Chapter 24: Alternatives

A. INTRODUCTION

OVERVIEW

In accordance with the State Environmental Quality Review Act (SEQRA) and City Environmental Quality Review (CEQR), this chapter presents and analyzes alternatives to the Proposed Actions. Under SEQRA and CEQR, alternatives selected for consideration in an Environmental Impact Statement (EIS) are generally those which have the potential to reduce, eliminate, or avoid adverse impacts of a proposed action while meeting some or all of the goals and objectives of the action. In addition to a comparative impact analysis, the alternatives are assessed to determine to what extent they substantively meet the goals and objectives of the proposed action.

This chapter considers a total of nine alternatives: two that were considered by Columbia during planning, but found to be infeasible; a No Action Alternative, in which the Proposed Actions are not undertaken; three alternatives to reduce or eliminate significant impacts identified in the technical analyses; a cogeneration energy supply alternative, which would increase reliability and lower costs of energy for the Academic Mixed-Use Development; and two alternative development scenarios: the Expanded Infill Alternative (development on Columbia and public property only) and the Community Board 9 (CB9) proposed 197-a Plan Alternative. The 197-a Plan Alternative is included at the request of CB9 in order to facilitate a comparison between the Proposed Actions and the 197-a Plan during the parallel public review of both proposals. The alternatives analysis in this chapter is distinct from the environmental review of the 197-a Plan, necessary to support review of the Plan under Section 197-a of the City Charter, and which accompanies that application. Instead, this EIS alternatives analysis considers whether potential zoning regulations consistent with the recommendations of the 197-a Plan would have the same or fewer significant adverse impacts than those of the Proposed Actions, and the extent to which the Plan would meet some or all of the goals of the Proposed Actions. This alternative has been revised since the Draft EIS (DEIS), primarily to allow for more development of community facility uses on properties owned or controlled by Columbia.

PRINCIPAL CONCLUSIONS

The conclusion of the alternatives analysis is that six of the nine alternatives would not substantively meet the goals and objectives of the Proposed Actions. Of the three remaining alternatives, two—one intended to reduce an identified significant shadow impact and the other a significant impact on a historic resource—can address specific shortcomings through several options, as discussed below. The other remaining alternative is an option to include cogeneration for one of the proposed energy plants for energy supply. The feasibility of this alternative depends on several factors, including the cost of producing electricity on campus vs. the cost of

buying the service from Con Edison. Each of the alternatives is summarized briefly below, followed by a more detailed chapter analysis.

ALTERNATIVES CONSIDERED AND REJECTED

Two alternatives to the Academic Mixed-Use Development were considered both during Columbia's planning process and subsequently in response to public comments on the Draft Scope for the Draft EIS (DEIS), but were eliminated from further consideration because they did not substantively meet the goals and objectives of the Proposed Actions.

One of these rejected alternatives would keep the Metropolitan Transportation Authority (MTA) Manhattanville Bus Depot above-grade between West 132nd and West 133rd Streets and Broadway and Twelfth Avenues, with Columbia buildings above. (In comparison, the Proposed Actions, subject to MTA agreement and further review processes, would rebuild the bus depot underground.) This alternative would result in buildings substantially exceeding the proposed zoning's maximum building heights. Further, this alternative would not achieve the Proposed Actions' overall urban design goals and objectives (such as the mandatory streetwall, setbacks at grade, and active ground-floor use requirements), and other Special Manhattanville Mixed-Use District requirements (such as the north–south midblock open area between West 132nd and West 133rd Streets, which could not be built).

An Infill Alternative was suggested during Scoping as an option to accommodate the University's proposed new campus only on sites currently owned or controlled by Columbia, in order to preserve buildings not owned or controlled by Columbia and thereby maintain more of the existing character of Subdistrict A, avoid direct residential displacement, and avoid the possible use of eminent domain. This alternative was evaluated for two scenarios: one (the "FAR 6" scenario) under which the Proposed Actions' zoning is assumed (with certain necessary exceptions) and the floor area ratio (FAR) of Columbia-owned or controlled sites would be 6, as with the Proposed Actions; and one (a "Full Build" scenario) under which the FAR on the Columbia-owned or controlled sites would be unconstrained by the proposed zoning to accommodate all of Columbia's long-term needs on those sites only. In both scenarios, there would be no central, below-grade service area; with the Infill Alternative, most of the uses proposed for the central below-grade space with the Proposed Actions would have to be accommodated above grade. In addition, given the reduced development area in the Infill Alternative compared with the Proposed Actions, both of its scenarios do not include major publicly accessible open spaces.

The Infill Alternative was eliminated from further consideration for the following reasons:

- The FAR 6 Scenario of the Infill Alternative would not meet the goal and purpose of the Proposed Actions to accommodate Columbia's long-term need for program space (5 to 6 million gross square feet [gsf]), since it would accommodate only approximately 42 percent of the total program space (4.8 million gsf) under Columbia's Academic Mixed-Use Development with the Proposed Actions. This situation would require Columbia to seek development sites in Manhattanville, in Morningside Heights, in Washington Heights, and possibly even outside New York City, to accommodate its long-term space needs. In formulating the Proposed Actions, Columbia has determined that ad hoc acquisition of space is not suitable as a long-term growth strategy, because the trends in academia toward coordination among programs and interdisciplinary education require proximity and an integrated campus setting. The Proposed Actions further reflect Columbia's determination that such acquisitions would create continual friction with local communities over individual

building initiatives and that the outcome of ad hoc expansion would be a miscellaneous collection of University buildings scattered in several urban neighborhoods, with little or no connection among them, as there would be if the expansion took place in one area, creating a new "campus."

- Although the Full Build Scenario could theoretically achieve the programmatic floor area identified by the University as necessary for its long-term growth, the resulting development plan would be inconsistent with the goals and objectives of the Proposed Actions, since it would be unconstrained by envelope controls of the proposed Special Manhattanville Mixed-Use Zoning District and would require an FAR of 10. The building heights would not be compatible with either the surrounding structures in the primary study area or the character of the remaining buildings in Subdistrict A; nor would the overall density be compatible with surrounding zoning patterns.
- The Infill Alternative would also not support the goals and objectives of the Proposed Actions to create an, integrated, modern, urban, and open University campus. Under the Infill Alternative, incompatible industrial and transportation uses would be intermixed with university uses, which would detract from the sense of an integrated campus. There would be no central public open spaces, which could be the focus of such a campus. In addition, without a centralized below-grade space for parking and loading, individual curb cuts and loading doors at each new building would be added to the existing ones, further decreasing any sense of a cohesive academic area.
- The Infill Alternative would not support the goals and objectives of the Proposed Actions to create an area that provides amenities for people associated with the University and local residents alike. Because setback and landscaping requirements would only apply to new construction sites, the widening of the sidewalks on east–west streets and the resulting increase in visual access to the waterfront would be irregular and therefore less effective than with Proposed Actions. The need to maximize program space would also result in significantly fewer street-level retail and other publicly accessible uses, which are intended to enliven the streetscape, particularly along West 125th Street, and draw people toward the waterfront.
- In both scenarios, the lack of the central below-grade space would greatly decrease the functionality of the University development and would require that above-grade development include several floors of academic research support and mechanical space. Further, the need to load at each building from the street and to have parking either above grade in each building (Full Build Scenario) or little or no parking at all (FAR 6 Scenario) would increase the number of curb cuts on the streets, discourage pedestrians, and increase the level of loading and parking activity in and around the area. These activities would not be compatible with the establishment of a cohesive University campus.

NO ACTION ALTERNATIVE

In the No Action Alternative, the proposed zoning changes and other land use actions would not be implemented. Unlike the Proposed Actions, which would add new community facilities, University housing, commercial uses, and open space to the Project Area, with the No Action Alternative, there would be a limited amount of new commercial and residential development in the Project Area.

Since the project-related development would not occur in the No Action Alternative, it would not result in the significant adverse impacts that would occur with the Proposed Actions. Specifically, this includes indirect displacement of low-income residents, indirect impacts on passive and active open space, shadows on the I.S. 195 Playground, demolition of a historic building (the former Sheffield Farms Stable), and various traffic, parking, transit, noise, and construction impacts. As with the Proposed Actions, the No Action Alternative would have no significant adverse impacts in the other technical areas. Modifications of the 125th Street IRT subway station and the Manhattan Valley IRT viaduct, which are proposed to address transit impacts, would not be provided in the No Action Alternative.

The existing manufacturing zoning districts in the Project Area do not permit college or university uses (or other related community facility uses listed under zoning use group 3). As a consequence, Columbia University would not be able to develop any academic uses in the No Action Alternative; this alternative would only contain Columbia University administrative buildings in the Project Area. As a consequence, the No Action Alternative would not facilitate the creation of modern facilities of a major university with space for teaching, academic research, the study of arts and humanities, and the education of professionals. In addition, the changes anticipated in Subdistrict B and the Other Area east of Broadway, changes that would enliven Twelfth Avenue in support of a new waterfront park and bring new activity to the Broadway corridor, would not occur. Thus, the No Action Alternative would not meet the goals and objectives of the Proposed Actions, including the revitalization, improvement, and redevelopment of a portion of the Manhattanville section of West Harlem, and the fulfillment of Columbia's role as a leading academic institution that makes a significant contribution to the economic, cultural, and intellectual vitality of New York City. In addition, the No Action Alternative would not realize the economic benefits of the Proposed Actions, including the creation of an average of approximately 1,215 full-time equivalent construction jobs for 22 years and 7,086 permanent jobs.

ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT ADVERSE IMPACTS

The impact analyses for the Proposed Actions identified shadows, historic resources, and noise significant impacts for which there is no practicable mitigation. The feasibility of alternatives that would reduce or eliminate these unmitigated significant impacts is examined below.

Shadows

As mentioned above, new construction from the Proposed Actions would cast incremental shadows on the I.S. 195 Playground, with significant adverse impacts during the December and March analysis periods. Recognizing that the December shadows would be impossible to reduce enough to affect the impact and that the colder weather is a time when the playground is less well-used, the analysis concentrated on the March/September 21 analysis period. To reduce the incremental shadows from the Proposed Actions to within acceptable limits, the maximum heights of the buildings on Sites 11 (west side of Broadway at West 133rd Street) and 12 (just west of Site 11) would have to be modified, to lower the height on Site 11 and increase it on Site 12, and the mass of the building on Site 11 would have to be arranged so that the eastern half of the site had a height of no more than 146 feet. This would reduce noontime and afternoon shadows from the Proposed Actions to within acceptable limits. To decrease the morning shadows, however, would require that the academic research building proposed for Site 17 (east side of Broadway between West 133rd and 134th Streets) be reduced in height by at least four stories, perhaps more, depending on how the rooftop mechanical structures could be located. The

academic research floor area removed from Site 17 could be accommodated within the maximum height and FAR limitations on the four other sites assumed for academic research use (located west of Broadway between West 129th and West 132nd Streets). This approach could also be taken to reduce the height of the building on Site 11 without changing the height or bulk on Site 12. However, accommodating this floor area on the four "receiving" buildings would result in these buildings being taller than they would otherwise have been under the University's Illustrative Plan. The Illustrative Plan, which demonstrates the University's current approach to the design of the development, attempts to limit the height of the buildings along the Broadway corridor opposite the Manhattanville Houses.

Another approach would be to simply reduce the size of the buildings that create the impact, without replacing the space elsewhere. However, this option would reduce the total program space by approximately 449,000 square feet (sf) to approximately 4.7 million sf, and thus it would conflict with the goal of the Proposed Actions to provide 5 to 6 million sf of program space for Columbia's long-term space needs.

Also being considered as a result of comments made during DEIS and project review is the option to place University housing on Sites 11 and 17, which would greatly reduce the height of buildings on those sites and proportionally reduce shadows. This alternative arrangement would greatly reduce shadows on the playground during the March/September 21 analysis days, so they would not be on the playground for the entire day, in contrast to the Proposed Actions' shadows. There would be some shadow from Site 17 in the morning, but it would move off the playground much more quickly, so that at 10:00 AM it would cover only a small area along the southeast edge, rather than more than half the space as under the Proposed Actions. By 10:45 AM the shadow would be gone; under the Proposed Actions, the shadow would not exit until 12:45 PM. In the afternoon, under both scenarios an incremental shadow from the building on Site 11 would enter the southern part of the playground. However, the alternative use and height scenario would substantially reduce the extent and duration of the incremental shadow during the early afternoon.

This is one alternative/project modification that would address the shadows impact. After reviewing each of the potential options for reducing or eliminating the impact, this FEIS concludes that the two realistic options are either to maintain the project land uses and building heights as proposed, allowing the impact to occur, but applying mitigation to the playground, or to seek a modification to the Proposed Actions and to change the uses and related building heights and configuration, and thus the building sizes on Sites 11, 12, and 17.

Historic Resources

Under the Proposed Actions, the former Sheffield Farms Stable is proposed to be demolished—a significant adverse impact on this historic resource. Measures were developed under the Proposed Actions to partially mitigate the adverse impacts These measures include Historic American Buildings Survey (HABS) Level I documentation of the exteriors and interiors of the former Sheffield Farms Stable and development and installation of a permanent interpretive exhibit or exhibits in or near the Project Area to document the history of the former Sheffield Farms Stable and to encompass the larger history of the Manhattanville neighborhood. Elements that would be considered for the exhibit include the HABS Level I documentation, salvaged elements of the former Sheffield Farms Stable, historic and current photographs and a historical narrative, historic industrial elements salvaged from the Studebaker Building, and interactive and multimedia features. However, these measures would not fully mitigate the significant adverse impact.

Potential alternatives to eliminate the impact of removal were evaluated, including the following:

- Retaining and reusing the building for academic research use,
- Incorporating all or a portion of the building into the proposed Jerome L. Greene Science Center, including retaining 50 percent of the building and just its Broadway façade, and
- Relocating the Jerome L. Greene Science Center to another location in the Phase 1 development area.

These options were considered in a historic feasibility study that was submitted to OPRHP for review that considered factors associated with retaining and adaptively reusing the building for academic research use. The study concluded that it is not feasible to adaptively reuse the former Sheffield Farms Stable for academic research use, or incorporate all or a portion of the building into the proposed Jerome L. Greene Science Center, or move the building to another location in the Phase 1 area, since such alternatives would not allow the project to meet its goals and objectives with respect to the Jerome L. Greene Science Center, and would significantly reduce the amount of usable space above grade and below grade associated with the Jerome L. Greene Science Center.

In a letter dated November 14, 2007, the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) concurred that it is not appropriate to retain just a portion of the former Sheffield Farms Stable or just its façade, but requested that an additional alternative be studied, as follows:

- Relocate the Jerome L. Greene Science Center to the southern half of Block 1996, avoiding the former Sheffield Farms Stable altogether, and provide appropriate floor area for the academic research building in a long rectangular shape. This would produce a building of approximately 100 by 345 feet. It would extend westward from Broadway; its west façade would abut the north-south midblock passage. This relocation would eliminate the small square from south side of the block and the "Lantern" building from Site 3. OPRHP has suggested that to retain these two uses in the project, consideration could be given to moving them to the north side of the block (on the south side of West 130th Street) where they would not be visible from West 125th Street.

This alternative was found to be not feasible for the following reasons:

- A footprint of 34,500 sf (100 feet by 345 feet) would be hypothetical only and not achievable under this scenario. In reality, assuming a reduction of 15 percent for internal and external articulation, a 29,325-gsf floor plate would result, which could accommodate 8 full Principal Investigator units averaging 3,500 gsf per team. Under the Proposed Actions, the Jerome L. Greene Science Center would function in research neighborhoods of between 9 and 10 Principal Investigators on each academic research floor, at the 3,500 gsf per team necessary for the advanced neuroscience and interdisciplinary research program of the facility.
- A narrow, long building would not allow for the efficient use of space on each floor. Corner-to-corner walking distances would be greatly increased, central conference and break areas—which promote collaboration—could not be achieved, and vertical circulation would be decentralized. The benefits of a more square configuration of the Jerome L. Greene Science Center under the Proposed Actions, which allows for offices and other key local lab support functions to be in close proximity to the lab benches, would not be achieved in a long, narrow building.

- To accommodate a larger floor plate for the Jerome L. Greene Science Center would require that the building extend into the area planned for the midblock north-south passageway, thereby effectively eliminating one of the remaining open space features of Phase 1 and removing one leg of the north-south open area which, under the Proposed Actions, would extend physically and visually from Prentis Hall through to West 133rd Street. Further elongation of the building would exacerbate the problems cited above. Another option to achieve the building's full program would be to add floors. To accommodate at least 75 Principal Investigator units required in the buildings' program, two additional academic research floors would be necessary.
- Retaining the Sheffield Farms Stable poses considerable engineering problems with respect to building the below-grade research support space, because of site conditions that require slurry wall construction. It is more practicable to build the slurry wall through the block at a point at least 100 feet west of Broadway, instead of trying to build the wall around the building. However, with the slurry wall located 100 feet or more west of Broadway, the portion of the site east of the wall could only have a conventional basement. This would result in approximately 20,000 gsf less for each of the two below-grade research support floors; a portion of that space would have to be provided above grade. Added to the two additional floors required to adjust to the smaller floor plate, this means that the building would be at least three stories (approximately 48 feet) taller than the building proposed under the Proposed Actions. The narrower below-grade support space below the Jerome L. Greene Science Center would constrain Columbia's ability to program that space efficiently for use by all of the Broadway academic research buildings.

In addition, the relocation option identified by OPRHP would significantly affect the ability of the plan to achieve key goals and purposes, as follows:

- With the arrangement of buildings and open space, the Phase 1 development would not create a gateway to the waterfront along West 125th/129th Street. The street would be characterized by a small open space (the Grove) viewed against the large continuous streetwall of the Jerome L. Greene Science Center behind it. The view north into the campus would be through a 50-foot-wide midblock passageway between two large buildings. The two loading docks slated for the Jerome L. Greene Science Center on West 130th Street would have to be moved to West 129th Street, where they would be partially visible from West 125th Street and where their curb cut would reduce the attractiveness of West 129th Street as a pathway to West 125th Street and the river.
- The arrangement of open spaces under this alternative would not meet the goals of the Proposed Project. The relocated Small Square would not function as an entrance to the new campus, for it could not be seen from West 125th Street. Similarly, the midblock open area would be confined to a lane between two buildings, and it could not offer views of the large Square and the Studebaker Building to the north. Thus, the pattern of development this alternative would require would reduce the functionality of the Proposed Project's open spaces and would detract from the ability of the Phase 1 development to function as a campus and to appear as a gateway to the remainder of the campus to the north.

Measures that would partially mitigate the significant adverse impact resulting from the demolition of the building for the initial (2015) phase of development are described in Chapter 23, "Mitigation." Consultation among OPRHP, ESDC, and Columbia will continue.

Noise

The Proposed Actions would result in an unmitigated significant noise impact on pedestrians at noise receptor Site 10, where installation of a new midblock traffic signal at West 125th Street between Twelfth Avenue and St. Clair Place would result in increased noise levels. Eliminating this significant noise impact requires an alternative that does not provide for a new traffic signal at this location. As such an alternative would not improve pedestrian safety and would fail to meet the needs for traffic management at noise receptor Site 10, it is not considered a reasonable alternative.

EXPANDED INFILL ALTERNATIVE

In response to comments made during public review of the DEIS and the Illustrative Plan, an alternative has been developed which considers whether the goals and purposes of the Proposed Actions could be accommodated under a scenario that assumes Columbia University would develop using only public property and property owned or controlled by Columbia. The alternative assumes that publicly owned properties, both above and below grade, could be acquired for redevelopment as part of the Academic Mixed-Use program. Under this alternative, some portions of most of the blocks in the Academic Mixed-Use Development area would be excluded from the University development. The development scenario created for this alternative assumed that the proposed zoning, including FAR limitations and maximum heights, would apply to all development sites in the Project Area.

Academic Mixed-Use Development Plan—Development Plan and Scenario

This alternative would contain all the uses in the Academic Mixed-Use Development scenario for the Proposed Actions, but would give preference to academic research to the extent possible. The development sites under this alternative would be more limited and of different sizes and shapes than those of the Proposed Actions; therefore, the development scenario would assume uses for each site based on its suitability for a particular type of development, irrespective of the General Project Plan (GPP) use limitations for development sites under the Proposed Actions. This alternative assumes the same minimum floor plate—25,000 sf to accommodate an academic research use and 15,000 sf to accommodate an academic use—as the Proposed Actions. The alternative also assumes that public land under streets could be acquired; there would be some deep below-grade support space for some of the functions accommodated in the Proposed Actions.

This alternative would provide publicly accessible open spaces, also a goal of the Proposed Actions, but these would be fewer and smaller than those of the Proposed Actions. This alternative would also seek to accommodate all the parking demand of the Academic Mixed-Use Development, as the plan in the Proposed Actions does.

The University land use pattern under this alternative would differ from that of the Proposed Actions. The six academic research sites would not be concentrated along Broadway; they would be located, instead on Twelfth Avenue, in the midblocks, and on Broadway. Sites for academic buildings and University housing would also be fit in wherever possible, and the sites for the housing would be small. Other aspects, such as the central Square, would be smaller, although located in the same place as with the Proposed Actions. The north-south midblock pedestrian passage would be shorter, while the east-west one would be the same as with the Proposed Actions. This alternative would require that parking be provided above grade in a garage on Site 13; the recreation program, reduced to a third, would be located above the garage. The former

Warren Nash Service Station building would be converted to academic use, as with the Proposed Actions, and the academic research building on Site 15 would be similar in size and scale to that of the Proposed Actions. Under this alternative, there would only be a smaller deep basement limited to the area beneath the two academic research sites on Twelfth Avenue and beneath the central Square. This alternative could also add parking levels below grade at this location, and could accommodate the relocation of the MTA Manhattanville Bus Depot below grade. This alternative would require more street-level loading docks in more locations and more curb cuts for car ramps than the Proposed Actions (although it would not require a truck or bus ramp).

This alternative could achieve only 65 percent of the total University program available under the Proposed Actions and 60 percent of its academic research space. The reduced floor area available for program space is a function of several factors. There would be less lot area available under this alternative than under the Proposed Actions. Below-grade space would be smaller and would provide shared academic research support for only two buildings. In addition, there would be no centralized mechanical space. Consequently, mechanical space and academic research support space would have to be provided above grade—with redundant facilities, further limiting the amount of space available for academic research programs.

This alternative would also not allow for development of Phase 1 of the Columbia plan, and the Jerome L. Greene Science Center would not be built on Site 3. Moreover, because the site of the academic building intended for the Business School in the Proposed Actions (Site 4) would be constrained by the private property directly to its west, it would be necessary to eliminate the Lantern building and the Small Square that are part of the Proposed Actions in order to fit it. If Site 3 were instead used for academic research purposes, the amount of floor area needed on Site 3 would reduce the amount of floor area on Site 4, since development on this block is subject to zoning floor area limitations. This, in turn, would result in insufficient floor area to accommodate the Business School. Columbia advises that if the Business School were unable to come to Manhattanville, a relocation of the School of International and Public Affairs (SIPA) would be unlikely as well. Finally, there would be no room for the School of the Arts due to the loss of the Lantern building.

Without these key program uses and lacking the open spaces of the Proposed Actions, Phase 1 program goals would not be achieved. The collection of buildings that would result in the Phase 1 area under this alternative would not fulfill the land use and urban design objectives of Phase 1 to create a West 125th Street gateway to the waterfront, as well as a gateway to the new campus.

Assumptions for Private Development

The Expanded Infill Alternative assumes that most of the private properties in Subdistrict A not in Columbia's ownership or control would be redeveloped to market-rate residential uses, under the regulations of the proposed Special Manhattanville Mixed-Use District. Altogether, this alternative would produce 337 units of housing, 293,280 sf of retail use, 54,800 sf of office use, and 61,700 sf of community facility use. Total new development in the Project Area under this alternative would be 5.5 million sf as compared with 7.09 million sf for the Proposed Actions.

Expanded Infill Alternative Compared With the Proposed Actions

A comparison of the impacts of the Expanded Infill Alternative compared with the Proposed Actions found the following:

- Neither the Proposed Actions nor the Expanded Infill Alternative would generate significant adverse impacts on land use, zoning, and public policy; community facilities, urban design

and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization; infrastructure; solid waste and sanitation services; energy; traffic in the Project Area; pedestrians; air quality; or public health.

- Like the Proposed Actions, by 2030 the Expanded Infill Alternative would have no significant adverse impact on direct residential or business displacement, on indirect business displacement, or on specific industries, but it could have a significant adverse impact on indirect residential displacement, affecting 1,319 unprotected units in the primary study area, including 823 units in the Riverside Park Community/3333 Broadway. However, the likelihood of this impact occurring would be somewhat less under the Expanded Infill Alternative than with the Proposed Actions.
- Like the Proposed Actions the Expanded Infill Alternative would add areas of passive open space in the Project Area (1.6 acres to the Proposed Actions' 2.16 acres), but it would also add population and thereby decrease open space ratios, resulting in significant adverse open space impacts. Both alternatives would result in a decline in active open space ratios by 2030, and would therefore require mitigation.
- The Expanded Infill Alternative would result in significant traffic impacts requiring mitigation on East 125th Street; these impacts would be similar to those identified for the Proposed Actions.
- Compared with the Proposed Actions, this alternative would produce a greater parking shortfall (530 spaces vs. 120 spaces). Mitigation measures for the Proposed Actions would eliminate this significant impact; for this alternative the measures would only partially mitigate the impact.
- Although the Expanded Infill Alternative would generate fewer bus trips than the Proposed Actions, significant adverse bus impacts are still expected to occur, albeit at lower magnitudes and requiring fewer additional buses to mitigate the projected impacts.
- Both alternatives would result in significant noise impacts at receptor Site 10. At all other locations, both alternatives, with or without traffic improvements, would not result in any significant noise impacts. It is expected that comparable levels of attenuation, and at the same locations, would be necessary under the Expanded Infill Alternative as those specified under the Proposed Actions.
- The Proposed Actions would result in traffic and noise impacts during construction; under the Expanded Infill Alternative, such impacts could occur, but most likely at a lower level than with the Proposed Actions.
- Unlike the Proposed Actions, the Expanded Infill Alternative would not have any of the following significant adverse impacts: shadow impacts on the I.S. 195 Playground; impacts on historic resources; or an impact from an increase of passengers on the escalator at the 125th Street No. 1 subway station.

Ability to Meet the Goals and Objectives of the Proposed Actions

The Expanded Infill Alternative would only partially meet the goals and objectives of the Proposed Actions for the following reasons:

- The Alternative could not accommodate Columbia's long-term needs for space. Whereas the Proposed Actions would produce 4.8 million sf of academic program space, the Expanded Infill Alternative would produce only 3.1 million sf of academic program space, or 65 percent of the required floor area. Space for academic research, the University's key

program objective, would be only 60 percent of that of the Proposed Actions (1.6 million sf compared with 2.6 million sf). Because this Alternative would not fulfill long-term needs for space, the University would not be able to avoid ad hoc acquisition of properties in neighborhoods outside of Columbia's existing campuses.

- The loss of floor area compared with the Proposed Actions would occur at critical locations, which would further reduce the alternative's ability to meet project goals and objectives. In particular, there would not be enough space for the Phase 1 uses—the Jerome L. Greene Science Center, the Business School, and the School of the Arts. In addition, according to Columbia University, SIPA has been attracted to a location in Manhattanville based largely on the presence of the Business School, with which it enjoys a strong relationship; Columbia advises that if the Business School were unable to come to Manhattanville, a relocation of SIPA would be unlikely as well. There would also be less room for active, contiguous ground-floor retail, no space at all for the Small Square, and the land for the Grove would not be available. Thus, this alternative would not achieve the Phase 1 objectives of transforming West 125th Street as a gateway to the waterfront and the West Harlem Waterfront park, or of acting as a major entrance to the proposed new graduate Manhattanville campus for Columbia University.

- The lack of the full central below-grade service area would reduce the functionality of the Academic Mixed-Use Development, restrict the ability of the University to produce buildings with full program space, and limit the ability to create a campus environment. Specifically, without the full central below-grade service area, below-grade parking and loading would be limited, and shared academic support space would serve only two buildings. There would also be no centralized below-grade mechanical systems and no additional floor area below-grade for Business School classrooms and other academic programs. Also, each building would need to have its own truck loading docks and those buildings with below grade parking would each have car ramps on the streets. Above-grade loading and parking facilities would interrupt the continuity of active ground-floor uses and result in parking and loading activities that would be incompatible with a campus environment. In addition, support uses that would be shared among buildings when located below grade under the Proposed Actions would, if located above grade, have to be duplicated in each building—each building would have its own boilers and mechanical system, each would have to have a mechanical floor above grade, and each academic research building would have academic research support space occupying at least two above-grade floors. Locating support space above grade would restrict the amount of program space that could be achieved in each building, and the ability of the University to achieve its program goals would be constrained.

- This alternative would create a development with less open space and fewer amenities for University and community users, without substantially improved pedestrian conditions or improved visual and physical access to the waterfront. As noted above, the open spaces would be fewer and smaller than under the Proposed Actions, and the north-south pedestrian path would be only two blocks long, although there would be a central square. The curb cuts and truck docks would diminish the attractiveness of the area for pedestrians. The reduction in active ground floor uses and their lack of contiguity would also decrease the area's attractiveness for pedestrians. The absence of widened sidewalks on the narrower side streets would also reduce this alternative's ability to improve views of and access to the waterfront.

COMMUNITY BOARD 9 PROPOSED 197-A PLAN ALTERNATIVE

During this DEIS's public scoping process, CB9 and other community members requested that the CB9's proposed 197-a Plan ("197-a Plan") be considered as an alternative to the Proposed Actions. The 197-a Plan calls for a mix of manufacturing, commercial, community facility, and residential uses in the Project Area, consistent with one goal of the Proposed Actions. However, the 197-a Plan differs substantively from the Proposed Actions with regard to accommodating the long-term needs of Columbia University for expansion. The focus of the 197-a Plan objectives is on preserving and attracting manufacturing uses to form a job base for local residents, increasing affordable housing opportunities in the area and maintaining the current neighborhood character with a wider mix of uses.

Working with CB9 leadership, the New York City Department of City Planning (DCP) developed a set of potential zoning regulations consistent with the 197-a Plan, to be used for purposes of this analysis. These regulations would increase density in the portion of the Project Area east of a line parallel to and 250 feet east of Twelfth Avenue plus the Other Area east of Broadway (which together constitute Subdistrict 2[1] of the 197-a Plan), and would permit residential and community facility uses in that area. Development for residential use would require a significant affordable housing component. A key aspect of the zoning for Subdistrict 2 would be the requirement that 80 percent of the first two floors of any new construction or conversions/expansions be devoted to manufacturing use; the remaining 20 percent would be commercial use. (After a good faith effort of one year to obtain manufacturing tenants on the first two floors of their buildings, owners could apply for a Special Permit, which would permit them to develop commercial and community facility space instead.) In addition, the zoning in Subdistrict 2 would preserve the existing streetwall, so that new infill development would relate to the existing built environment. In an area which corresponds to Subdistrict B, plus the portion of the Project Area east and within 250 feet of Twelfth Avenue (Subdistrict 1 of the 197-a Plan), a manufacturing zoning designation would remain, and residential and community facility uses would continue to be prohibited. In Subdistrict 1, retail uses would be limited to the sale of items produced in the manufacturing space.

Working with CB9 leadership, DCP also developed a set of development assumptions (including identification of projected development sites and likely uses for Subdistrict 2), which were used to form the basis for a development scenario, assuming a build-out under the hypothetical zoning regulations. This scenario assumed both conversions and new construction in Subdistrict 2, but virtually no change in Subdistrict 1. In total, the 197-a Plan Alternative 1 development scenario assumed that approximately 2.2 million gsf of mixed-use development would be created, including approximately 1.3 million sf of office/community facility uses, 378,920 sf of residential uses (approximately 421 units), 249,490 sf of retail uses, and 261,765 sf of manufacturing uses. The development scenario would also accommodate the science, math, and engineering public secondary school (as in the future without the Proposed Actions), and 17,849 sf of public open space. The scenario was developed without regard to current ownership patterns and was based upon zoning capacity rather than upon market demand analyses for its

[1] Subdistrict 1 and Subdistrict 2 of the 197-a Plan Alternative correspond to the Project Area. The Academic Mixed-Use Development Area (Subdistrict A of the proposed rezoning) includes a portion of Subdistrict 1, covering the area up to 250 feet east of Twelfth Avenue, and most of Subdistrict 2. Other Area east of Broadway is included in Subdistrict 2, but it is not part of the proposed rezoning's Subdistrict A.

component uses; it thus responds to the CB9 request by providing a comparison of the impacts of the Proposed Actions with those of the 197-a Plan, assuming that the development goals of the 197-a Plan were realized. However, a number of factors suggest that the amount and type of development in the scenario is unlikely to be fully realized under current or likely future market conditions. Accordingly, the analysis of the 197-a Plan Alternative 1 likely overstates its potential adverse impacts in some areas, such as potential traffic, socioeconomic, and open space impacts. At the same time, it also likely overstates its benefits, particularly in terms of its employment generation and the extent to which the rezoning area would be revitalized.

197-a Plan Alternative 1 Compared with the Proposed Actions

A comparison of the impacts of the 197-a Plan Alternative 1 with those of the Proposed Actions found the following:

- Neither the Proposed Actions nor the 197-a Plan Alternative 1 would generate significant adverse impacts on land use, zoning, and public policy; community facilities; urban design and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization; infrastructure; solid waste; energy; air quality; or public health.
- Like the Proposed Actions, by 2030 the 197-a Plan Alternative 1 development scenario, if realized, would create a significant adverse indirect residential displacement impact affecting up to 1,319 unprotected housing units in the primary study area, including 823 units in the Riverside Park Community/3333 Broadway. However, the indirect residential displacement pressure would most likely be at a lower level than with the Proposed Actions.
- Like the Proposed Actions, the 197-a Plan Alternative 1 would result in a significant adverse impact on passive open space in 2015 and 2030.
- Like the Proposed Actions without project-related improvements (see Appendix M), the 197-a Plan Alternative 1 development scenario, if realized, would create significant adverse traffic impacts at a number of study area locations, and similarly, all of these impacts could be fully mitigated. With regard to parking, the 197-a Plan Alternative 1 would result in significant adverse impacts both on-street and off-street, whereas the Proposed Actions would only result in significant adverse off-street impacts. Like the Proposed Actions without project-related improvements, the 197-a Plan Alternative 1 would also result in significant pedestrian impacts at the Broadway/West 125th Street and Broadway/West 129th Street west crosswalks, but during fewer time periods. Unlike the Proposed Actions without project-related improvements, it would not result in significant adverse pedestrian impacts at the Broadway/West 130th Street west crosswalk. Crosswalk impacts of both the Proposed Actions without project-related improvements and the 197-a Plan Alternative 1 could be fully mitigated by widening the appropriate crosswalks. Under the Proposed Actions with project-related improvements (see Chapter 18, "Transit and Pedestrians"), there would not be any significant adverse pedestrian impacts. Like the Proposed Actions, the 197-a Plan Alternative 1 would have significant impacts on the Bx15 in the PM; however, the 197-a Plan Alternative 1 would require less mitigation than the Proposed Actions.
- The 197-a Plan Alternative 1 would not have any unmitigated noise impacts. The Proposed Actions with traffic improvements would have a significant, unmitigated pedestrian level noise impact on West 125th Street near Twelfth Avenue; without the traffic improvements, the Proposed Actions, like the 197-a Plan Alternative 1, would not have a significant noise impact at that or any other location.

- The Proposed Actions would result in traffic and noise impacts during construction; under the 197-a Plan Alternative 1, such impacts could occur, but most likely at a lower level than with the Proposed Actions.
- Unlike the Proposed Actions, the 197-a Plan Alternative 1 would not have any of the following significant adverse impacts: shadow impacts on the I.S. 195 Playground; an indirect impact on active open space; impacts on historic resources; or an impact from an increase of passengers on the escalator at the 125th Street No. 1 subway station.

Ability to Meet Goals and Objectives of the Proposed Actions

The 197-a Plan Alternative 1 would not meet the goals and objectives of the Proposed Actions, for the following reasons:

- The use provisions of Subdistrict 1 of the 197-a Plan Alternative 1 would preclude development of most community facilities (including Columbia academic and academic research buildings) and approximately 1.15 million sf of development proposed by Columbia would not be achieved under the 197-a Plan Alternative 1 in this area. Based on the Illustrative Plan for the Proposed Actions, this loss would include all of the proposed University housing and one full academic building and portions of other buildings, as well.
- In Subdistrict 2, the 197-a Plan Alternative 1 development scenario assumes that approximately 662,000 sf of the 1.324 million sf assumed for office or community facility space would be occupied by community facilities, so the maximum amount of space theoretically available under this alternative would be about 14 percent of the program space (4.8 million gsf) under Columbia's Academic Mixed-Use Development with the Proposed Actions. However, under the design regulations assumed for the 197-a Plan Alternative 1 development scenario, none of the sites considered adequate for new construction of a University use could yield the floor plates and size appropriate for the academic research buildings. Thus, this alternative would not be able to accommodate the new, state-of-the-art academic research facilities which have been identified by Columbia as a key goal and objective of the Proposed Actions.
- Of the development sites with approximately 662,000 sf available for community facility use, Columbia believes that under the design regulations assumed for the 197-a Plan Alternative 1 development scenario, only three would be large enough to construct new buildings, and these would be feasible only for academic use. Adding to the three new construction sites the adaptive reuse of the former Warren Nash Service Station building, proposed for academic use under both the 197-a Plan Alternative 1 and the Proposed Actions, there would be only four academic buildings plus a few smaller structures. The total floor area available (662,000 sf) represents approximately 14 percent of the 4.8 million gsf of program space provided in the Proposed Actions to meet Columbia's long-term needs.
- The 197-a Plan Alternative 1 would not support the goals and objectives of the Proposed Actions to create an integrated, modern, urban, and open University campus. The three new and one converted academic buildings that could be developed would be spread out in the Project Area, interspersed with a variety of other uses (industrial and transportation uses, commercial offices, and housing) and could not create an integrated campus setting. This arrangement also would not provide a central open space, which would be the focus of such a campus.
- Under the 197-a Plan Alternative 1, Columbia would likely have to attempt to meet its needs for program space through ad hoc acquisition or properties as near to its existing campuses

as possible. In formulating the Proposed Actions, and as discussed in Chapter 1, Columbia has determined that this approach is infeasible as a long-term growth strategy, for the following reasons: the trends in academia toward coordination among programs and interdisciplinary education require an integrated campus setting; there is no assurance that the amount of space needed could actually be acquired through ad hoc acquisitions; Columbia believes that ad hoc acquisitions would create continual friction with local communities over individual building initiatives; and the outcome of ad hoc expansion would be a miscellaneous collection of University buildings scattered in several urban neighborhoods and lacking any cohesive identity.

- The 197-a Plan Alternative 1 would not support the goals and objectives of the Proposed Actions to create an area that provides amenities for people associated with the University and local residents alike. Given the scarcity of program space, there would be no opportunity under this alternative to provide a central, publicly accessible open space to serve as a gathering place for both the University and the community.

As indicated above, several features of the potential zoning regulations under the 197-a Plan Alternative 1 severely constrain the ability to develop program space suitable for Columbia academic and academic research buildings. These include the requirement for a continuous streetwall and rear yard regulations. If the requirement for a continuous streetwall were relaxed, through-block buildings with rear yard equivalents would become possible, and the use of zoning lot mergers to assemble larger sites would become feasible. However, even under these revised assumptions (which are inconsistent with the potential zoning regulations of the 197-a Plan Alternative 1) and assuming further that all sites currently owned or controlled by Columbia were available exclusively for community facility use rather than the community facility/commercial use split assumed under the 197-a Plan Alternative 1 development scenario, only three sites that could accommodate academic research were identified, with four smaller sites identified for new construction of academic use, five buildings for conversion to academic use, and six small sites identified for University housing. Even with these revised assumptions, the 197-a Plan Alternative 1 would not meet the goals and purposes of the Proposed Actions, for the following reasons:

- The total gross floor area above grade for Columbia program space would total 1.9 million sf; with the addition of below-grade space in the newly constructed buildings, this total would be 2.1 million. Approximately 875,000 gsf would be for academic research, 667,000 for academic use, and 138,800 for University housing. The Columbia buildings would also contain approximately 250,000 gsf of ground-floor retail, which would be required under the 197-a Plan Special Permit to permit uses other than manufacturing on the first two floors of newly constructed or converted buildings. Thus, of the 1.9 million sf available, the total floor area of University-related program space would be approximately 1.7 million gsf. This floor area is approximately 35 percent of the 4.8 million of gsf program space provided in the Proposed Actions and identified by Columbia in development of the Proposed Actions as necessary to meet its long-term needs (5-6 million sf). In addition, two of the three possible academic research buildings cited above would not have the rectangular floor plates that Columbia has identified as optimal for state-of-the-art modern science research facilities.
- Similar to the CB9 197-a Plan Alternative 1 development scenario, the scenario with revised assumptions could not provide substantial publicly accessible open space or a central below-grade service area with shared program and support space. Thus, this scenario would not fulfill the goals and objectives of the Proposed Actions to create an integrated, modern, urban, and open campus for the University.

COMMUNITY BOARD 9 PROPOSED 197-A PLAN ALTERNATIVE 2

Subsequent to issuance of the DEIS, CB9 proposed changes in the boundaries of the Manhattanville Special Purpose District's Subdistricts 1 and 2, as well as land use and floor area requirements and design regulations. According to CB9, these revisions would (1) "allow CB9 to better achieve its stated objective of establishing a mixed-use, mixed-ownership commercial, light manufacturing, academic and residential community, with an active street life open to all its constituents"; and (2) "enable Columbia to redevelop its properties to meet its needs in a manner consistent with the goals and objectives of the 197-a Plan." The Resolution also states that in accommodating more community facility development, the revisions would "allow Columbia University to meet its current and forecasted needs."

