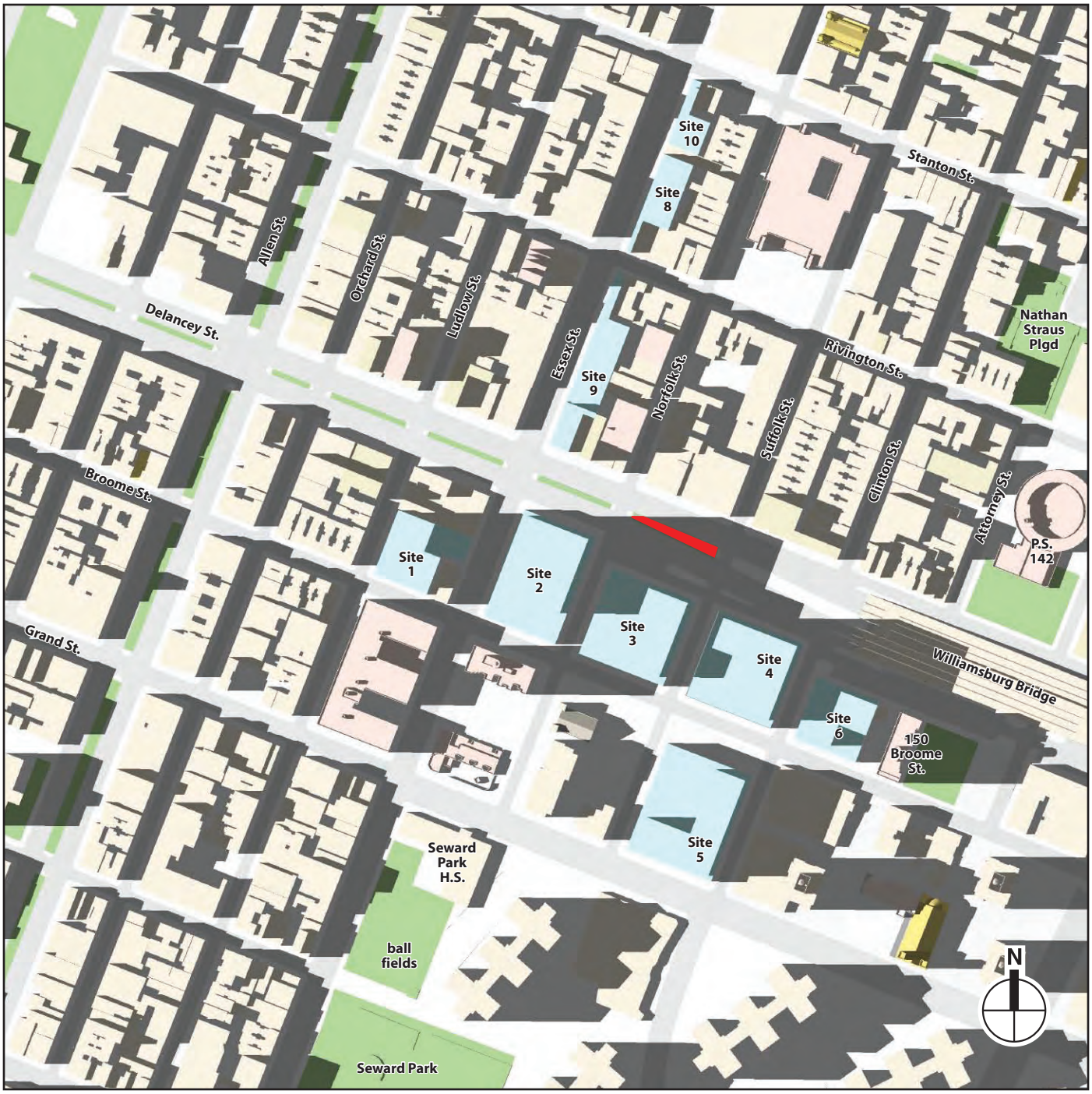
SCALE

Note: Daylight Saving Time not used.