Subdistrict 1: New Consolidated Manufacturing District

In the revised plan, Subdistrict 1 would be reduced from that of 197-a Plan Alternative 1, but it would still envision Subdistrict 1 as a manufacturing district with local retail. The zoning would be similar to that of 197-a Plan Alternative 1 for its larger Subdistrict 1; however, super specialty manufacturing with a ground-floor retail outlet has been changed from a requirement to an incentive. Unlike the original plan, an FAR bonus of 1.0 or 1.5 would be granted for developments that include production uses with ancillary retail on the ground floor or first two floors of the district. Zoning regulations in Subdistrict 1 under 197-a Plan Alternative 2 are virtually identical to those of 197-a Plan Alternative 1. Like the development scenario assumptions for Subdistrict 1 in 197-a Plan Alternative 1, new industrial development with manufacturing and related retail use is considered unlikely in this area and, thus, no major land use change would be expected in this area under the development scenario for Subdistrict 1. In general, it is assumed that Subdistrict 1 would retain its existing uses.

Subdistrict 2: New Broadway Mixed-Use District

Subdistrict 2 of the 197-a Plan Alternative 2 is larger than Subdistrict 2 under the original plan. The zoning assumptions for 197-a Plan Alternative 2 would differ materially from 197-a Plan Alternative 1 and would increase the FAR of manufacturing, commercial, community facility, and residential uses. Instead of requiring that 80 percent of the first two floors be manufacturing, as in the original plan, the revised plan would provide an FAR bonus as an incentive. Development for residential use would require a significant affordable housing component. The Plan identifies 12 sites in Subdistrict 2 as worthy of preservation through conversion and reuse, because of their historic and cultural value to CB9. Five of these sites, owned or controlled by Columbia and located west of Broadway, would be preserved in the alternative's development plan. It is assumed for purposes of the development scenario for the 197-a Plan Alternative 2 that below-grade space would consist of conventional basements.

This scenario is substantially different from that of 197-a Plan Alternative 1. That scenario produced a development plan with office, community facility, housing, retail, and industrial uses on many separate sites, none of which was large enough to accommodate a single academic research building, i.e., with a floor plate of at least 25,000 sf and total floor area of at least 250,000 sf. Thus, its community facility component provided only 13 percent of the program space needed by Columbia University over the long-term and accommodated in the Proposed Actions. By relaxing some of the requirements of 197-a Plan Alternative 1, the community facility component increased to about a third of that of the Proposed Actions. Based on revisions to the 197-a Plan for Subdistrict 2 (expansion of the area available for community facility development; increase in the community facility FAR; and elimination of mandatory ground-

floor uses) and development assumptions provided by CB9, which recognize that Columbia would develop property for its own, rather than mixed use, the 197-a Plan Alternative 2 would provide additional opportunities for the types of buildings sought by Columbia under the Proposed Actions. However, it would still provide only approximately half of the program space available under the Proposed Actions, and only half of academic research program space. It would not include below-grade shared space, and there would be no use of publicly owned or private sites or new construction on sites of historic interest to CB9.

With regard to non-Columbia development, the Chevy Service Station and Buick buildings located on the east and west sides of Broadway as resources of historic interest to CB9, would be converted to residential use with construction of new floors above. Two sites owned by Tuck-It-Away would be demolished and redeveloped with new residential buildings. In the portion of Subdistrict 2 containing the properties known as Other Area east of Broadway in the Proposed Actions, the Claremont Theater would be preserved with a residential overbuild.

The private sites under 197-a Plan Alternative 2 would produce 402 units of housing (362,340 sf of residential use), of which 201 would be affordable units and 192,550 sf of retail use. This is slightly less than the original 197-a Plan, which was estimated to generate 420 units, of which 210 would be affordable. Total new development under the 197-a Plan Alternative 2 would be 3.57 million sf, compared with 7.09 million sf for the Proposed Actions. The potential effects of the alternative are assessed and compared with those of the Proposed Actions, below.

197-a Plan Alternative 2 Compared with the Proposed Actions

A comparison of the impacts of 197-a Plan Alternative with those of the Proposed Actions found the following:

- Neither the Proposed Actions nor 197-a Plan Alternative 2 would generate significant adverse impacts on land use, zoning, and public policy; community facilities; urban design and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization; infrastructure; solid waste and sanitation services; energy; traffic in the Project Area; pedestrians; air quality; or public health.
- Like the Proposed Actions, by 2030, 197-a Plan Alternative 2 would have no significant adverse impact on direct residential or business displacement, on indirect business displacement, or on specific industries, but it could have a significant adverse impact on indirect residential displacement, affecting 1,319 unprotected units in the primary study area, including 823 units in the Riverside Park Community/333Broadway. However, the likelihood of this impact occurring and its extent would be somewhat less under the 197-a Plan Alternative 2 than with the Proposed Actions.
- Like the Proposed Actions, 197-a Plan Alternative 2 would add areas of passive open space in the Project Area (0.41 acres to the Proposed Actions' 2.16 acres), but it would also add population and thereby decrease open space ratios, resulting in significant adverse open space impacts. Both alternatives would result in a decline in active open space ratios by 2030, and would therefore require mitigation.
- 197-a Plan Alternative 2 would include the traffic improvement plan for the Project Area and its immediate surroundings. However, like the Proposed Actions, it would result in significant traffic impacts requiring mitigation outside of the study area—on East 125th Street.

- Compared with the Proposed Actions, this alternative would produce a greater parking shortfall (950 spaces vs. 120 spaces). Mitigation measures for the Proposed Actions would eliminate this significant impact; for this alternative the measures would only partially mitigate the impact.
- Although 197-a Plan Alternative 2 would generate fewer bus trips than the Proposed Actions, significant adverse bus impacts are still expected to occur, albeit at lower magnitudes and requiring fewer additional buses to mitigate the projected impacts.
- Both alternatives would result in significant noise impacts at receptor Site 10. At all other locations, both alternatives, be it with or without traffic improvements, would not result in any significant noise impacts. It is expected that comparable levels of attenuation, and at the same locations, would be necessary under 197-a Plan Alternative 2 as those specified under the Proposed Actions.
- 197-a Plan Alternative 2 could result in air quality impacts during construction; these would not occur under the Proposed Actions. E-designations or similar measures could be applied to provide for emission reduction measures and therefore mitigate any impacts.
- Unlike the Proposed Actions, 197-a Plan Alternative 2 would not have any of the following significant adverse impacts: shadow impacts on the I.S. 195 Playground; impacts on historic resources; or an impact from an increase of passengers on the escalator at the 125th Street No. 1 subway station.

197-A PLAN ALTERNATIVE 2 WITH FURTHER REVISIONS

CB9 also proposed a "relaxed" version of the development assumptions for 197-a Plan Alternative 2, under which the requirement to preserve buildings of historic interest to CB9 would be removed. As a result, the four buildings owned by Columbia and assumed to be preserved in 197-a Plan Alternative 2 would be demolished, allowing buildings with more regular floor plates. The West Market Diner, also owned by Columbia, was assumed to be relocated to another site in Subdistrict 1. Also, the Chevy and Buick Service Station buildings, owned by Tuck-It-Away, were assumed to be demolished and replaced by new construction. In addition, this version of the 197-a Plan acknowledges Columbia's ownership of the Broadway frontage on the triangular site for the proposed park on West 125th Street and assumes that Columbia would build an academic building there. Thus, the size of the park would be reduced.

The 197-a Plan Alternative 2-Relaxed would offer more opportunities for the types of buildings accommodated in the Proposed Actions than the 197-a Plan Alternative 2, but it would still provide only 53 percent of the program space available under the Proposed Actions, and only half of academic research program space. In addition, the private sites under 197-a Plan Alternative 2-Relaxed would produce the same amount of housing as they would with the 197-a Plan Alternative 2, because the residential maximum FAR of 6 would limit that use, whether it was produced through conversion or new construction. Total new development under the 197-a Plan Alternative 2-Relaxed would be 3.79 million sf, compared with 7.09 million sf for the Proposed Actions.

Ability to Meet the Goals and Objectives of the Proposed Actions

Both 197-a Plan Alternative 2 and its "relaxed" scenario would not meet the goals and objectives of the Proposed Actions for the following reasons:

- The alternative could not accommodate Columbia's long-term needs for space. Whereas the Proposed Actions would produce 4.8 million sf of academic program space, 197-a Plan Alternative 2 would produce only 2.4 million sf of academic program space, or 50 percent of the required floor area. The relaxed scenario would raise this total to 2.6 million sf, or 53 percent of the required floor area. Space for academic research, the University's key program objective, would be only 50 percent of that of the Proposed Actions (1.2 million sf compared with 2.6 million square feet) in the 197-a Plan Alternative 2 or 50 percent with the relaxed scenario. Because this alternative would not fulfill long-term needs for space, the University would not be able to avoid ad hoc acquisition of properties in neighborhoods outside of Columbia's existing campuses.

- The reduced floor area compared with the Proposed Actions would occur at critical locations, which would further reduce the alternative's ability to meet project goals and objectives. In particular, the alternative could not accommodate the Phase 1 uses of the Proposed Actions. The tall academic research building on Site 3 would be sufficient to meet the program floor area goals (350,000 sf) for the Jerome L. Greene Science Center, but there would be insufficient space and floor area for the Business School and the School of the Arts. Columbia would be unable to achieve the diverse mix of major anchor programs planned for Phase I, and advises that the likelihood that the Jerome L. Greene Science Center would alone advance is uncertain. In addition, Columbia advises that a relocation of SIPA would be unlikely as well. There would also be less room for active, contiguous ground-floor retail, no space at all for the Small Square, and the land for the Grove would not be available. Thus, this alternative would not achieve the Phase 1 objectives of transforming West 125th Street as a gateway to the waterfront and the West Harlem Waterfront park, or of acting as a major entrance to the proposed new graduate Manhattanville campus for Columbia University. The relaxed scenario would provide slightly more floor area in this location, but with a smaller park. This would not alter the conclusion for the 197-a Plan Alternative 2.

- The lack of the full central below-grade service area would reduce the functionality of the Academic Mixed-Use Development, the ability of the University to produce buildings with full program space, and limit the ability to create a campus environment. Specifically, without the central below-grade service area, there would be no central loading facility and centralized parking, no major shared academic support space, no centralized mechanical systems, and no additional floor area for Business School classrooms, and other academic programs. As a result, each building would have its own truck loading docks and those buildings with below-grade parking would each have car ramps on the streets. These features would be incompatible with a campus atmosphere. In addition, support uses that would be shared among buildings when located below grade, if located above grade would have to be duplicated in each building—each building would have its own boilers and mechanical system, each would have to have a mechanical floor above grade, and each academic research building would have academic research support space occupying at least two above-grade floors. Locating support uses above grade would restrict the amount of program space that could be achieved in each building, and the ability of the University to achieve its program goals would be constrained.

- This alternative would create a development with less open space and fewer amenities for University and community users, without substantially improved pedestrian conditions or improved visual and physical access to the waterfront. As noted above, the open spaces

would be fewer and smaller than under the Proposed Actions and there would be no north-south pedestrian path, central large Square, or Small Square. The curb cuts and truck docks would diminish the attractiveness of the area for pedestrians. The reduction in active ground floor uses and their lack of contiguity would also decrease the area's attractiveness for pedestrians. The absence of widened sidewalks on the narrower side streets would also reduce this alternative's ability to improve views of and access to the waterfront. As noted above, the inability to create the full Phase 1 program, with the Jerome L. Greene Science Center and three key graduate schools plus new open space, would reduce this alternative's ability to enliven and activate West 125th Street as a gateway to the waterfront.

COGENERATION ENERGY SUPPLY ALTERNATIVE

The academic research facilities proposed for the Academic Mixed-Use Area would have high year-round energy requirements and would need highly reliable utilities. A cogeneration plant, which could generate a portion of the electricity needed to serve the academic research buildings and the other campus facilities, instead of purchasing electricity from Con Edison, is being considered as an option to increase reliability of electrical service and potentially decrease its costs.

In the Cogeneration Energy Supply Alternative, a cogeneration plant would be constructed to provide a portion of the power, as well as heating and cooling, for the buildings in the Academic Mixed-Use Area in the area bounded by Broadway, West 125th Street, Twelfth Avenue, and West 132nd Street. It would be located beneath Site 3, in the southern portion of the central, below-grade service area. In this alternative, the central energy plant proposed at Site 14, and package boiler systems proposed for the three buildings east of Broadway and one building on Site 1 south of West 129th Street, would be identical in terms of equipment and operation to those proposed as part of the Proposed Actions.

Compared with the Proposed Actions, the Cogeneration Energy Supply Alternative would result in similar levels of pollutant emissions. Like the Proposed Actions, no significant adverse air quality impacts are expected.

B. ALTERNATIVES CONSIDERED AND REJECTED

As part of Columbia's planning process and in response to comments made at the Scoping meeting for the DEIS, other alternatives for the Academic Mixed-Use Development were considered, including an alternative design, in which the MTA Manhattanville Bus Depot remains above grade at its current location; and an Infill Development Alternative, in which Columbia only develops on sites it currently owns. Neither of these alternatives proved viable for the reasons detailed below.

MANHATTANVILLE BUS DEPOT OVERBUILD ALTERNATIVE

As described in Chapter 1, the Proposed Actions would rebuild underground the MTA Manhattanville Bus Depot, currently located on the block between West 132nd and West 133rd Streets and Broadway and Twelfth Avenue, in the same location, with Columbia buildings above. An alternative design was considered for this block (Block 1999), in which the Academic Mixed-Use Development would contain the same total above-grade space as the Proposed Actions (maximum 6.0 FAR); the bus depot would remain in its current above-grade location,

and Columbia buildings would be developed above. All other aspects of the Proposed Actions would remain the same.

To achieve the same total above-grade space requirements for the Academic Mixed-Use Development on this block, the Columbia buildings on this block would have to be developed on a truss support and would thus be much higher to accommodate the same total development as the Proposed Actions. This would result in the addition of one-and-a-half floors, four floors, six floors, and four-and-a-half floors for buildings 11, 12, 13, and 14, respectively, and the maximum building heights set forth in the proposed zoning would have to be exceeded. In addition, a north-south midblock open area could not be constructed between West 132nd and West 133rd Streets.

Overall, this alternative could not achieve the urban design goals of the Proposed Actions. The existing streetwalls of the bus depot on West 132nd and West 133rd Streets would remain, as would the bus depot-associated parking lot on the western end of the block. The mandatory streetwall, setbacks at grade, and active ground-floor use requirements set forth in the proposed zoning for this block could not be achieved. In this alternative, the unified design of community facilities buildings and open spaces proposed pursuant to the Proposed Actions could not be achieved for the full Academic Mixed-Use Area. The continuity of required active ground-floor uses in transparent spaces along Twelfth Avenue would be broken, as would the system of unified streetwalls and widened sidewalks. The streetscape around Block 1999 would continue to have a transportation character, and West 133rd Street would be cut off from the interconnected system of open spaces that would be created through the Academic Mixed-Use Development south of West 132nd Street. This design alternative would not meet the requirements of the Special Manhattanville Mixed-Use District. Because this alternative would not meet the goals and objectives of the Proposed Actions, it was found to be infeasible and eliminated from further consideration.

INFILL DEVELOPMENT ALTERNATIVE

The Infill Alternative was suggested during Scoping as an option to accommodate the University's proposed new campus, in order to preserve buildings not owned or controlled by Columbia and thereby maintain more of the existing character of Subdistrict A, avoid direct residential displacement, and avoid the possible use of eminent domain. In response to these comments, an Infill Development Alternative for Subdistrict A was evaluated. The evaluation addresses two development scenarios: an FAR 6 scenario and a Full Build scenario. Both scenarios assume that Columbia would build only on properties that it owns or controls (see Figure 24-1), leaving all others in place. The FAR 6 scenario evaluates the Columbia-sponsored development that could occur in Subdistrict A on Columbia-owned or -controlled property, assuming that the Project Area were to be rezoned generally as proposed in the Proposed Actions. Because under this scenario it would be impossible to accommodate the full program of the Proposed Actions, a Full Build scenario was also developed in which Columbia's full program would be accommodated on Columbia-owned or -controlled property, without regard for either underlying or proposed zoning. This scenario would require an FAR of approximately 10.

In both scenarios, there would be no central, below-grade service area, for two reasons: (1) the Infill Alternative assumes development on Columbia-owned or -controlled property only; no use of the land beneath public streets is assumed, making it impossible to create one, contiguous, deep service area; and (2) to go to substantial depths below grade under the geological setting of most of the Project Area (high water table, deep bedrock, and wet soils in between) would

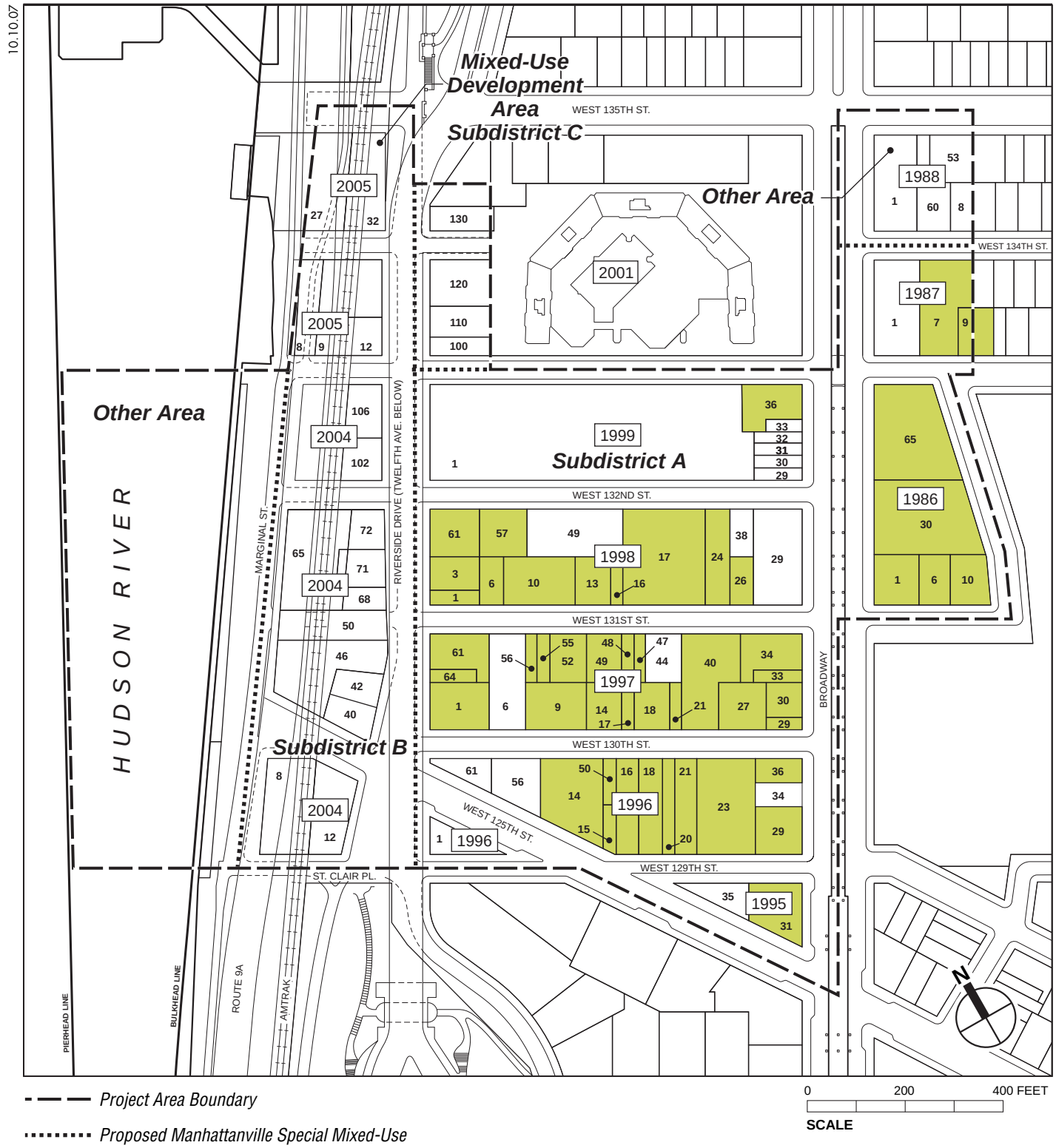

Figure 24-1
Infill Alternative: Columbia Controlled Property

require slurry wall construction, which, as discussed in Chapter 21, "Construction," Columbia has advised is only economical for a large, regularly shaped, central area.[1] Therefore, both scenarios assume conventional basements that go down one or perhaps two levels, depending on subsurface conditions (see Figure 24-2). Most of the uses proposed for the central below-grade space would have to be accommodated above grade, if at all.

In addition, given the reduced development area in the Infill Alternative, both of its scenarios do not include major publicly accessible open spaces, although it is assumed that the north–south midblock open areas, the east–west open area between Broadway and Old Broadway, and the at-grade setbacks on the east–west streets and Twelfth Avenue would be generally maintained. Each of the scenarios is evaluated below.

FAR 6 SCENARIO

To create a site plan for the FAR 6 scenario, accommodating academic research buildings on the largest sites was given priority; academic and University housing uses were assumed for other sites, based on the most reasonable use for the size and shape of the footprint of each site. The required setbacks and height limitations of the proposed rezoning were also assumed in framing

[1] The below-grade central service area is proposed to be very deep (up to 80 feet) to accommodate the energy centers and a range of coordinated support functions, parking, loading, and program space anticipated to be below grade. However, deep rock and generally poor soil conditions in most of the Project Area make construction of this space difficult and costly. The area also contains a high water table, which requires that most basements deeper than approximately 12 to 15 feet must have a water cutoff wall (e.g., slurry wall) reaching down to lower permeability soils, which are up to 120 feet below grade, or to bedrock, to reduce volumes of groundwater seeping into the open excavations and to minimize the volume of water that must be pumped out of the excavation and discharged. Construction of slurry walls requires considerable logistical support, including extensive concrete slurry production equipment on site. Where slurry walls are to be constructed along the perimeter of a future basement and below-grade space, first a long, narrow section, or "panel," is excavated. The excavation is filled with slurry, a mixture of bentonite clay and water that can be pumped. For each panel, a steel reinforcement cage, carefully measured to match the width and depth of the panel, is either fabricated on site or brought there in smaller sections for assembly. Each such reinforcement cage may reach 120 feet in length, though some may exceed 120 feet. Once completed, the reinforcement cages are lowered into the slurry-filled panels. The panels are then filled with concrete. In total, it may take two to three days to complete excavation and concreting of each individual panel. As the slurry wall is being completed, site excavation can begin. When the soil is removed from the excavation, the soil on the outside exerts a large inward horizontal force, so that tiebacks into the soil or rock, or steel braces, designed to resist this force until the below-grade foundations and structures are built, must be installed. Columbia estimates that with the large, regularly shaped slurry walls proposed for the Academic Mixed Use Development, the average combined cost of slurry wall construction, excavation, and piling totals approximately $1,525 (2007 dollars) per cubic yard of slurry wall. However, the cost of slurry walls increases significantly if the below-grade space is irregularly shaped and/or discontinuous—requiring more square footage of slurry wall compared with a simple, large rectangular shape—as the Infill Alternative would require. The incremental costs of the slurry walls as a proportion of overall construction costs increases substantially as the size of the site decreases. Moreover, where any very deep basement/cellar lies beneath individual buildings (or two buildings), a considerable proportion of the available space must be given over to entrance and exit ramps, and appropriate fire egress, so that the efficiency of these spaces is reduced, particularly compared with the efficiency of one large service area. Therefore, use of slurry wall construction for relatively small areas beneath one or two buildings is not practicable and would not be undertaken under the Infill Alternative.

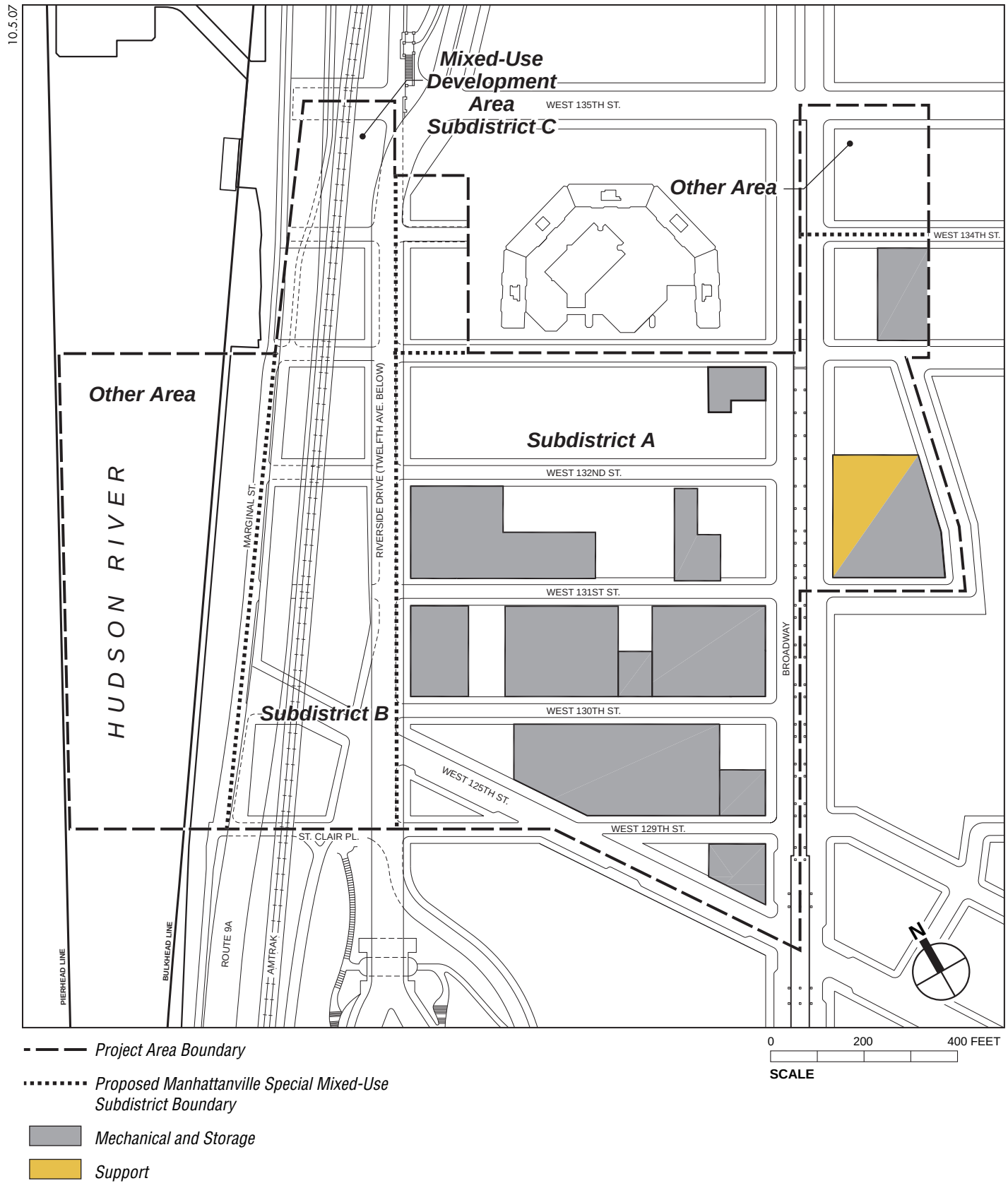

Figure 24-2
Infill Alternative:
Below-Grade Conventional Basements

the FAR 6 development scenario. Because Columbia would not own or control all of the properties on the block containing the large central open space, there would be no requirement for the open space in the FAR 6 scenario's assumed zoning. Given this condition, it was decided that the 50-foot height limitation over this space with the Proposed Actions would be replaced with a height limitation of 180 feet, which is similar to the height limitations on buildings to the north and south of the site in the Proposed Actions. To maximize program space and accommodate uses that are located below grade in the Proposed Actions given the limited floor area available in this scenario, there would be no off-street parking in Subdistrict A under the FAR 6 scenario and virtually no room for active ground-floor space.

The result would yield total development of approximately 3.5 million sf, or about 52 percent of full development under the Proposed Actions. However, because this alternative could not take advantage of the efficiencies of the central below-grade storage area, proportionally more development would be taken up with mechanical space, storage, and academic research support, so that the amount of actual program space would be only 47 percent of that of the Proposed Actions (2.3 million sf compared with 4.8 million sf). Looking at individual program elements, the 6 FAR alternative would provide only 42 percent of the Proposed Actions' academic research space.

The pattern of development would differ from the Proposed Actions, also (see Figure 24-3). Academic research would be located on five sites, including the site that in the Proposed Actions would be the Square; academic buildings would be located on five sites, one of which would be the former Warren Nash Service Station building; and University housing would be located in four smaller sites scattered across Subdistrict A. Publicly accessible open space would be limited to a midblock passage extending north-south for two blocks (West 129th to West 131st Streets)—instead of a full four-block landscaped midblock passage, and to the east-west midblock passage between the Nash building and Site 15. In an effort to maximize program space within the FAR and site limitations of this alternative, all below-grade space in this alternative was assumed to contain loading/freight, mechanical equipment and storage only. Little or no off-street parking is assumed for the 6 FAR scenario. Academic research support space would be located above grade even though the overall academic program space for this alternative would be less than half that of the Proposed Actions; the academic research support space would be nearly equal to that of the Proposed Actions (94 percent). The reason is that the space under the Proposed Actions would be shared by four of the research buildings, while all required equipment and facilities for support would have to be duplicated in each one of the academic research buildings under this alternative. Similarly, the alternative would require more mechanical/loading space than the Proposed Actions, due to the inability to share facilities (e.g., central loading, energy plants). Two-thirds of this space would be above grade. In this alternative, the need to use above-grade building space for various support functions, given the FAR limitations, greatly reduces its ability to accommodate the academic program space required by Columbia and active ground floor uses.

As shown in Figure 24-4, the tallest building, located on Site 6 (Broadway between West 130th and West 132nd Streets),would be 215 feet to the roofline, plus up to 60 feet for rooftop mechanical equipment.

FULL BUILD SCENARIO

The Full Build scenario would result in development on the same sites (with the same conventional basements) as the FAR 6 scenario, but would produce substantially taller buildings.

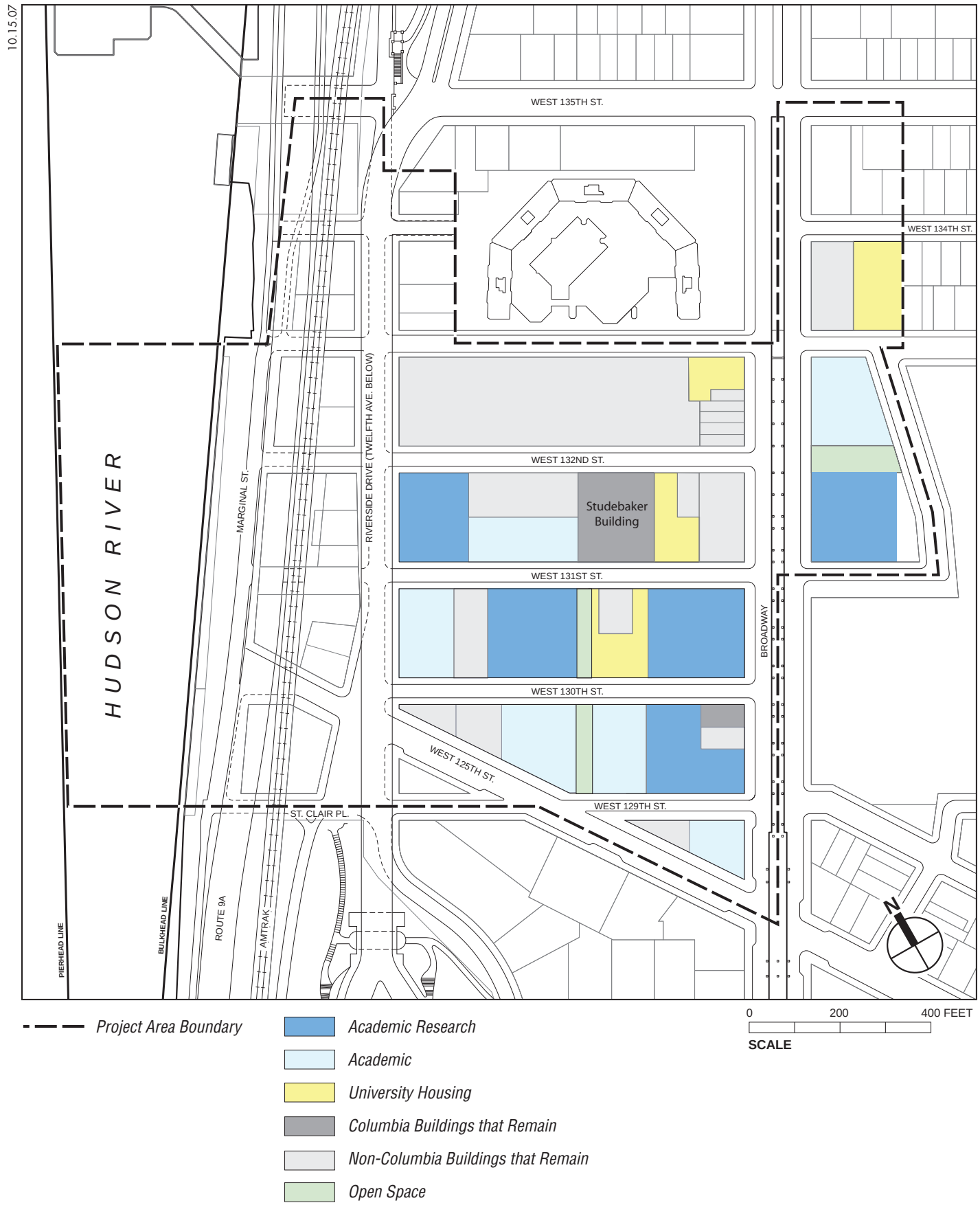

Figure 24-3
Infill Alternative:
FAR 6 Scenario: Land Use

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

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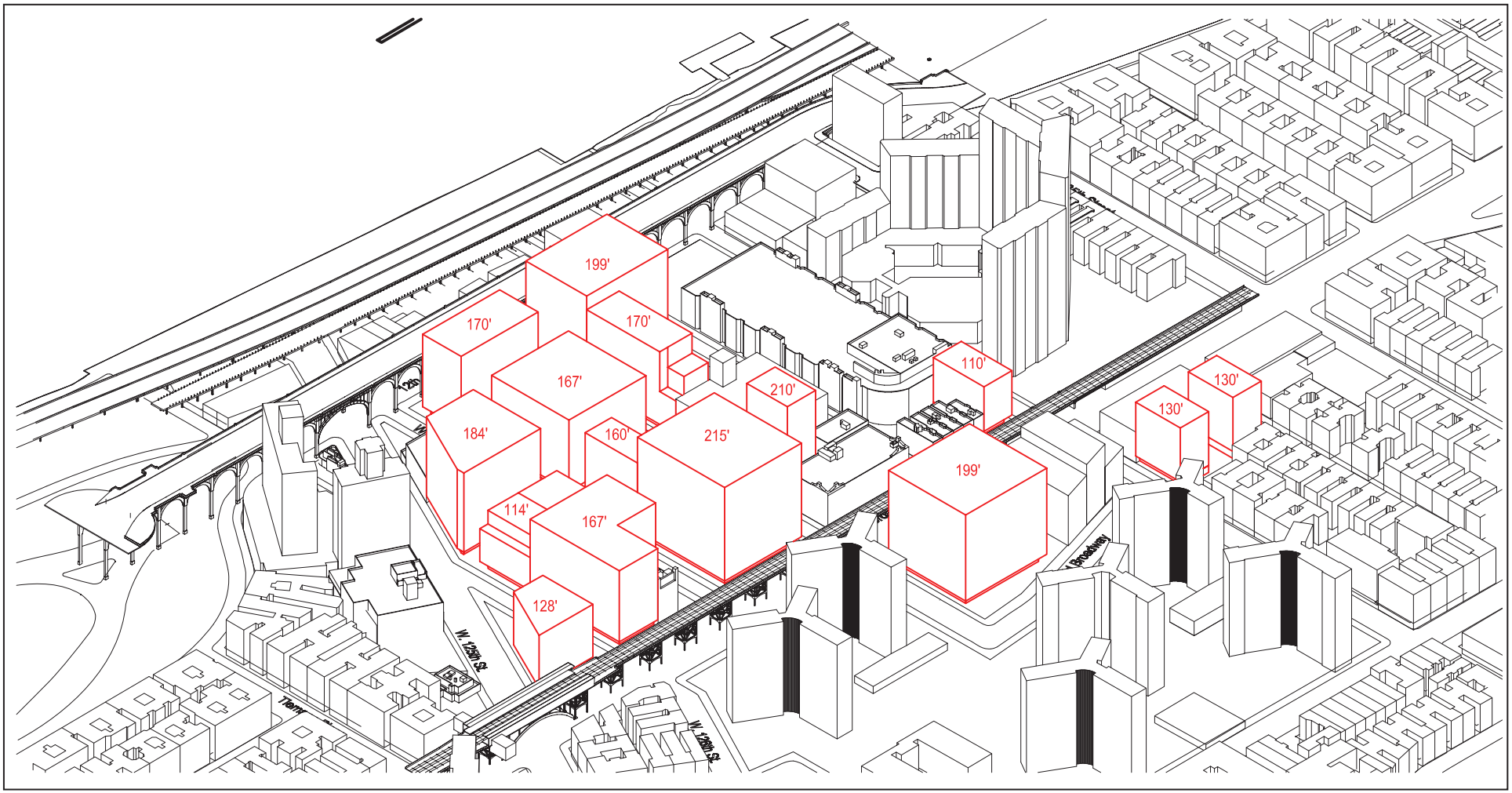

NOTE: Stacks not included

Figure 24-4
Infill Alternative:
FAR 6 Scenario: Northwest Aerial View

This scenario would produce the same amount of total program space as the Proposed Actions (4.8 million gsf) comprising the approximately same amount of program space for each component—academic research, academic, University housing, and recreation. However, because only 458,000 sf would be available below grade, most of the functions planned for the central below-grade service area in the Proposed Actions would have to be provided above grade. This includes all of the Proposed Actions' below-grade program space (e.g., portions of the swimming and diving center, and science support, support for academic programs), parking, loading, and mechanical space. Certain components of the central below-grade service area would not be required or could not be accommodated above grade under the Full Build scenario—such as entry ramps, cellar and egress, the two energy centers, and approximately half of the area for parking. In the Full Build scenario, above-grade parking could be accommodated at grade in six of the buildings with larger footprints. Only 341,920 sf could be provided for parking above grade, compared with 785,608 sf below grade under the Proposed Actions. This would yield about 1,140 spaces, fewer than half those of the Proposed Actions. The reduction in frontage on Broadway, West 125th/West 129th Street, and Twelfth Avenue would limit ground-floor uses to approximately 55,000 sf, compared with 162,620 sf with the Proposed Actions. As with the FAR 6 scenario, the plan for the Full Build scenario could accommodate three midblock open areas, but no large open spaces (see Figure 24-5). In total, the Full Build scenario would yield 4.8 million sf of University program space in a total floor area of 6.5 million gsf, 6.0 million of which would be built above grade.

The Infill Alternative was eliminated from further consideration for the following reasons:

- The FAR 6 Scenario of the Infill Alternative would not meet the goal and purpose of the Proposed Actions to accommodate Columbia's long-term need for program space (5 to 6 million gsf), since it would accommodate only approximately 42 percent of the total program space (4.8 million gsf) under Columbia's Academic Mixed-Use Development with the Proposed Actions. This situation would require Columbia to seek development sites in Manhattanville, in Morningside Heights, in Washington Heights, and possibly even outside New York City, in order to accommodate its long-term space needs. The amount of space that Columbia needs makes the prospect of acquiring it in an ad hoc manner extremely difficult. In formulating the Proposed Actions, Columbia has determined that ad hoc acquisition of space is not suitable as a long-term growth strategy, because the trends in academia toward coordination among programs and interdisciplinary education require proximity and an integrated campus setting. The Proposed Actions further reflect Columbia's determination that such acquisitions would create continual friction with local communities over individual building initiatives and that the outcome of ad hoc expansion would be a miscellaneous collection of University buildings scattered in several urban neighborhoods, with little or no connection among them, as there would be if the expansion took place in one area, creating a new "campus."
- Although the Full Build Scenario could theoretically achieve the programmatic floor area identified by the University as necessary for its long-term growth, the resulting development plan would be inconsistent with the goals and objectives of the Proposed Actions to respect the context of surrounding neighborhoods, since it would have to be unconstrained by envelope controls of the proposed Special Manhattanville Mixed-Use Zoning District and would require an FAR of 10. As shown in Figure 24-6, the tallest building under this scenario (the academic research building on the east side of Broadway) would reach 479 feet to the roofline, plus up to 60 feet for mechanical equipment. The two academic research buildings on the west side of Broadway would rise to a roofline height of 415 and 399 feet,

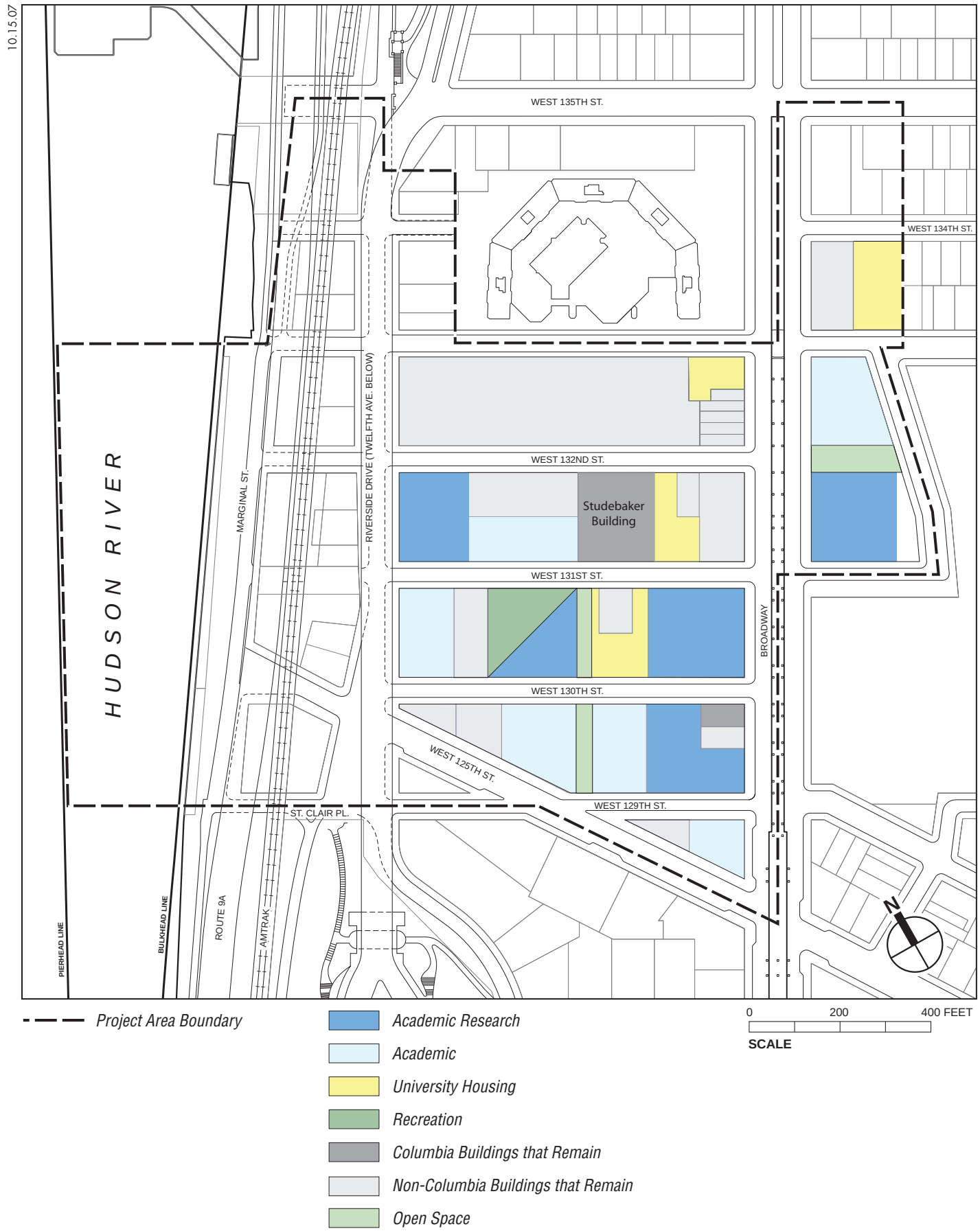

Figure 24-5

Infill Alternative:
Full Build Scenario: Land Use

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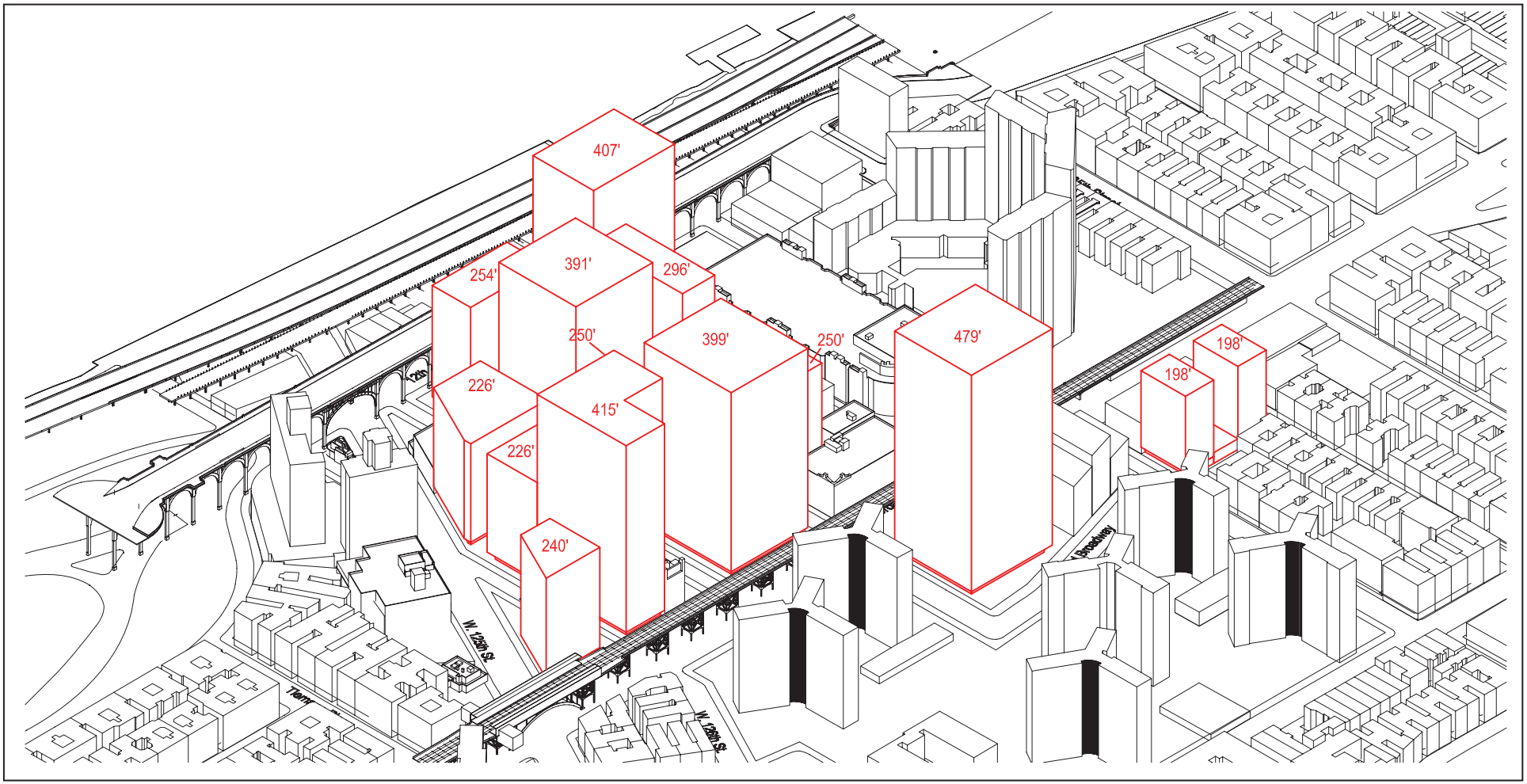

NOTE: Stacks not included

Figure 24-6
Infill Alternative:
Full Build Scenario: Northwest Aerial View

respectively, plus up to 60 feet for mechanical equipment. By contrast, the maximum height of any building with the Proposed Actions would be about 54 percent of the maximum under the Full Build scenario—260 feet without rooftop mechanical equipment. In all, to provide the floor area to meet Columbia's long-term needs, three buildings would have to be taller than 400 feet (without mechanical space); two buildings would be between 300 and 400 feet high to the roofline; and seven buildings would be between 200 and 300 feet to the roofline; the two shortest buildings would each be 198 feet to the roofline. The building heights would not be compatible with either the character of the remaining buildings in Subdistrict A or the surrounding structures in the primary study area—nor would the overall density be compatible with surrounding zoning patterns.

- The Infill Alternative would also not support the goals and objectives of the Proposed Actions to create an integrated, modern, urban, and open University campus. There would be no central public open spaces, which would be a focus of such a campus, and although there would be three midblock open areas and at-grade setbacks for new construction, these would not create a consistent improvement in access and pedestrian flow into and through the Project Area. Although the new buildings would be located near one another, industrial, transportation, and utility uses <u>on parcels not owned by Columbia</u> would be interspersed among them. The workaday functions (e.g., trucking, loading) of these other uses would be very visible on the street, as would those kinds of activities at the University buildings themselves; without a centralized below-grade space for parking and loading, individual curb cuts and loading doors at each new building would be added to the existing ones, further decreasing any sense of a cohesive academic area. The lack of an urban campus setting would be compounded in the Full Build Scenario by the sheer size of its buildings, more akin to a Central Business District than a university campus, and the greater level of loading and delivery activities associated with them.

- The Infill Alternative would not support the goals and objectives of the Proposed Actions to create an area that provides amenities for people associated with the University and local residents alike, including publicly accessible open spaces and improved access through the Project Area to the waterfront and the West Harlem Waterfront park, currently under construction. As noted above, this Alternative would not provide either the larger or smaller open space available under the Proposed Actions, and its midblock open areas, intended for additional pedestrian circulation, would be more limited. Because the setback and landscaping requirements would only apply to new construction sites—and not to existing structures not under Columbia's ownership or control—the widening of the sidewalks on east–west streets and the resulting increase in visual access to the waterfront would be irregular and therefore less effective than with the Proposed Actions. The need to maximize program space would also result in significantly less street-level retail and other publicly accessible uses, which are intended to enliven the streetscape, particularly along West 125th Street, and draw people toward the waterfront. Further, as noted above, the sidewalks would have substantially more curb cuts, making the pedestrian environment less attractive than with the Proposed Actions.

- <u>In both scenarios, the lack of the central below-grade service area would greatly decrease the functionality of the University development, and would require that above-grade development include several floors of academic research support and mechanical space. In particular, without the central loading dock and energy centers and the ability to use a distribution system connecting the buildings west of Broadway for shared functions, the University would have to build and operate redundant loading and mechanical systems in</u>

each building; the same is true for academic research support space, which under the Proposed Actions' development plan, would be interconnected and allow easy sharing of equipment and other lab support facilities among the campus's academic research buildings. Above grade, the mechanical and academic research support facilities would have to be duplicated in each building and would occupy approximately three floors in each academic research structure, leaving considerably less space for academic research floor area. There would be an additional mechanical floor above grade in each of the other buildings, i.e., academic and University housing. The full program space is hypothetically achievable in the Full Build Scenario; however, the need to accommodate several floors of academic research support, which would be on the lower floors and the mechanical floor, which would likely be located on a central floor in each academic research building, would result in excessively tall and bulky buildings, with large windowless façades. As noted above, the need to load at each building from the street would increase the number of curb cuts on the streets and also increase the level of loading in and around the area. In addition, the need to have parking either above grade in each building (Full Build Scenario) or little or no parking at all (FAR 6 scenario) would increase the level of parking activity in the area, discouraging pedestrians. These activities would not be compatible with an attempt to create a campus setting in Subdistrict A

In sum, both scenarios of the Infill Alternative would not meet the goal and purpose of the Proposed Actions to create an integrated, open campus setting with significant open space, streetscapes, and other amenities available to the public and Columbia; nor would they meet the goal to improve access to and through the Project Area and to the West Harlem Waterfront park. The FAR 6 Scenario of the Infill Alternative would not meet two additional goals and purposes of the Proposed Actions: to provide adequate space in one location for systematic long-term expansion and to avoid ad hoc acquisition of properties in local neighborhoods outside the University's campuses. The Full Build Scenario, while appearing to meet Columbia's long-term space needs, would be inconsistent with the goals and objectives of the Proposed Actions, since it would result in a high-density environment, incompatible with its surroundings, with tall buildings containing inefficient and intrusive support functions located primarily above grade.

C. NO ACTION ALTERNATIVE

DESCRIPTION OF THE NO ACTION ALTERNATIVE

Consideration of the No Action Alternative is mandated by both SEQRA and CEQR, and is intended to provide the lead and involved agencies with an assessment of the consequences of not selecting the Proposed Actions. As applied in the "Future without the Proposed Actions" in Chapters 3 through 22 of this FEIS, the No Action Alternative also provides a baseline against which impacts of the Proposed Actions may be compared.

The No Action Alternative assumes that the Proposed Actions would not be implemented. The No Action Alternative assumes that no amendments to the zoning map and zoning text for the Special Manhattanville Mixed-Use District will be adopted, and that no General Project Plan (GPP) will be approved by the Empire State Development Corporation (ESDC). While no determination has yet been made by the New York City Planning Commission (CPC), this alternative also assumes that the rezoning applications (from M1-2 to C6-2 districts) for various sites within the Project Area submitted by Tuck-It-Away Associates, L.P., and Hudson North

American would be approved. In all other properties of the Project Area, existing zoning would continue to control development.

Specific development projects anticipated to be in place in 2015 and 2030 in the No Action Alternative are summarized in Chapter 2, "Procedural and Analytical Framework." The majority of the developments within the Project Area would involve the reuse, conversion, and expansion of existing buildings in the No Action Alternative. In the No Action Alternative, the public secondary school for science, math, and engineering would be located in the Project Area east of Broadway between West 131st and West 132nd Streets. This site may also contain Columbia administrative uses built above the secondary school. The alternative assumes that other University administrative uses would occupy the Studebaker Building, and the former Warren Nash Service Station building would be converted for Columbia office space. Outside the Project Area (in the primary study area), under the No Action Alternative, Columbia would construct a new entrance along the south side of West 125th Street for its building at 560 Riverside Drive and an academic building at the southwest corner of West 125th Street and Broadway.

Directly east of the Project Area, a new special purpose zoning district—the 125th Street Special District—would be mapped over the entire two-block-wide corridor along 125th Street between Second Avenue and Broadway. The 125th Street Special District would allow a range of retail, arts, entertainment, and cultural uses to physically and economically activate the street, and would include contextual zoning controls to respond to the specific scale and character of the corridor and adjacent streets, and support future job creation and career opportunities. A portion of the 125th Street Special District would be within ½ mile of the Project Area (the secondary study area for several of the technical analyses for the Proposed Actions). Of the 26 total projected development sites identified in the Draft Scope for this rezoning, five sites would overlap with the secondary study area—there are no projected development sites within the ¼-mile primary study area. Each projected development site would contain residential development with ground-floor retail. These five projected development sites would total to an estimated 260 residential units, plus 71,632 sf of retail, 103,958 sf office, and 11,890 sf of community facility uses.

Although this alternative would contain some Columbia University buildings in and near the Project Area, it would not create modern facilities of a major university with space for teaching, academic research, the study of arts and humanities, and the education of professionals. In addition, the changes anticipated in Subdistrict B and the Other Area east of Broadway, changes that would enliven Twelfth Avenue in support of a new waterfront park and bring new activity to the Broadway corridor, would not occur. Thus, the No Action Alternative would not meet the goals and objectives of the Proposed Actions. Specifically:

- The revitalization, improvement, and redevelopment of a portion of the Manhattanville section of West Harlem by allowing greater density and a wider variety of land uses would not occur; and
- Columbia would not be able to fulfill its role as a leading academic institution that makes a significant contribution to the economic, cultural, and intellectual vitality of New York City by enabling it to expand and modernize its facilities within a 17-acre Academic Mixed-Use Area within the proposed 35-acre Special District.

The technical chapters of this FEIS have described the No Action Alternative (referred to therein as "the future without the Proposed Actions") and have used it as the basis to assess the potential

impacts and associated mitigation for the Proposed Project. The No Action Alternative would not require any discretionary actions.

NO ACTION ALTERNATIVE COMPARED WITH THE PROPOSED ACTIONS

LAND USE, ZONING, AND PUBLIC POLICY

Unlike the Proposed Actions, which would add new community facilities, commercial, and open space to the Project Area, the No Action Alternative would result in a limited amount of new commercial and residential development in the Project Area. The No Action Alternative would not result in any material changes to Project Area land use patterns. The low-scale Project Area would not be transformed into a denser, active mixed-use neighborhood. As noted above, new development would be limited to a relatively small number of individual projects, including two Columbia projects for administrative uses (the Studebaker Building and the former Warren Nash Service Station building), and the proposed secondary school for math, science, and engineering. Existing low-rise commercial and warehouse uses would remain in Subdistrict B, with the exception of the new restaurant under construction at Twelfth Avenue and West 133rd Street. In the No Action Alternative, the West Harlem Waterfront park would be constructed in the Other Area west of Marginal Street.

Despite certain land use changes assumed in this alternative, for the most part, predominantly low-scale industrial buildings containing auto-related uses, warehouses, transportation and utility facilities, and parking lots would continue to characterize land use in the Project Area. This assumption is based on recent trends in land use in the Project Area, and does not assume any potential change in these trends, given the limitations of the area's underlying, low-density manufacturing districts. These uses would continue to pose an uninviting barrier between the Hudson River waterfront to the west and the residential areas to the north and east. Potential growth would most likely be drawn to both the primary and secondary study areas, where a broader range of uses would be permitted and greater maximum FARs would be allowed.

Six separate, non-contiguous areas within the Project Area would be rezoned from M1-2 to C6-2 in the No Action Alternative (as shown in Figure 3-7 in Chapter 3, "Land Use, Zoning, and Public Policy.") Unlike the Proposed Actions, these rezoning actions would not provide a cohesive, comprehensive land use framework for the Project Area. Instead, six sites, which constitute 5.7 percent of the land area in the Project Area, would be redeveloped with new residential uses. New residential buildings would be constructed on five sites. On the sixth site, the existing storage building would be converted to residential space with new residential construction above on the sixth site, while manufacturing zoning would continue to predominate in the rest of the Project Area.

The existing manufacturing zoning districts in the Project Area do not permit college or university uses (or other related community facility uses listed under zoning use group 3). Therefore, Columbia University would not be able to develop any academic uses in the No Action Alternative; this alternative would only contain Columbia University administrative buildings (the Studebaker Building and the former Warren Nash Service Station building) in the Project Area.

The No Action Alternative, like the Proposed Actions, would not result in significant adverse impacts on land use, zoning, or public policy. However, the No Action Alternative would not advance the objectives of the New York City Economic Development Corporation (EDC) West Harlem Master Plan, specifically the later stages of the plan that call for a rezoning of the area east of the waterfront

(including the Project Area) to allow for a greater density and mix of uses, such as retail, commercial, academic research, institutional, and academic purposes. Unlike the Proposed Actions, in the No Action Alternative, access to and from the West Harlem Waterfront park and adjoining areas would not be improved, and the pedestrian atmosphere would not be enlivened.

SOCIOECONOMIC CONDITIONS

In the No Action Alternative, existing economic activities in the Project Area would largely remain. However, it is possible that development (facilitated by the rezoning applications submitted by Tuck-It-Away Associates, L.P., and Hudson North American) would occur on some of the Proposed Actions' projected development sites, resulting in the addition of a combination of residential, ground-floor retail, and community facility space. If the Tuck-It-Away Associates and Hudson North American rezoning applications are approved, then a possible 481 new market-rate residential units and 378 employees would be added to the Project Area.[1] Collectively, these new developments would likely increase the demand for neighborhood retail and service uses within the Project Area, such as restaurants, dry cleaners, and grocery stores. This development, if it were to go forward, would not result in the direct displacement of existing businesses that is anticipated with the Proposed Actions,[2] with the exception of the C-Town supermarket (approximately 22 employees) at 3320 Broadway and the El Mundo Department Store (approximately 83 employees) at 3300 Broadway, where redevelopment would require demolition of the existing buildings. However, it would not create as many jobs on these sites as would the Proposed Actions. The No Action Alternative would generate an estimated 1,473 permanent jobs within the Project Area (1,073 of which would be jobs from Columbia University projects), compared with 7,086 jobs generated by the Proposed Actions.

Columbia University would only undertake two development projects (the Studebaker Building and the former Warren Nash Service Station Building) in the Project Area in the No Action Alternative, as described above. These No Action projects, combined with other University development initiatives outside of the Project Area—as well as City College projects—would increase the study areas' academic-related economic activity but not nearly to the level expected with the Proposed Actions.

Development anticipated in the No Action Alternative would not result in the direct displacement of any residents, and would result in less direct business displacement compared with the Proposed Actions. An estimated 11 businesses and institutional uses, and 111 employees would be displaced from the Project Area in the No Action Alternative, compared with an estimated 298 residents, 85 businesses, and 880 employees with the Proposed Actions, as shown in Table 24-1. However, neither the Proposed Actions nor the No Action Alternative would result in significant adverse impacts due to direct displacement; neither would displace a substantial portion of the residential population in the study areas, displace businesses with substantial economic value, or displace

[1] Estimates of housing units and employment have been identified by the applicant, as described in EAS documents dated July 2007. Employment estimates for the 3300 and 3320 Broadway rezoning applications are based on standard factors of employment density applied to the residential, retail, and community facility floor area that would be permitted were the rezoning applications to be approved.

[2] Unlike the Proposed Actions, under this alternative, the removal of the Tuck-It-Away business and a portion of the Hudson North American business from its own property is not defined as direct business displacement under CEQR. Nonetheless, the Tuck-It-Away business would close, and its workers could be displaced.

anchor establishments or uses that form a substantial customer base. In addition, the No Action Alternative would not result in significant benefits to the area's business and residential communities through substantial economic growth and job creation. The No Action Alternative also would not beneficially affect existing businesses by significantly increasing the worker and visitor populations, thereby creating a substantial new customer base.

Table 24-1
No Action Alternative, Direct Residential and Business and Institutional Displacement, Compared with the Proposed Actions

Direct Displacement	No-Action Alternative	Proposed Actions*
Residents	0	298
Businesses and Institutions	11	85
Employees	111	880
Note: * Numbers are for the 2030 Build year.		

As described in Chapter 4, "Socioeconomic Conditions," the Proposed Actions have the potential to result in indirect displacement pressures on residents within the primary and secondary study areas. With the Proposed Actions, this impact would be significant and adverse by 2030 within the primary study area. This significant adverse impact would not occur in the No Action Alternative.

COMMUNITY FACILITIES AND SERVICES

Like the Proposed Actions, the No Action Alternative would not directly displace police, fire, public education, public day care, or health care facilities, and the secondary school for science, math, and engineering would be built.

In the No Action Alternative, background growth and new development near the Project Area would generate new demand for public schools, libraries, day care centers, and health care facilities. Similar to conditions in the Proposed Actions, there would be adequate capacity at public elementary and intermediate schools, libraries, and health care facilities to support this growth in the No Action Alternative.

Therefore, the No Action Alternative, like the Proposed Actions, would not result in significant adverse impacts on community facilities.

OPEN SPACE

In the No Action Alternative, the population of the study area and the amount of new open space would increase, but not as much as with the Proposed Actions, so the open space ratios would be higher for the No Action Alternative (see Table 24-2).

New open space for the area will be provided with the construction of the West Harlem Waterfront park along the Hudson River between West 129th and West 133rd Streets. This City-owned open space will include walking and biking paths, an excursion pier to allow docking for excursion and ferry boats, a recreation pier, an ecological platform, a small multi-purpose building, and several passive recreation areas such as lawns and sitting areas. The upland area will contain a system of passive linear landscape elements and gathering places (approximately 2.26 acres) and approximately 9,995 sf (0.23 acres) for a new pedestrian and bike path.

Table 24-2
No Action Alternative, Adequacy of Open Space Resources Compared with the Proposed Actions 2015 and 2030

Ratio	City Guideline Ratio	No Action Ratio	Proposed Actions Ratio	Percent Change
2015 Non-Residential Study Area				
Passive/non-residents	0.15	4.13	2.45*	(40.7)
Passive/total population	0.40	0.78	0.71*	(9.0)
2015 Residential Study Area				
Total/residents	2.50	1.64	1.66	1.2
Passive/residents	0.50	0.88	0.90	2.3
Active/residents	2.00	0.75	0.76	1.3
Passive/total population	0.39	0.63	0.61	(3.2)
2030 Non-Residential Study Area				
Passive/non-residents	0.15	4.13	1.66*	(59.8)
Passive/total population	0.38	0.73	0.59*	(19.2)
2030 Residential Study Area				
Total/residents	2.50	1.52	1.52	0
Passive/residents	0.50	0.82	0.83	1.2
Active/residents	2.00	0.70	0.69*	(1.4)
Passive/total population	0.38	0.60	0.55	(8.3)

Notes: Ratios in acres per 1,000 people.
* Results in a significant adverse impact

The No Action Alternative would not include the 93,965 sf of publicly accessible open space that would be provided by the Proposed Actions. The Proposed Actions would integrate new areas of passive open space into the urban fabric of Manhattanville that would be available to existing and future workers, visitors, and residents in the area that would not be provided in the No Action Alternative. Thus, the No Action Alternative would not result in the open space benefits that would be realized with the Proposed Actions.

However, unlike the Proposed Actions, the No Action Alternative would not result in significant adverse indirect impacts on passive open space in the non-residential study area and active open space in the residential study area.

SHADOWS

The No Action Alternative would not result in significant new shadows on sun-sensitive receptors. Therefore, the No Action Alternative would not cast new shadows on the I.S. 195 Playground north of West 133rd Street, whereas the Proposed Actions would result in significant adverse impacts on this sun-sensitive receptor.

HISTORIC RESOURCES

Since the Project Area has been determined not archaeologically sensitive, like the Proposed Actions, no archaeological resources would be disturbed in the No Action Alternative.

The No Action Alternative would not result in the demolition of the former Sheffield Farms Stable at 3229 Broadway. Therefore, the No Action Alternative would not result in significant adverse impacts on this historic resource, requiring mitigation. However, it is possible that implementation of the rezoning application for 3229 Broadway (submitted by Hudson North American) in the No Action Alternative, which would allow residential uses, could also result in modifications to the existing building. The EAS for this application was submitted in July 2007. A Positive Declaration was issued by CPC, determining that an EIS will be required. A reasonable worst-case development scenario is identified by the applicant in the EAS in which the existing building would be converted to residential and retail uses and new residential development would be constructed above. In comments dated June 22, 2007, the New York City Landmarks Preservation Commission (LPC) determined that the expansion of the new building, as proposed, would constitute a significant adverse impact.

The No Action Alternative would not require that modifications be made to the 125th Street IRT Subway Station and the Manhattan Valley IRT viaduct to offset potential impacts due to the lack of capacity at the station to accommodate the projected numbers of users with the Proposed Actions. Therefore, no mitigation measures would need to be designed in consultation with MTA-New York City Transit (NYCT), the New York State Office of Parks, Recreation and Historic Preservation (OPRHP), and LPC to avoid or minimize potential adverse impacts on the 125th IRT Street Subway Station and the Manhattan Valley IRT viaduct.

URBAN DESIGN AND VISUAL RESOURCES

In the No Action Alternative, the Project Area would largely remain in its current condition, characterized by mostly low-rise, nondescript industrial buildings containing storage and warehouse facilities, some meat wholesaling operations, machine shops, and auto-related uses that include gas stations, garages, parking lots, a car wash, and auto parts and repair facilities. Defining streetscape features would continue to be blank masonry ground floors with vehicular entrances and loadings docks covered with roll-down metal gates, parking lots, vacant buildings, empty lots, and a jumble of signage and awnings. Although there would be a slight increase in density and the diversity of building uses in the Project Area and study area through the development of some new buildings and enlargements to others, this new development would mostly occur on the edges of the Project Area along Broadway, West 125th Street, and Twelfth Avenue. The side streets would continue to have an industrial character and remain uninviting to pedestrians. The renovation and conversion to University administrative uses of two existing historically and architecturally significant buildings, the Studebaker Building and the former Warren Nash Service Station building, would not affect building bulk in the Project Area, which would mostly remain the same. There would be no transformation of the Project Area into a collection of community facilities buildings with active-ground floor uses in transparent spaces and coordinated massing, heights, and streetwalls, and which would be organized around an interconnected system of new open spaces and widened sidewalks. Further, there would not be any improved views through the Project Area toward the waterfront.

In the No Action Alternative, some improvements would be made to West 125th Street, but there would be no open space created at the intersection of West 125th and West 129th Streets, and the north side of West 125th Street would continue to be primarily lined by industrial and auto-related buildings. Improvements to the street would include the creation of a new entrance and lobby to 560 Riverside Drive, construction of a new academic building at the southwest corner of Broadway and West 125th Street, and anticipated streetscape improvements that may include widened sidewalks, plantings, and new street lighting and furniture. These improvements

would make West 125th Street a more inviting corridor to the new Harlem River Waterfront park, but the corridor would be less inviting to pedestrians than with the Proposed Actions. New buildings with active ground-floor uses would not line the north side of West 125th Street; the one change to that side of the street would be the enlargement of a three-story garage at the intersection of West 129th and West 125th Streets pursuant to a rezoning. That building would be demolished and a new residential building would be developed.

Overall, neither the No Action Alternative nor the Proposed Actions would have any significant adverse impacts on urban design and visual resources. However, the No Action Alternative would not positively affect the Project Area's urban design like the Proposed Actions.

NEIGHBORHOOD CHARACTER

Unlike conditions with the Proposed Actions, in the No Action Alternative, the existing neighborhood character of the Project Area would remain substantially unchanged. While there are several projects proposed or planned within the Project Area in the No Action Alternative, the Project Area is expected to retain its most prominent characteristics, and overall neighborhood character would be minimally affected. The character of the Project Area in the No Action Alternative would continue to contrast sharply with the character of the primary and secondary study areas.

The No Action Alternative would not result in substantial changes in traffic or noise in the vicinity of the Project Area. The No Action Alternative would not replace the aging industrial area with a new mix of uses, including academic facilities in the form of space for academic research, for the study of arts and humanities, and for the education of professionals, plus active ground-floor spaces, publicly accessible open spaces, and a lively streetscape; with new commercial uses along Twelfth Avenue; and new or expanded community facilities and residential development along the east side of Broadway. The No Action Alternative would not improve the streetscapes; provide active retail uses along Broadway, West 125th Street, and Twelfth Avenue; improve connections to the waterfront; and introduce substantial new publicly accessible open space. Therefore, while avoiding some localized effects on neighborhood character (e.g., indirect residential displacement), the No Action Alternative would not result in the benefits to neighborhood character that would be achieved with the Proposed Actions. Overall, the No Action Alternative, like the Proposed Actions, would not result in significant adverse impacts to neighborhood character.

NATURAL RESOURCES

The No Action Alternative would increase the concentration of pollutants during a combined sewer overflow (CSO) discharge to the Hudson River, although to a lesser extent than the Proposed Actions. Stormwater in the No Action Alternative would flow into the existing combined sewers in the Project Area, whereas in the Proposed Actions stormwater from West 132nd to West 130th Streets between Twelfth Avenue and Broadway would be collected through new storm sewers installed in those streets to reduce the total flow into the sewer system and at the North River Water Pollution Control Plant (WPCP). The potential for an increased loss of migratory birds due to building collisions would be lower, due to the reduced level of development expected with the No Action Alternative. Neither the Proposed Actions nor the No Action Alternative would result in significant adverse impacts on water quality, terrestrial resources, wetlands, floodplains, aquatic resources, or endangered, threatened, or special concern species.

HAZARDOUS MATERIALS

Several developments potentially occurring in the Project Area under the No Action Alternative would be pursuant to rezoning applications, all of which would be subject to CEQR review. Construction of the high school in the Project Area would also be subject to CEQR review, as part of a City-mandated Site Selection process. Thus, remediation of potential hazardous materials on these sites would be required, as with the Proposed Actions. Construction on the McDonald's site (West 125th Street at Broadway) would be as-of-right, and so would not be subject to the rigorous requirements of a public process. Nonetheless, any development project needing financing would be required to satisfy the lending institution as to the nature of any hazardous materials on site and their remediation; it is therefore unlikely that such development sites would remain unmitigated or expose workers and passersby to hazardous materials.

On the other properties in the area, although potential hazardous materials would not be disturbed under the No Action Alternative (because there would be no major construction), they would not be removed (as with the Proposed Actions). Nonetheless, the No Action Alternative, because it would not disturb potential hazardous materials without remediation, like the Proposed Actions would have no significant adverse environmental impacts from exposure to hazardous materials.

WATERFRONT REVITALIZATION PROGRAM

The No Action Alternative would result in less development within the coastal zone than the Proposed Actions. Subdistrict A would not be redeveloped as an Academic Mixed-Use Development, and Subdistrict B would not be redeveloped with new low-rise commercial uses. The No Action Alternative would not replace the existing automotive uses, storage facilities, and industrial and manufacturing uses with new community facility and commercial development that would enliven and attract residents and visitors to the Manhattanville waterfront and the new West Harlem Waterfront park. Unlike the Proposed Actions, the No Action Alternative would not enhance the physical and visual access to the waterfront, create active ground-floor uses, or new streetscape features to contribute to improved pedestrian movements, thereby establishing connections through the Project Area to the waterfront. As a consequence, it would generate fewer visitors, residents, and workers to the coastal zone and the proposed West Harlem Waterfront park than the Proposed Actions. Unlike the Proposed Actions, the No Action Alternative would not further the goal of encouraging commercial and residential redevelopment within an appropriate coastal zone area. Like the Proposed Actions, the No Action Alternative would be consistent with the goals of the Waterfront Revitalization Program.

INFRASTRUCTURE

The No Action Alternative would generate less demand for City water supply and sewer services than the Proposed Actions. Given the age and capacity of the existing drainage system in the Project Area, the No Action Alternative would also eventually require the additional sewer segment upgrades and replacements needed with the Proposed Actions. Like the Proposed Actions, any new connections and sewer upgrades in the No Action Alternative would require New York City Department of Environmental Protection (DEP)-approved Drainage Plan amendments. The North River WPCP would have available capacity to treat the increased sewage generated by both the No Action Alternative and the Proposed Actions. Stormwater in the No Action Alternative would flow into the existing combined sewers in the Project Area, whereas in the Proposed Actions, stormwater from West 132nd to West 130th Streets between

Twelfth Avenue and Broadway would be collected through new storm sewers installed in those streets to reduce the total design flow to the sewers and the North River WPCP. As with the Proposed Actions, the No Action Alternative's additional demand on infrastructure services would not affect the City's water supply or local water pressure, or result in infrastructure impacts on the City's sewer system. Therefore, the No Action Alternative, like the Proposed Actions, would not result in significant adverse infrastructure impacts.

SOLID WASTE AND SANITATION SERVICES

In the No Action Alternative, the volume of solid waste generated in the Project Area would not substantially change, and no major changes in the City's solid waste management handling practices are expected. With this alternative, the Proposed Actions' increase in solid waste would not occur. The No Action Alternative, like the Proposed Actions, would not result in any significant adverse impacts on the solid waste handling and disposal systems that serve New York City.

ENERGY

New energy demands in the Project Area would be created with the No Action Alternative, if the proposed development pursuant to the Tuck-It-Away and Despatch rezonings were to be approved. In the No Action Alternative, the Con Edison cooling station located between West 131st and West 132nd Streets and Broadway and Twelfth Avenue would not have to be relocated to allow construction of the new buildings in Subdistrict A by the Proposed Actions. The No Action Alternative, like the Proposed Actions, would not result in significant adverse impacts on energy systems.

TRAFFIC AND PARKING

Like conditions with the Proposed Actions, the analysis of vehicular traffic and parking for the No Action Alternative reflects future background projects and growth that are expected to occur by the 2015 and 2030 future analysis years (see Chapter 2). In the No Action Alternative, the traffic generation and circulation changes associated with the Proposed Actions with traffic improvements would not occur. Consequently, the No Action Alternative would not include the street direction changes and pedestrian safety modifications associated with the Proposed Actions with traffic improvements, nor would it provide for the project's installations of traffic signals and pavement markings at a number of stop sign-controlled intersections along Twelfth Avenue, West 125th Street, and Marginal Street. The No Action Alternative assumes that existing traffic timings, traffic controls, and street network will continue in the future; the same conditions that have been assumed for the Proposed Actions without traffic improvements scenario. The analysis of the No Action Alternative accounts for changes due to the proposed rezoning of 125th Street east of the Project Area.

Unlike conditions with the Proposed Actions (both with and without traffic improvements), for the No Action Alternative, existing parking would not be removed, four interim off-street parking facilities with 652 spaces would not be provided by 2015, and four below-grade parking facilities with up to 2,300 total spaces would not be in place for the 2030 condition. In the No Action Alternative, the relatively small changes to on-street parking supply that would occur in the study area under the Proposed Actions also would not occur.

2015 Analysis Year

Traffic

Although some traffic would be added by the No Build projects proposed in the future without the Proposed Actions, the greater volumes of traffic generated by the Proposed Actions would not be added to the street system in the No Action Alternative. Therefore, among the primary study area signalized intersections during the AM peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for one intersection under the Proposed Actions with traffic improvements, and would not result in the significant adverse traffic impacts identified for five intersections under the Proposed Actions without traffic improvements. Among the primary study area unsignalized intersections, neither the No Action Alternative nor the Proposed Actions with traffic improvements would result in any significant adverse traffic impacts during the AM peak hour, whereas the Proposed Actions without traffic improvements would result in significant adverse traffic impacts at five unsignalized intersections that would otherwise not occur under the No Action Alternative. Among the secondary study area signalized intersections during the AM peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for three intersections under the Proposed Actions with and without traffic improvements.

Among the primary study area signalized intersections during the midday peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for one intersection under the Proposed Actions with traffic improvements, and would not result in the significant adverse traffic impacts identified for three intersections under the Proposed Actions without traffic improvements. Among the primary study area unsignalized intersections, neither the No Action Alternative nor the Proposed Actions with traffic improvements would result in any significant adverse traffic impacts during the midday peak hour, whereas the Proposed Actions without traffic improvements would result in significant adverse traffic impacts at five intersections that would otherwise not occur under the No Action Alternative. Among the secondary study area signalized intersections during the midday peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for three intersections under the Proposed Actions with and without traffic improvements.

Among the primary study area signalized intersections during the PM peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for two intersections under the Proposed Actions with traffic improvements, and would not result in the significant adverse traffic impacts identified for six intersections under the Proposed Actions without traffic improvements. Among the primary study area unsignalized intersections, neither the No Action Alternative nor the Proposed Actions with traffic improvements would result in any significant adverse traffic impacts during the PM peak hour, whereas the Proposed Actions without traffic improvements would result in significant adverse traffic impacts at six intersections that would otherwise not occur under the No Action Alternative. Among the secondary study area signalized intersections during the PM peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for three intersections under the Proposed Actions with and without traffic improvements.

Parking

In the 2015 No Action Alternative, on-street parking utilization within ½ mile of the Project Area would be 76, 82, and 83 percent during the AM, midday, and PM peak periods, respectively, compared with 79, 87, and 87 percent under the Proposed Actions with traffic improvements, and 78, 86, and 86 percent under the Proposed Actions without traffic

improvements. Neither the No Action Alternative nor the Proposed Actions with or without improvements would have a significant adverse impact on on-street parking.

The Proposed Actions' removal of five of 26 existing off-street parking facilities within one mile of the Project Area and the resulting shortfall of approximately 235 and 265 spaces during the AM and midday periods, respectively, would not occur in the No Action Alternative. Thus, unlike the Proposed Actions, the No Action Alternative would not create a significant adverse impact on public parking in 2015.

2030 Analysis Year

Traffic

Although some traffic would be added by the No Build projects proposed in the future without the Proposed Actions for 2030, the greater volumes of traffic generated by the Proposed Actions in 2030 would not be added to the street system in the No Action Alternative. Therefore, among the primary study area signalized intersections during the AM peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for one intersection under the Proposed Actions with traffic improvements, and would not result in the significant adverse traffic impacts identified for five intersections under the Proposed Actions without traffic improvements. Among the primary study area unsignalized intersections, neither the No Action Alternative nor the Proposed Actions with traffic improvements would result in any significant adverse traffic impacts during the AM peak hour, whereas the Proposed Actions without traffic improvements would yield significant adverse traffic impacts at seven intersections that would otherwise not occur under the No Action Alternative. Among the secondary study area signalized intersections during the AM peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for two intersections under both the Proposed Actions with and without traffic improvements.

Among the primary study area signalized intersections during the midday peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for one intersection under the Proposed Actions with traffic improvements, and would not result in the significant adverse traffic impacts identified for four intersections under the Proposed Actions without traffic improvements. Among the primary study area unsignalized intersections, neither the No Action Alternative nor the Proposed Actions with traffic improvements would result in any significant adverse traffic impacts during the midday peak hour, whereas the Proposed Actions without traffic improvements would result in significant adverse traffic impacts at six intersections that would otherwise not occur under the No Action Alternative. Among the secondary study area signalized intersections during the midday peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for two intersections under the Proposed Actions with and without traffic improvements.

Among the primary study area signalized intersections during the PM peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for three intersections under the Proposed Actions with traffic improvements, and would not result in the significant traffic adverse impacts identified for eight intersections under the Proposed Actions without traffic improvements. Among the primary study area unsignalized intersections, neither the No Action Alternative nor the Proposed Actions with traffic improvements would result in any significant adverse traffic impacts during the PM peak hour, whereas the Proposed Actions without traffic improvements would result in significant adverse traffic impacts at six intersections that would otherwise not occur under the No Action Alternative. Among the

secondary study area signalized intersections during the PM peak hour, the No Action Alternative would not result in the significant adverse traffic impacts identified for four intersections under both the Proposed Actions with and without traffic improvements.

Parking

In the 2030 No Action Alternative, on-street parking utilization within ½ mile of the Project Area would be 81, 88, and 90 percent during the AM, midday, and PM peak periods, respectively, compared with 86, 94, and 94 percent under the Proposed Actions with traffic improvements and 84, 92, and 93 percent under the Proposed Actions without traffic improvements. Neither the No Action Alternative nor the Proposed Actions with or without traffic improvements would have a significant adverse impact on on-street parking.

In the No Action Alternative, Columbia University would not create the Proposed Actions' additional off-street parking. With the No Action Alternative, capacity of the 26 off-street parking facilities within one mile of the Project Area would be 103, 104, and 80 percent utilized during the AM, midday, and PM peak periods, respectively. The Proposed Actions' removal of all existing off-street parking facilities and introduction of up to 2,300 spaces in the Project Area and the resulting shortfall during the AM (just over 120 spaces) and midday (less than 50 spaces) periods would not occur in the No Action Alternative. Thus, unlike the Proposed Actions, the No Action Alternative would not create a significant adverse impact on public parking in 2030.

TRANSIT AND PEDESTRIANS

As with the analysis of vehicular traffic, the projection of future transit and pedestrian trips for the No Action Alternative reflects background projects and area growth that is expected to be completed by the 2015 and 2030 future analysis years.

With the No Action Alternative, available transit services would be the same as under the Proposed Actions with or without traffic improvements. However, the various changes to the 2015 and 2030 pedestrian travel network planned for the Proposed Actions with traffic improvements, which include improvements to sidewalks, crosswalks, and traffic signals, or under the Proposed Actions without traffic improvements, which include primarily widened sidewalks from setbacks of new buildings, would not occur.