June 21 - 3:00 PM

Figure 6-32

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

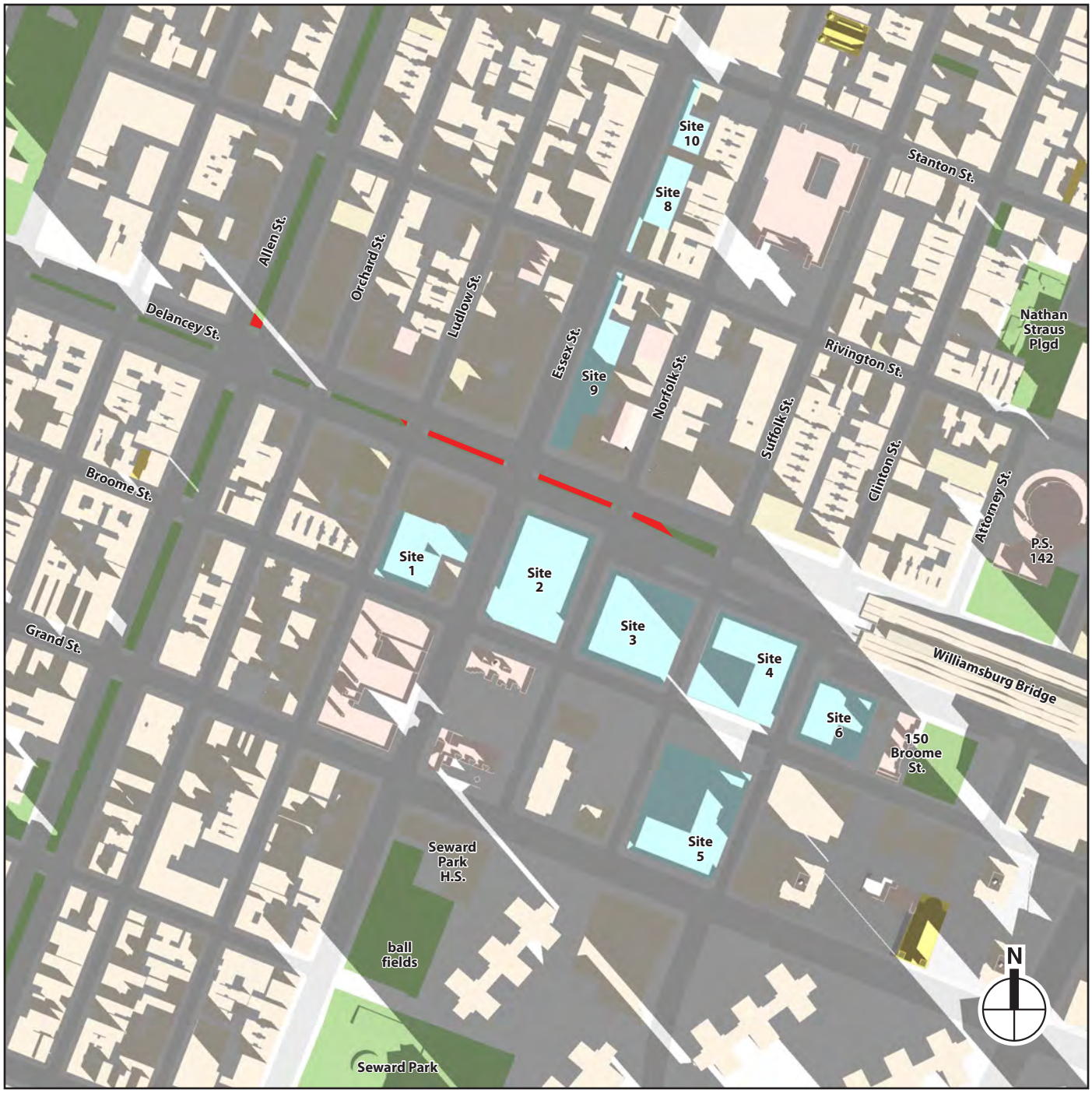
SCALE

Note: Daylight Saving Time not used.