2015 Analysis Year

Transit

In 2015, under the No Action Alternative and the Proposed Actions with and without traffic improvements, all subway station elements would operate at LOS C or better during the AM and PM peak periods. The northbound and southbound No. 1 subway and the westbound Bx15 bus would also operate within guideline capacities. However, the No Action Alternative would not result in significant adverse bus impacts on the eastbound Bx15 route during the PM peak period under the Proposed Actions with and without traffic improvements.

Pedestrians

In the 2015 No Action Alternative, all pedestrian analysis locations would operate at LOS C or better except at the east crosswalk at Broadway and West 125th Street, which would operate at LOS D in both the AM and PM peak periods. The service level of this crosswalk, however, would improve with the Proposed Actions in place due the elimination of certain projects along the east side of Broadway that would otherwise remain under the No Action Alternative and the

redistribution of pedestrian trips in the area under the Proposed Actions. As a result, under the Proposed Actions with and without traffic improvements, all pedestrian analysis locations would operate at LOS C or better, and neither the Proposed Actions (with or without traffic improvements) nor the No Action Alternative would result in significant adverse impacts on pedestrian conditions in 2015.

2030 Analysis Year

Transit

In the 2030 No Action Alternative, all subway station elements would operate at LOS B or better, and the significant impact at the Broadway and 125th Street Subway Station (the E101 down escalator during the AM peak period and the E102 up escalator during the PM peak period) identified for the Proposed Actions with and without traffic improvements would not occur.

As with the Proposed Actions with or without traffic improvements, in the 2030 No Action Alternative, the northbound and southbound No. 1 subway would operate within guideline capacities. With the No Action Alternative, the eastbound and westbound Bx15 bus would also operate within guideline capacities; therefore, the impact associated with the over-capacity conditions under the Proposed Actions with or without traffic improvements on the eastbound Bx15 bus during the PM peak hour and on the westbound Bx15 bus during the AM peak hour would not occur.

Pedestrians

Under the 2030 No Action Alternative, all pedestrian analysis locations would operate at LOS C or better except at the east crosswalk at Broadway and West 125th Street, which would operate at LOS D in both the AM and PM peak periods. With the Proposed Actions in place, the service level of this crosswalk would improve due to the elimination of certain projects along the east side of Broadway that would otherwise remain under the No Action Alternative and the redistribution of pedestrian trips in the area under the Proposed Actions. With the Proposed Actions and planned traffic improvements in place, all pedestrian analysis locations would operate at acceptable mid-LOS D or better. Therefore, neither the No Action Alternative nor the Proposed Actions with traffic improvements would result in significant adverse pedestrian impacts. However, under the Proposed Actions without traffic improvements, the three west crosswalks along Broadway at West 125th, West 129th, and West 130th Streets would all be significantly adversely impacted. These significant adverse impacts would not occur under the No Action Alternative.

TRAFFIC SAFETY

The No Action Alternative, like the Proposed Actions with or without traffic improvements, is not expected to result in significant adverse safety impacts in the area.

AIR QUALITY

Like the Proposed Actions, the No Action Alternative would not have a significant adverse impact on air quality, either from mobile, stationary, or industrial sources of pollution. No violations of the National Ambient Air Quality Standards (NAAQS) for emissions of NO_x, CO, PM_{10}, and SO_2, and no significant impacts due to $PM_{2.5}$ emissions are predicted to occur either in

the No Action Alternative or with the Proposed Actions, and both scenarios would be consistent with the New York State Implementation Plan (SIP).

NOISE

The significant adverse noise impact predicted to occur on West 125th Street near Twelfth Avenue (in 2015 and 2030) with the Proposed Actions would not occur in the No Action Alternative.

CONSTRUCTION

The No Action Alternative would result in a limited amount of new commercial and residential development in the Project Area. Construction activities associated with the No Action Alternative would be substantially smaller in scale and shorter in duration than what would be undertaken for the Proposed Actions. Therefore, in the No Action Alternative, the traffic and noise impacts associated with the construction of the Proposed Actions would not occur. However, the economic benefits attributable to construction expenditures and construction jobs would be much smaller in scale than with the Proposed Actions.

PUBLIC HEALTH

Like the Proposed Actions, the No Action Alternative is not expected to result in significant adverse impacts on public health.

CONCLUSION

In the No Action Alternative, the proposed zoning changes and GPP would not be implemented. In the No Action Alternative, the limited development within the Project Area would, for the most part, involve the reuse, conversion, and expansion of existing buildings. Unlike the Proposed Actions, which would add new community facilities, University housing, commercial uses, and open space to the Project Area, the No Action Alternative would result in a limited amount of new commercial and residential development in the Project Area.

As with the Proposed Actions, the No Action Alternative would not result in any significant adverse impacts on land use, zoning, and public policy, community facilities, urban design and visual resources, neighborhood character, natural resources, hazardous materials, infrastructure, solid waste and sanitation services, energy, pedestrians, air quality, and public health.

The No Action Alternative would not create the Proposed Actions' impact on indirect displacement of low-income residents. In addition, the No Action Alternative would not require mitigation to offset the indirect impact to passive open space in the non-residential study area and active open space in the residential study area. The No Action Alternative would also not require mitigation to offset the potential effects of the Proposed Actions' shadows on a sun-sensitive receptor (the I.S. 195 Playground). The alternative would not create significant adverse effects on two historic buildings, requiring mitigation, nor would it require modifications to the 125th Street IRT Subway Station and the Manhattan Valley IRT viaduct (both historic resources) to offset potential impacts due to the lack of capacity at the stations to accommodate the projected number of users in the Proposed Actions. The No Action Alternative would result in fewer severely congested locations with respect to traffic and transit compared with the Proposed Actions, and would not result in a significant adverse impact on off-street public parking. In the No Action Alternative, the significant adverse noise impacts associated with the

Proposed Actions would not occur. In addition, significant impacts from construction under the Proposed Actions would not occur with the No Action Alternative.

However, the No Action Alternative would not advance the objectives of EDC's West Harlem Master Plan, a portion of which calls for a rezoning for the area east of the waterfront to allow for a greater density and mix of uses, such as retail, commercial, academic research, and institutional purposes. The No Action Alternative would not result in improved access to and from the West Harlem Waterfront park and adjoining areas. In addition, the No Action Alternative would not include the 93,965 sf of publicly accessible open space that would be provided by the Proposed Actions. The No Action Alternative would not replace the aging and low-density industrial area with a mix of new uses, including academic facilities in the form of scientific and other academic research space, active ground-floor spaces, and expanded community facilities and residential development along the east side of Broadway.

The existing manufacturing zoning districts in the Project Area do not permit college or university uses (or other related community facility uses listed under zoning use group 3). Therefore, Columbia University would not be able to develop any academic uses in the No Action Alternative; this alternative would only contain Columbia University administration buildings in the Project Area. Therefore, the No Action Alternative would not meet Columbia's long-term growth needs over the next approximately 25 years—a goal of 5 to 6 million sf of program space for the institution's modern facilities, with space for teaching, academic research, the study of arts and humanities, and the education of professionals.

D. ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT ADVERSE IMPACTS

The impact analyses provided in the DEIS identified a number of significant impacts for which no practicable mitigation had been formulated. This section examines the feasibility of alternatives that would reduce or eliminate the unmitigated significant impacts.

SHADOWS

The maximum heights of buildings under the Proposed Actions would cast incremental shadows on the I.S. 195 Playground north of West 133rd Street, after 2015. The analysis of four seasonal study periods (May, June, December, and March) found that while there would be no significant adverse impacts in the May and June analysis periods, there would be significant adverse impacts from incremental shadows cast during the December and March analysis periods. In considering options to reduce shadow impacts, the analysis focused on the March/September analysis period, since the very long shadows in December make it impossible to eliminate a large portion of the shadows, and it is a time of year when the playground is less well-used. Solving the problem for the March/September period would mean that the Proposed Actions could maintain adequate sunlight on the playground for at least nine months of the year.

On the March analysis day, two buildings would cause the great majority of incremental shadows impacts—the building on Site 17, which is located on the east side of Broadway between West 133rd and West 134th Streets, and the building on Site 11, which is located on the west side of Broadway between West 132nd and West 133rd Streets. Additional shadow studies were performed to determine the extent to which these buildings would have to be altered to bring their shadows' adverse effects below the level of significance. Reducing the severity of the impact would focus primarily on the March/September condition, because the December

condition represents a shorter period of time, both in hours of the day and days of the year. It is also the time when there is normally less use of the playground. For the March/September condition, the shadows from project buildings would not be considered significant if they allowed sunlight to fall on reasonably large portions of the playground during the late morning and early afternoon hours, as would be the case for the May/August and June analysis days.

Shadows from the building on Site 17 would be cast on the playground during the morning hours, and the largest incremental shadows would occur around 10:30 AM, when approximately two-thirds of the entire open space would be in shadow. (For a portion of the morning, shadows from the residential building assumed in the Other Area—east side of Broadway between West 134th and West 135th Streets—would also fall on the playground.) By noon, the shadows would decrease in size to cover about one-third of the open space, with shadows coming from buildings on both Sites 11 and 17. By 2:00 PM, incremental shadow from the building on Site 11 would cover the southern half of the playground. At 4:00 PM, the existing shadow from 3333 Broadway would cover approximately half of the playground, and incremental shadow from the building on Site 11 would cover the other half. At 5:15 PM, the existing shadow from 3333 Broadway would cover most of the playground, while the shadow from Building 11 would continue to fill in the remaining area.

In the reasonable worst-case development scenario for shadows, which assumes maximum building heights, Site 17 would contain an academic research building with a height of 240 feet, with 60 additional feet for mechanical facilities on the roof. This translates to a 16-story academic research building. If the mechanical equipment were assumed to be placed on the roof of a different building and the height of the remaining structure were to be reduced to 180 feet, or 12 stories—then the incremental shadow on the playground from Site 17 would be reduced to within acceptable levels. If mechanical equipment were required on the roof and it could not be located to minimize its shadow, then the building would have to be reduced by up to another 60 feet (approximately 4 stories). The shadow from Site 11 could be reduced by modifying the maximum heights of the buildings on Site 11 and Site 12, which is the site just west of Site 11. This would decrease the height on Site 11 to 170 feet and increase the height on Site 12 to 260 feet plus 60 feet for rooftop mechanical structures. In addition, the massing of the building on Site 11 would have to be oriented to keep the height of the structure on the eastern half of the site—the portion directly south of the playground—to no more than 146 feet.

The reasonable worst-case development scenario for shadows assumed the maximum heights on all buildings in the Project Area. This is an overly conservative assumption considering that the maximum permitted FAR and limitations on floor area for each site under the zoning text and the GPP would not permit the construction of all the buildings in the Project Area to their maximum heights. Within this overall conservative maximum there are options for alleviating the significant shadow impact. As noted above, the shadows from the building on Site 11 could be reduced to within acceptable limits by a reorganization of its bulk and that of the building directly to its west; this would amount to a reorientation of the building's shape as contemplated in the Illustrative Plan (see Chapter 1) and a change in the height of a neighboring building. The result would be that height would be moved from Broadway to a midblock building.

The reduction of impact could not be achieved on Site 17 by a simple reorganization of bulk. If the rooftop mechanical structures could be placed so as to reduce their shadows, then the academic research building on Site 17 would have to be reduced by four stories overall to bring its shadows on the playground to within acceptable limits. It is possible that additional floors would have to be removed, depending on the location and size of mechanical structures. Thus, to

address the shadow impact from Site 17, while still providing the space that Columbia needs for its long-term expansion, several floors from Site 17 would have to be accommodated in the other academic research buildings (on Sites 2, 6, 6b, 8, or 15). It would also be possible to transfer the excess height from Site 11 southward to the other Broadway academic research sites, leaving the maximum height on Site 12 unchanged. These transfers could be accommodated within the maximum height limits on all of those sites; however, the buildings would be taller under the Illustrative Plan. This is because the Illustrative Plan, which demonstrates the University's current approach to the design of the development, attempts to limit the height of the buildings along the Broadway corridor opposite the Manhattanville Houses.

Another approach would be to simply reduce the size of the buildings that create the impact, without replacing the space elsewhere. However, this option would reduce the total program space by approximately 449,000 sf to approximately 4.7 million square feet, and thus it would conflict with the goal of the Proposed Actions to provide 5 to 6 million square feet of program space for Columbia's long-term space needs.

Also being considered as a result of comments made during DEIS and project review is the option to place University housing on Sites 17 and 11, which would greatly reduce the height of buildings on those sites and proportionally reduce shadows. With this change in land use, the building height on Site 17 would be reduced from a maximum of 240 feet plus a mechanical penthouse of up to 60 feet to a maximum of 120 feet. On Site 11, the lot size would be altered so that it extended only 120 feet west of Broadway; the size of Site 12 would be concomitantly increased. Site 11 would have either an academic or University housing use to a maximum height of 180 feet, with a possible mechanical penthouse of up to an additional 40 feet. Maximum height on Site 12 would be reduced from 230 feet to 170 feet, plus a 60-foot mechanical penthouse. This alternative arrangement would greatly reduce shadows on the playground during the March 21/September 21 analysis day, so they would not be on the playground for the entire day, in contrast to the Proposed Actions' shadows. There would be some shadow from Site 17 in the morning, but it would move off the playground much more quickly, so that at 10:00 AM it would cover only a small area along the southeast edge rather than more than half the space as under the Proposed Actions. By 10:45 AM the shadow would be gone, whereas under the Proposed Actions the shadow would still cover over half the space at 11:15 and would not exit until 12:45 PM.

Under both scenarios an incremental shadow from the building on Site 11 would enter the southern part of the playground; under the Proposed Actions, by 2:15 PM, the shadow would cover most of the playground. With the alternative use and height, the shadow would move across only the southern area of the playground, covering a little less than a quarter of the total playground area even at its greatest extent around 3:00 PM. Under the Proposed Actions, at 3:45 PM the playground would be completely shaded by a combination of existing shadow (from 3333 Broadway) and incremental shadow from buildings on Sites 11 and 12, and the playground would remain shaded until the end of the day. With the alternative use and height scenario, an area in the center of the playground would remain in sunlight due to the shorter buildings on Sites 11 and 12. At 4:45 PM a small area of sunlight would still remain. Thus, the alternative use and height scenario would substantially reduce the extent and duration of incremental shadow during the March/September analysis day, particularly during the late morning and early afternoon.

This is one alternative/project modification that would address the shadows impact. After reviewing each of the potential options for reducing or eliminating the impact, this FEIS

concludes that the two realistic options are either to maintain the project land uses and building heights as proposed, allowing the impact to occur, but applying mitigation to the playground (see Chapter 23), or to seek a modification to the Proposed Actions to change the uses and related building heights and configuration and thus the building sizes on Sites 17, 11, and 12.

HISTORIC RESOURCES

The plan for the Academic Mixed-Use Development proposes to remove the former Sheffield Farms Stable at 3229 Broadway to allow for the construction of a Phase 1 academic research building on Development Site 2 (the Jerome L. Greene Science Center for Columbia's Mind, Brain and Behavior initiative). Measures were developed under the Proposed Actions, to partially mitigate the adverse impacts These measures include Historic American Buildings Survey (HABS) Level I documentation of the exteriors and interiors of the former Sheffield Farms Stable and development and installation of a permanent interpretive exhibit or exhibits in or near the Project Area to document the history of the former Sheffield Farms Stable and to encompass the larger history of the Manhattanville neighborhood. Elements that would be considered for the exhibit include the HABS Level I documentation, salvaged elements of the former Sheffield Farms Stable, historic and current photographs and a historical narrative, historic industrial elements salvaged from the Studebaker Building, and interactive and multimedia features. However, these measures would not fully mitigate the significant adverse impact.

Potential alternatives to eliminate the impact of removal were evaluated, including the following:

- Retaining and reusing the building for academic research use,
- Incorporating all or a portion of the building into the proposed Jerome L. Greene Science Center, including retaining 50 percent of the building and just its Broadway façade, and
- Relocating the Jerome L. Greene Science Center to another location in the Phase 1 development area.

These options were considered in a historic feasibility study that was submitted to OPRHP for review. The feasibility study considered factors associated with retaining and adaptively reusing the building for academic research use. These factors include specific floor layouts, including the need for large rectangular floor plates with minimal obstructions and requirements for laboratory and support space, structural characteristics, and infrastructure and utility service requirements for academic research buildings, including the need for high floor-to-floor heights to accommodate necessary laboratory infrastructure beneath the ceiling and the need for below-grade support, which would serve the proposed academic research buildings on Broadway and requires construction of a slurry wall. The study concluded that it is not feasible to adaptively reuse the former Sheffield Farms Stable for academic research use, or incorporate all or a portion of the building into the proposed Jerome L. Greene Science Center, or move the building to another location in the Phase 1 area, since such alternatives would not allow the project to meet its goals and objectives with respect to the Jerome L. Greene Science Center, and would significantly reduce the amount of usable space above grade and below grade associated with the Jerome L. Greene Science Center.

In a letter dated November 14, 2007, OPRHP concurred that it is not appropriate to retain just a portion of the former Sheffield Farms Stable or just its façade, but requested that an additional alternative be studied, as follows:

- Relocate the Jerome L. Greene Science Center to the southern half of Block 19xx, avoiding the former Sheffield Farms Stable altogether, and provide appropriate floor area for the academic research building in a long rectangular shape, as shown in Figure 24-7. This would produce a building of approximately 100 by 345 feet. It would extend westward from Broadway; its west façade would abut the north-south midblock passage. This relocation would eliminate the small square from south side of the block and the Lantern building from Site 3. OPRHP has suggested that to retain these two uses in the project, consideration could be given to moving them to the north side of the block (on the south side of West 130th Street) where they would not be visible from West 125th Street.

This alternative was found to be not feasible for the following reasons:

- A footprint of 34,500 square feet (100 feet by 345 feet) would be hypothetical only and not achievable under this scenario. In reality, assuming a reduction of 15 percent for internal and external articulation, a 29,325 gsf floor plate would result, approximately 8,175 gsf less than under the Proposed Actions. A 29,325-gsf-floor plate could accommodate eight full Principal Investigator units averaging 3,500 gsf per team. Under the Proposed Actions, the Jerome L. Greene Science Center would function in research neighborhoods of between 9 and 10 Principal Investigators on each academic research floor, at the 3,500 gsf per team necessary for the advanced neuroscience and interdisciplinary research program of the facility.
- A narrow, 300 plus foot long building would not allow for the efficient use of support space on each floor. Corner-to-corner walking distances would be greatly increased, central conference and break areas, which promote collaboration, could not be achieved and vertical circulation would be decentralized. The benefits of a more square configuration of the Jerome L. Greene Science Center under the Proposed Actions, which allows for offices and other key local lab support functions to be in close proximity to the lab benches, would not be achieved in a long, narrow building.
- To accommodate a larger floor plate for the Jerome L. Greene Science Center than this 29, 345 gsf floor plate would require that the building extend into the area planned for the midblock north-south passageway, thereby effectively eliminating one of the remaining open space features of Phase 1 and removing one leg of the north-south open area which, under the Proposed Actions would extend physically and visually from Prentis Hall through to West 133rd Street. In addition, further elongation of the building would exacerbate the problems cited above. The only other way that the proposed number of Principal Investigators required for the interdisciplinary Neurosciences program could be accommodated in a building with a 29,325 gsf floor plate would be to add floors. To accommodate at least 75 Principal Investigator units required in the buildings' program, two additional academic research floors would be necessary.
- Retaining the former Sheffield Farms Stable poses considerable engineering problems with respect to building the below-grade research support space. The water table, located approximately 10 to 15 feet below grade, would exert considerable groundwater pressure, coming from the north, the south, and the west against the slurry wall if it were to be built around the Sheffield Farms Stable. Tiebacks would be required to counter this pressure; they would have to be spaced approximately every 8 to 10 feet vertically and horizontally. The tiebacks would have to extend under the Sheffield Farms Stable. Due to the stable's small footprint, the tiebacks would also likely cross over each other, which is not acceptable from an engineering standpoint. Additionally, bedrock in this location is very deep—more than 250 feet down—and it would not be feasible to build a 250-foot-deep slurry wall to cut off

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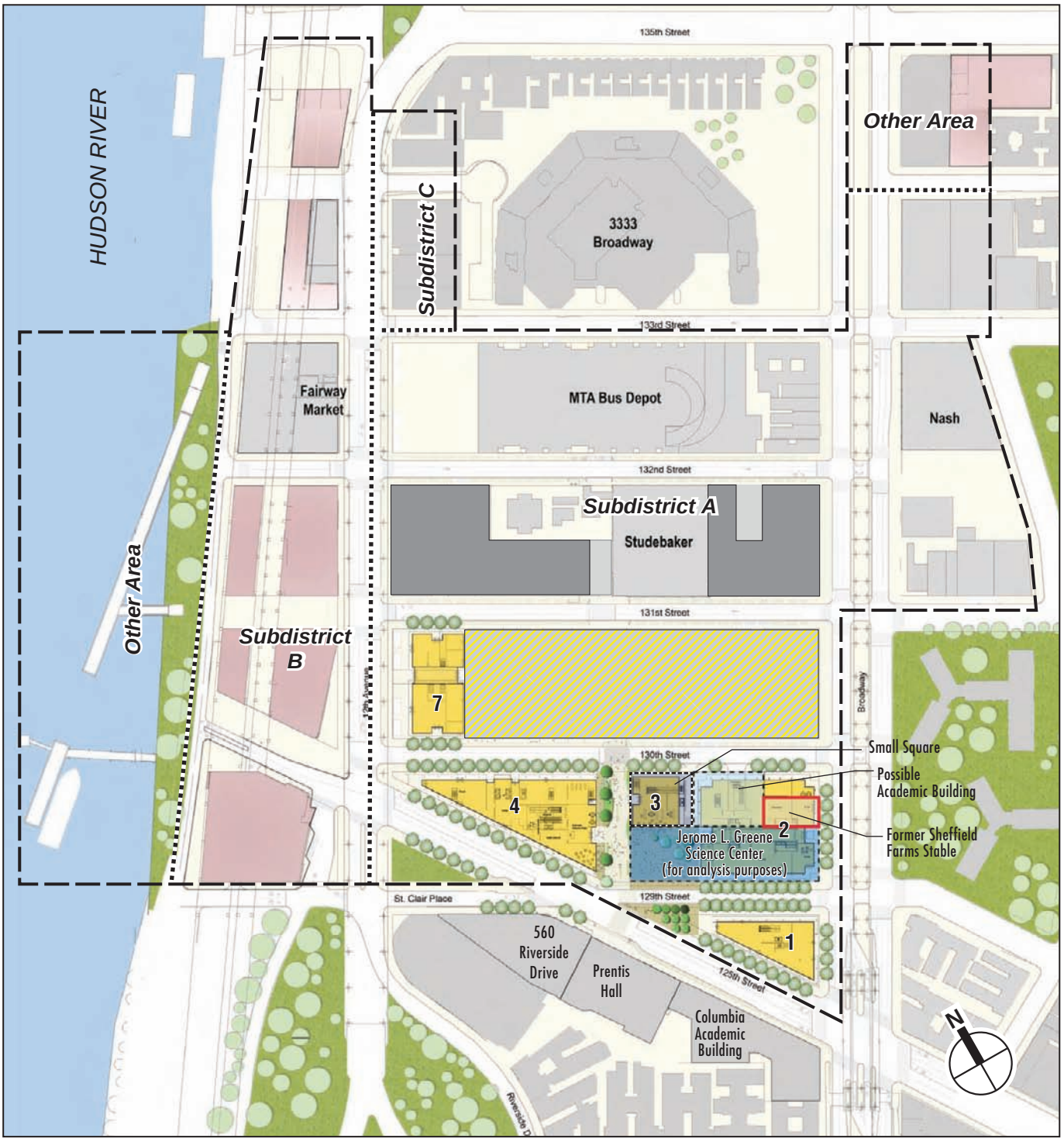


NOT TO SCALE

Project and Rezoning Area Boundary

Subdistrict Boundary

1 *Development Site*

Construction Staging/ Interim Parking

Under Construction

Existing Development

Columbia University Development

New Open Space

Subdistricts B, C, and the Other Areas Projected Development Sites

Note: Building articulations and design features illustrative

Figure 24-7

Historic Preservation Alternative

the water. Without a sealed space, dewatering would lower the water table under the Sheffield Farms Stable considerably, making it susceptible to settlement. Therefore, it is more practicable to build the slurry wall through the block at a point at least 100 feet west of Broadway. This way only dewatering would be required west of the Sheffield Farms Stable and mechanisms could be put in place to control the lowering of the water table under the building. However, if the slurry wall is located 100 feet or more west of Broadway, then only a conventional basement could be built on the block along Broadway. This would result in approximately 20,000 gsf less for each of the two below-grade research support floors; a portion of that space would have to be provided above grade. Added to the two additional floors required to adjust to the smaller floor plate, this means that the building would be at least three stories (approximately 48 feet) taller than the building proposed under the Proposed Actions. The narrower below-grade support space below the Jerome L. Greene Science Center would constrain Columbia's ability to program that space efficiently for use by all of the Broadway academic research buildings.

In addition, the relocation option identified by OPRHP would significantly affect the ability of the plan to achieve key goals and purposes, as follows:

- With the arrangement of buildings and open space shown in Figure 24-7, the Phase 1 development would not create a gateway to the waterfront along West 125th/129th Street. The street would be characterized by a small open space (the Grove) viewed against the large continuous streetwall of the Jerome L. Greene Science Center behind it. The view north into the campus would be through a 50-foot-wide midblock passageway between two large buildings. The two loading docks slated for the Jerome L. Green Science Center on West 130th would have to be moved to West 129th Street, where they would be partially visible from West 125th Street and where their curb cut would reduce the attractiveness of West 129th Street as a pathway to West 125th Street and the river.
- The arrangement of open spaces under this alternative would not meet the goals of the project. In its position on the north side of the block, the small Square would not function as an entrance to the new campus. It would not add to the appeal of West 125th Street, as it would not be visible from that vantage point. Similarly, the midblock open area would be confined to a lane between two buildings and it could not offer views of the large Square and the Studebaker building to the north. Thus, the pattern of development that relocating Jerome L. Greene Science center would require under this alternative would reduce the functionality of the project's open spaces and would detract from the ability of the Phase 1 development to function as a campus and to appear as a gateway to the remainder of the campus to the north.

Measures that would partially mitigate the significant adverse impact resulting from the demolition of the building for the initial (2015) phase of development are described in Chapter 23. Consultation among OPRHP, ESDC, and Columbia will continue.

E. EXPANDED INFILL ALTERNATIVE[1]

DESCRIPTION OF ALTERNATIVE

In response to comments made during public review of the DEIS and the Illustrative Plan, an alternative has been developed which considers whether the goals and purposes of the Proposed Actions could be accommodated under a scenario that assumes Columbia would develop using public property and property owned or controlled by Columbia only, i.e., without private sites not currently owned or controlled by Columbia. The alternative assumes that publicly owned properties, both above and below grade, could be acquired for redevelopment as part of the Academic Mixed-Use program. As shown in Figure 24-8, under this alternative, portions of most of the blocks in the Academic Mixed-Use Development area would be excluded from the University development. These include the western ends of Blocks 1995 and 1996; Hudson Moving and Storage (the former Sheffield Farms Stable) on Broadway between West 129th and West 130th Streets; a residential building on Block 1997; the Con Edison facility and Tuck-It-Away on Block 1998; four residential buildings on the Broadway frontage of Block 1999; and the Service Station building on Broadway between West 133rd and West 134th Streets (Block 1987). Only Block 1986 would remain unchanged.

In creating a development scenario for this alternative, it was assumed that the proposed zoning would apply to all development sites in the Project Area. The new development would respect side yard and rear yard requirements under the regulations of the proposed Special District and building code requirements for light and air and legal window on private properties. Assumptions for Academic Mixed-Use development and for other development are discussed in separate sections, below.

ACADEMIC MIXED-USE DEVELOPMENT PLAN

Development Assumptions

The alternative would contain all the uses in the Academic Mixed-Use Development scenario for the Proposed Actions, but would give preference to academic research to the extent possible. Given that the development sites under this alternative would be more limited and of different sizes and shapes than those of the Proposed Actions, the development scenario would assume uses for each site based on its suitability for a particular type of development, irrespective of the GPP use limitations for development sites under the Proposed Actions. Consistent with the goals and purposes of the Proposed Actions, the development scenario for the alternative assumes that a site must allow for a minimum floor plate of 25,000 sf in order to accommodate an academic research use and a minimum of 15,000 sf in order to accommodate an academic use. Because the alternative assumes that public land beneath streets could be acquired, the alternative also assumes a deep below-grade support space for at least some of the functions accommodated in the Proposed Actions.

As noted above, the proposed zoning regulations would apply, including FAR limitations and maximum heights. Buildings would be to maximum heights and zoning envelopes; if a building straddled two height zones under the proposed zoning, the lower height zone would govern.[2] This alternative would provide publicly accessible open space, which is a goal of the Proposed

[1] This entire Section E is new in the FEIS.

[2] The Expanded Infill Alternative has been structured to be within the "scope" of the zoning proposal in the project's ULURP application.

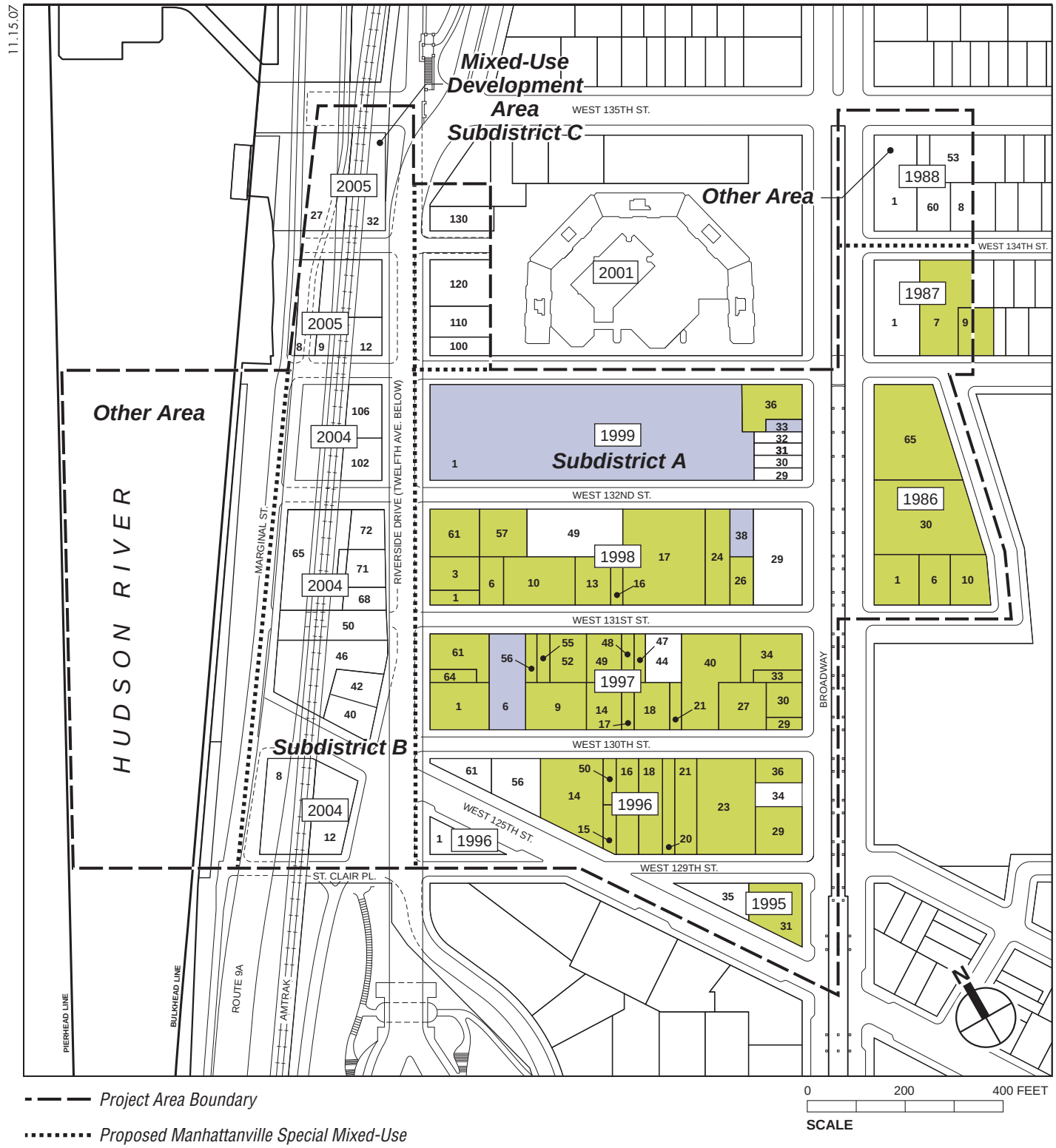


Figure 24-8

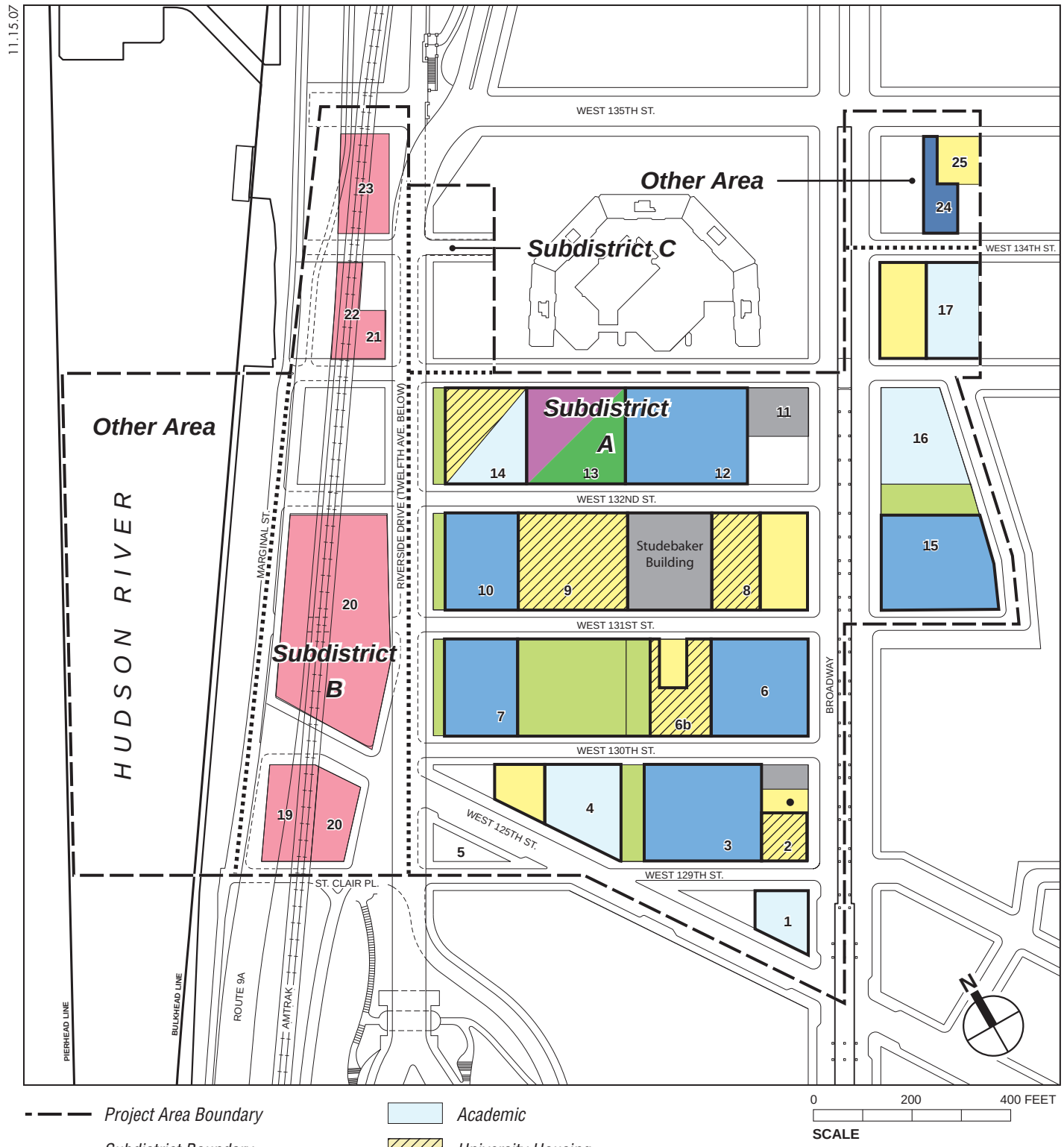
Expanded Infill Alternative: Columbia and Publicly Controlled Property

Actions, but these would be fewer and smaller than the Proposed Actions' open spaces, because not as much land area would be available overall and because some of the existing private properties are located on the sites of proposed open spaces. The Square would be maintained at a minimum of 40,000 sf (it is proposed at 50,000 sf in the Illustrative Scenario); the Small Square would be omitted to allow a larger floor plate for Site 3. The north-south midblock open area would be maintained between West 129th and West 131st Streets only; it would be 45 feet wide (compared with 50 feet under the Proposed Actions). The east-west midblock open area would be the same as in the Proposed Actions, as would be the 30-foot sidewalk widening on Twelfth Avenue. However, the 5-foot sidewalk widenings on the east-west streets would be omitted, so that the development could maintain a continuous streetwall with existing buildings to remain and proposed development on private properties in the area; however the 30-foot setback on Twelfth Avenue would be maintained. The Expanded Infill Alternative would also attempt to accommodate all the parking demand of the Academic Mixed-Use Development, as the plan in the Proposed Actions does.

Development Scenario

As shown in Figure 24-9, the University land use pattern under this alternative would be different from that of the Proposed Actions. There would be six academic research sites, but they would not be concentrated along Broadway; rather, they would be located on Twelfth Avenue and in the midblocks as well as on Broadway. Sites for academic buildings and University housing would also be fitted in wherever possible, and the sites for University housing would be generally small. The central Square would be smaller, but located in the same place as in the Proposed Actions, and the north-south midblock pedestrian way would go no farther north than West 131st Street. The east-west midblock passage would be the same as under the Proposed Actions. This alternative would also require that parking be provided above grade (in a structure on Site 13), because there would be limited below-grade space (see discussion below). There would only be room for a third of the recreation program; this would be sited above the garage on Site 13. The former Warren Nash Service Station building would be converted to academic use, as in the Proposed Actions, and Site 15 could produce an academic research building similar in size and scale to that of the Proposed Actions.

As shown in Figure 24-10, there would only be a limited deep basement under this alternative. Although it would be technically feasible to build a deep basement beneath a larger portion of the area of Subdistrict A than is shown in Figure 24-10, this would be extremely expensive, because its shape would be irregular, which would drive up the cost of construction, and—more importantly—there would be very little benefit in creating such a space. In particular, with the University uses scattered and the below-grade area interrupted by intervening privately owned properties, the opportunity to create a central loading area and connect it through a continuous tunnel system to all other sites or to create a central energy center would not exist. Also, without the several academic research sites located adjacent to one another, as in the Proposed Actions, the opportunity to create and gain efficiencies from a large shared academic support area connected to the central loading area would also not be possible. For these reasons, the deep basement in this alternative is limited to the area beneath the two academic research sites on Twelfth Avenue and beneath the central Square. The slurry wall construction in this location would be reasonably regular, and some efficiency in providing shared academic support to the two buildings could be achieved. It would also be possible to add several parking levels below grade at this location to help achieve the aim of this alternative to accommodate the parking demand from its University buildings. The alternative would be able to accommodate the relocation of the bus depot below grade by limiting this facility to two underground levels only,



MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Figure 24-9
Expanded Infill Alternative: Land Use

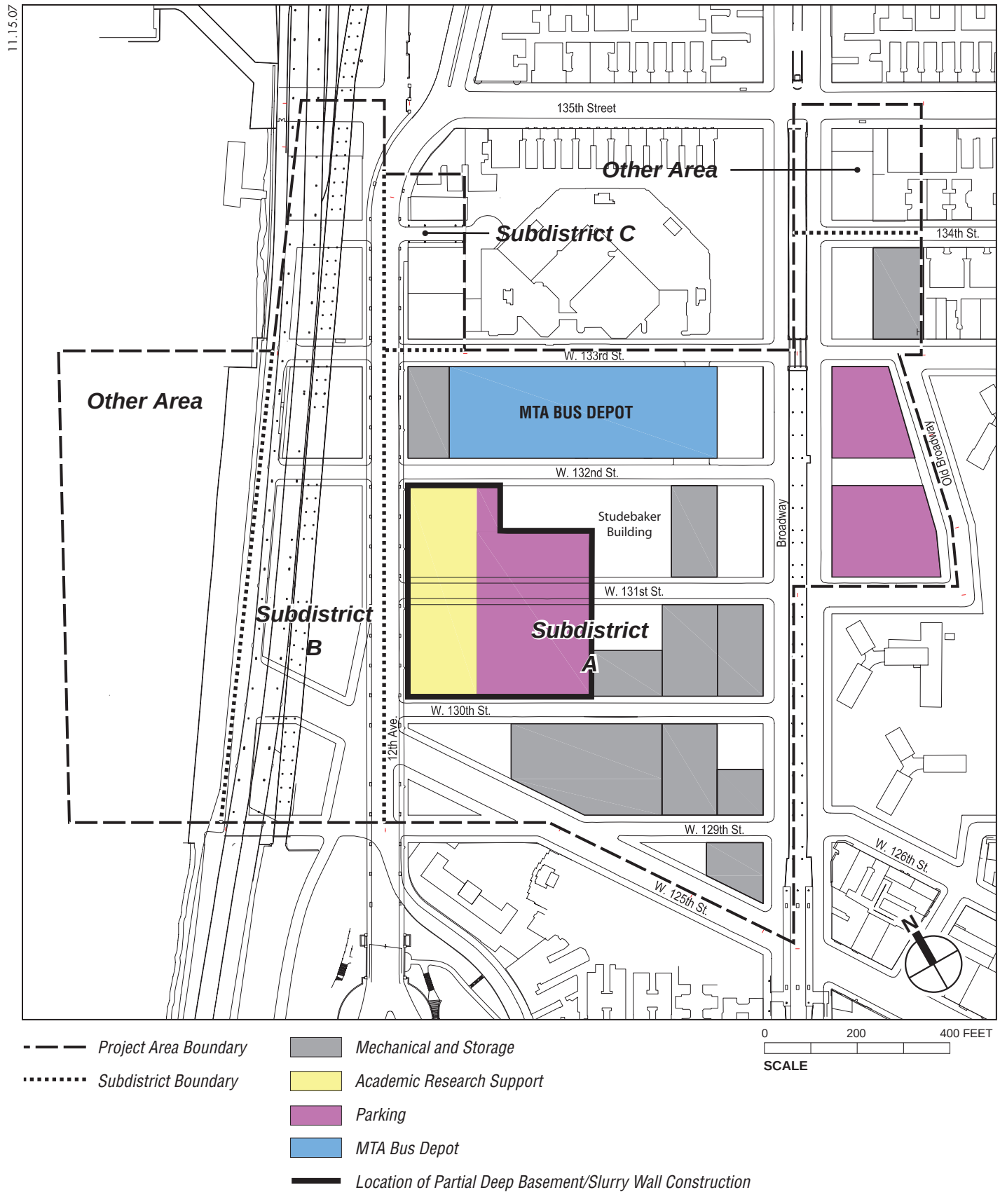


Figure 24-10
Expanded Infill Alternative: Below-Grade Area

so that slurry wall construction would not be required. Slurry wall construction would be required on the western end of the block under the Proposed Actions to build the Phase 2 Energy Center. That plan would extend the slurry wall to the east toward the center of the block, which would permit an extra level for the relocated bus depot. This level, containing 80,000 sf for parking for MTA employees, would have to be accommodated above grade in the parking garage in this alternative. As a result of the limited below-grade space, this alternative would require 20 loading docks in 11 locations and seven curb cuts for two-way car ramps (see Figure 24-11). This compares to the Proposed Actions, which would have six loading docks in three locations, one-two-way truck ramp, and four curb cuts for bus and car ramps.

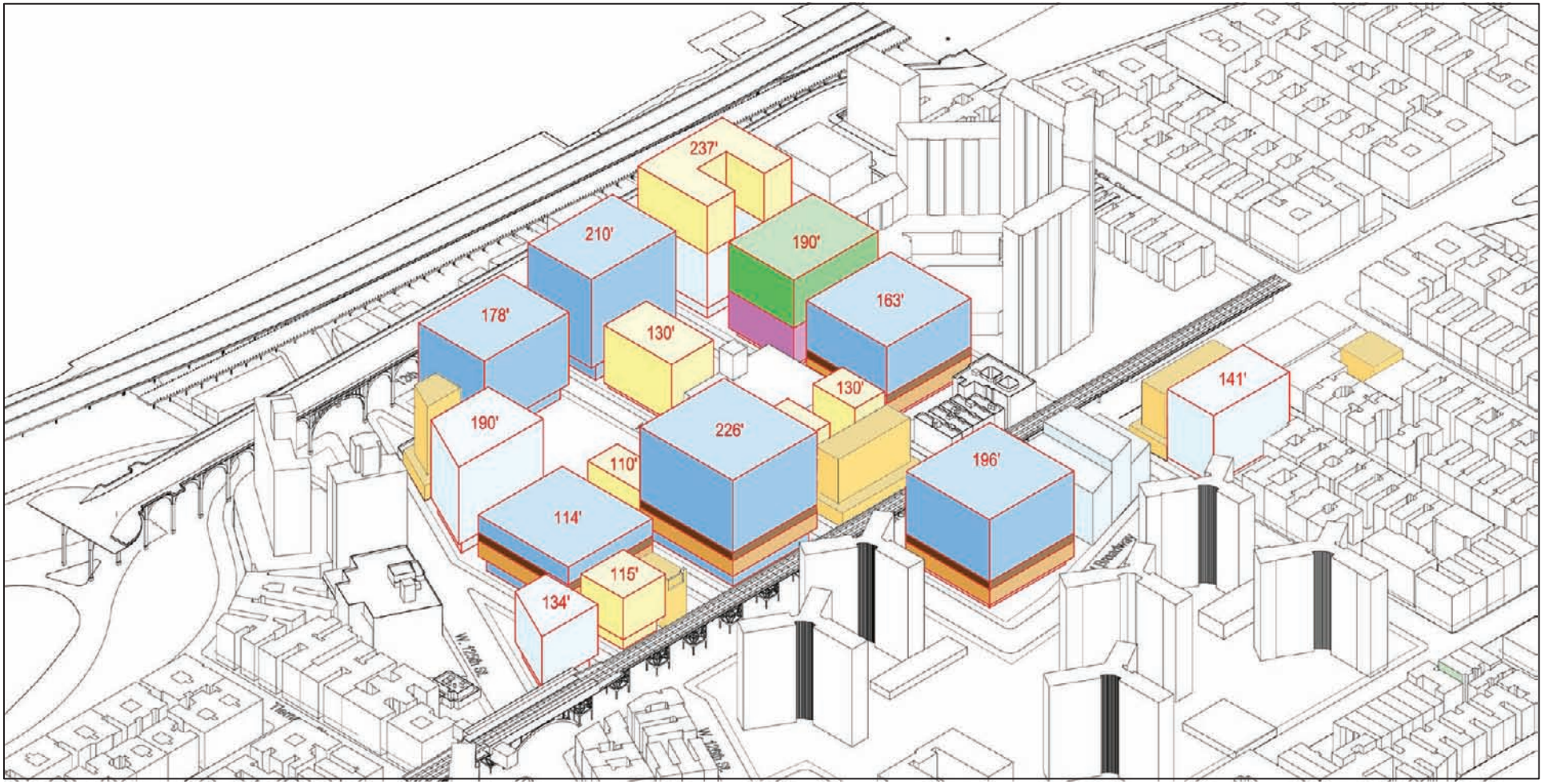
The six academic research sites would not all produce adequately sized academic research buildings. As shown in Table 24-3, the alternative could achieve 65 percent of the total academic program available in the Proposed Actions and 60 percent of its academic research program space. The inability to achieve the level of development of the Proposed Actions arises from the reduced property available, and the need to accommodate support uses that are below-grade in the Proposed Actions, but that must be above grade (and use up zoning floor area) in this alternative. Those support uses, academic research support and mechanical space, would require more floor area than in the Proposed Actions, because several features and facilities would have to be duplicated in each building.

In addition to not achieving the overall program floor area goals of the Proposed Actions, the Expanded Infill Alternative would not allow for development of Phase 1 of the Columbia plan. Without the Broadway frontage available in the Proposed Actions, it would be necessary to move the Jerome L. Greene Science Center proposed for Site 3 in the Phase 1 plan westward to create a rectangular shape and adequate floor plate size. However, as shown in Figure 24-12, the height of the academic research building on Site 3 would be limited by the proposed zoning to 114 feet. Given the floor-to-floor requirements of a first class academic research building like the Jerome L. Greene Science Center (approximately 16 feet), this would limit the number of floors to five, including the base. Two of those floors would have to be academic research support and another floor would be given over to mechanical space (see Figure 24-13), leaving very little for academic research. Specifically, the building would contain 205,330 sf, of which only 131,050 sf would be for academic research. The Science Center's program requirements, which would be met in the Proposed Actions, are for 350,000 sf of academic research program space. Under this alternative, therefore, Columbia advises that Jerome L. Greene Science Center would not be built on Site 3. Alternative use of Site 3 for academic research purposes is also questionable, since the 205,330 sf available for the building falls short of Columbia's minimum floor area criterion of 250,000, and is further constrained by the need to place academic research support space above grade.

At the same time, the site of the academic building intended for the Business School in the Proposed Actions (Site 4) would be constrained by the private property directly to its west. To achieve a reasonable footprint for an academic building in this location and accommodate an academic research building floor plate to the east, it would be necessary to eliminate the Lantern building and the Small Square.

Figure 24-11

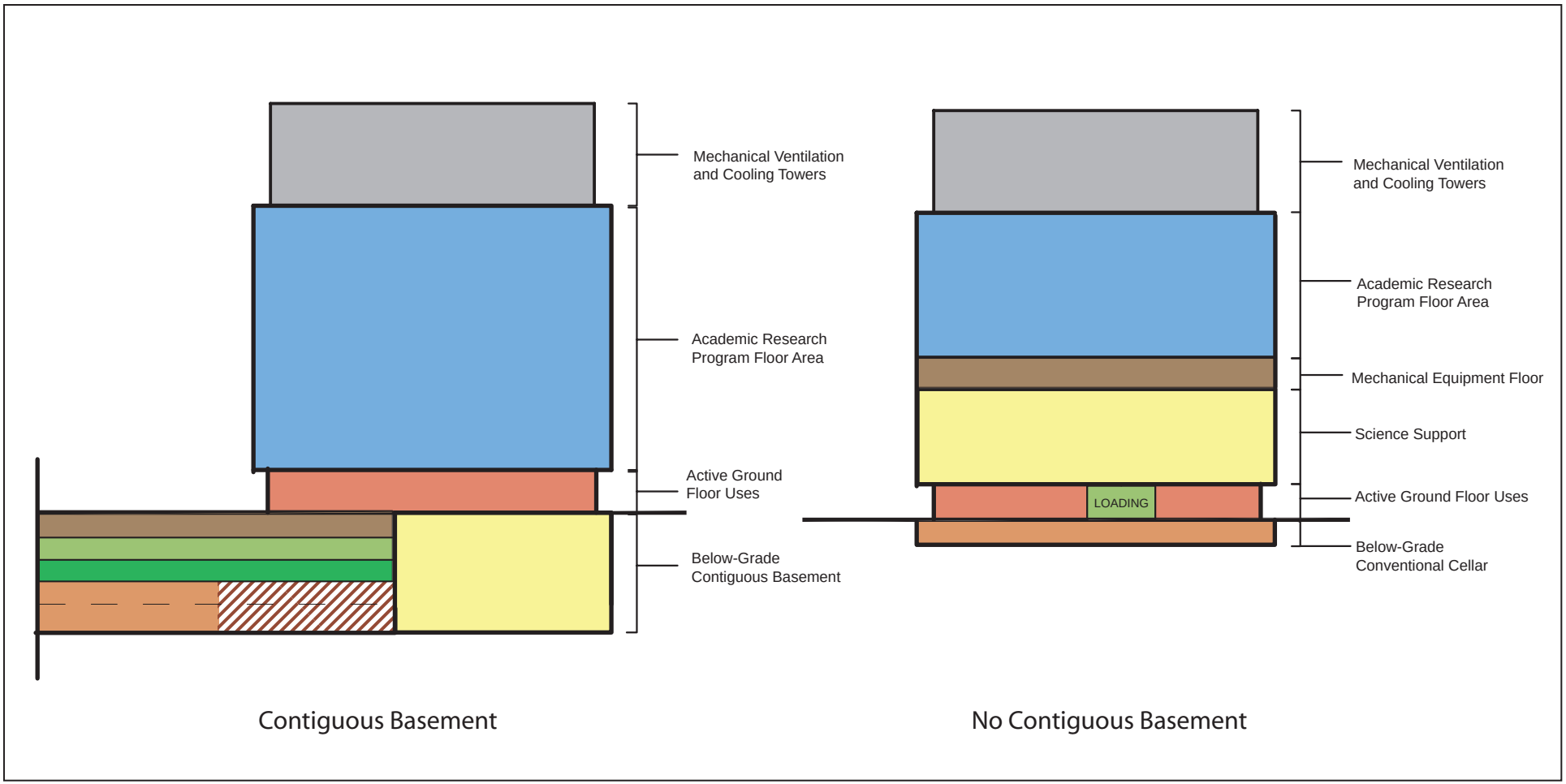
Expanded Infill Alternative: Ground Floor Plan



NOTE: Stacks not included

- *Academic Research*
- *University Housing*
- *Academic*
- *Residential*
- *Science Support*
- *Mechanical*

Figure 24-12
Expanded Infill Alternative: Northwest Aerial View



Academic Research Program
Mechanical Equipment
Science Support
Active Ground Floor Uses
Loading
Parking
Mechanical Ventilation and Cooling Towers
Building Mechanical, Storage, and HVAC
Energy Center

Figure 24-13
Expanded Infill Alternative: Sections of Typical Academic Research Building

Table 24-3
Columbia University Development: Proposed Actions Compared with Expanded Infill Alternative (sf in 000s)

	Proposed Actions	Expanded Infill Alternative	EI/PA
Above Grade			
Academic Research	2,597.0	1,566.2	
Academic	1,255.5	976.8	
University Housing	509.2	468.3	
Recreation	250.7	130.1	
Subtotal Program Space	**4,612.4**	**3,141.4**	**68.1%**
Retail	162.6	49.6	
Academic Research Support		277.8	
MTA Parking		80.0	
Parking		47.0	
Ramp, Mechanical, Loading, Freight, etc.		348.2	
Total Above Grade	**4,775.0**	**3,943.9**	**82.6%**
Below Grade			
Academic Research Support	296.2	137.9	
Below Grade Academic Program	69.8	0	
Swimming/Diving Center	145.4	0	
Subtotal Program Space	**511.5**	**137.9**	**27.0%**
Central Energy Plant	70.2	0	
Ramp, Mechanical, Loading, Freight, etc.	429.2	267.0	
Storage	189.2	43.2	
Parking	705.6	402.2	
MTA Parking	80.0		
Total Below Grade	**1,985.7**	**850.3**	**41.2%**
Above and Below Grade			
Academic Research	2,597.0	1,566.2	60.3%
Academic	1,325.4	976.8	73.7
University Housing	509.2	468.3	92.0
Recreation	396.1	130.1	32.8
Subtotal Academic Program	**4,827.7**	**3,141.4**	**65.1%**
Academic Research Support*	296.2	415.7	140.3%
Retail	162.6	49.6	30.5
Central Energy Plant	70.2	0	0
Ramp, Mechanical, Loading, Freight, etc*	429.2	615.2	143.3
Storage	189.2	43.2	22.8
Parking	705.6	449.2	63.7
MTA Parking	80.0	80.0	100.0%
Total Other Uses	**1,933.0**	**1,652.9**	**85.5%**
GRAND TOTAL	**6,760.7**	**4,794.3**	**70.9%**

Note: * Above grade space is less efficient than centralized below grade space.

In addition, the need to put as much floor area as possible into an academic research building on Site 3 would reduce the amount of floor area on Site 4, since development on the block is subject to zoning floor area limitations. Additional academic program space, available in the deep basement below grade under the Proposed Actions, could not be built to augment floor area on Site 4. While the total floor area for the Business School above and below grade under the Proposed Actions would be 482,000 sf, under the Expanded Infill Alternative the area available

for the Business School would be approximately 280,000 sf.[1] Thus, under the Expanded Infill Alternative, there would not be enough floor area to accommodate the Business School. As a result of the loss of the Lantern building, discussed above, there would also be no room for the School of the Arts under the Expanded Infill Alternative. In addition, according to Columbia University, the SIPA has been attracted to a location in Manhattanville based largely on the presence of the Business School, with which it enjoys a strong relationship; Columbia advises that if the Business School were unable to come to Manhattanville, a relocation of SIPA would be unlikely as well. Without these key program uses and lacking the Small Square and the Grove, which would remain in its current auto-related use under this alternative, Phase 1 program goals would not be achieved. The collection of buildings that would result in the Phase 1 area under the Expanded Infill Alternative would also not fulfill the urban design and land use objectives of Phase 1 to create a West 125th Street gateway to the waterfront we well as a gateway to the new campus.

ASSUMPTIONS FOR PRIVATE PROPERTY DEVELOPMENT

The Expanded Infill Alternative assumes that most of the private properties in Subdistrict A not in Columbia's ownership or control would be redeveloped to residential uses under the regulations of the proposed Special Manhattanville Mixed-Use District. Only one existing building would be preserved in this Alternative: the former Sheffield Farms Stable. This building is assumed to be converted and expanded as residential use with ground-floor retail, similar to the owner's current rezoning application. The Con Edison property on West 132nd Street, the housing on the Broadway frontage between West 132nd and West 133rd Streets, and the two service stations on West 125th Street would not be redeveloped. Private property development in Subdistrict B and Other Area east of Broadway is assumed to be the same as for the Proposed Actions.

As shown in Table 24-4, the private sites in Subdistrict A would produce 238 units of housing (213,780 square feet of residential use) and 169,084 square feet of retail use. It is assumed that the housing would all be market rate. Therefore, in addition to what is assumed in Other Area and Subdistrict B, the non-Columbia sites in the Project Area would produce, 337 units of housing (302,600 square feet of residential use), 293,280 square feet of retail use, 54,800 square feet of office use, and 61,700 square feet of community facility use.

Total new development in the Project Area under the Expanded Infill Alternative would be 5.5 million sf, compared with 7.09 million sf for the Proposed Actions. The potential effects of the alternative are assessed and compared with those of the Proposed Actions, below.

[1] If it is assumed further that the height of the Jerome L. Greene Science Center were increased as a result of a subsequent zoning action and the number of floors in that building were increased, the amount of floor area available to the Business School would decrease in a corresponding amount due to the overall 6 FAR limit on the amount of floor area available on the zoning lot.

Table 24-4
Projected Development: Proposed Actions Compared with Expanded Infill Alternative

	Proposed Actions	Expanded Infill Alternative
Subdistrict A		
Columbia University Uses		
Program Space - Including Academic Research Support	5,126,900	3,557,100
All other uses	1,636,800	1,237,200
Subtotal Columbia University	**6,763,700**	**4,794,300**
Non-Columbia University Uses		
Residential (238 units)	N/A	213,780
Retail	N/A	169,084
Subtotal Non-Columbia University		**382,865**
Subtotal Subdistrict A	**6,763,700**	**5,177,165**
Subdistrict B		
Commercial Uses		
Retail	124,196	124,196
Office	54,808	54,808
Subtotal	**179,004**	**179,004**
Subdistrict C[1] **Subtotal**	**0**	**0**
Other Areas		
Residential (99 units)	88,819	88,819
Community facility	61,698	61,698
Subtotal	**150,517**	**150,517**
Total	**7,090,194**	**5,506,686**

Note: [1] There are no projected development sites in Subdistrict C.

EXPANDED INFILL ALTERNATIVE COMPARED WITH THE PROPOSED ACTIONS

LAND USE, ZONING AND PUBLIC POLICY

Like the Proposed Actions, the Expanded Infill Alternative would improve conditions in and be generally consistent with public policies for the Project Area, primary study area, and secondary study area. No significant adverse impacts on land use and zoning would result. The Proposed Actions are intended to provide the zoning and land use changes to revitalize Manhattanville and allow Columbia University to develop a new Academic Mixed-Use Development for its long-term growth needs. Using that zoning, but not controlling all of the land area in Subdistrict A of the Project Area, the Expanded Infill Alternative would create a mix of uses similar to the Proposed Actions, but with some differences. As shown in Figure 24-9, the two service stations on West 125th Street and the Con Edison cooling facility on West 132nd Street would remain in their current uses, as would the existing residential buildings on Broadway between West 132nd and West 133rd Streets. The privately owned sites to be redeveloped or converted, which occupy less than 10 percent of the land area in Subdistrict A, would be occupied by residential use with ground-floor retail under the Expanded Infill Alternative.

As under the Proposed Actions, the mix of new uses would replace an area virtually devoid of open spaces and generally characterized by auto repair businesses, parking lots, moving and storage facilities, and sites with low-density commercial or industrial buildings. However, whereas the Proposed Actions would create a major West 125th Street gateway to the waterfront in Phase 1, with the Jerome L. Greene Science Center, a new location for the Business School, the School of International and Public Affairs, and the School of the Arts, active ground floor uses, publicly accessible open space facing West 125th/129th Street and a landscaped midblock open

area to move people northward through the university area, the Expanded Infill Alternative would produce a mix of private residential buildings and Columbia uses, but without key schools and the state-of-the-art academic research center identified for Phase 1 under the Proposed Actions.

At full build out of the Expanded Infill Alternative, new development would consist of 4.8 million sf of Columbia University uses and 382,865 sf of housing and retail on privately owned sites in Subdistrict A. This compares to 6.8 million sf of uses in and below Columbia University buildings under the Proposed Actions. Like the Proposed Actions, the Expanded Infill Alternative would produce 179,004 sf of retail and office uses in Subdistrict B, and 150,517 sf of residential and community facility use in Other Area east of Broadway.

The full alternative would introduce 238 market rate housing units within the Academic Mixed-Use District, in addition to providing 99 units in the Other Area east of Broadway. Affordable housing on Broadway between West 132nd and West 133rd Streets would not be relocated. Open spaces would be smaller than those of the Proposed Actions, and the sidewalk widenings required under the Proposed Actions to offer better vistas and a more inviting pedestrian experience would not be required under this alternative, in order to respect the streetwall of the existing buildings.

Like the Proposed Actions, the Expanded Infill Alternative would promote redevelopment of the Project Area, including the portion adjacent to the waterfront, and would be generally consistent with public policy throughout the Project Area, primary study area, and secondary study area. Also like the Proposed Actions, the Expanded Infill Alternative would be consistent with a number of the goals and objectives of the West Harlem Master Plan, but would not advance all of its recommendations. Like the Proposed Actions, the Expanded Infill Alternative would not have an adverse effect on land use, zoning, or public policy in the Project Area or study areas.

SOCIOECONOMIC CONDITIONS

Like the Proposed Actions, the Expanded Infill Alternative would have no significant adverse impact on direct residential or business displacement, on indirect business displacement, or on specific industries, but it could have a significant adverse impact on indirect residential displacement. Under this alternative, there would be an increase of employment in the Project Area, and it would be expected that a number of new employees (University and non-University affiliated) would seek to reside in the study area. Likewise, a build-out under this alternative would increase the attractiveness of the neighborhood, drawing other new residents to the study area. As with the Proposed Actions, by 2030 this could result in some indirect residential displacement of the at-risk population in the 1,319 unprotected units in the primary study area, including the 823 units in the Riverside Park Community/3333 Broadway. However, the likelihood of this impact occurring would be somewhat less under the Expanded Infill Alternative than with the Proposed Actions. Each area of socioeconomic analysis is discussed below.

Direct Residential Displacement and Additions to Study Area Population

The Expanded Infill Alternative would result in less direct residential displacement than would occur under the Proposed Actions. This alternative would directly displace units in City-owned residential buildings and two churches owned by Columbia. The residential buildings on Broadway between West 132nd Street and West 133rd Street would not be displaced under this alternative. The alternative would directly displace 40 Project Area dwelling units housing an estimated 89 residents, as compared with the Proposed Actions, which would displace an estimated 298 Project Area residents living in 135 units (see Table 24-5). However, as noted above and discussed in greater

detail in Chapter 4, the Proposed Actions would not have a significant adverse socioeconomic impact based on direct residential displacement, and it is anticipated that by 2030, all existing residents in the Academic Mixed-Use Area would be relocated to new housing in or near the study areas. The Expanded Infill Alternative would add up to 1,888 residents to the Project Area, including a projected 995 University faculty, researchers, students, and family members.[1]

Table 24-5
Expanded Infill Alternative, Direct Residential and Business and Institutional Displacement, Compared with the Proposed Actions

Direct Displacement	Expanded Infill Alternative	Proposed Actions*
Residents	89	298
Businesses and Institutions	74	85
Employees	690	880
Note: * Numbers are for the 2030 Build year.		

Direct Business Displacement and Additions to Employment

Build-out under the Expanded Infill Alternative would result in the direct displacement of a number of existing businesses and employees, although to a lesser extent than with the Proposed Actions. Overall, the Expanded Infill Alternative would directly displace an estimated 74 businesses and institutional uses and 690 employees, compared with the direct displacement of 85 businesses and 880 workers with the Proposed Actions (see Table 24-5). However, neither the Proposed Actions nor the Expanded Infill Alternative would result in significant adverse impacts due to direct business displacement; displace businesses with substantial economic value to the City, or that are the subjects of City or other policies to preserve, enhance or protect them, or define neighborhood character.

Like the Proposed Actions, the development scenario under the Expanded Infill Alternative would add employment to the Project Area that would offset employment displacement. The amount and types of uses assumed under the development scenario for this alternative would generate an estimated 5,211 employees, of whom 4,085 would be University-generated employees (see Table 24-6). This is compared with a total of 7,086 employees generated by the Proposed Actions, of which 6,399 would be University-generated employees.

Indirect Residential Displacement

Under the development scenario for the Expanded Infill Alternative, an adverse impact could occur because, as with the Proposed Actions, build-out under this alternative could initiate a trend toward increased rents in the primary study area. This alternative's University population would create a projected demand for as many as 239 housing units within the primary study area and 421 units within the secondary study area (which includes the 239-unit demand within the primary study area). This is compared with the demand generated by the Proposed Actions of 839 housing units within the primary study area and 1,131 units within the secondary study area (which includes the 839-unit demand within the primary study area). In addition to this new University-generated housing demand, the new residential, and retail uses assumed under the Expanded Infill Alternative could make the Project Area more attractive as a destination and, by increasing the residential appeal of the Project Area and study areas, could attract additional persons seeking housing in the area.

[1] University faculty and student residential population provided by Columbia University; non-University housing population based on 337 units and an average household size of 2.65).

Table 24-6
Expanded Infill Alternative Development Scenario: Employment Calculation

Uses	GSF	Employees
University-generated employment		
University space	4,664,686	3,858
Retail space in University buildings	49,569	227
Sub-total	**4,714,225**	**4,085**
Non-University-generated employment		
Office	54,808	219
Community Facility	61,698	123
Residential	302,599	51
Retail	293,280	733
Sub-total	**712,385**	**1,126**
Total	**5,426,610**	**5,211**

Notes: University employment provided by Columbia University. Non-University employment based on the following standard employment rates: 4/1,000 sf office, 2/1,000 sf community facility, 1/5,900 sf residential, and 2.5/1,000 sf retail. University and total GSF estimates differ from Table 24-4 because this table includes only employment-generating gsf.

By 2030, this could result in some indirect residential displacement of the at-risk population in 1,319 unprotected units in the primary study area, including the 823 units in the Riverside Park Community/3333 Broadway. As with the Proposed Actions, this impact could be significant, but would be limited to the primary study area. In addition, the Academic Mixed-Use Development with the Proposed Actions would introduce a greater population of students, faculty, and employees (some of whom would be provided housing in the university area and others who would seek housing throughout the study area) to the Project Area than under the Expanded Infill Alternative. For these reasons, the likelihood of an impact occurring and its extent would be somewhat less under the Expanded Infill Alternative than with the Proposed Actions.

Indirect Business Displacement

Like the Proposed Actions, the Expanded Infill Alternative could result in the indirect displacement of some existing retail businesses in the immediate vicinity of the Project Area, as well as some industrial uses in the M1-1 area to the southeast of the Project Area due to rent increases. However, as with the Proposed Actions this alternative would not result in significant adverse indirect business displacement. The businesses that would be vulnerable to indirect displacement would not meet the *CEQR Technical Manual* criteria for significant displacement impact—i.e., collectively, they are not of substantial economic value to the City; they can be relocated elsewhere in the City; they are not subject to regulations or publicly adopted plans to preserve, enhance, or protect them; and they are not a defining element of neighborhood character.

Impacts on Specific Industries

Like the Proposed Actions, the Expanded Infill Alternative would not have an adverse effect on specific industries either within or outside the Project Area and study areas. Businesses subject to direct displacement by both the Proposed Actions and this alternative vary in type and size, and are not concentrated in any specific industry sector. In addition, none of the businesses subject to displacement are essential to the survival of an industry sector within, or outside of, the study area.

COMMUNITY FACILITIES

Like the Proposed Actions, although the Expanded Infill Alternative would introduce new residents to Manhattanville, no significant adverse impacts on community facilities and services would result. By 2030, the Columbia University development under the Expanded Infill Alternative would include approximately 663 units of University housing. Using the same assumptions to analyze the Proposed Actions Chapter 5, Community Facilitates, these units are being assessed as moderate-high income units for a conservative schools analysis.[1] The private sites in Subdistrict A would produce 238 units of housing. The reasonable worst-case development scenario for the Other Areas would be same as the Proposed Actions under the Expanded Infill Alternative—99 units (on Projected Development Site 25). The private sites in Subdistrict A and the units in the Other Areas are all being conservatively assessed as low-moderate income units. Using an average household size of 2.65, the projected development in the Other Areas is anticipated to generate 262 residents. The total residential population generated by the Proposed Actions would be approximately 1,888 residents (approximately 1,626 residents in Subdistrict A and 262 residents in the Other Areas).

As shown in Table 24-7, the development scenario would generate 120 elementary school children and a total of 194 public school students overall. This is compared with a total of 416 students generated by the Proposed Actions. Based on this number of students, similar to conditions in the Proposed Actions, there would be adequate capacity at public elementary and intermediate schools, libraries, and health care facilities to support this assumed level of growth. Similarly, neither would affect the physical operations of, or access to and from, a fire station or police precinct house, and therefore the Expanded Infill Alternative, like the Proposed Actions, would not have a significant adverse impact on police and fire services. Therefore, the Expanded Infill Alternative, like the Proposed Actions, would not result in significant adverse impacts on community facilities.

Table 24-7
Expanded Infill Alternative: Projected New Housing Units and Estimated Number of Students Generated by the New Housing Units

Income Level of Units	Total Units	Projected Elementary Students	Projected Middle School Students	Projected High School Students	Total Students Generated
Moderate-High income	663	80	20	27	127
Low-Moderate income	337	40	10	17	67
Total	**1,000**	**120**	**30**	**44**	**194**

Source: Student generation rates are based on the *CEQR Technical Manual*'s Table 3C-2, "Projected Public School Pupil Ratios in New Housing Units of All Sizes."

OPEN SPACE

Like the Proposed Actions, the Expanded Infill Alternative would establish new areas of passive open space in Manhattanville that would be available to area residents, existing and future workers, and visitors. However these spaces would be fewer and smaller than those of the

[1] The University housing units for graduate students, faculty, and other employees would be considered unassisted or market-rate housing for high-income levels. However, the units have been conservatively considered as moderate-high rather than high-income households for the purpose of estimating the number of public school students generated.

Proposed Actions. Proposed open space would be located in the new Academic Mixed-Use Development between Broadway and Twelfth Avenue, just west of the center of the new Academic Mixed-Use Development between West 130th and West 131st Streets. However, this central open space would be smaller the Square under the Proposed Actions. The Expanded Infill Alternative also include midblock open areas extending north south between West 129th and West 131st Streets, and east west between Broadway and Old Broadway. These open spaces would be landscaped plazas with seating. In total, the Expanded Infill Alternative would create 1.6 acres (69,364 sf) of privately owned, publicly accessible open space, compared with 2.16 acres (93,965 sf) under the Proposed Actions. Like the Proposed Actions the Expanded Infill Alternative would add open space in the Project Area, but as it would also add population (residents, workers, and students), it would result in significant adverse open space impacts, as discussed below.

Direct Effects

Unlike the Proposed Actions, the Expanded Infill Alternative would not have a significant adverse shadow impact on the I.S. 195 playground on Broadway between West 133rd and West 134th Streets. There would be no new building on Site 11, and the heights of the two buildings on Site 17 would be considerable lower than those under the Proposed Actions. Along Broadway, Site 17 would contain a low-rise (approximately seven-story) new residential building on a private (non-Columbia) site and to the east of this site would be a Columbia academic building that would rise only approximately 140 feet. Under the Proposed Actions, Site 17 would contain an academic research building, rising along the Broadway frontage, up to a maximum height of 240 feet (360 feet with mechanical space). Therefore, the shadows from the buildings on Site 17 would not reach as far into the playground or remain on the play area for as long as the Proposed Actions' shadows.

Indirect Effects

Like the Proposed Actions, the Expanded Infill Alternative would decrease open space ratios, although all passive open space ratios would remain substantially higher than established City guidelines. However, the decrease in the ratio for the non-residential study area would be large enough to constitute a significant open space impact in both the alternative and the Proposed Actions, as shown in Table 24-8. As shown in Table 24-8, this indirect passive open space impact would be less than that of the Proposed Actions.

Although the active open space ratios in the future with both the Expanded Infill Alternative and the Proposed Actions would continue to be below the levels recommended by the City, it is recognized that this goal is not feasible for many areas of the City, and these ratios are not considered impact thresholds. According to the *CEQR Technical Manual*, a 5 percent decrease in open space ratios is considered a substantial change warranting a detailed analysis. However, in areas where the open space ratio is very low (e.g., below 1.5 acres per 1,000 residents), a decrease of less than 1 percent in the open space ratio may result in a potential significant adverse impact on open space. The Expanded Infill Alternative would not result in a decrease in the active open space ratio over No Build conditions in 2030, and the Proposed Actions would reduce the active open space ratio by 1.4 in the same time period. Therefore, unlike the Proposed Actions, the Expanded Infill Alternative would not have a significant adverse indirect impact on active open space. Because the active open space ratio is substantially lower than established City guidelines, this decline would constitute a significant adverse impact on active open spaces in the 2030 analysis year, requiring mitigation, under both options.

Table 24-8
Expanded Infill Alternative, Adequacy of Open Space Resources Compared with the Proposed Actions

Ratio	City Guideline Ratio	No Build Ratio	Proposed Actions Ratio	Expanded Infill Alternative Ratio	Percent Change Proposed Actions	Percent Change Expanded Infill
Non-Residential Study Area						
Passive/non-residents	0.15	4.13	1.66*	2.57*	(59.8)	(37.8)
Passive/total population	0.38	0.73	0.59*	0.68*	(19.2)	(6.8)
Residential Study Area						
Total/residents	2.50	1.52	1.52	1.53	0	0.7
Passive/residents	0.50	0.82	0.83	0.84	1.2	2.4
Active/residents	2.00	0.70	0.69	0.70	(1.4)	0
Passive/total population	0.38	0.60	0.55	0.59	(8.3)	1.7

Note: Ratios in acres per 1,000 people.
* Results in a significant adverse impact

SHADOWS

Unlike the Proposed Actions, this alternative would have no impact on the I.S. 195 playground on Broadway between West 133rd and West 134th Streets. The significant shadow impact in this location, identified for the Proposed Actions, would not occur under the Expanded Infill Alternative. See discussion above regarding open space, direct impacts.

HISTORIC RESOURCES

Unlike the Proposed Actions, the Expanded Infill Alternative would not require the demolition of the former Sheffield Farms Stable on Broadway between West 129th and West 130th Streets—a building that listed on the State and National Registers of Historic Places, which could result in significant adverse impacts. The Expanded Infill Alternative assumes that the owner's plans for the building would be carried out; these plans propose to add four stories to the building. One story is proposed to be built to the lot line on Broadway; the other three would be set back 10 feet from the lot line. Because of these proposed alterations and additions, CPC issued a Positive Declaration on the application, requiring that this issue be addressed in an EIS. It is assumed for analysis purposes that the issue will be resolved through redesign or mitigation, so the conversion assumed as part of the Expanded Infill Alternative would not have an adverse impact on historic resources.

Similar to the Proposed Actions, Columbia would relocate the West Market Diner's 1948 dining car to a new site in the Project Area or study area and consult with OPRHP regarding its relocation and rehabilitation. Moving the 1948 dining car and rehabilitating it would not result in significant adverse impacts. Like the Proposed Actions, the Expanded Infill Alternative assumes that in the Other Area east of Broadway development that could result from the rezoning would preserve the historic Claremont Theater building, so there would be no significant adverse impact on that resources, either.

Similar to the Proposed Actions, new construction adjacent to historic buildings could result in inadvertent damage, including ground-borne vibration, falling debris, and accidental damage from heavy machinery. Historic resources that could be affected through adjacent construction

and/or overbuilding include the former Warren Nash Service Station building, the Studebaker Building, the former Sheffield Farms Stable, the Claremont Theater building, and the Manhattan Valley IRT viaduct. Like the Proposed Actions, under the Expanded Infill Alternative, to avoid construction-related impacts on architectural resources within 90 feet of project construction, including the West Market Diner, the Manhattan Valley IRT viaduct, the 125th Street IRT Subway Station, the Claremont Theater building, the Riverside Drive viaduct, and—to the extent necessary—the former Warren Nash Service Station building and the Studebaker Building, the protection measures contained in the construction protection plan (CPP) approved by OPRHP and LPC would be implemented by a professional engineer before any demolition, excavation, and construction.

Unlike the Proposed Actions, under the Expanded Infill Alternative, transit mitigation would not be required at the 125th Street IRT Subway Station and the Manhattan Valley IRT viaduct. As-of-right construction in the Other Area east of Broadway would comply with the procedures set forth in DOB's *Technical Policy and Procedure Notice* (TPPN) #10/88, which is designed to provide for the protection of historic resources during construction.

URBAN DESIGN AND VISUAL RESOURCES

Total development under the Expanded Infill Alternative would be less than under the Proposed Actions, but new buildings would be similar in footprint, massing, and height. Eight existing buildings, two auto service establishments, and the Con Edison cooling facility would be retained in Subdistrict A under this alternative; the presence of the existing buildings and uses would lessen the ability to create a group of community facilities buildings with coordinated massing, heights, and streetwalls, which in the Proposed Actions would be organized around an interconnected system of new open spaces. Existing buildings would be retained along Broadway—including the historic former Sheffield Farms Stables building (expanded and converted to residential use, West 125th Street, and in the midblocks between Broadway and Twelfth Avenue. Broadway would be characterized more by a mix of existing buildings and new structures than under the Proposed Actions, and there would be no widened sidewalks on the side streets, because of the presence of existing buildings. In addition, the existing properties would prevent the creation of some of the open spaces that would be provided under the Proposed Actions, and the central square would be smaller in size.

Overall, under the Expanded Infill Alternative, Subdistrict A would be developed with new community facilities buildings similar in bulk, form, and height to those of the Proposed Actions, but there would be fewer such new buildings, and those that would be constructed would be interspersed with more existing low-rise buildings and new residential structures. The Expanded Infill Alternative would have lesser beneficial effects on the area's streetscape than would the Proposed Actions. Because there would not be a full central below-grade service area, with shared functions, there would be more curb cuts under this alternative, and each academic research building would have two floors of science support space above grade just above the building's base. These floors would not have windows, so they would appear from the street as blank walls interrupted only by mechanical louvers. The numerous curb cuts and the presence of existing buildings and other properties that would not be redeveloped would limit the provision of active ground-floors uses; the blank walls above the base of the academic research buildings would also detract from a sense of a lively and inviting streetscape. As a result of the more limited amount of active ground-floor uses and streetwall transparency, numerous curb cuts, and sidewalks that would not be widened, the side streets would be less inviting to pedestrians than under the Proposed Actions, and views through Subdistrict A toward the waterfront would be

less improved. In addition, because the schools and science center slated for Phase 1 development along West 125th/129th Street could not be located there under the Expanded Infill Alternative, it could not produce the strong, vibrant Phase 1 mix of academic, academic research, open space and active ground floor uses along West 125th Street of the Proposed Actions. Rather, there would be a collection of Columbia buildings, a new apartment building, and auto service establishments, which, together, would offer very little to the streetscape, compared with the Proposed Actions.

In general, effects on visual resources under this alternative would be similar to those under the Proposed Actions. Like the Proposed Actions, the Expanded Infill Alternative would not result in an adverse impact on urban design or visual resources.

NEIGHBORHOOD CHARACTER

Like the Proposed Actions, the Expanded Infill Alternative would clearly and substantially alter the Project Area's neighborhood character, as defined by CEQR. The aging industrial area would be replaced with a major graduate school and academic research campus of Columbia University, and a mixed-use development adjacent to the waterfront and on the east side of Broadway. Land uses would be similar to the Proposed Actions, although a small amount of land area would be devoted to market-rate residential use with ground-floor retail in contrast to the Proposed Actions. However, as noted above, the alternative would be less successful in improving streetscapes. Like the Proposed Actions, in both 2015 and 2030, the changes in the Project Area from this alternative would not adversely affect neighborhood character in the primary and secondary study areas.

Like the Proposed Actions, this alternative would preserve the former Warren Nash Service Station building and the Claremont Theater, which are historic resources. The alternative would not adversely affect the context for the former Warren Nash Service Station building or the Studebaker Building. Unlike the Proposed Actions, this alternative would not result in demolition of the former Sheffield Farms Stable, thus preserving an additional historic resource. However, the demolition of the former Sheffield Farms Stable is not considered to be a significant adverse neighborhood character impact of the Proposed Actions. Both the Expanded Infill Alternative and the Proposed Actions would not adversely affect neighborhood character through changes to historic resources of their contexts.

In both project phases, the Proposed Actions and the Expanded Infill Alternative would displace jobs, some of which are held by study area residents, and replace them with a greater number of job opportunities in a broader range of job classifications, thus preserving and expanding the potential employment base for local residents. In general, both the Proposed Actions and the Expanded Infill Alternative would introduce new residents, either in University housing or in the primary and secondary study areas. The housing demand would be less under the Expanded Infill Alternative. The Expanded Infill Alternative would also introduce more new market-rate housing in the Project Area than the Proposed Actions. By 2030, the new residential demand from faculty, researchers, and graduate students, coupled with the effect that redevelopment of the Project Area would have on the attractiveness of the study areas as places to live, could lead to rent increases in units not protected by rent control, rent stabilization, or a public housing program. This would create a significant adverse indirect residential displacement impact in the primary study area. However, housing in the primary study area would remain typified by large publicly subsidized housing complexes and other rent-regulated housing (representing 73.1 percent of all units), which would be unaffected by the Proposed Actions or the Expanded Infill

Alternative. Therefore, like the Proposed Actions, the significant adverse indirect residential displacement impact of the Expanded Infill Alternative would not result in a significant adverse impact on neighborhood character.

Like the Proposed Actions, the population characteristics of the new residents would probably more closely reflect the characteristics of Manhattan residents as a whole, but the numbers of new residents would not be high enough to make a significant difference in the population characteristics prevailing in the study areas. The limited indirect retail displacement that could result from increased rents in the immediate vicinity of the Project Area would not lead to major changes within the primary study area's commercial strips, and would not result in adverse changes to neighborhood character.