June 21 - 4:00 PM

Figure 6-33

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

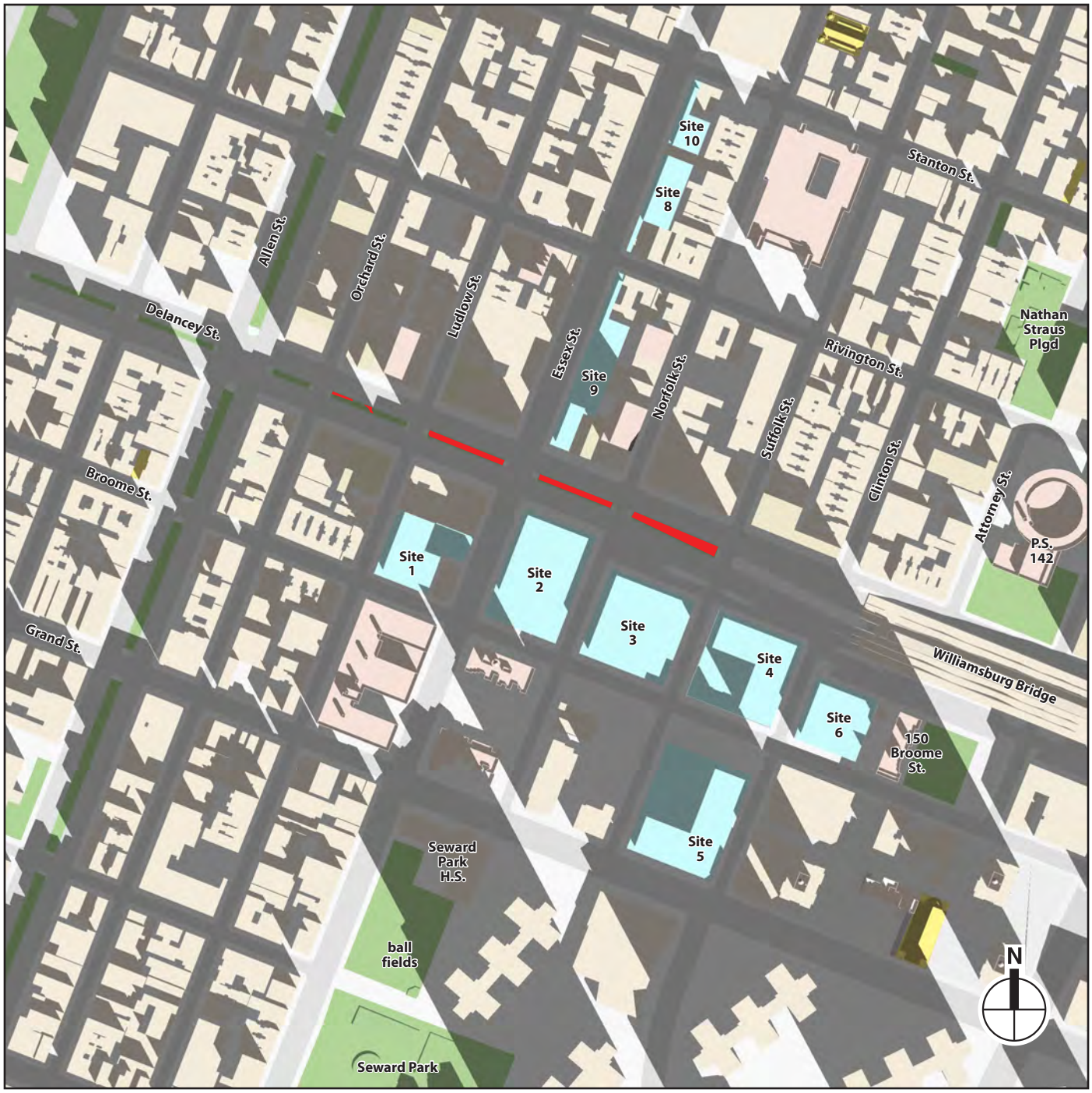
SCALE

Note: Daylight Saving Time not used.