Like the Proposed Actions, the Expanded Infill Alternative would increase vehicular, transit, and pedestrian demand, with results similar to that of the Proposed Actions. Like the Proposed Actions, these increases would not cause significant neighborhood character impacts from changes in traffic. Like the Proposed Actions, under the Expanded Infill Alternative, the increase in traffic and the installation of a traffic light on West 125th Street between Broadway and Twelfth Avenue would lead to a significant adverse noise impact on. In 2030 this site would be surrounded by commercial uses and a University building, which would be constructed to fully mitigate the effect of high ambient noise levels. However, a new residential building is assumed for the site directly west of the academic building on Site 4b. It is assumed that the building would have double-glazed windows and central air conditioning, which are standard for market-rate housing in Manhattan, so that a significant adverse noise impact would be avoided. Thus, the noise effects of the Proposed Actions would not affect neighborhood character.

In summary, the like the Proposed Actions, the Expanded Infill Alternative would significantly change neighborhood character in the Project Area and, overall, in the primary and secondary areas, but this change would not be adverse, and there would be no significant adverse impact on neighborhood character.

NATURAL RESOURCES

Like the Proposed Actions, the Expanded Infill Alternative would not result in significant adverse impacts on the floodplain, groundwater, or terrestrial natural resources in the vicinity of the Project Area, or on water quality and aquatic biota of the Lower Hudson River Estuary in 2015 or 2030. The Academic Mixed-Use Area (Subdistrict A), the Other Area east of Broadway, and Subdistrict C are not within the 100-year floodplain. Therefore, development in these portions of the Project Area in 2015 and 2030, including the partial deep basement included in the Expanded Infill Alternative, would not affect flooding within and adjacent to the Project Area. A portion of Subdistrict B near the Hudson River is within the 100-year floodplain. Within Subdistrict B, the floodplain is currently covered by impervious surfaces. The projected stimulation of retail and office redevelopment in Subdistrict B resulting from the Proposed Actions would not be expected to result in a reduction in imperviousness within this portion of the floodplain. Therefore, redevelopment of this area would not change the floodplain's ability to contain flood waters, or exacerbate flooding conditions within or adjacent to the Project Area. Like the Proposed Actions, under the Expanded Infill Alternative, the construction and operation of the new buildings within the Academic Mixed-Use Area would not result in significant adverse impacts on groundwater resources. Construction of the buildings would result in the removal or capping of contaminated soils and historic fill, minimizing the potential for adverse impacts on groundwater quality. Although the construction of the slurry walls would modify

groundwater flow pattern in the immediate vicinity of the walls, groundwater would be expected to flow around the slurry walls and then continue toward the Hudson River; this effect would be less under the Expanded Infill Alternative, because the below grade space would be smaller, but neither this alternative nor the Proposed Actions would create a significant adverse change in groundwater flow.

Like the Proposed Actions, the Expanded Infill Alternative would increase vegetation resources within the Academic Mixed-Use Area and the amount of potential habitat available to birds and other wildlife, although that increase would not be as great as under the Proposed Actions. The maximum building heights allowed for the new buildings proposed to be completed by 2030 would be similar to the heights of surrounding buildings and would not be expected to result in a significant increase in the loss of migratory birds due to building collisions. Air emissions from the buildings' HVAC systems would also not adversely affect air quality and thus would not significantly affect the environment for birds and other biota in the Project Area and study areas.

Like the Proposed Actions, under the Expanded Infill Alternative, the development of Columbia's facilities (including the deep below ground space) in the Academic Mixed-Use Area would not have an adverse impact on the environment due to the earthquake potential of the New York City metropolitan region.

Like the Proposed Actions, under the Expanded Infill Alternative, the increase in the volume of sewage treated by the North River Water Pollution Control Plant (WPCP) in 2015 and 2030 would not be expected to adversely affect the WPCP's ability to meet the effluent limitations of the North River WPCP's SPDES permit, or adversely affect water quality of the Hudson River in the vicinity of the North River WPCP even after consideration of projected flow increases from other proposed projects within the North River WPCP drainage area. Appendix E.1, "Water Quality Modeling," provides a detailed assessment of potential impacts on water quality in the Hudson and Harlem Rivers from the Proposed Actions. Since development under the Expanded Infill Alternative would be less than the Proposed Actions, the conclusions of that assessment apply to this alternative as well.

The Expanded Infill Alternative assumes that a separate stormwater system would be built under a schedule similar to that for the Proposed Actions. The proposed separate stormwater system would be in full operation in 2030 under the Expanded Infill Alternative. Like the Proposed Actions, the volume of CSO would be expected to decrease by 1.6 mgy in 2030 with a decrease in the associated pollutant loadings. The decrease in CSO volume would be about 0.4 percent, and the number of CSO events per year would be unchanged. Like the Proposed Actions, pollutant loading to the Hudson River from the operation of the new storm sewer and subsequent discharge from the CSO outfall at St. Clair Place would not be expected to result in significant adverse impacts on water quality or aquatic biota, or result in adverse impacts on the aquatic habitat enhancement measures implemented as part of the West Harlem Waterfront park project. The new storm sewers would be expected to include measures to contain floatables (e.g., standard DEP catchbasin with sump and hood), and to trap sediment and oil (e.g. catchbasins with hydrodynamic separators). The hydrodynamic separators would be voluntary measures, or measures used as part of the SWPPP prepared for the Expanded Infill Alternative. Therefore, the like the Proposed Actions, the Expanded Infill Alternative would not adversely impact water quality, sediment quality, or aquatic biota of the Lower Hudson River Estuary.

Also like the Proposed Actions, no adverse impacts would occur on the New York State- and federally-listed endangered shortnose sturgeon identified as present in the Hudson River in the vicinity of the Project Area. Similarly, the Expanded Infill Alternative would not be expected to

result in adverse impacts on the Lower Hudson Reach Significant Coastal Fish and Wildlife Habitat. The active New York State-listed endangered peregrine falcon nest is far enough away from the Project Area (0.4 miles, or 0.6 kilometers) that it would not be adversely affected by the Expanded Infill Alternative. Coordination with the New York State Department of Environmental Conservation (DEC)'s New York Natural Heritage Program (NYNHP) has been conducted regarding the peregrine falcon nest, and additional coordination would be conducted prior to the anticipated start of construction.

During construction dewatering activities, the recovered groundwater would be treated, as necessary, prior to discharge to the combined sewer system or the Hudson River. Therefore, like the Proposed Actions no adverse impacts on surface water quality of the Hudson River would be expected to occur during the construction of the Expanded Infill Alternative.

HAZARDOUS MATERIALS

Like the Proposed Actions, under the Expanded Infill Alternative, potential contaminants would be remediated (cleaned up) as part of the development of this area by Columbia University. Contaminated soil, historic fill, and demolition debris would be either disposed of off-site in accordance with all applicable regulations or capped (i.e., covered by a building, paving, or other impervious material). However, properties not developed would not be remediated.

Potential impacts during Columbia's construction and development activities would be avoided by implementing a Construction Health and Safety Plan (CHASP), which would ensure that there would be no significant adverse impacts on public health, workers' safety, or the environment as a result of potential hazardous materials exposed by or encountered during construction. Following construction, any remaining contamination would be isolated from the environment, and it is expected that there would be no further potential for exposure. In addition, to address the remediation of known or potential environmental conditions that may be encountered during proposed construction and development activities, a Remedial Action Plan (RAP) would be prepared. (Both the RAP and CHASP would be approved by DEP and DEC, if necessary, in response to a reported petroleum spill.) To ensure the implementation of these measures, Restrictive Declarations would be placed against these Columbia-owned properties, as required by DEP.

Under the Expanded Infill Alternative, an E-designation would be placed on lots comprising development sites in the Academic Mixed-Use Area not owned or controlled by Columbia University and for the remainder of the Project Area, pursuant to Section 11-15 of the New York City Zoning Resolution. The owner and developer of a lot with an E-designation would have to prepare a Phase I Environmental Site Assessment (Phase I ESA) and, if necessary, implement a testing and sampling protocol and Health and Safety Plan (HASP) to the satisfaction of DEP before DOB would issue a building permit. Based on the results of the sampling protocol, if remediation were to be necessary, a RAP and CHASP would have to be submitted and approved by DEP. With these measures in place, no significant adverse impacts related to hazardous materials are expected to occur under either the Expanded Infill Alternative or the Proposed Actions.

WATERFRONT REVITALIZATION

Like the Proposed Actions, the Expanded Infill Alternative would be consistent with the City's 10 Waterfront Revitalization Program (WRP) coastal policies and the WRP's goals of enlivening the waterfront and attracting the public to the City's coastal areas. The alternative would

redevelop a large portion of Subdistricts A and B, adding student, worker and residential population west of Broadway. Unlike the Proposed Actions, the alternative would not require widened sidewalks on east-west streets in Subdistrict A, but the 30-foot sidewalk widening on Twelfth Avenue would still be required. Only one new significant publicly accessible open space (compared with two with the Proposed Actions) and a shortened north–south midblock connection would be created west of Broadway. With the diminished amenities and greater number of curb cuts necessary with the Expanded Infill Alternative, the alternative would still be able to attract the public towards the waterfront, but its effect would not be as strong as the Proposed Actions.

Neither the Expanded Infill Alternative nor the Proposed Actions would result in adverse impacts on terrestrial plants or animals, water quality, or aquatic biota. The proposed Special Manhattanville Mixed-Use Zoning District would have landscaping requirements for all open space areas. This would result in increased vegetation resources within the Academic Mixed-Use Area, under the alternative although, with fewer acres of open space, the amount of landscaping would not be as great. The new buildings would be similar in height to the surrounding buildings and are not expected to cause an increased loss of migratory birds from building collisions. Like the Proposed Actions, under this alternative, the development in the Academic Mixed-Use area and in Subdistrict B and Other area east of Broadway would facilitate the revitalization of Manhattanville, which would be consistent with the City's WRP.

INFRASTRUCTURE

By 2030, the new water usage from the Expanded Infill Alternative is estimated to be 0.74 million gpd, and new sanitary sewage flow would be 0.33 million gpd, compared with 1.8 million gpd net new water usage and 0.9 million gpd of net new wastewater flow under the Proposed Actions.

The projected development associated with the Proposed Actions would create new demand for water and wastewater treatment. With either the Expanded Infill Alternative or the Proposed Actions, an amended drainage plan would be instituted for the Project Area. With the proposed amended drainage plan sewers built by the applicant, the local wastewater collection system would have the capacity to meet the expected demand. Therefore, no significant adverse impacts are expected to result to these services with either the Expanded Infill Alternative or the Proposed Actions.

SOLID WASTE AND SANITATION SERVICES

The Expanded Infill Alternative would generate a net increase of about 95 tons of solid waste per week in 2030, compared with the Proposed Actions, which would generate a net increase of about 146 tons per week in 2030. Although the new development would create new demand for the disposal of solid waste, municipal and private solid waste services have adequate capacity to meet the increases in demand from either development option. Therefore, like the Proposed Actions, no significant adverse impacts from the Expanded Infill Alternative on these services are expected.

Like the Proposed Actions, certain solid wastes, such as regulated medical wastes and spent chemicals, would likely be generated by the uses contemplated under the Expanded Infill Alternative. Specialty waste handling companies (not the New York City Department of Sanitation [DSNY] or ordinary private carters) would be used to manage these wastes. These companies are regulated and licensed by both the New York State and federal governments. The

regulations for the collection, handling, transportation, and final destruction of these wastes ensure that significant adverse impacts would not result. The specialty companies are able to expand their services to meet the demand and are expected to be available to handle the wastes. Therefore, no significant adverse impacts from the handling of regulated wastes would be expected from either the Expanded Infill Alternative or the Proposed Actions.

ENERGY

The development that could occur with the Proposed Actions would increase energy demand under either the Expanded Infill Alternative or the Proposed Actions, but not to the degree that it would cause a significant adverse impact on energy generation, transmission, and distribution systems. Unlike the Proposed Actions, the Expanded Infill Alternative would not require the relocation of the Con Edison cooling station located on the block between West 131st and west 132nd Streets, Broadway and Twelfth Avenue.

TRAFFIC AND PARKING

Like the Proposed Actions, the Expanded Infill Alternative would include the same transportation improvements detailed in Chapter 17, "Traffic and Parking," and Appendix H, including the conversion of several roadway segments from two-way to one-way operation, the installation of numerous traffic signals at currently unsignalized intersections, the reconfiguration of roadway geometry and lane striping, and the modification of signal timing and phasing. This alternative would maintain the same range of uses considered for the Academic Mixed-Use Area under the Proposed Actions but at different space allocations, as described above. It would also include the commercial uses permitted in the Proposed Actions' Subdistrict B west of Twelfth Avenue and various residential and community facility uses in the Other Area east of Broadway, as well as allow for some additional residential and commercial uses within Subdistrict A.

Overall, the Expanded Infill Alternative would yield 65 to 80 percent of the total person- and vehicle-trips projected for the Proposed Actions. Because the transportation network and types of uses anticipated to be developed would be similar under the Expanded Infill Alternative to those considered for the Project Area under the Proposed Actions, the related travel patterns would be similar as well. Hence, it is expected that potential transportation impacts outside of the Project Area, would be of smaller magnitudes than identified for the Proposed Actions and the measures recommended in Chapter 23 to mitigate those impacts would be equally effective in mitigating any potential impacts resulting from the Expanded Infill Alternative. Within the Project Area, traffic circulation patterns are expected to be slightly different due to differences in parking locations and space allocations. Nonetheless, as demonstrated below and similar to the Proposed Actions, no significant adverse traffic impacts are anticipated at the Project Area intersections.

Under the Proposed Actions, there would be enough on-site parking to fully accommodate the projected demand from the Academic Mixed-Use Area and other Columbia University demand that is currently met elsewhere off-site. With the Expanded Infill Alternative, because more substantial below-grade parking construction could not be achieved, the projected demand could not be fully accommodated on-site. Therefore, the Expanded Infill Alternative would create a greater parking shortfall and significant adverse parking impact than the Proposed Actions.

Trip Generation

The projection of future trips associated with the Expanded Infill Alternative considers the same range of uses as what was analyzed for the Proposed Actions. Based on the trip generation estimates summarized in Tables 24-9 and 24-10, the Expanded Infill Alternative would generate 32, 34, and 30 percent fewer total person trips and 30, 22, and 27 percent fewer total vehicle trips during the AM, midday, and PM peak hours, respectively.

Table 24-9
Comparison of Expanded Infill Alternative and Proposed Actions: Person Trips

Peak Hour	Scenarios	Mode of Travel						
		Auto	Taxi	Subway	Bus	Other	Walk	Total
AM	Proposed Actions	1,126	126	2,457	504	133	1,489	5,835
	Expanded Infill Alternative	791	90	1,654	368	98	980	3,981
Midday	Proposed Actions	546	192	889	409	118	4,192	6,346
	Expanded Infill Alternative	465	140	607	307	72	2,590	4,181
PM	Proposed Actions	1,341	182	2,660	608	134	1,983	6,908
	Expanded Infill Alternative	1,001	139	1,816	459	98	1,311	4,824

Notes:
Proposed Actions = Reasonable Worst-Case Transportation Scenario + Subdistrict B and the Other Area developments
Expanded Infill Alternative = Alternative components in Subdistrict A + Subdistrict B and the Other Area developments
Other = Columbia shuttle and commuter rail

Table 24-10
Comparison of Expanded Infill Alternative and Proposed Actions: Vehicle Trips

Peak Hour	Scenarios	Type of Vehicle				
		Auto	Taxi	Truck	Shuttle	Total
AM	Proposed Actions	925	180	90	24	1,219
	Expanded Infill Alternative	646	130	66	24	866
Midday	Proposed Actions	400	214	92	24	730
	Expanded Infill Alternative	331	154	68	24	577
PM	Proposed Actions	1,061	242	38	24	1,365
	Expanded Infill Alternative	778	176	28	24	1,006

Notes:
Proposed Actions = Reasonable Worst-Case Transportation Scenario + Subdistrict B and the Other Area developments
Expanded Infill Alternative = Alternative components in Subdistrict A + Subdistrict B and the Other Area developments

Traffic

Based on the incremental traffic assignments developed for the Proposed Actions and the parking allocations discussed below, the 2030 vehicle trips projected for the Expanded Infill Alternative, as depicted in Appendix Figures N3-1 to N3-3 for the three analysis periods, were assigned to the traffic network to yield the future 2030 Expanded Infill Alternative traffic networks (see Appendix Figures N3-4 to N3-6). The bulk (92 percent) of the Expanded Infill Alternative incremental traffic were assigned to the two proposed on-site garages west of Broadway and the one existing on-site garage east of Broadway. The remaining 8 percent of the incremental traffic were assigned on-street. Intersection volumes projected for the Expanded Infill Alternative were compared with those from the Proposed Actions (see Appendix N3) to determine whether a more detailed examination of traffic operations is warranted. This comparison revealed that an analysis of the Twelfth Avenue intersections with West 131st and West 132nd Streets during the AM peak hour and the Broadway northbound and West 133rd Street intersection during the PM peak hour is necessary to identify potential traffic impacts at these locations. As shown in Table 24-11, the analysis found that the projected conditions under the Expanded Infill Alternative would not result in significant adverse impacts.

Table 24-11
2030 No Build, Proposed Actions, and Expanded Infill Alternative Level-of-Service Analysis

Intersection	2030 No Build				2030 Proposed Actions				2030 Exp. Infill Alternative				Notes
	Lane Group	V/C Ratio	Delay (spv)	LOS	Lane Group	V/C Ratio	Delay (spv)	LOS	Lane Group	V/C Ratio	Delay (spv)	LOS	
AM Peak Hour													
Twelfth Avenue @ West 132nd Street													
Eastbound	LTR	0.81	39.0	D	LTR	0.86	36.4	D	LTR	0.74	30.6	C	Intersection configuration and operation same as the Proposed Actions.
Westbound	LTR	0.12	20.8	C									
Northbound	LTR	0.52	14.4	B	TR	0.67	17.5	B	TR	0.78	21.0	C	
Southbound	LTR	0.14	10.4	B	L	0.52	21.7	C	L	0.65	30.8	C	
					LT	0.34	12.8	B	LT	0.28	12.1	B	
	Int.		21.7	C	Int.		25.4	C	Int.		24.4	C	
Twelfth Avenue @ West 131st Street (Unsignalized in No Build)													
Eastbound	LTR	0.03	20.3	C									Intersection configuration and operation same as the Proposed Actions.
Westbound					L	0.32	23.6	C	L	0.15	21.1	C	
	LTR	0.44	40.8	E	LTR	0.00	19.3	B	LTR	0.10	20.6	C	
					R	0.30	23.7	C	R	0.27	23.2	C	
Northbound	LT	0.01	7.8	A	LT	0.55	14.9	B	LT	0.60	15.9	B	
Southbound	LT	0.18	11.8	B	TR	0.49	13.9	B	TR	0.39	12.6	B	
					Int.				Int.		15.5	B	
PM Peak Hour													
Broadway Northbound @ West 133rd Street													
Eastbound	LT	0.26	18.3	B									Intersection configuration and operation same as the Proposed Actions.
Westbound	TR	0.93	50.9	D	TR	0.88	43.5	D	TR	0.88	43.7	D	
Northbound	LT	0.83	21.1	C	L	0.76	21.0	C	L	0.75	20.7	C	
	R	0.06	9.1	A	TR	1.00	41.8	D	TR	0.94	29.6	C	
	Int.		29.6	C	Int.		37.5	D	Int.		30.8	C	

Notes: L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; Int. = Intersection
V/C = Volume to Capacity; LOS = Level of Service.

Parking

Compared with the Proposed Actions, this alternative would produce a greater parking shortfall (530 spaces vs. 120 spaces), as follows:

- Under the Proposed Actions, up to 2,300 Columbia University-operated, off-street parking spaces could be constructed in the below-grade central service area; this represents an excess of 300 spaces over the University's parking demand. The Proposed Actions would displace 679 existing spaces. Columbia would relocate parking from its other garages to fill the 300 extra spaces in the below-grade central service area and would allow public parking in the spaces that would be thus vacated. This, less the available off-street parking in the area, would bring the alternative's total parking shortfall to 120 spaces. The shortfall would be fully mitigated by Columbia's providing additional parking beneath the Henry Hudson Parkway viaduct north of West 135th Street, or partially mitigated by reconfiguring the space in the Columbia's garage at 560 Riverside Drive to provide 72 additional spaces.
- Under the Expanded Infill Alternative, only 1,323 parking spaces could be provided to meet a University demand for 1,435 spaces, resulting in a parking demand shortfall of 112 spaces. The alternative would displace 679 existing parking spaces, as well. This, less the available off-street parking in the area, would bring the alternative's total parking shortfall to 530 spaces, which would be greater than under the Proposed Actions. This impact could not be fully mitigated by the either of the measures proposed to address the shortfall under the Proposed Actions.

TRANSIT AND PEDESTRIANS

Subways

Significant adverse subway impacts were identified for the Proposed Actions at the E101 and E102 escalators at the 125th Street No. 1 subway station. With substantially fewer projected peak hour subway trips, as shown in Table 24-9, the Expanded Infill Alternative would not be expected to result in significant adverse impacts at these station elements. Hence, it would also not warrant the recommended replacement of the existing escalators, as proposed mitigation for the Proposed Actions, with wider and more efficient escalators.

Buses

As shown in Table 24-9, the Expanded Infill Alternative would generate fewer bus trips than the Proposed Actions. While significant adverse bus impacts are still expected to occur, they would be at lower magnitudes and require fewer additional buses to mitigate the projected impacts.

Pedestrians

With fewer overall person-trips projected for the Expanded Infill Alternative, as compared with the Proposed Actions, there would also be fewer pedestrian trips made on the analyzed pedestrian elements. Since the future 2030 conditions under the Proposed Actions were determined to not yield any significant adverse pedestrian impacts with the transportation improvements in place, the Expanded Infill Alternative would also not result in any significant adverse pedestrian impacts.

AIR QUALITY

As described above in "Traffic and Parking," since this alternative assumes that Columbia would build only on properties that it owns or controls, overall volumes of vehicles and the total off-street parking capacity would be lower than with the Proposed Actions. Like the Proposed Actions, the Expanded Infill Alternative would not be expected to have a significant adverse impact on air quality from mobile sources of pollution For below-grade parking facilities, a Restrictive Declaration for the Academic Mixed-Use Area under the Expanded Infill Alternative would include the similar provisions as for the Proposed Actions. However, ventilation of air from the proposed multilevel parking garage on the block between 132nd Street and 133rd Street could potentially result in increases in carbon monoxide (CO) concentrations in the immediate vicinity of the garage. Therefore, a parking garage analysis was conducted to evaluate potential future CO concentrations with the Expanded Infill Alternative parking garage.

Under the Expanded Infill Alternative, new buildings would have separate HVAC systems, whereas most of the heating and cooling for the University buildings with the Proposed Actions would be provided by the proposed central energy plants. A screening analysis was performed to assess air quality impacts associated with emissions from the Infill Alternative development scenario HVAC systems.

The Expanded Infill Alternative would include academic research, but would be more limited and of different sizes and shapes than those of the Proposed Actions. Nevertheless, a review was conducted to determine whether any new or additional air quality impacts would potentially occur due to an accidental laboratory chemical spill.

The Expanded Infill Alternative would maintain existing properties not owned or controlled by Columbia University. None of the properties that would remain under the Expanded Infill

Alternative within the Academic Mixed-Use Area were found to possess a federal, state or local air permit. Therefore, no additional sources of air emissions from manufacturing or processing facilities would be present as compared with the Proposed Actions.

Like the Proposed Actions, the Expanded Infill Alternative assumes the MTA Manhattanville Bus Depot on the block between West 132nd and West 133rd Streets would be relocated to the below-grade space generally beneath its current location. No significant adverse impacts on Columbia developments are anticipated; however, to ensure that significant impacts of $PM_{2.5}$ at receptor locations in the community do not occur, a Restrictive Declaration for the Academic Mixed-Use Area under the Expanded Infill Alternative would include similar provisions for the below-grade bus depot as for the Proposed Actions, which would generally include use of cleaner burning natural gas, and restrictions on the locations and height of combustion exhaust stacks.

Parking Facility

The Expanded Infill Alternative would include a multi-level above-grade parking facility at Site 13. Emissions from vehicles using the naturally ventilated parking garage could potentially affect ambient levels of CO in the project study area.

An analysis of the emissions from the outlet vents and their dispersion in the environment was performed, calculating pollutant levels in the surrounding area, using the methodology set forth in the *CEQR Technical Manual* (refer to Chapter 19, "Air Quality" for a description of the general assumptions used). Since specific design information for the parking facility are not available, the analysis conservatively assumed that all Columbia parking capacity would be located at the ground level of the parking facility, to maximize potential cumulative impacts with on-street traffic.

The CO concentrations were determined for the time periods when overall garage usage would be the greatest, considering the hours when the greatest number of vehicles would exit the facility. Departing vehicles were assumed to be operating in a "cold-start" mode, emitting higher levels of CO than arriving "hot-stabilized" vehicles. Maximum emissions would result in the highest CO levels and the greatest potential impacts. Traffic data for the parking garage analysis were derived from the trip generation analysis described in the traffic section for this alternative.

Background and on-street CO concentrations were added to the modeling results to obtain the total ambient levels. The on-street CO concentration was determined using the methodology in Air Quality Appendix 1 of the *CEQR Technical Manual*, utilizing traffic volumes utilized in the mobile source analysis.

Based on the methodology previously discussed, the maximum overall predicted future CO concentrations, including ambient background levels and potential contributions from nearby on-street traffic, at sidewalk receptor locations, would be 3.1 ppm and 2.3 ppm for the 1- and 8-hour periods, respectively. At elevated locations, maximum CO concentrations, including ambient background levels, would be much lower (i.e., similar to ambient background) since the nearest receptor at an adjacent building would be a minimum of 30 feet in distance. The maximum 1- and 8-hour contributions from the parking garage alone would be 0.04 ppm and 0.03 ppm, respectively. The values are the highest predicted concentrations for any time period analyzed.

These maximum predicted CO levels are below the applicable CO standards and CEQR CO *de minimis* criteria. Based on the use of these design provisions, no significant adverse impacts from the Expanded Infill Alternative's parking facility are expected.

HVAC Systems

The methodology described in the *CEQR Technical Manual* was used for the analysis and considered impacts on receptor sites (see Chapter 19 for a description of the methodology). Each of the proposed development sites was evaluated to assess impacts on existing buildings and other projected development sites (i.e., project-on-project impacts). In addition, other proposed residential developments (i.e., No Build developments) were reviewed for analysis as potential receptor sites. In all cases, the HVAC stacks were assumed to be placed at the edge of the roof closest to the nearest building. The analysis was performed assuming both natural gas and No. 2 fuel oil as the HVAC systems' fuel types for Columbia development sites, and natural gas and No. 4 fuel oil for non-Columbia development sites. The primary pollutant of concern when burning natural gas is nitrogen dioxide (NO_2), and when burning oil, sulfur dioxide (SO_2).

Columbia Development Sites

For Columbia development sites 3, 6b, 7, 8, 9, 10, 12, 13 and the Nash Building, the screening analysis determined that using No. 2 oil with the maximum proposed development size, the distance from the nearest receptor of a similar or greater height was less than the allowable distance in Figure 3Q-8 of the *CEQR Technical Manual*. Therefore, for these sites, a refined air quality analysis was undertaken utilizing the U.S. Environmental Protection Agency (EPA) AERMOD dispersion model. The results of the analysis determined that for Sites 9, 10, 12, and 13, the HVAC stacks would need to be placed at a specified minimum distance from the nearest receptor site if utilizing natural gas exclusively.

Therefore, under the Expanded Infill Alternative, a Restrictive Declaration would be placed on Sites 9, 10, 12, and 13, to preclude the potential for significant adverse air quality impacts on other projected developments from the HVAC emissions. The Restrictive Declaration would provide the following restrictions regarding the location of HVAC exhaust stacks and/or require the use of natural gas for fossil fuel-fired HVAC equipment.

Site 9:

Any new University housing and/or other academic development must use No. 2 oil or natural gas as the type of fuel for HVAC systems, and ensure that the heating, ventilating and air conditioning stack(s) is located at least 40 feet from the lot line facing Twelfth Avenue when firing No. 2 oil to avoid any potential significant air quality impacts.

Site 10:

Any new University housing and/or other academic development must use No. 2 oil or natural gas as the type of fuel for HVAC systems, and ensure that the heating, ventilating and air conditioning stack(s) is located at least 30 feet from the lot line facing West 132nd Street when firing No. 2 oil to avoid any potential significant air quality impacts.

Site 12:

Any new University housing and/or other academic development must use No. 2 oil or natural gas as the type of fuel for HVAC systems, and ensure that the heating, ventilating and air conditioning stack(s) is located at least 20 feet from the lot line facing West 133rd Street when firing No. 2 oil, to avoid any potential significant air quality impacts.

Site 13:

Any University housing and/or other academic development must use No. 2 oil or natural gas as the type of fuel for HVAC systems, and ensure that the heating, ventilating and air conditioning stack(s) is located at least 60 feet from the lot line facing Broadway when firing No. 2 oil to avoid any potential significant air quality impacts.

Private Development Sites

For the five private sites that would be assumed to be developed under the Expanded Infill Alternative, the same CEQR Technical Manual screening method was utilized, except as a default assumption, No. 4 oil was assumed as the fuel type for HVAC systems, which is conservative. For each of these sites the screening analysis determined that using No. 4 oil or even No. 2 oil, with the maximum proposed development size, the distance from the nearest receptor of a similar or greater height was less than the allowable distance in Figure 3Q-5 of the CEQR Technical Manual. Therefore, for these sites, a refined air quality analysis was undertaken utilizing the U.S.EPA AERMOD dispersion model. The results of the analysis determined that for two sites, the HVAC stacks would need to be placed at a specified minimum distance from the nearest receptor site and/or utilize natural gas exclusively.

Therefore, under the Expanded Infill Alternative, an E-designation would be incorporated into the rezoning proposal for the affected non-Columbia site, to preclude the potential for significant adverse air quality impacts on other projected developments from the HVAC emissions. The E-designation would provide the following restrictions regarding the location of HVAC exhaust stacks and/or require the use of natural gas for fossil fuel-fired HVAC equipment.

Site on Block 1996, Lot 56:

Any new residential and/or commercial development must use No. 4 oil, No. 2 oil, or natural gas as the fuel type. The development must also ensure that the heating, ventilating and air conditioning stack(s) is located at least 60 feet from the lot line facing Broadway when firing No. 4 oil, at least 30 feet from the same lot line when firing No. 2 oil, or use natural gas to avoid any potential significant air quality impacts.

Site on Block 1987, Lot 1:

Any new residential and/or commercial development must use exclusively natural gas as the type of fuel for HVAC systems.

Like the Proposed Actions, the Expanded Infill Alternative would not be expected to result in significant adverse impacts on air quality from stationary sources of pollution. It is expected that no violations of the NAAQS for emissions of NO_x, CO, PM_{10}, and SO_2, and no significant impacts due to $PM_{2.5}$ emissions would be predicted to occur in the Expanded Infill Alternative, and this alternative would be consistent with the New York SIP.

Chemical Spill Analysis

An analysis was performed to determine potential impacts from an accidental chemical spill within a fume hood at academic research buildings in the Academic Mixed-Use Area under the Expanded Infill Alternative. Impacts were evaluated using procedures described in the *CEQR Technical Manual* (see Chapter 19 for a detailed description of the methodology and the assumptions used). The same set of design assumptions were utilized as in the Proposed Actions. The analysis focused on the block between West 132nd and 133rd Street, west of Broadway since the fume hood analysis performed for the Proposed Actions had identified one site on this

block where the nominal design assumptions were not sufficient to avoid impacts from an accidental chemical spill within a fume hood (see Chapter 19). For Site 12, the modeling results predicted an exceedance for the analyzed chemicals. The required stacks and exhaust velocities would not be practical to avoid a potential significant adverse impact on the Riverside Park Community apartment complex from an accidental laboratory chemical spill. Therefore, this would represent an unmitigated impact under the Expanded Infill Alternative.

NOISE

To assess potential noise impacts of the Expanded Infill Alternative development scenario, a noise analysis was performed using the same analysis methodologies that were used for impact analyses of the Proposed Actions. This analysis examined potential noise impacts at three noise receptors—Sites 6, 10, and 13—for the 2030 analysis year. These three noise receptor sites were selected for analysis because they were the locations where, based upon the analyses of the Proposed Actions (both with and without proposed traffic improvements), the largest incremental change in noise levels would be expected. (Site 6 was chosen because it is a location which is fairly sensitive to increased project-generated traffic; Site 10 was chosen because this is the only location where the Proposed Actions with traffic improvements result would result in a significant noise impact; and Site 13 was selected because it is a location which is fairly sensitive to increased project-generated traffic.) The noise analysis for the Expanded Infill Alternative development scenario was performed using traffic conditions with project proposed traffic improvements.

The Expanded Infill Alternative development scenario would, if realized, generate fewer vehicle trips than the Proposed Actions, and those trips would be distributed on the network in a manner similar to the Proposed Actions. As shown in Table 24-12, noise levels with the Expanded Infill Alternative development scenario would be comparable to noise levels with the Proposed Actions with traffic improvements. (L_{10} values for the Expanded Infill Alternative are presented in Appendix R.2.) Both the Expanded Infill Alternative development scenario and the Proposed Actions scenario with transportation improvements would have a midblock traffic signal on West 125th Street between Broadway and Twelfth Avenue (to facilitate pedestrian movements), and, therefore, both scenarios would result in significant noise impacts at receptor Site 10. At all other locations, the Expanded Infill Alternative development scenario, similar to the Proposed Actions, both with and without traffic improvements, would not result in any significant noise impacts.

Table 24-12
$L_{eq(1)}$ Noise Levels for the Expanded Infill Alternative in the Year 2030

Site	Location	Time Period	No Build	Expanded Infill Alternative		Proposed Actions With Improvements		Proposed Actions Without Improvements	
				Build	Increase	Build	Increase	Build	Increase
6	12th Av, W131–W132	AM	75.7	77.4	1.7	77.3	1.6	76.6	0.9
		PM	68.1	69.4	1.3	69.6	1.5	69.4	1.3
10	W125th, 12th Av –St Clair Pl	AM	69.9	73.5	**3.6**	73.7	**3.8**	70.1	0.2
		PM	69.8	75.4	**5.6**	75.5	**5.7**	69.4	-0.4
13	B'way, Tiemann Pl– W125th	AM	77.5	77.1	-0.4	77.1	-0.4	78.0	0.5
		PM	76.2	76.3	0.1	76.4	0.2	76.9	0.7

Note: Noise levels in bold denotes values that exceed CEQR significant impact criteria.

It is expected that comparable levels of attenuation, at the same locations, would be necessary under the Expanded Infill Alternative as those specified under the Proposed Actions.

CONSTRUCTION

Land Use and Neighborhood Character

The Expanded Infill Alternative would result in construction in Subdistrict A over a somewhat shorter period than the Proposed Actions, because fewer buildings would be built and the slurry wall construction would be limited to a smaller area, involving only one street closure. This and other closures for utility relocation would be of shorter duration than under the Proposed Actions. Like the Proposed Actions, throughout the construction period, access to surrounding residences, businesses, institutions, and waterfront uses in the Project Area and primary study area would be maintained. In addition, throughout the construction period, measures would be implemented to control noise, vibration, and dust on construction sites, including the erection of construction fencing and, in some areas, fencing incorporating sound-reducing measures. Because none of these impacts would be continuous in any one location or ultimately permanent, they would not create significant impacts on land use patterns or neighborhood character in the area.

Construction activities would not significantly affect neighborhood character in the primary or secondary study areas, although there would be some inconvenience to neighboring land uses, as with any construction. There would be no significant adverse impacts on land use or neighborhood character from construction in Subdistrict B or the Other Area east of Broadway.

Socioeconomic Conditions

Like the Proposed Actions, construction activities associated with the Expanded Infill Alternative would, in some instances, temporarily affect pedestrian and vehicular access within, and in the vicinity of, the Project Area. However, these land and/or sidewalk closures are not expected to obstruct entrances to existing businesses, or obstruct major thoroughfares used by customers, and businesses are not expected to be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities. Utility service would be maintained to all businesses, although very short-term interruptions (duration in hours) may occur when new equipment (e.g., a transformer, or a sewer or water line) is put into operation. Overall, construction of the Proposed Project is not expected to result in any significant adverse impacts on surrounding businesses.

Economic benefits attributable to construction expenditures and construction jobs are a direct function of the costs of construction. Since the Expanded Infill Alternative would result in a development that would be smaller than that of the Proposed Actions, its economic benefits during construction would be proportionally smaller as well. Based on typical cost per square foot, the Expanded Infill Alternative development would likely entail construction costs of approximately 78 percent of those with the Proposed Actions. As a result, the economic benefits attributable to construction expenditures and construction jobs would be approximately 78 percent of those that would result with the Proposed Actions.

Historic Resources

As described above, the historic resources in the Project Area would need to be protected during construction.

To avoid construction-related impacts on architectural resources within 90 feet of project construction, including the West Market Diner, the Manhattan Valley IRT viaduct, the 125th Street IRT Subway Station, the Riverside Drive viaduct, the Claremont Theater building, and—to the extent necessary—the former Warren Nash Service Station building and the Studebaker Building, the protection measures contained in the CPP approved by OPRHP and LPC would be implemented by a professional engineer before any demolition, excavation, and construction. As-of-right construction in the Other Area east of Broadway would comply with the procedures set forth in DOB's *Technical Policy and Procedure Notice* (TPPN) #10/88, which is designed to provide for the protection of historic resources during construction.

Hazardous Materials

Like the Proposed Actions, under the Expanded Infill Alternative, potential contaminants identified in the Academic Mixed-Use Area on lots owned or controlled by Columbia University at the time of construction would be remediated (cleaned up) as part of the development of this area by Columbia University. Potential impacts during construction and development activities would be avoided by implementing a CHASP. In addition, to address the remediation of known or potential environmental conditions that may be encountered during proposed construction and development activities, a RAP will be prepared. (Both the RAP and CHASP would be approved by DEP and DEC, if necessary, in response to a reported petroleum spill.) To ensure the implementation of these measures, Restrictive Declarations will be placed against Columbia-owned properties, as required by DEP.

Like the Proposed Actions, with this alternative an E-designation would be placed on lots comprising development sites in the Academic Mixed-Use Area not owned by Columbia University. The owner and developer of a lot with an E-designation must prepare a Phase I Environmental Site Assessment (Phase I ESA) and, if necessary, implement a testing and sampling protocol and Health and Safety Plan (HASP) to the satisfaction of DEP before DOB issues a building permit. Based on the results of the sampling protocol, if remediation is necessary, a RAP and CHASP must be submitted and approved by DEP.

With these measures in place (i.e., where necessary, DEP-approved RAPs and CHASPs for all lots to be developed in the project area), no significant adverse impacts related to hazardous materials are expected to occur as a result of the Proposed Actions.

Infrastructure

Unlike the Proposed Actions, this alternative would not require relocation of a major sewer main from beneath West 130th Street. Therefore, construction activities would be similar to typical construction in Manhattan with regard to utilities. Like the Proposed Actions, this alternative would not have a significant adverse impact on infrastructure during construction.

Traffic and Transportation

As compared with the Proposed Actions, the Expanded Infill Alternative would yield fewer construction worker vehicles and truck deliveries during construction. In addition, roadway disruptions and complete street closures would be more limited with the substantially smaller below-grade space than under the Proposed Actions. While significant adverse traffic impacts during construction are still likely to occur with the Expanded Infill Alternative, these impacts are expected to be lower in magnitude and for shorter durations. During Phase 1 construction, parking needs of construction workers are expected to be met in the same manner described for the Proposed Actions. However, during Phase 2 construction, the combination of construction

worker and project demand absent the substantial below-grade parking considered for the Proposed Actions is likely to result in a parking shortfall, and significant parking impact similar to what was concluded above for the completed project under the Expanded Infill Alternative.

With regard to transit and pedestrian conditions during construction, temporary bus stop relocations and sidewalk closures are anticipated. Nonetheless, similar to the conclusions reached for the Proposed Actions, the Expanded Infill Alternative would not result in the potential for significant adverse transit and pedestrian impacts during construction.

Air Quality

Similar to the Proposed Actions, all Columbia University construction in Subdistrict A under the Expanded Infill Alternative would be conducted in accordance with the University's state-of-the-art emissions reduction program as detailed in Chapter 21, "Construction." However, construction activities in Subdistrict A under the Expanded Infill Alternative would be of a smaller scale and less intensive than those of the Proposed Actions. Unlike the Proposed Actions, below-grade construction activities under this alternative would be limited to the western portion of the two blocks from West 130th Street to West 132nd Street. The remainder of the development sites would be constructed with conventional basements. Overall, this would require less on-site equipment, and the duration of construction activities on each block would be less than under the Proposed Actions. However, since the Expanded Infill Alternative only considers University development on public property and property currently owned or controlled by Columbia, construction activities associated with the University's development may occur adjacent to existing or proposed residential development on private properties. In such cases, Columbia University would take into consideration the placement of construction equipment, locating emission sources away from residential properties where possible. As shown with the Proposed Actions, with Columbia University's emissions reduction program in place, no significant air quality impacts were predicted. Therefore, since construction activities under this alternative would be less intensive, like the Proposed Actions, the Expanded Infill Alternative would not be expected to result in significant air quality impacts due to construction in Subdistrict A.

Non-Columbia University construction activities in Subdistrict B and the Other Area east of Broadway under the Expanded Infill Alternative would be the same as with the Proposed Actions. Therefore, like the Proposed Actions, with the implementation of emissions reduction measures, which would be implemented through E-designations, no significant air quality impacts would be expected due to construction in Subdistrict B and Other Areas.

Noise

Similar to the Proposed Actions, all construction in Subdistrict A under the Expanded Infill Alternative would utilize a wide variety of noise control measures (including quiet construction procedures and equipment, early electrification, noise barriers, noise curtains, acoustical tents, etc.) to reduce construction noise effects. Construction activities in Subdistrict A under the Expanded Infill Alternative would be of a smaller scale and less intensive than those of the Proposed Actions, construction activities in Subdistrict B and the Other Area East of Broadway would be comparable to those of the Proposed Action. Similar to the Proposed Actions, the Expanded Infill Alternative would be expected to result in significant noise impacts at residential locations which have a direct line-of-sight to construction at Riverside Park Community (3333 Broadway), 560 Riverside Drive; and at two buildings of Manhattanville Houses (95 Old Broadway and 1430 Amsterdam Avenue), and at one institution location (Prentis Hall). In

addition, because the Expanded Infill Alternative would involve development adjacent to residential uses within Subdistrict A, at these residential locations, significant adverse noise impacts would be expected to occur due to construction activities.