December 21 - 9:00 AM

Figure 6-34

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

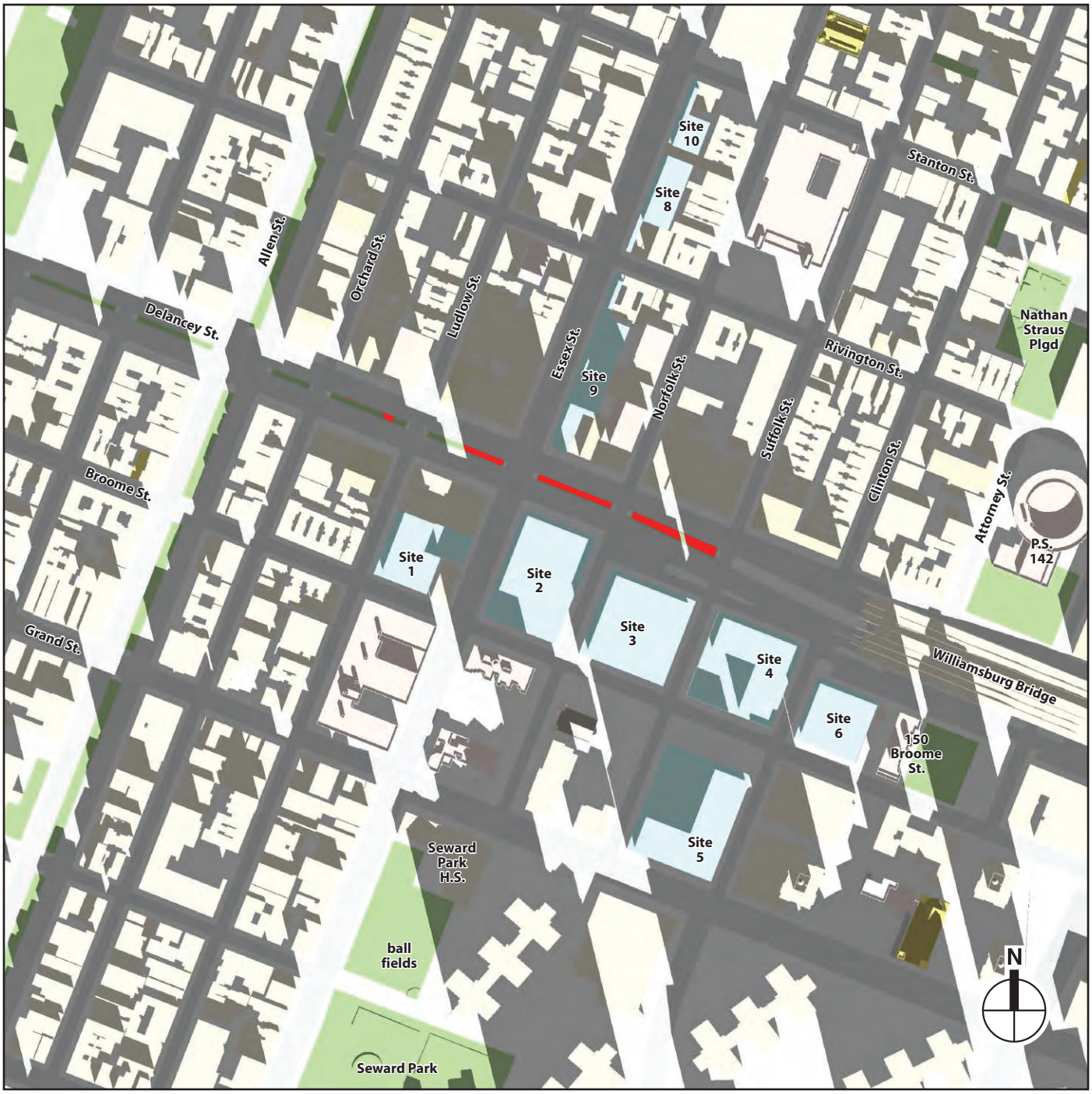
SCALE

Note: Daylight Saving Time not used.

December 21 - 10:00 AM

Figure 6-35

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

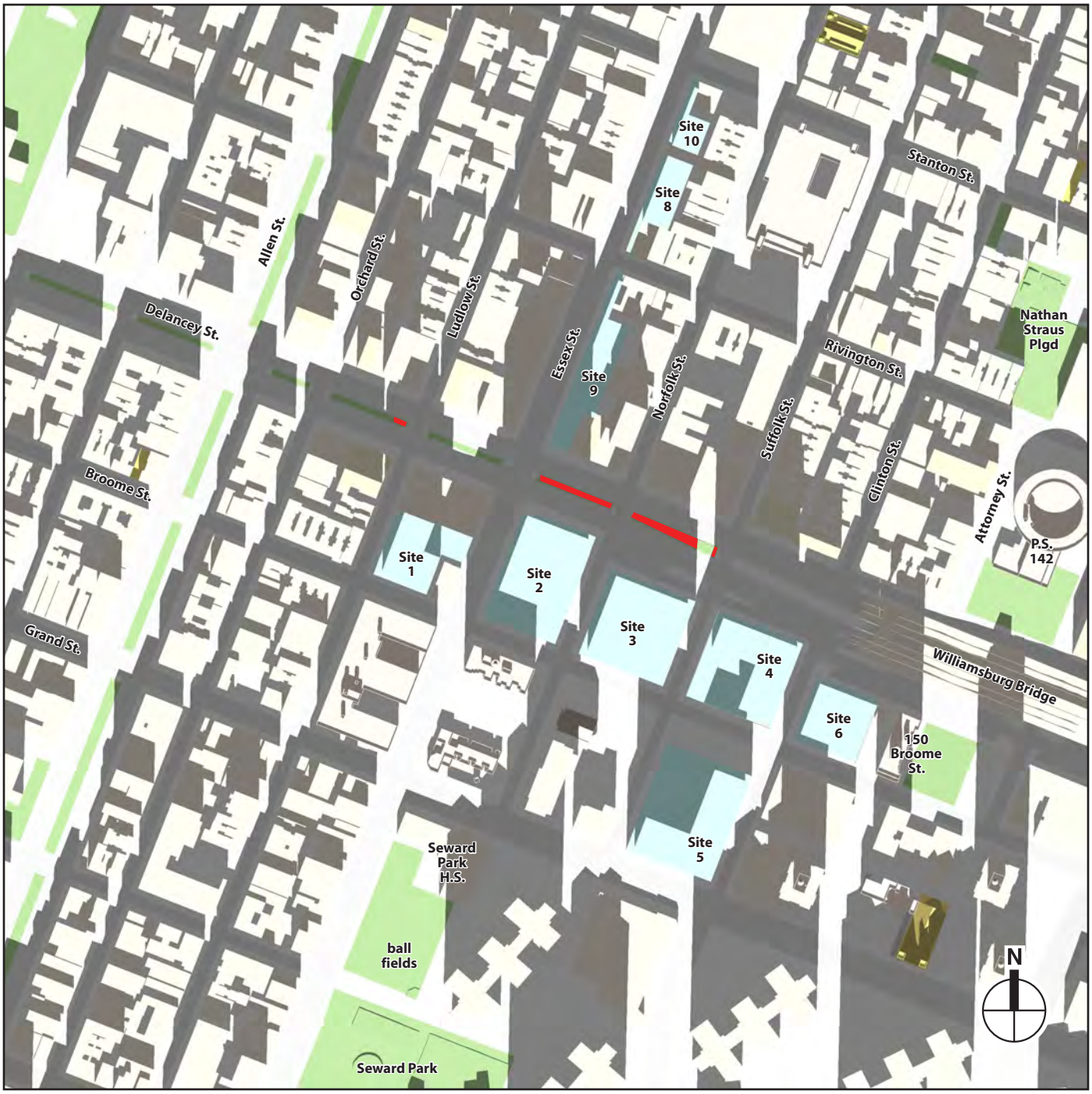
0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