PUBLIC HEALTH

As with the Proposed Actions, with emissions reduction measures in place, but with less intensive construction activities, no significant adverse public health impacts with respect to air quality would be expected from construction activities in the Project Area. Similar to the Proposed Actions, while construction activities would produce noise levels of a magnitude that at times are annoying and intrusive, construction activities for the Expanded Infill Alternative would only occur for a limited number of hours per day, and for a limited time period. Based upon the limited durations of these noise levels, the noise produced by construction activities would not result in a significant adverse public health impact.

ABILITY TO MEET THE GOALS AND OBJECTIVES OF THE PROPOSED ACTIONS

The Expanded Infill Alternative would only partially meet the goals and objectives of the Proposed Actions for the following reasons:

- The Alternative could not accommodate Columbia's long-term needs for space. Whereas the Proposed Actions would produce 4.8 million sf of academic program space, the Expanded Infill Alternative would produce only 3.1 million sf of academic program space, or 65 percent of the required floor area. Space for academic research, the University's key program objective, would be only 60 percent of that of the Proposed Actions (1.6 million sf compared with 2.6 million sf). Because this Alternative would not fulfill long-term needs for space, the University would not be able to avoid ad hoc acquisition of properties in neighborhoods outside of Columbia's existing campuses.
- The reduced floor area compared with the Proposed Actions would occur at critical locations, which would further reduce the Alternative's ability to meet project goals and objectives. In particular, there would not be enough space for the Phase 1 uses—the Jerome L. Greene Science Center, the Business School, and the School of the Arts. In addition, according to Columbia University, the SIPA has been attracted to a location in Manhattanville based largely on the presence of the Business School, with which it enjoys a strong relationship; Columbia advises that if the Business School were unable to come to Manhattanville, a relocation of SIPA would be unlikely as well. There would also be less room for active, contiguous ground-floor retail, no space at all for the Small Square, and the land for the Grove would not be available. Thus, this Alternative would not achieve the Phase 1 objectives of transforming West 125th Street as a gateway to the waterfront and the West Harlem Waterfront park, or of acting as a major entrance to the proposed new graduate Manhattanville campus for Columbia University.
- The lack of the full central below-grade service area would reduce the functionality of the Academic Mixed-Use Development, restrict the ability of the University to produce buildings with full program space, and limit the ability to create a campus environment. Specifically, without the full central below-grade service area, there would be no central loading facility and centralized parking, shared academic support space serving only two buildings, no centralized mechanical/HVAC systems, and no additional floor area for Business School classrooms, and other academic programs. As a result, each building would have its own truck loading docks, and those buildings with below-grade parking would each

have car ramps on the streets. Above-grade loading and parking facilities would interrupt the continuity of active ground-floor uses and result in parking and loading activities not conducive to a campus environment. In addition, support uses that would be shared among buildings when located below grade under the Proposed Actions would, if located above grade, have to be duplicated in each building—each building would have its own boilers and HVAC system, each would have to have a mechanical floor above grade, and each academic research building would have academic research support space occupying at least two above-grade floors. Locating support space above grade would restrict the amount of program space that could be achieved in each building, and the ability of the University to achieve its program goals would be constrained.

- This alternative would achieve only limited success in creating a campus with open space and amenities for University and community users, improved pedestrian conditions, and improved visual and physical access to the waterfront. As noted above, the open spaces would be fewer and smaller than under the Proposed Actions, and the north-south pedestrian path would be only two blocks long, although there would be a central square. The curb cuts and truck docks would diminish the attractiveness of the area for pedestrians. The reduction in active ground floor uses and their lack of contiguity would also decrease the area's attractiveness for pedestrians. The absence of widened sidewalks on the narrower side streets would also reduce this alternative's ability to improve views of and access to the waterfront. As noted above, the inability to create the full Phase 1 program, with the Jerome L. Greene Science Center and three key graduate schools plus new open space, would reduce this alternative's ability to enliven and activate West 125th Street as a gateway to the waterfront.

F. COMMUNITY BOARD 9 PROPOSED 197-A PLAN ALTERNATIVES

As described below, Manhattan Community Board 9 has led a comprehensive public planning effort to create a plan for the Community District under 197-a of the New York City Charter. The plan, as originally set forth, was considered as an alternative in the DEIS. Based on the land use and zoning policies in the original plan, a development scenario was formulated and its potential impacts were compared with those of the Proposed Actions. Because this scenario could only produce a small percentage of the program space needed by Columbia, a second scenario was developed, which relaxed some of the restrictions that had impeded community facility development (and in particular development of academic research buildings) in the original formulation.

Since publication of the DEIS, CB9 has revised the 197-a Plan in an attempt to provide more space for the University's needs, and it has revised the original plan to further relax certain development restrictions. For purposes of clarity, the DEIS alternative is referred to as 197-a Plan Alternative 1. This alternative is described below, as it was in the DEIS, but only a summary of impacts is presented in the FEIS chapter; the detailed analyses can be found in Appendix N-1. The FEIS alternative is referred to as 197-a Plan Alternative 2, and it is analyzed below. The more "relaxed" version of this alternative is referred to as 197-a Plan Alternative 2-Relaxed.

INTRODUCTION

During the public Scoping process for this DEIS, Manhattan Community Board 9 (CB9) and other community members requested that the CB9 proposed 197-a Plan ("197-a Plan") be considered as an alternative to the Proposed Actions. Although as discussed below, Columbia does not believe that the development resulting from the 197-a Plan would meet the University's

goals and objectives, DCP agreed to this request in order to facilitate a comparison between the Proposed Actions and the 197-a Plan during the parallel public review of both proposals. The following alternatives analysis is distinct from the environmental review of the 197-a Plan necessary to support review of the Plan under Section 197-a of the City Charter, which accompanies that application. Instead, this EIS alternatives analysis considers whether potential zoning regulations consistent with the recommendations of the 197-a Plan would have the same or fewer significant adverse impacts than those of the Proposed Actions.

The underlying stated goals of the 197-a Plan include: improving the quality of life of neighborhood residents, preserving traditional building patterns and neighborhood scale, encouraging the creation and development of job-intensive businesses to benefit local residents, providing affordable housing, and allowing future growth while preserving the district's physical and demographic character without displacement of existing CB9 residents. The 197-a Plan lists several land use and zoning recommendations, as follows:

(1) Establish a special purpose district in Manhattanville;

(2) Proscribe use of eminent domain for conveyance to private developers;

(3) Study and adopt contextual zoning;

(4) Utilize inclusionary zoning to create affordable housing; and

(5) Explore development of underbuilt sites.

The 197-a Plan calls for a mix of manufacturing, commercial, community facility, and residential uses of the Project Area, consistent with the first goal, described below, for the Proposed Actions. This mix of uses, achieved through a rezoning that would facilitate new construction and conversions, is aimed at preserving building patterns and neighborhood scale, while allowing for future growth.

The goals of the 197-a Plan differ substantially from those of the Proposed Actions with regard to accommodating the long-term needs of Columbia University. One of Columbia's main goals in Subdistrict A of the rezoning area (which includes nearly all of Subdistrict 2 and a portion of Subdistrict 1 in the 197-a Plan, shown in Figure 24-14 and described in more detail below) is to implement a systematic long-range plan to develop an integrated University area, with publicly accessible open space and other amenities, that supports Columbia's educational goals, and at the same time to eliminate the University's reliance on ad hoc acquisitions of property to accommodate expansion of its academic or academic research facilities, as has been the case near the Morningside Heights campus. The 197-a Plan would allow for a limited amount of community facility space within Subdistrict 2, and little if any such development in Subdistrict 1, and has not been designed to accommodate Columbia's long-term goals for expansion.

This chapter assesses development based on the 197-a Plan, given a set of potential zoning regulations and development assumptions prepared by DCP in consultation with CB9 leadership in order to compare its environmental effects with those of the Proposed Actions. The analysis also considers the extent to which the 197-a Plan, although not designed with the purpose of accommodating Columbia University's needs, could nevertheless accommodate those needs and meet the goals of the Proposed Actions.

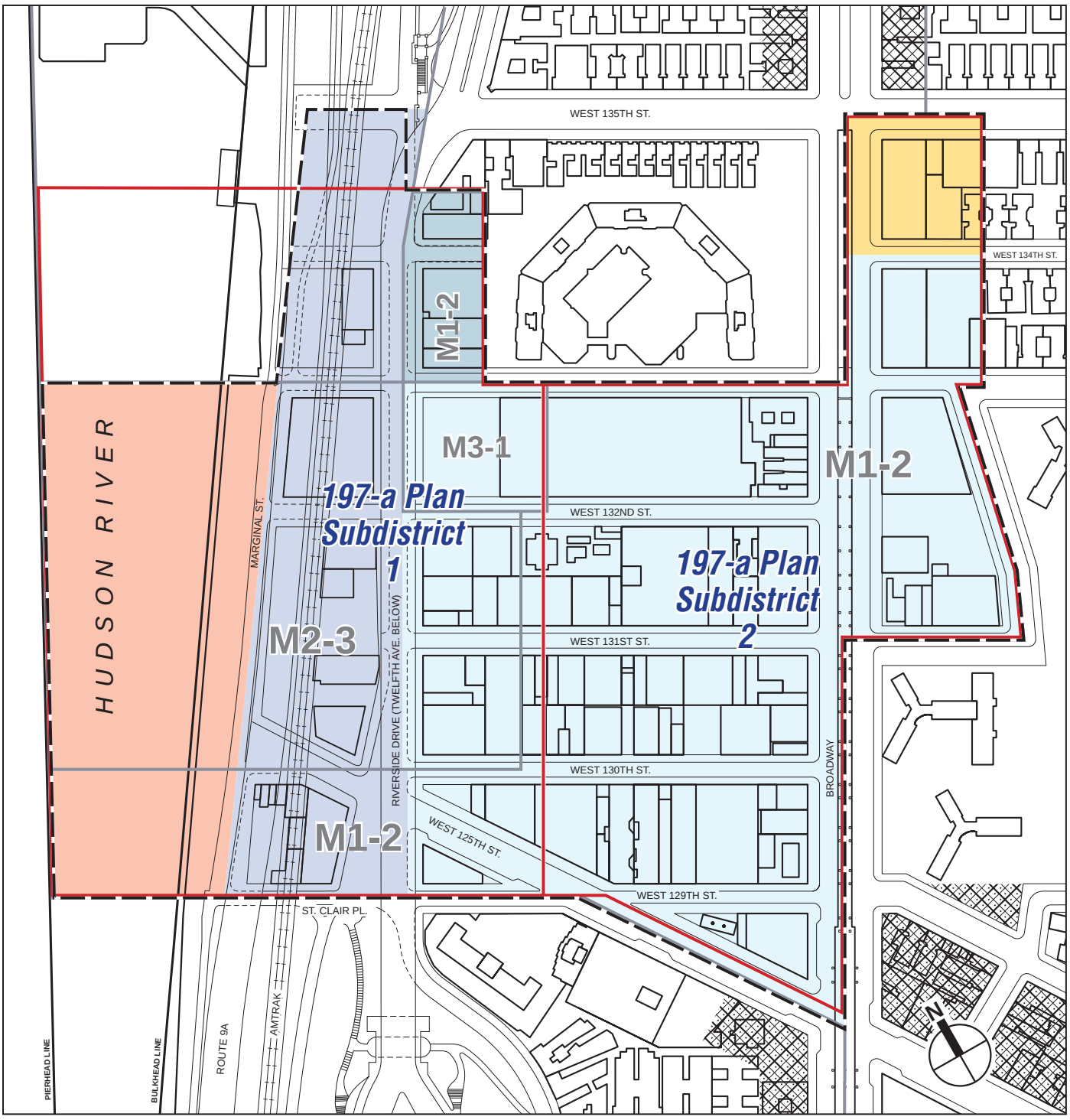


Figure 24-14

197-a Plan Alternative 1: Subdistrict Boundaries

BACKGROUND

Section 197-a of the New York City Charter authorizes community boards and borough boards, as well as the mayor, CPC, DCP, and any borough president to sponsor plans for the development, growth, and improvement of the City, its boroughs, and communities. Proposed 197-a Plans are reviewed by the affected community boards and borough presidents, as well as by CPC and—if approved by CPC—the City Council in accordance with Section 197-a and the procedures and timetable set out in *Rules for the Processing of Plans Pursuant to Charter Section 197-a*. If approved by CPC and adopted by the City Council, 197-a Plans are published and distributed, together with any modifications made by CPC and the City Council, so that they may guide subsequent actions by City agencies. As described in *Rules for the Processing of Plans Pursuant to Charter Section 197-a*, an adopted plan "shall serve as a policy to guide subsequent actions by City agencies," but does not establish binding zoning and other land use controls that affect the nature or amount of future development.

CB9 has developed a proposed 197-a Plan for Manhattan Community District No. 9, an area bounded by West 155th Street to the north, West 110th Street to the south, the Hudson River to the west, and a linear park system (comprising Morningside Park, St. Nicholas Park, and Jackie Robinson Park) to the east—and approved it on October 21, 2004.

On October 17, 2005, CPC determined that the plan met threshold standards for form and content, as set forth in Article 4 of the *Rules for the Processing of Plans Pursuant to Charter Section 197-a*. At the same time, the Commission invoked Section 3.021 of *Rules for the Processing of Plans Pursuant to Charter Section 197-a* on October 17, 2005 in order to encourage dialogue between the sponsors of the 197-a Plan and the Proposed Actions, and also stated that consideration would be given to both plans, such that the public review process of one would not precede that of the other. As a result of this approach, the 197-a Plan began its public review process at the same time as the Proposed Actions. As part of this public review, a separate CEQR review was undertaken for the 197-a Plan. An Environmental Assessment Statement (EAS) was prepared (CEQR No. 07DCP072M**)**, and a negative declaration is anticipated to be issued on June 18, 2007. The analysis in this chapter does not constitute an environmental review of the Plan, as discussed below.

Following CPC's determination, the leadership of CB9 and others subsequently requested during the public Scoping process of the Proposed Actions that the 197-a Plan be considered as an EIS alternative to the Proposed Actions, and DCP agreed to this request. However, the land use proposal presented in the CB9 proposed 197-a Plan is intended to serve as a set of general zoning recommendations and is not a specific zoning or development proposal sufficient for a comparison of the potential environmental impacts of the Plan with those of the Proposed Actions. Accordingly, for the purposes of this DEIS analysis, DCP, in consultation with the leadership of CB9, developed a set of agreed-upon zoning regulations and development assumptions consistent with the documentation of the CB9 proposed 197-a Plan which form the basis for a hypothetical development scenario if such regulations were adopted pursuant to the CB9 proposed 197-a Plan and a build-out under those conditions were achieved. This scenario, described in more detail below, forms the basis for environmental analysis of the "197-a Plan Alternative 1."

DESCRIPTION OF COMMUNITY BOARD 9 197-A PLAN ALTERNATIVE 1

The 197-a Plan proposes the establishment of a Special Purpose District in Manhattanville with three Subdistricts; Subdistricts 1 and 2 are within the Project Area (see Figure 24-14). Potential

zoning regulations and development assumptions for these two Subdistricts and a hypothetical development scenario, utilized for environmental analysis, are described below.

SUBDISTRICT 1: NEW CONSOLIDATED MANUFACTURING DISTRICT

The CB9 proposed 197-a Plan envisions a Subdistrict 1—located from 250 feet east of Twelfth Avenue to the Hudson River, between West 129th Street/St. Clair Place and West 134th Street (see Figure 24-14)—as a light manufacturing district that provides for "super specialty" uses that combine retail and light production or wholesale functions. A low-density light manufacturing zoning district designation is therefore assumed for Subdistrict 1 in the 197-a Plan Alternative 1, with more detailed zoning assumptions as described below.

Zoning Assumptions

Working with CB9 leadership, DCP developed a set of potential zoning regulations consistent with the 197-a Plan, to be used for analysis purposes. Based on these potential zoning regulations, for analysis purposes, it is assumed that Subdistrict 1 would be subject to the regulations of an M1 district, with an FAR of 2. This would be the same FAR as under the M1-2, M2-3, and M3-1 districts currently mapped there, but would be an increase for the M1-1 district (located in the northwest portion of Subdistrict 1), which currently permits a maximum of 1 FAR. Existing zoning in Subdistrict 1 permits a mix of retail and manufacturing uses, and limits the size of some types of retail establishments to less than 10,000 sf; a Special Permit is required for retail uses over 10,000 sf. Under current zoning, within an M1 district, permitted use groups include use groups 5 through 14 (retail and commercial), use group 16 (general service), and use group 17 (manufacturing). Most community facility uses, including colleges and dormitories, are not permitted as-of-right in M1 districts.

Under the 197-a Plan Alternative 1, all the permitted uses in an M1 zoning district would be allowed in Subdistrict 1, with the following exceptions:

- Use Group 17c: public transit, railroad or electric utility substations, open or enclosed with no limit on size (e.g., the Con Edison cooling station), to be allowed by Special Permit;
- Use Group 18: gas pumping station—to be allowed by Special Permit;
- Selected Use Group 18 Uses: would be allowed by Special Permit if controlled by higher performance standards and if a small retail front is included. These selected uses include microbreweries; glassblowing studios; metal treatment, such as enameling, japanning, and lacquering; monument works; and stone processing or products related to artistic work.

The CB9 proposed 197-a Plan envisions a "super specialty" use, under which retail and light manufacturing would be required to exist in combination; i.e., one of these uses would not be permitted without the other. Retail square footage would be required to be no greater than 20 percent of the total. This mandatory combination of uses would limit retail use in Subdistrict 1 to the sale of goods which are manufactured or otherwise handled (such as wholesaled) on site.

The following height limits are assumed for Subdistrict 1 under the 197-a Plan Alternative 1

- 35-foot height limit within 100 feet east of Twelfth Avenue (two floors to accommodate industrial/manufacturing uses);
- 35-foot height limit west of Twelfth Avenue to the Hudson River (two floors to accommodate industrial/manufacturing uses); and
- 60-foot height limit between 100 feet and 200 feet east of Twelfth Avenue.

Development Scenario Assumptions for Subdistrict 1

There are three elevated structures (the Henry Hudson Parkway, the Amtrak rail line, and the Twelfth Avenue viaduct) above, or partially above, almost all of the lots west of Twelfth Avenue. Much of the one-and-a-half-block M1-1 area, which would be upzoned in the CB9 proposed 197-a Plan, lies beneath elevated structures. As described in Chapter 2, this condition creates a difficult environment for new development because of physical constraints posed by the elevated structures. The area beneath the elevated structures also includes a three- to four-story brick former rail substation building, currently used as a warehouse by Fairway Market. The adjacent lot is currently under construction for a one- to one-and-a-half-story café. Two other lots are City-owned, currently used by DEP. Therefore, new development for manufacturing and related retail use is unlikely in this area.

Of the four-and-a-half blocks west of Twelfth Avenue, Fairway Market (buildings and parking lots) occupies two entire blocks, one of which is a double block, and part of another block. As under the reasonable worst-case development scenario assumed in the Proposed Actions, it is assumed that the Fairway Market site would not be redeveloped.

The majority of the lots east of Twelfth Avenue (not including the MTA Manhattanville Bus Depot) within Subdistrict 1 are currently occupied by buildings built to 1 FAR or more; over a third of the lots have buildings built to 2 FAR or more. Of the lots that have buildings built to 2 FAR or more, the vast majority are occupied by buildings with three or more floors. A portion of the bus depot is located on the entire block front between West 132nd and West 133rd Streets. The bus depot lot is not considered a projected development site in the 197-a Plan Alternative 1. Therefore, new development for manufacturing and related retail use would not be expected on the majority of lots east of Twelfth Avenue within Subdistrict 1.

"Super specialty" uses are also not expected to replace active businesses in Subdistrict 1, since current uses could continue to operate, and the "super specialty" zoning is less flexible than the existing zoning. Conversions on a small number of sites for "super specialty" uses would be possible under the Subdistrict 1 regulations. However, no new developments were identified for Subdistrict 1 under the 197-a Plan Alternative 1 and, thus, no major land use change would be expected in this area under the development scenario for Subdistrict 1. In general, then, Subdistrict 1 would retain its existing uses.

SUBDISTRICT 2: NEW BROADWAY MIXED-USE DISTRICT

Subdistrict 2 of the 197-a Plan Alternative 1—generally located 250 feet east of Twelfth Avenue and between West 125th and West 133rd to West 135th Streets, west of Broadway and Old Broadway (see Figure 24-14)—is described in the CB9 proposed 197-a Plan as a "vertical live/work" district.

Zoning Assumptions

The CB9 proposed 197-a Plan calls for a requirement of light manufacturing uses and limited amounts of commercial and retail uses on the first two floors of all new construction and conversions. Subdistrict 2 would also allow residential, commercial, or community facility uses above the second floor. The CB9 proposed 197-a Plan also proposes a maximum FAR of 6.0 for manufacturing and commercial uses, and 4.0 for residential and community facility uses, including colleges, universities, dormitories, libraries, art galleries, nursing homes, schools, houses of worship, medical offices, community centers, and nonprofits. Two additional

recommendations of the CB9 proposed 197-a Plan are to maintain existing streetwalls and require affordable housing in new residential development.

Under the 197-a Plan Alternative 1, it is further assumed that industrial, semi-industrial, and manufacturing uses would be permitted in Subdistrict 2 pursuant to the rules of the Special Mixed-Use District text in the Zoning Resolution (Section 123-22). Most retail and commercial uses in use groups 6 to 15 would be permitted, including hotels, retail (clothing, furniture, food, and carpet stores limited to 10,000 sf), offices, restaurants, showrooms, medical labs, studios, and nightclubs.

Lower-Story Manufacturing Requirement. Under the 197-a Plan Alternative 1, retail and office uses would be permitted in Subdistrict 2 in up to 20 percent of the floor area on the first two floors of a building, with 80 percent of the floor area on these floors required to be occupied by manufacturing uses. A larger amount of non-manufacturing uses on the first two floors would be allowed by CPC Special Permit, which would require an applicant to demonstrate that after a one-year "good faith" marketing effort there are no feasible manufacturing tenants willing to take the space. If this finding is met, then CPC could allow more than 20 percent non-industrial commercial and community facilities uses on the first two floors of a given building. The Special Permit would be subject to CEQR review and the Uniform Land Use Review Procedure (ULURP).

Special Rules for Residential Uses. In addition to the first and second-floor manufacturing/commercial requirement, a mandatory inclusionary housing provision would apply in new residential buildings, requiring that at least 50 percent of the new units be affordable to tenants within the specified income categories listed below. (Note, however, that the legal authority to adopt this mandatory, as opposed to voluntary, inclusionary housing provision has not been determined. Currently, the New York City Zoning Resolution provides FAR incentives for inclusionary housing, but does not require inclusionary housing.) The mandatory mix of income categories for this affordable housing would be:

1.	10–24 percent area median income (AMI)	34 percent of affordable units
2.	24–48 percent AMI	33 percent of affordable units
3.	48–80 percent AMI	33 percent of affordable units

Affordable housing units could also be constructed off-site within Community District 9 at a ratio of two affordable units for every new market-rate residential unit.

Special Permit for Conversion of Non-Residential Buildings. Conversions of existing non-residential buildings to dwelling units would be allowed only through a CPC Special Permit. Such a permit would be issued only after CPC certifies the following:

1. The applicant can demonstrate that after a one-year "good faith" marketing effort, that no tenant for manufacturing uses in space above the first two floors of the building can be found at fair market rent ;
2. The new residential units would meet the conditions outlined in the mandatory inclusionary housing for new residential construction within the Special District; and
3. Industrial uses would be preserved on at least 80 percent of the first two floors of the building, and those floors would not be used for residences.

Design Requirements. The following streetwall and setback requirements for Subdistrict 2 are assumed:

- Required streetwalls of up to 85 feet in height;

- A minimum setback of 20 feet on a narrow street and 15 feet on a wide street after 85 feet or six stories, whichever is less, is required;
- A rear yard of 20 feet for commercial and community uses or 30 feet for residential uses is required;
- A sky exposure plane of 2.7 to 1 on a narrow street and 5.6 to 1 on a wide street (expressed as a ratio of vertical distance to horizontal distance); and
- The "sliver lot" rule in Zoning Resolution Section 23-692 would apply: On wide streets, the height of the building could not exceed the width of the street or the tallest adjacent building, whichever is more; on narrow streets, the height could not exceed the width of the street or the shortest adjacent existing building, whichever is more.

Development Scenario Assumptions for Subdistrict 2

The CB9 proposed 197-a Plan would allow a new range of commercial, residential, and community facility uses, compared with current zoning, and manufacturing uses would continue to be permitted. To assist DCP in formulating a development scenario for Subdistrict 2 under the 197-A Plan Alternative 1, the leadership of CB9 and DCP identified development sites based primarily on size, location, and degree of utilization, without regard to current ownership patterns. These are called "projected" development sites. A total of 35 such sites were identified as possible for development in Subdistrict 2, 15 for conversion and 20 for new construction. The development scenario assumes that four of the conversion sites with unused floor area under the Subdistrict 2 maximum floor area requirements would also include additions above the existing buildings.

For analysis purposes, it is assumed that above the two lower floors of manufacturing and commercial uses, residential uses would be developed on 20 to 25 percent of the sites, and non-residential uses (community facility and commercial) would be developed on 75 to 80 percent of the sites. Residential uses would be less likely, because the proposed lower-story manufacturing/commercial requirement and mandatory inclusionary housing provisions could serve to discourage market-rate housing development. For the non-residential uses, the development scenario assumes 50 percent of the floor area above the first two floors to be community facility and 50 percent as commercial. While these assumptions apply to both new construction and conversion sites, a greater proportion of residential uses is assumed for conversion sites. In addition, the development scenario also assumes that the conversion sites on the east side of Broadway would be converted to residential use, because they are close to existing residential uses.

For new construction on sites that cross the subdistrict boundary between Subdistrict 1 and Subdistrict 2, the scenario assumes that if 25 feet or less of the lot falls in Subdistrict 1, then the development assumptions for Subdistrict 2 would be used for that portion of the lot in Subdistrict 1. If more than 25 feet of the lot falls within Subdistrict 1, then only that portion of the lot within Subdistrict 2 would be considered for new construction.

For analysis purposes, it is also assumed that the new construction sites would apply for the Special Permit from CPC to allow a larger amount of non-manufacturing uses on the first two floors. This assumption reflects the fact that virtually no new construction in Manhattan in recent decades has included space for manufacturing use. It is assumed that both local and destination retail uses would be developed on the first floor and community facility/office uses on the second floor of these new construction sites. This is consistent with new construction associated with other Special Mixed-Use districts in Manhattan.

Based on existing uses and the Subdistrict 2 zoning assumptions, 19 lots in Subdistrict 2 are assumed to remain unchanged and to retain their existing land uses (see Figure 24-15). Three of these lots are located east of Broadway and 16 lots are located west of Broadway and include, among others, all of Block 1999 (the block containing the MTA Manhattanville Bus Depot), and all existing residential buildings.

DEVELOPMENT SCENARIO

Based on the zoning and development assumptions presented above, the development scenario under the 197-a Plan Alternative 1 focuses on new construction and conversions in Subdistrict 2.[1] As described above, while conversions on a small number of sites for "super specialty" uses would be possible in Subdistrict 1, no substantial land use changes are assumed in Subdistrict 1 under the 197-a Plan Alternative. By contrast, with respect to Subdistrict 2, the development scenario assumes full build-out of identified sites for new development and conversions.

In total, the 35 projected development sites assumed in the 197-a Plan Alternative 1 development scenario would yield approximately 2.2 million gsf of mixed-use development (see Figures 24-15 and 24-16, and Table 24-13). All blocks in Subdistrict 2 would contain some new development except Block 1999, the block containing the MTA Manhattanville Bus Depot and existing residential buildings (see Figure 24-9). The 2.2 million sf would include approximately 1.3 million sf of office/community facility uses, 378,920 sf of residential uses (for approximately 421 units based on 900 sf per unit), 249,490 sf of retail uses, and 261,765 sf of manufacturing uses. The development scenario would also accommodate the science, math, and engineering public secondary school (as assumed in the future without the Proposed Actions; see Chapter 2).[2]

The 197-a Plan Alternative 1 development scenario would also include public open space occupying the triangular block on the west side of Broadway between West 125th and West 129th Streets for a total of 17,849 sf. (Acquisition for public use would be required to create this open space, since this site currently is not in public ownership.)

[1] Subdistrict 2 comprises the easterly portion of Subdistrict A in the proposed rezoning plus the Other Area east of Broadway, which would generate 186,800 gsf of residential, retail, and manufacturing uses in converted buildings.

[2] The 197-a Plan Alternatives development scenarios do not include the Studebaker Building as a conversion site, although it was originally listed as such by DCP and the CB9 leadership. This building is more appropriately included as a No Build project for two reasons: (1) it is in active renovation by Columbia for University administration use, and so cannot be considered as a candidate for conversion under the development scenario; and (2) all "build" alternatives in an EIS are assessed against the same future baseline condition, so that a fair comparison of impacts can be made. If the Studebaker Building were in the 197-a Plan development scenario it would increase the size of the development and decrease the size of the future baseline case, thus exaggerating the impacts of the 197-a Plan, particularly in the areas of traffic, parking, and open space, compared with the Proposed Actions.

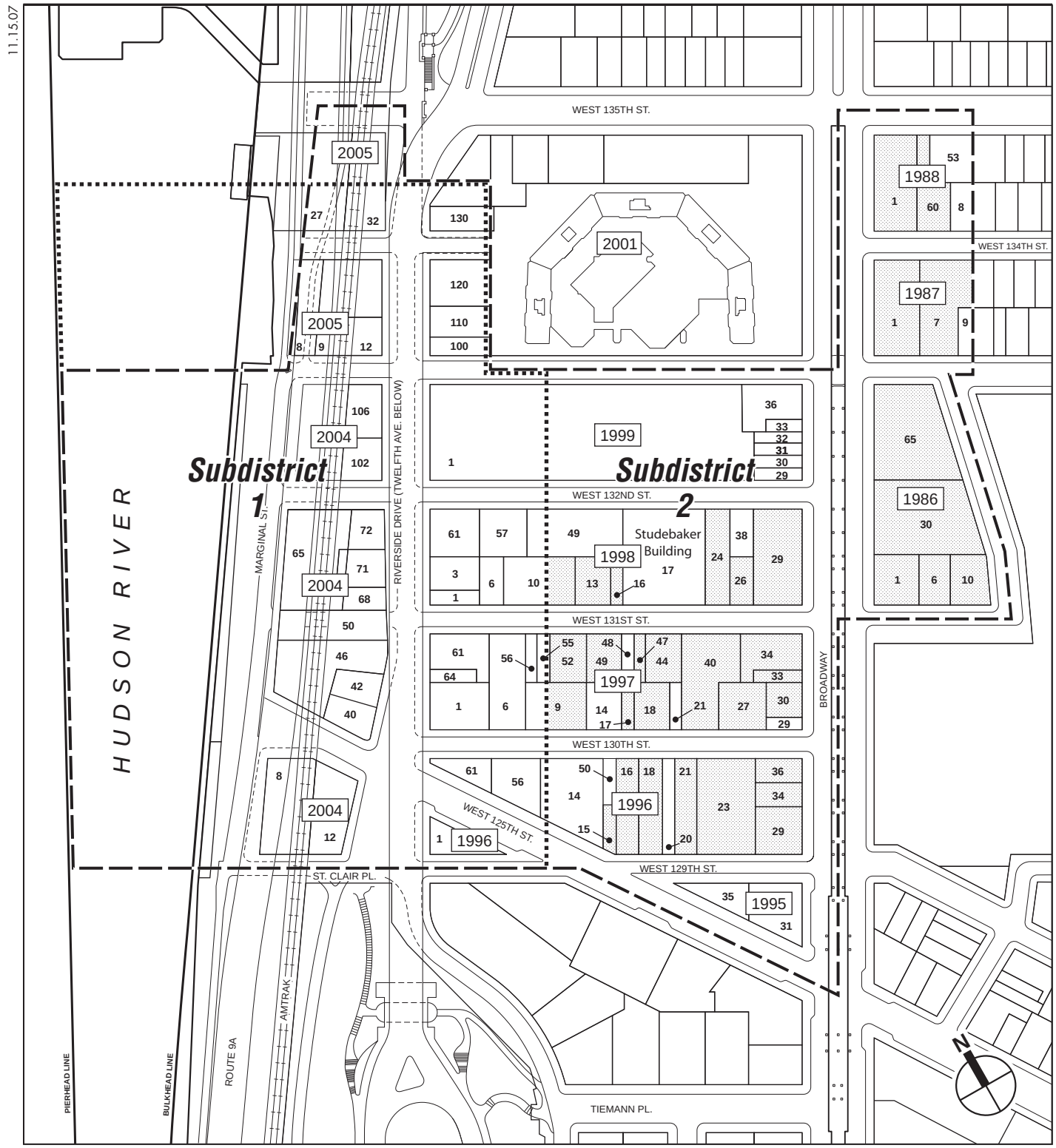
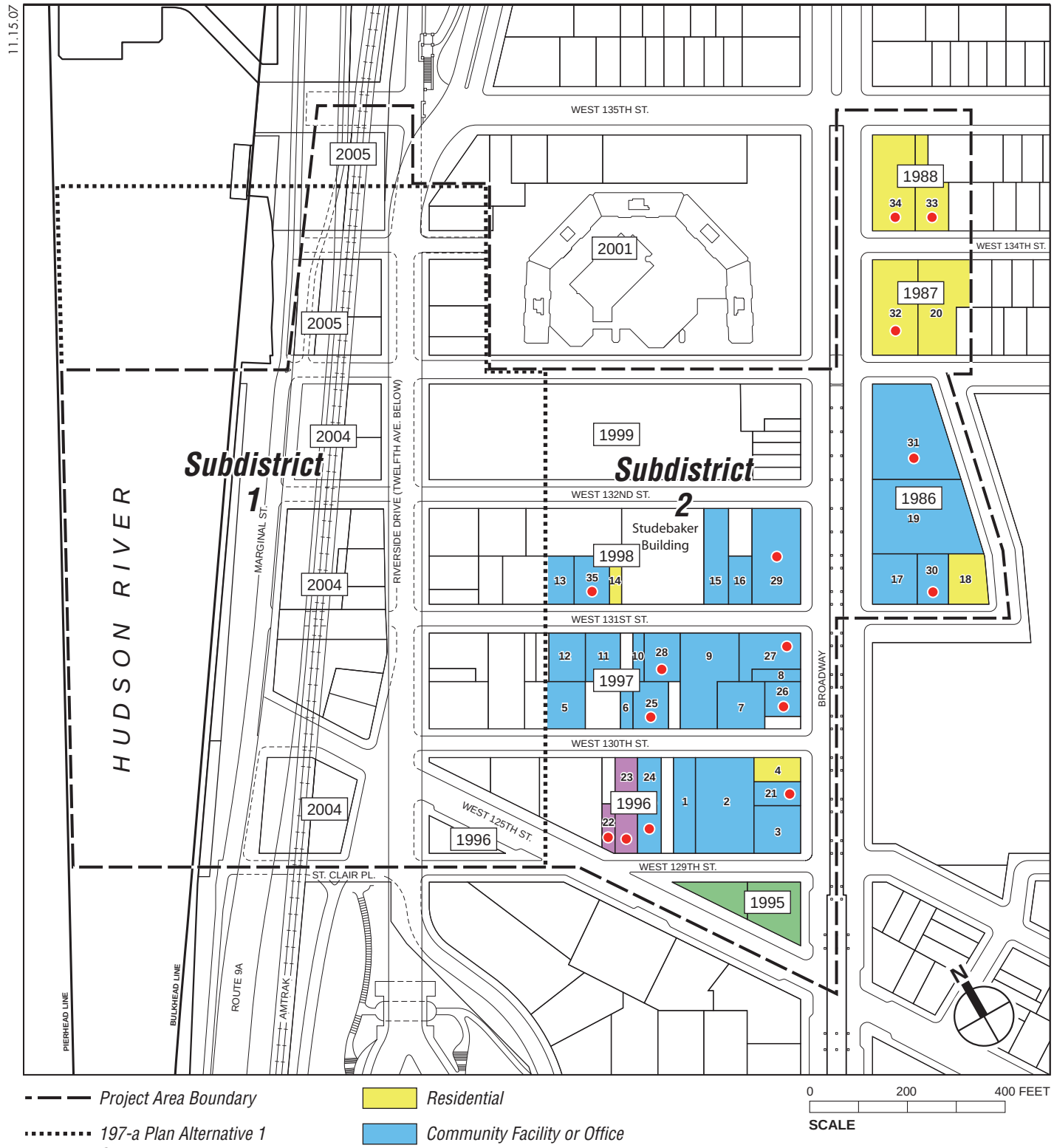


Figure 24-15

197-a Plan Alternative 1: Location of Projected Development Sites

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT



NOTES: *New construction sites assumed to have retail on first floor and community facility/office on second floor.*
Conversion sites assumed to have manufacturing/retail on first two floors.
See Table 24-13 for reference

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

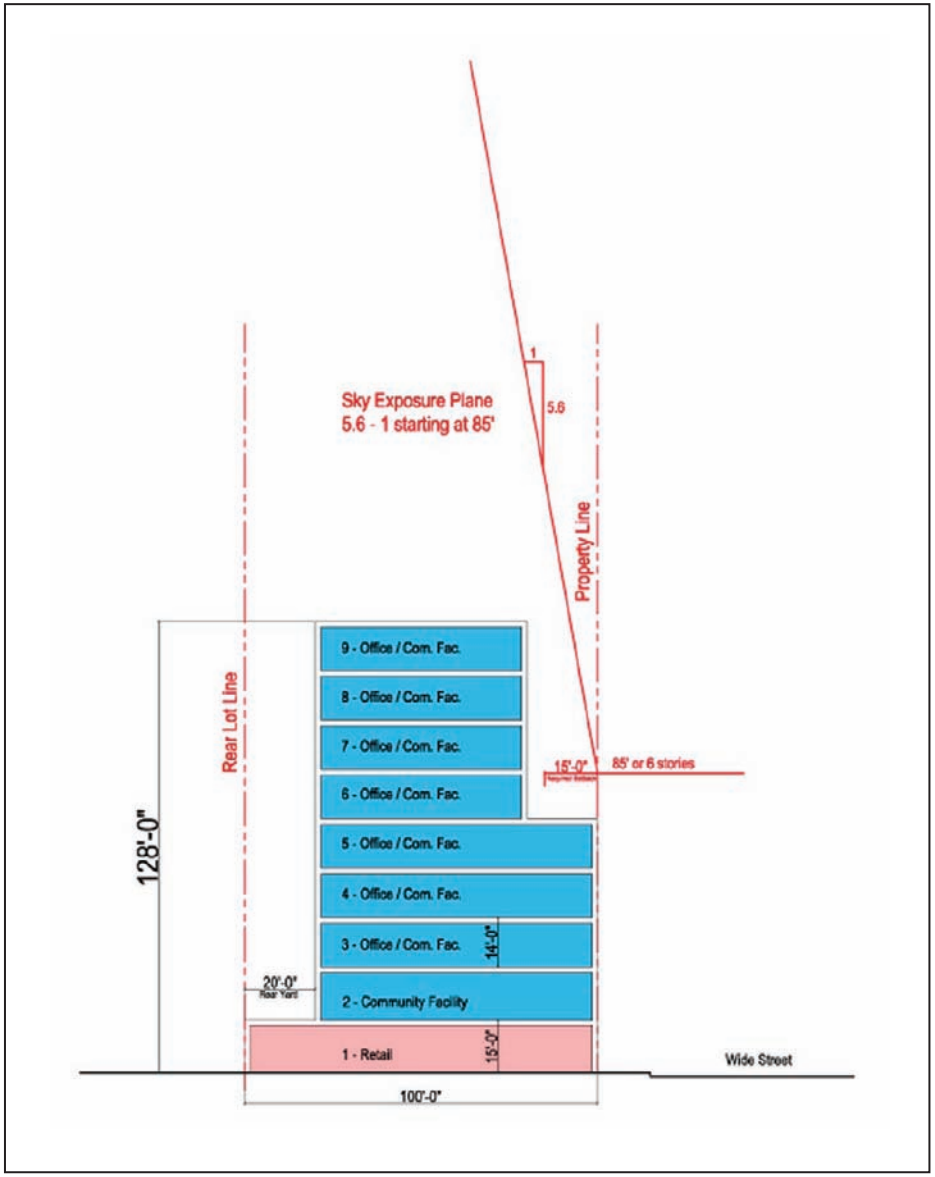
Figure 24-16
197-a Plan Alternative 1: Land Use

Table 24-13
CB9 Proposed 197-a Plan Alternative 1: Projected Development Sites (in GSF)