December 21 - 11:00 AM

Figure 6-36



Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

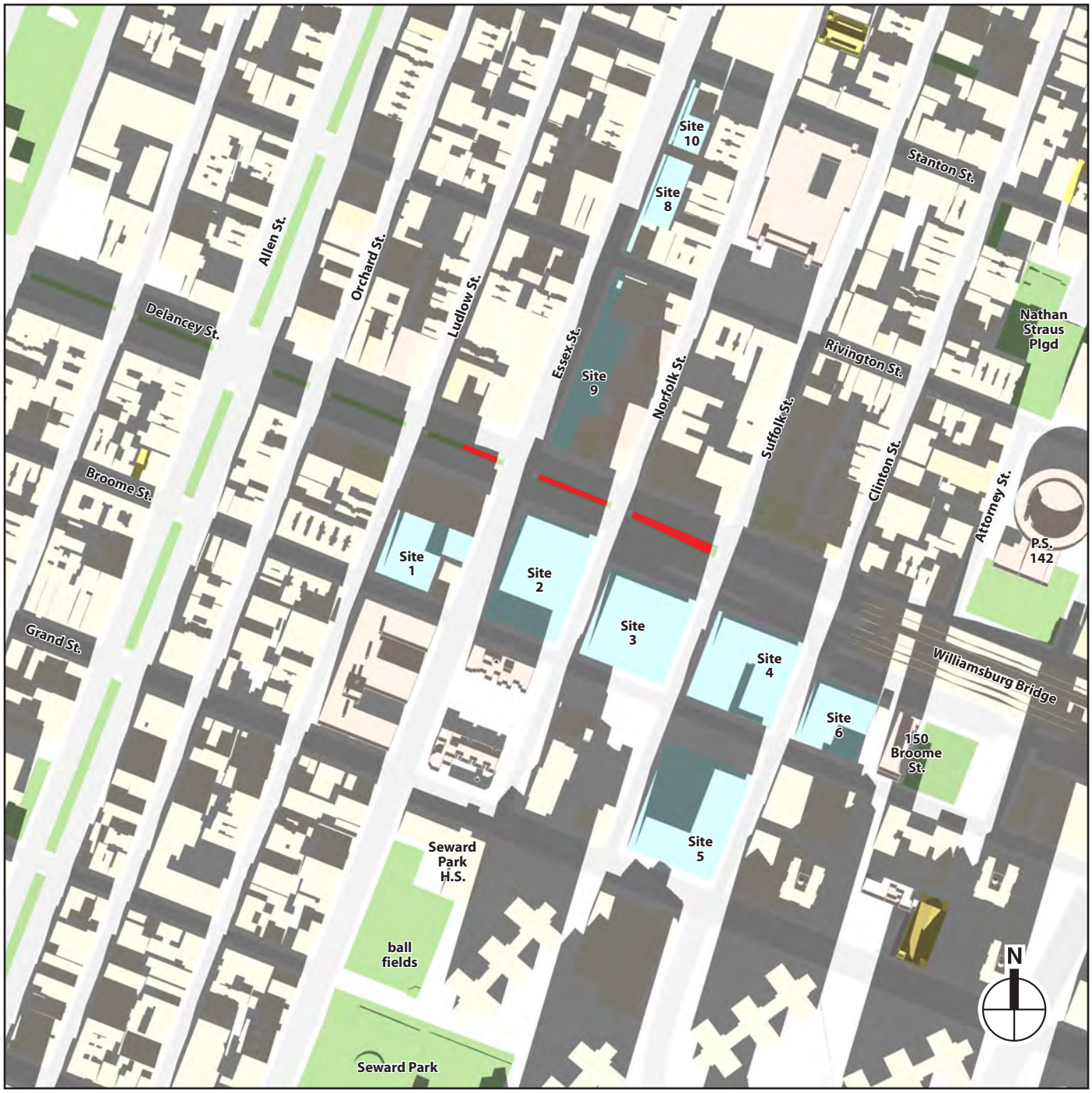
0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

December 21 - 12:00 PM

Figure 6-37

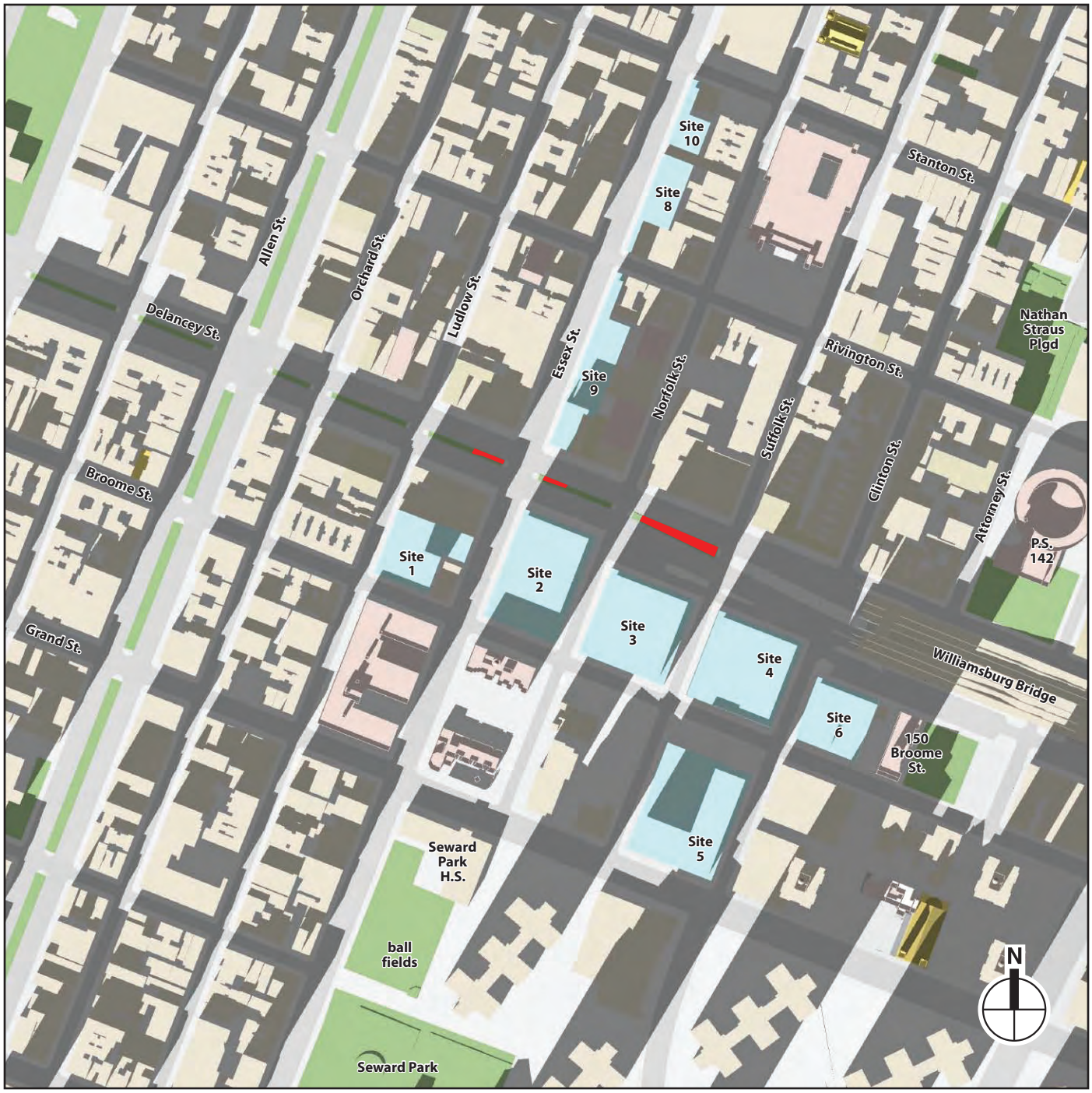


Note: Daylight Saving Time not used.

December 21 - 1:00 PM

Figure 6-38

3.22.12



ILLUSTRATIVE FOR ANALYSIS PURPOSES

Publicly Accessible Open Space and Greenstreets

Historic Resource with Sun-Sensitive Features

Proposed Maximum Envelopes

Incremental Shadow on Sun-Sensitive Resource

0 200 500 FEET

SCALE

Note: Daylight Saving Time not used.

December 21 - 2:00 PM

Figure 6-39

Note: Daylight Saving Time not used.

December 21 - 2:53 PM

Figure 6-40