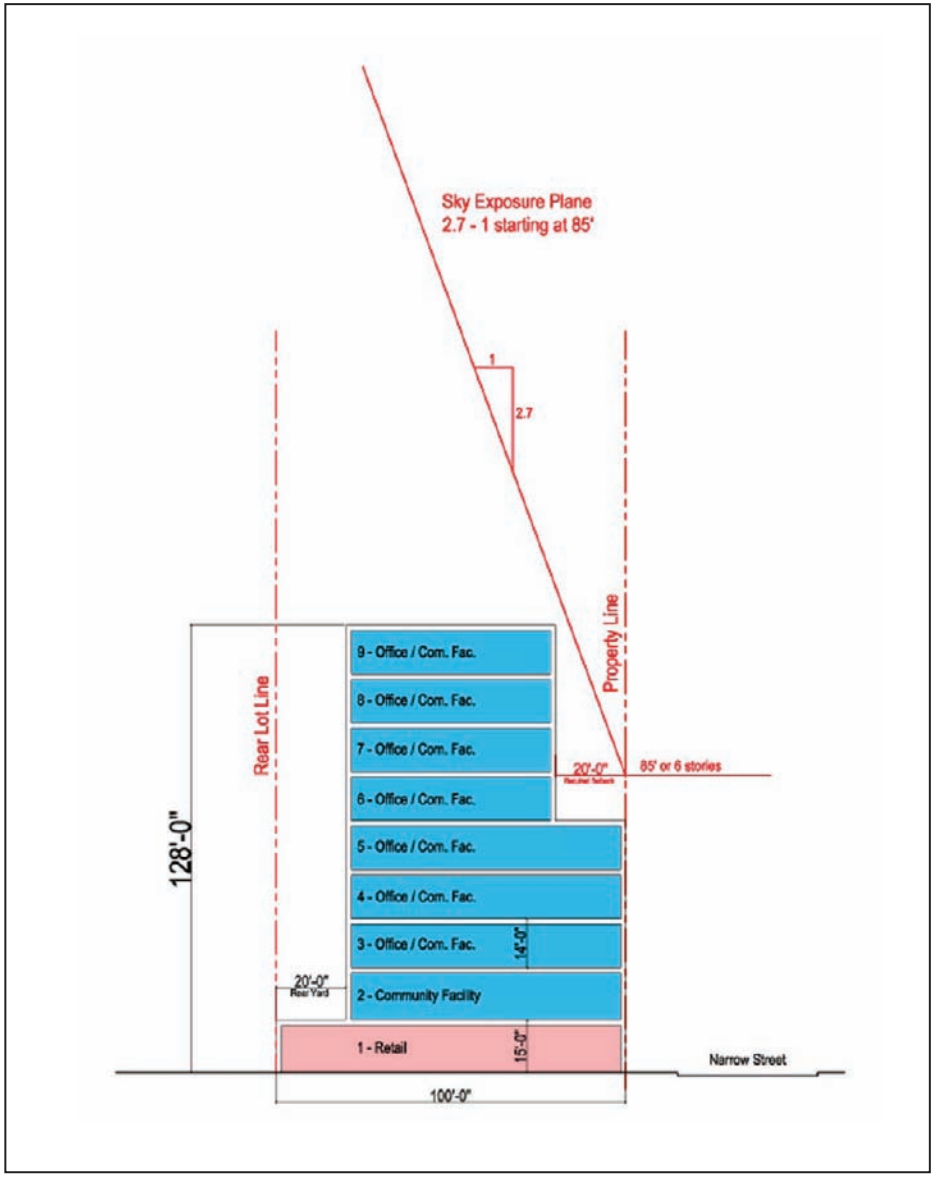
Site #[1]	Block: Lot[2]	Office/Community Facility	Residential	Retail	Manufacturing	Total
New Construction Sites						
1	1996: 21	57,000		9,000		66,000
2	1996: 23	142,500		22,000		164,500
3	1996: 29	57,952		9,990		67,942
4	1996: 36	5,009	24,043	5,009		34,061
5	1997: 9 (p/o)	42,750		6,750		49,500
6	1997: 17	6,250		2,250		8,500
7	1997: 27	57,000		9,000		66,000
8	1997: 33	14,500		2,500		17,000
9	1997: 40	114,000		18,000		132,000
10	1997: 47	6,250		2,250		8,500
11	1997: 49	42,750		6,750		49,500
12	1997: 52	42,750		6,750		49,500
13	1998: 10 (p/o)	28,500		4,500		33,000
14	1998: 16	2,250	12,000	2,250		16,500
15	1998: 24	57,000		9,000		66,000
16	1998: 26	28,500		4,500		33,000
17	1986: 1	57,901		9,983		67,884
18	1986: 10	6,474	31,075	6,474		44,023
19	1986: 30	186,646		29,533		216,179
20	1987: 7	17,550	93,600	17,550		128,700
Subtotal		**973,532**	**160,718**	**184,039**		**1,318,289**
Conversion Sites						
21	1996: 34	20,000		2,000	8,00	30,000
22	1996: 15	0		880	3,52	4,400
23	1996: 16	0		4,000	16,00	20,000
24	1996: 18	9,919		3,968	15,87	29,757
25	1997: 18	7,511		3,004	12,01	22,532
26	1997: 30	44,896		2,245	8,97	56,120
27	1997: 34	24,281		3,885	15,54	43,706
28	1997: 44	22,482		2,998	11,99	37,470
29	1998: 29	39,820		7,964	31,85	79,640
30	1986: 6	14,000		2,800	11,20	28,000
31	1986: 65	131,460		10,517	42,06	184,044
Subtotal		**314,369**		**44,261**	**177,03**	**535,669**
Conversion and Expansion Sites						
32	1987: 1		86,323	7,194	28,77	122,291
33[3]	1988: 60		45,562	3,797	15,18	64,546
34[3]	1988: 1		86,323	7,194	28,77	122,291
35	1998: 13	35,971		2,998	11,99	50,959
Subtotal		**35,971**	**218,208**	**21,183**	**84,72**	**360,087**
TOTAL		**1,323,872**	**378,926**	**249,483**	**261,76**	**2,214,045**

Notes: p/o = part of
[1] Site reference corresponds to Figure 24-16.
[2] Block/lot reference corresponds to Figure 24-15.
[3] Located in the Other Area east of Broadway, not in Subdistrict A of the proposed Special Manhattanville District
Sources: CB9, DCP

Analysis of development possibilities based on the zoning assumptions for Subdistrict 2 indicates that for new construction, the full FAR of 6 could not be achieved. Given rear yard, streetwall, and sky exposure plane requirements, total achievable FAR for an interior lot would be 5.5. As described above, for analysis purposes, it is also assumed that the new construction sites would apply for the Special Permit from CPC to allow retail on the first floor and community facility/office uses on the second floor; allowing for mechanical space, these uses would occupy a total of 1.5 FAR. Above the first two floors, the structure could achieve 4 FAR for residential or office/community facility uses. As shown in Figures 24-17 and 24-18, which detail the effect of these design regulations, only the ground floor would cover the full lot area. In the commercial/community facility examples—assuming a lot depth of 100 feet—the depth of the remaining floors from the property line would be 80 feet; in the housing example, the second



Wide Street

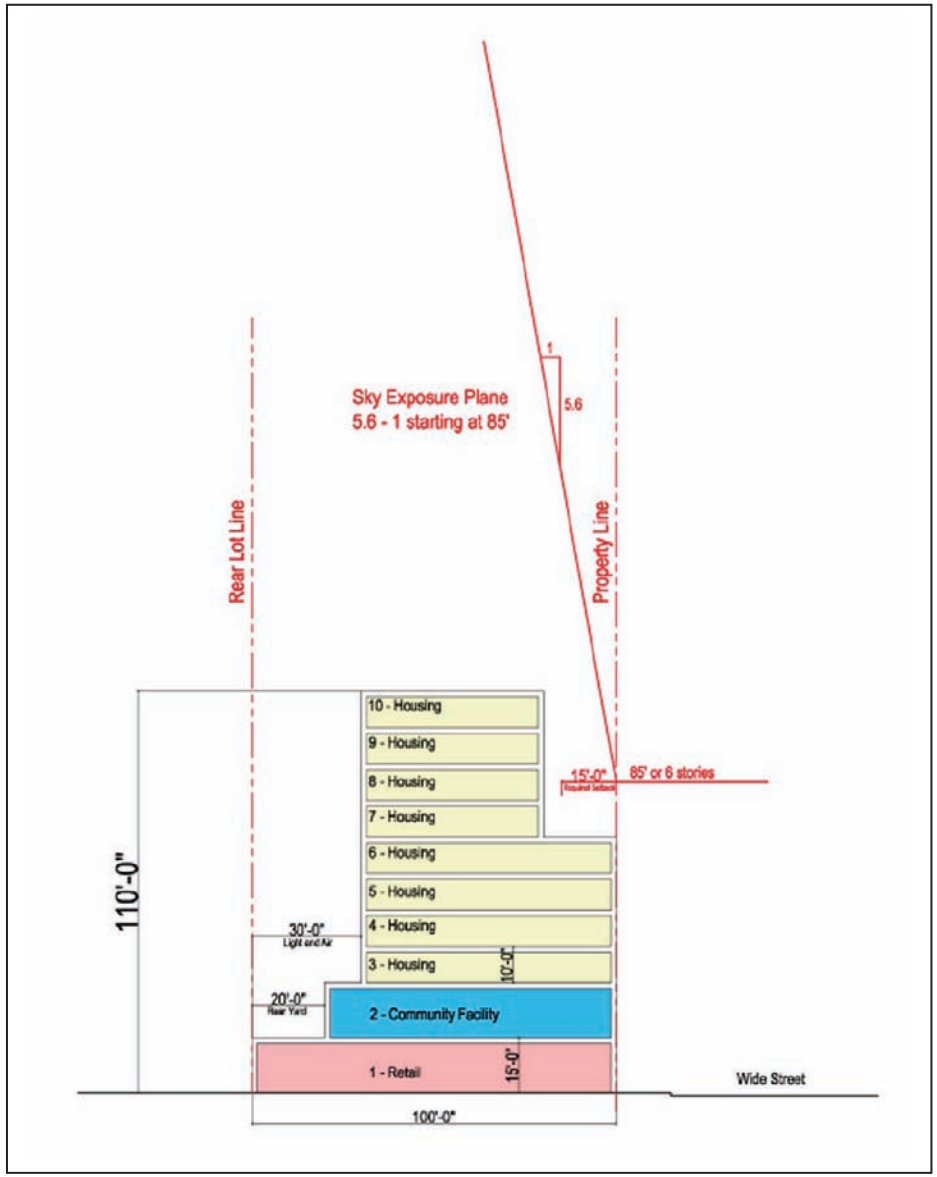


Narrow Street

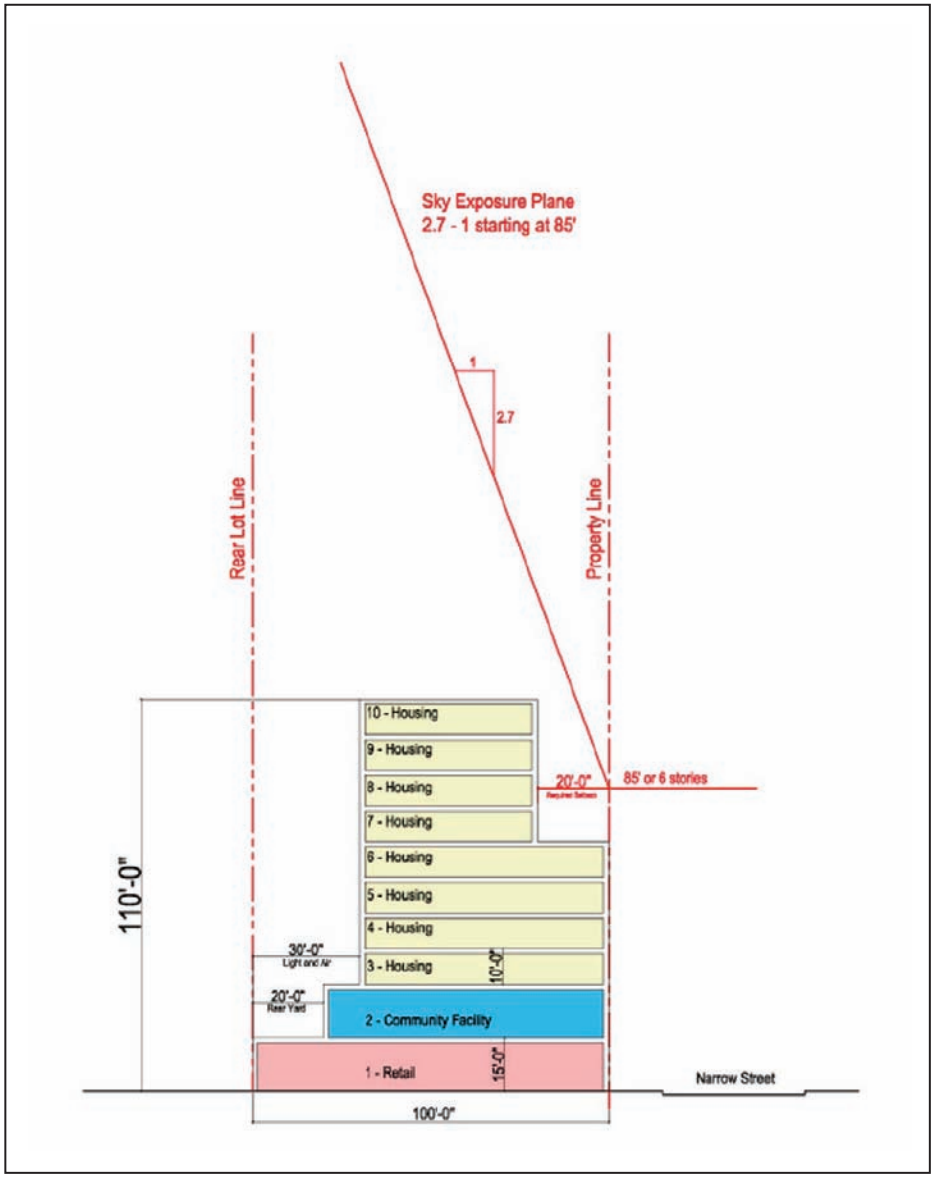
Note: Assumes a 100' deep interior lot

Figure 24-17

197-a Plan Alternative 1:
Section of New Construction Office/Community Facility Building



Wide Street



Narrow Street

Figure 24-18

197-a Plan Alternative 1:
Section of New Construction Residential Building

floor (manufacturing use) would also be 80 feet deep; the residential floors could only extend to a point at least 30 feet from the rear lot line, so they would be 70 feet deep. The building's streetwall would rise to a minimum of 85 feet or six stories along the property line, after which the building would have to set back at least 15 feet on a wide street and at least 20 feet on a narrow street. The resulting structure would also have to stand within a sky exposure plane, which would be set to begin angling back from the property line at 85 feet above the ground. The cross-sections shown in Figures 24-17 and 24-18 assume a reasonable building configuration with only one setback and consistent upper floors. Because of the restrictions on floor sizes resulting from these design regulations, the effective FAR would be 5.5, rather than the 6.0 permitted in the proposed zoning.

Although no height restriction is assumed for Subdistrict 2, based on the streetwall, setback, and yard requirements described above, the office/community facility buildings in the 197-a Plan Alternative development scenario would typically rise to a height of approximately 128 feet and residential buildings to 110 feet. This is based on a floor-to-floor height of 15 feet for first floor retail/manufacturing uses, 14 feet for office/community facility uses, and 10 feet for residential uses (see Figures 24-19 and 24-20 for a massing diagram of the development scenario).

It is important to note that the above gross square footage for development sites under the 197-a Plan were developed without regard to current ownership patterns and were not based on market studies, long-term development projections, or the determination of market demand for various uses. Rather, the development scenario has been formulated based exclusively on zoning capacity of identified development sites, and assumes their full build-out. Several factors in fact suggest that the amount and type of development assumed on these sites are unlikely to be realized under current or likely future market conditions. These include the following:

- Over the last several decades, new development in Manhattan has included little or no new space for manufacturing. In this regard, the development scenario assumes that manufacturing uses would be created only on the first two floors of existing buildings and that owners of sites for new construction would obtain Special Permits to allow other uses in the ground- and second-floor spaces. As a result of these assumptions, the development scenario contains approximately 313,050 sf of manufacturing use, compared with the 608,320 sf that would be theoretically available. However, even this assumption of 313,050 sf does not reflect market conditions. As described in Chapter 4, there is already a trend within the study areas' manufacturing zones toward conversion of manufacturing uses to other uses (primarily office space with some warehouse distribution). Although employment in the Project Area has not decreased in the last 20 years, the manufacturing component of this employment has continued to decline. The local trend reflects a long-term, City-wide decline in manufacturing; from 1975 to 2000, manufacturing employment decreased from 19.0 percent to 7.2 percent of the City's employment; in Manhattan, it went from 16.5 percent in 1975 to only 5.9 percent of total employment in 2000.[1] Manufacturing continues its decline in the City (in 2005 manufacturing represented only 3.3 percent of the City's employment, and the number of jobs in the sector declined by 35 percent since 2000) and in

[1] Annual average insured employment; source, New York State Department of Labor. Historic data from 1975 to 2000 is based on the Standard Industrial Classification (SIC).

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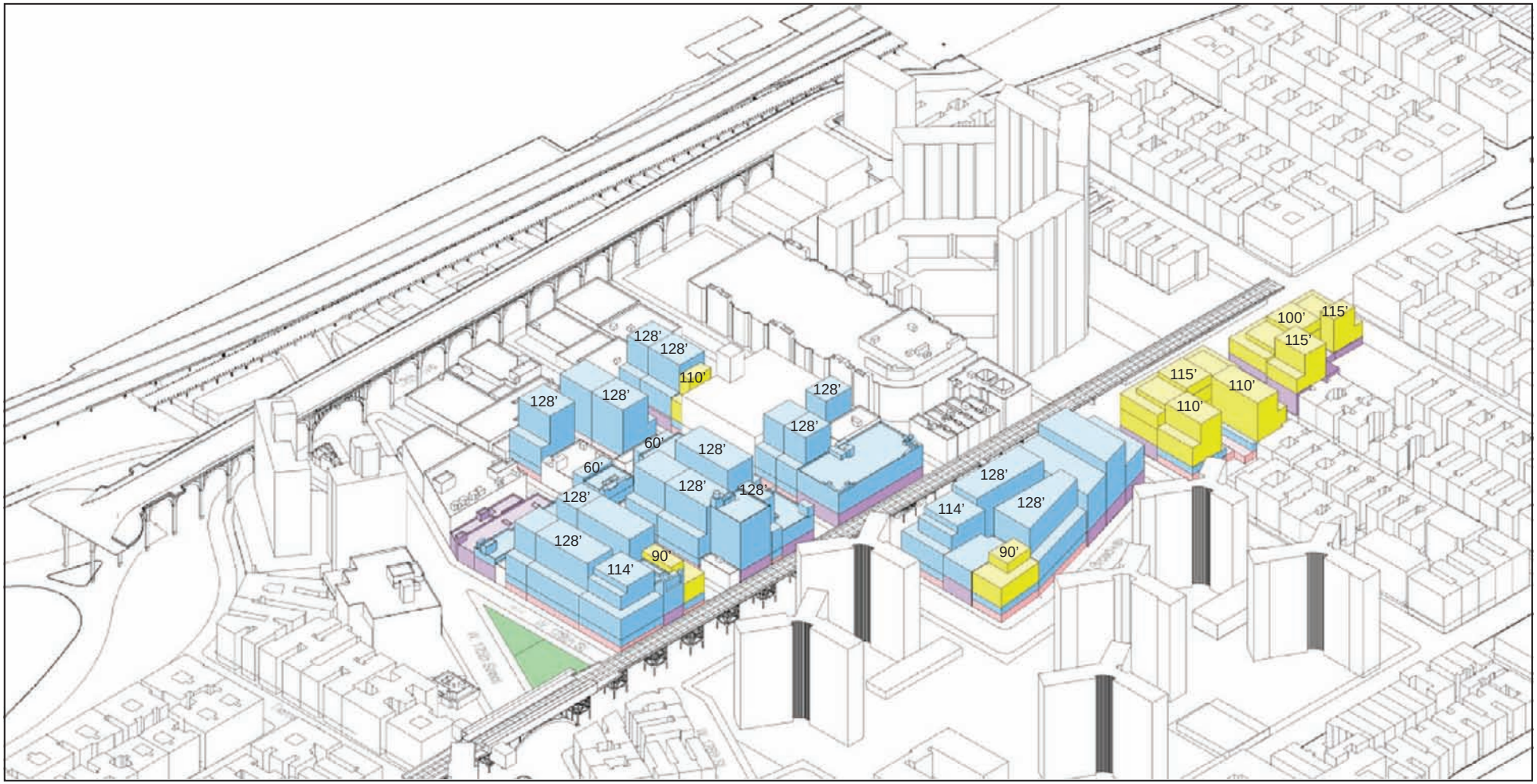

Office/Community Facility

Residential

Manufacturing/Retail (First Two Floors Only, Conversions)

Retail (First Floor Only, New Construction)

Open Space

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Figure 24-19

197-a Plan Alternative 1: Massing Diagram View Northwest

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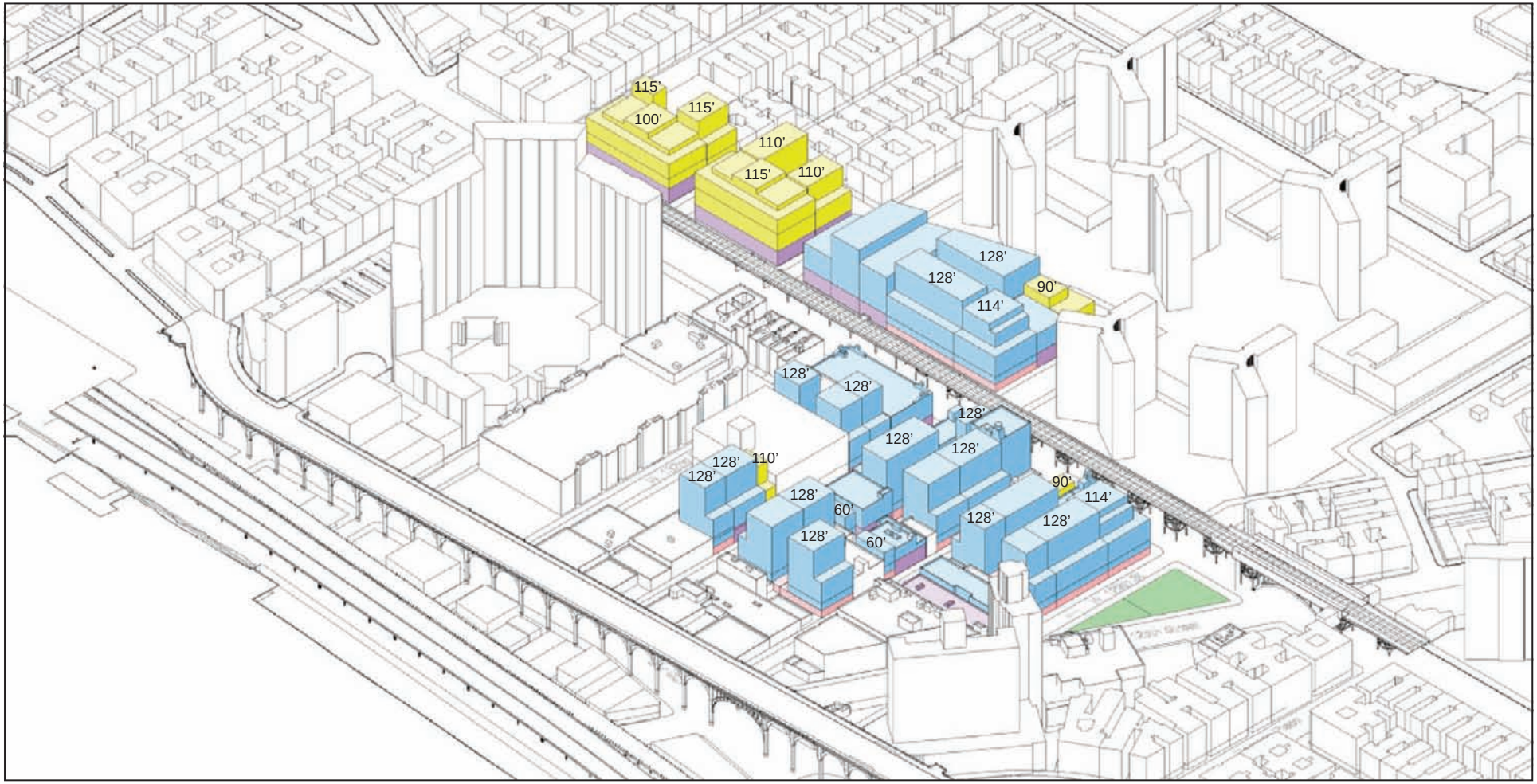

Office/Community Facility

Residential

Manufacturing/Retail (First Two Floors Only, Conversions)

Retail (First Floor Only, New Construction)

Open Space

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Figure 24-20

197-a Plan Alternative 1: Massing Diagram View Northeast

Manhattan (manufacturing represented only 1.9 percent of all jobs in 2005, and the number of jobs in the sector declined by 39 percent between 2000 and 2005).[1]

- The proposal for "super specialty" uses in Subdistrict 1 and the goal of encouraging other small light manufacturing in Subdistrict 2 which are part of the CB9 proposed 197-a Plan seek to build on a relatively recent phenomenon in the City: the growth of new, small manufacturing enterprises that succeed because their products are specialized; they have close ties to New York area markets; and they compete primarily on the basis of factors like design quality, customer service, and quick turnaround time. Census data show that such firms are establishing themselves in the City and finding a niche in which to thrive. According to "Made in New York: The Future of Manufacturing in New York,"[2] in 1987, of the total of 7,600 small manufacturing firms operating in the City, more than 4,000 had been established in the previous three years; by 1991, the U.S. Census reported that 96 percent of the firms that opened between 1984 and 1987 were still in business. However, these enterprises are small, with an average of three employees per firm, and it does not appear that the growth in these small manufacturing establishments has created a demand for new manufacturing space. "Made in New York" reported that 35 percent, or 1,450, of the 7,600 small manufacturing firms existing in 1987 were in Manhattan. This represented an employment growth of 4,350 employees (assuming three employees per firm) from 1984 to 1987 even as overall manufacturing employment in Manhattan declined by 31,000 jobs. In the same three-year period, however, no new manufacturing space was constructed in Manhattan. It can be inferred that these new firms were occupying some of the space vacated by more traditional manufacturing firms, rather than creating new manufacturing space.
- It is possible that several "super specialty" uses in Subdistrict 1 and some of the space on the lower two floors of existing buildings in Subdistrict 2 could be tenanted with small manufacturing firms with appropriate subsidy and incentive programs. However, it is highly unlikely that, even if subsidies and incentives were available; there would be a market for as much as 300,000 sf or more of manufacturing space in Manhattanville. It should be noted that Manhattanville was not designated as an Industrial Business Zone (IBZ) by the City in its January 2005 report "New York City Industrial Policy: Protecting and Growing New York City's Industrial Job Base." Fourteen IBZs were designated throughout the City, and these are the target areas for public initiatives to enhance and preserve the industrial nature of these areas. To the extent that there would be public benefits to encourage new or enhanced manufacturing uses in the City, this is most likely to occur in IBZ zones.
- The development scenario assumes that most of the upper floors (for a total of 1.3 million sf) of both converted and newly constructed buildings would be occupied with either office or community facility uses. However, as of September 30, 2006, the vacancy rate in the Northern Manhattan office "submarket" was 13.2 percent, more than double the Manhattan average of 6.4 percent, and there were 565,000 sf of vacant office space in Northern

[1] Annual average insured employment; source, New York State Department of Labor. Historical data from 2000 to 2005 is based on the North American Industrial Classification System (NAICS).

[2] Moss, Mitchell L., Hugh O'Neill, John Kedeshian, "Made in New York: The Future of Manufacturing in New York," Taub Urban Research Center, April 1996. This report contains information from the 1992 Census of Retail Trade. Although this information is old, it contains the results of a special Census study focused on small manufacturing firms, comparable data for which are not available in later published reports from the Census Bureau.

Manhattan. Based on this information, it does not appear that there is a market for an additional 700,000 sf of office space in Manhattanville. It is equally unclear that there would be demand from local and regional community facilities other than Columbia University for as much as 1.3 million sf of community facility space. (As discussed in greater detail below, however, it cannot be assumed that this space would be filled by Columbia, for several reasons.)

- The development scenario assumes the construction of 421 units of housing, 50 percent of which would be affordable. At the present time, there is no zoning mechanism to require that affordable housing be included in conversions and new construction; current inclusionary zoning regulations provide floor area incentives but no obligation to develop affordable housing units. Although it can be hypothesized that subsidy and other mechanisms would be formulated and implemented in conjunction with a mandatory inclusionary housing program, there is no guarantee that this would happen or that it could be done consistent with all legal requirements. Absent high level subsidies and other mechanisms, it is equally possible that owners and developers would elect to forego residential use altogether, in favor of other uses.

In view of the above, there would be significant obstacles to the full realization of the projected development scenario for the 197-a Plan Alternative 1. The manufacturing, office, community facility, and residential gross square footage under the development scenario are nevertheless assumed to occur for purposes of responding to CB9's request for a comparison of the potential impacts of the 197-a Plan to those of the Proposed Actions. As a result, however, the analysis of the 197-a Plan Alternative 1 may overstate its potential adverse impacts in some areas, such as potential traffic impacts. At the same time, it may overstate its benefits, particularly in terms of employment generation and the extent to which the rezoning area would be revitalized.

197-A PLAN ALTERNATIVE 1 COMPARED WITH THE PROPOSED ACTIONS

Build-out under the 197-a Plan Alternative 1 development scenario could potentially be completed by 2015. However, the analyses summarized below compare the 197-a Plan Alternative 1 with the fully developed Proposed Actions in 2030, in order to better reflect the differences between the two, as follows:

- Neither the Proposed Actions nor the 197-a Plan Alternative 1 would generate significant adverse impacts on land use, zoning, and public policy; community facilities; urban design and visual resources; neighborhood character; natural resources; hazardous materials; waterfront revitalization; infrastructure; solid waste; energy; air quality; or public health.
- Like the Proposed Actions, by 2030 the 197-a Plan Alternative 1 development scenario, if realized, would create a significant adverse indirect residential displacement impact affecting up to 1,319 unprotected housing units in the primary study area, including 823 units in the Riverside Park Community/3333 Broadway. However, the indirect residential displacement pressure would most likely be at a lower level than with the Proposed Actions.
- Like the Proposed Actions, the 197-a Plan Alternative 1 would result in a significant adverse impact on passive open space in 2015 and 2030.
- Like the Proposed Actions without project-related improvements (see Appendix M), the 197-a Plan Alternative 1 development scenario, if realized, would create significant adverse traffic impacts at a number of study area locations, and similarly, all of these impacts could be fully mitigated. With regard to parking, the 197-a Plan Alternative 1 would result in significant adverse impacts both on-street and off-street, whereas the Proposed Actions

would only result in significant adverse off-street impacts. Like the Proposed Actions without project-related improvements, the 197-a Plan Alternative 1 would also result in significant pedestrian impacts at the Broadway/West 125th Street and Broadway/West 129th Street west crosswalks, but during fewer time periods. Unlike the Proposed Actions without project-related improvements, it would not result in significant adverse pedestrian impacts at the Broadway/West 130th Street west crosswalk. Crosswalk impacts of both the Proposed Actions without project-related improvements and the 197-a Plan Alternative 1 could be fully mitigated by widening the appropriate crosswalks. Under the Proposed Actions with project-related improvements (see Chapter 18, "Transit and Pedestrians"), there would not be any significant adverse pedestrian impacts. Like the Proposed Actions, the 197-a Plan Alternative 1 would have significant impacts on the Bx15 in the PM; however, the 197-a Plan Alternative 1 would require less mitigation than the Proposed Actions.

- The 197-a Plan Alternative 1 would not have any unmitigated noise impacts. The Proposed Actions with traffic improvements would have a significant, unmitigated pedestrian level noise impact on West 125th Street near Twelfth Avenue; without the traffic improvements, the Proposed Actions, like the 197-a Plan Alternative 1, would not have a significant noise impact at that or any other location.
- The Proposed Actions would result in traffic and noise impacts during construction; under the 197-a Plan Alternative 1, such impacts could occur, but most likely at a lower level than with the Proposed Actions.
- Unlike the Proposed Actions, the 197-a Plan Alternative 1 would not have any of the following significant adverse impacts: shadow impacts on the I.S. 195 Playground; an indirect impact on active open space; impacts on historic resources; or an impact from an increase of passengers on the escalator at the 125th Street No. 1 subway station.

ABILITY OF 197-A PLAN ALTERNATIVE 1 TO MEET THE GOALS AND OBJECTIVES OF THE PROPOSED ACTIONS

The 197-a Plan Alternative 1 would not meet the goals and objectives of the Proposed Actions, for the following reasons:

- The use provisions of Subdistrict 1 of the 197-a Plan Alternative 1 would preclude development of most community facilities (including Columbia academic and academic research buildings), and approximately 1.15 million sf of development proposed by Columbia would not be achieved under the 197-a Plan Alternative 1 in this area. Based on the Illustrative Plan for the Proposed Actions, this loss would include all of the proposed University housing and one full academic building and portions of other buildings, as well.
- In Subdistrict 2, the 197-a Plan Alternative 1 development scenario assumes that approximately 662,000 sf of the 1.324 million sf assumed for office or community facility space would be occupied by community facilities, so the maximum amount of space theoretically available under this alternative would be about 14 percent of the total program space (4.8 million gsf) under Columbia's Academic Mixed-Use Development with the Proposed Actions.
- Under the design regulations assumed for the 197-a Plan Alternative 1 development scenario, none of the sites considered adequate for new construction of a university use could yield the floor plates and size adequate for the academic research buildings (the reuse of the former Warren Nash Service Station building is also not appropriate for academic research use). Even with relatively large site areas (20,000 to 33,491 sf), these buildings

could not be designed with floor plates of regular shapes and consistent sizes, since the zoning assumed for the 197-a Plan Alternative 1 development scenario requires setbacks above the streetwall and rear yard requirements, and total floor area of academic research space in each building would be well below the optimum for academic research use. (Gross floor area would range from 132,000 to 216,180 sf.) Thus, this alternative would not be able to accommodate the new state-of-the-art academic research facilities which have been identified by Columbia as a key goal and objective of the Proposed Actions.

- As shown in Figure 24-16 and Table 24-13, under the design regulations assumed for the 197-a Plan Alternative 1 development scenario, only three development sites would be large enough to permit a building with more than 114,000 sf of community facility space to be constructed, given the streetwall, setback, and rear yard requirements of the 197-a Plan Alternative 1 (see Figures 24-17 and 24-18 and accompanying discussion, above). (This conclusion assumes that Special Permits would be granted to allow the lower floors of buildings on these sites to be occupied by community facility and retail use.) These buildings would be on 197-a Plan development scenario projected development site 2 (142,500 sf), site 9 (114,000 sf), and site 19 (186,646), for a total of 443,146 sf. Adding to this the adaptive reuse of the former Warren Nash Service Station building (site 31 in Figure 24-16), proposed under both the 197-a Plan Alternative 1 and the Proposed Actions, the total such space would come to 574,600 gsf. Also accounting for several smaller existing buildings, the total community facility space available to Columbia would be 662,000 gsf, which is approximately 14 percent of the 4.8 million sf of program space provided in the Proposed Actions and identified in the Proposed Actions as necessary to meet Columbia's long-term needs over the next 25 years.
- Under the 197-a Plan Alternative 1, Columbia would likely have to attempt to meet its needs for program space through ad hoc acquisition or properties as near to its existing campuses as possible. In formulating the Proposed Actions, and as discussed in Chapter 1, Columbia has determined that this approach is infeasible as a long-term growth strategy, for the following reasons: the trends in academia toward coordination among programs and interdisciplinary education require an integrated campus setting; there is no assurance that the amount of space needed could actually be acquired through ad hoc acquisitions; Columbia believes that ad hoc acquisitions would create continual friction with local communities over individual building initiatives; and the outcome of ad hoc expansion would be a miscellaneous collection of University buildings scattered in several urban neighborhoods and lacking any cohesive identity.
- The 197-a Plan Alternative 1 would not support the goals and objectives of the Proposed Actions to create an integrated, modern, urban, and open University campus. The three new and one converted academic buildings that could be developed would be spread out in the Project Area, interspersed with a variety of other uses (industrial and transportation uses, commercial offices, and housing) and could not create an integrated campus setting. This arrangement also would not provide a central open space, which would be the focus of such a campus. Nor would there be any opportunity to create a central below-grade space that would help link the buildings in an integrated campus setting.
- The 197-a Plan would not support the goals and objectives of the Proposed Actions to create an area that provides amenities for people associated with the University and local residents alike. With the four academic buildings that could be built spread out in the Project Area, there would be no opportunity under the 197-a Plan Alternative 1 to provide a central,

publicly accessible open space to serve as a gathering place for both the University and the community, or to otherwise in any way create an integrated campus environment.

As indicated above, several features of the potential zoning regulations under the 197-a Plan Alternative 1 would severely constrain the ability to develop program space suitable for Columbia academic and academic research buildings. These include the requirement for a continuous streetwall and rear yard regulations. If the requirement for a continuous streetwall were relaxed, through-block buildings with rear yard equivalents would become possible, and the use of zoning lot mergers to assemble larger sites—including mergers with lots containing conversion buildings—would become feasible. However, even under these revised assumptions (which are inconsistent with the potential zoning regulations of the 197-a Plan Alternative 1) and assuming further that all sites currently owned or controlled by Columbia were available exclusively for community facility use rather than the combination of community facility/commercial uses assumed under the 197-a Plan Alternative 1 development scenario, only three sites that could accommodate academic research were identified, with four smaller sites identified for new construction of academic use, five buildings for conversion to academic use, and six small sites identified for University housing. (More detail on this analysis is provided in Appendix N.2.) Even with these revised assumptions, the 197-a Plan Alternative 1 would not meet the goals and purposes of the Proposed Actions, for the following reasons:

- The total gross floor area above grade for Columbia program space would total 1.9 million sf; with the addition of below-grade space, this total would be 2.1 million. Approximately 875,000 gsf would be for academic research, 667,000 for academic use, and 138,800 for University housing. The Columbia buildings would also contain approximately 250,000 gsf of ground-floor retail, which would be required under the 197-a Plan Special Permit to permit uses other than manufacturing on the first two floors of newly constructed or converted buildings. Thus, of the 1.9 million sf available, the total floor area of University-related program space would be approximately 1.7 million gsf. This floor area is approximately 35 percent of the 4.8 million gsf of program space provided in the Proposed Actions, and identified by Columbia in development of the Proposed Actions as necessary to meet its long-term needs (5-6 million sf). In addition, two of the three possible academic research buildings would not have the simple rectangular floor plates that Columbia has identified as optimal for ensuring the most efficient accommodations for state-of-the-art modern science research and for allowing flexibility as the needs of modern science change over time.
- Similar to the CB9 197-a Plan Alternative 1 development scenario, the scenario with revised assumptions could not provide substantial publicly accessible open space or a central below-grade service area with shared program and support space. Thus, this scenario would not fulfill the goals and objectives of the Proposed Actions to create an integrated, modern, urban, and open campus for the University.

In summary, neither the CB9 197-a Plan Alternative 1 development scenario nor a modified version of the 197-a Plan Alternative 1 that would maximize program space for Columbia would meet the goals and objects of the Proposed Actions for Columbia: (1) to create enough program space to accommodate Columbia's anticipated long-term growth (5 to 6 million sf of program space); (2) to create an integrated, modern, urban, and open campus of graduate schools in arts and sciences and academic research to promote productive interaction among disciplines; (3) to create sufficient state-of-art facilities for academic research and academic programs; and (4) to avoid ad hoc acquisition of properties over time on the periphery of the University's existing

campuses. The 197-a Plan Alternative 1 would not support the goal of the Proposed Actions to create a university area that is an amenity for the community, with ample open space, improved access to the waterfront, widened sidewalks, and substantial ground-level retail and other publicly accessible spaces and activities.

DESCRIPTION OF COMMUNITY BOARD 9 197-A PLAN ALTERNATIVE 2[1]

The 197-a Plan proposes the establishment of a Special Purpose District in Manhattanville with three Subdistricts; Subdistricts 1 and 2 are within the Project Area (see Figure 24-21). Subsequent to issuance of the DEIS, CB9 proposed changes in the boundaries of Subdistricts 1 and 2, as well as land use and floor area requirements and design regulations. In its August 20, 2007 Resolution approving these revisions to the Plan, CB9 states that the revisions would (1) "allow CB9 to better achieve its stated objective of establishing a mixed-use, mixed-ownership commercial, light manufacturing, academic and residential community, with an active street life open to all its constituents"; and (2) "...enable Columbia to redevelop its properties to meet its needs in a manner consistent with the goals and objectives of the 197-a Plan...". The Resolution also states that in accommodating more community facility development, the revisions would "...allow Columbia University to meets [sic] it [sic] current and forecasted needs [approximately 50-60 percent of its worst case projections]..."

SUBDISTRICT 1: NEW CONSOLIDATED MANUFACTURING DISTRICT[1]

In the revised plan, Subdistrict 1 would be located on the west side of Twelfth Avenue to the Hudson River, between West 129th Street/St. Clair Place and West 134th Street (see Figure 24-21). This area is reduced from that of 197-a Plan Alternative 1, which extended the manufacturing district 250 feet east of Twelfth Avenue. The revised plan envisions Subdistrict 1 as a manufacturing district with local retail. A single low-density light manufacturing zoning district designation is therefore assumed for Subdistrict 1 in the 197-a Plan Alternative 2. Although this zoning is similar to that of 197-a Plan Alternative 1 for its larger Subdistrict 1, super specialty manufacturing with a ground floor retail outlet has been changed from a requirement to an incentive. An FAR bonus of 1.0 or 1.5 would be granted for developments that include production uses with ancillary retail on the ground floor or first two floors of the district.

Zoning Assumptions

Working with CB9 leadership, DCP developed a set of potential zoning regulations consistent with the 197-a Plan, to be used for analysis purposes. Based on these potential zoning regulations, for analysis purposes, it is assumed that Subdistrict 1 would be subject to the regulations of an M1 district, with an FAR of 2. This would be the same FAR as under the M1-2, M2-3, and M3-1 districts currently mapped there, but would be an increase for the M1-1 district (located in the northwest portion of Subdistrict 1), which currently permits a maximum of 1 FAR. Existing zoning in Subdistrict 1 permits a mix of retail and manufacturing uses, but limits the size of some types of retail establishments to less than 10,000 sf. Under this alternative, a Special Permit would be required for retail uses over 10,000 sf, except for a supermarket in existence at the time of rezoning which would be permitted to occupy a floor area greater than 10,000 sf[2] and to expand. Under current zoning, within an M1 district,

[1] This entire section is new in the FEIS.

[2] This provision is addressed to the Fairway market located on the west side of Twelfth Avenue at West 132nd Street.

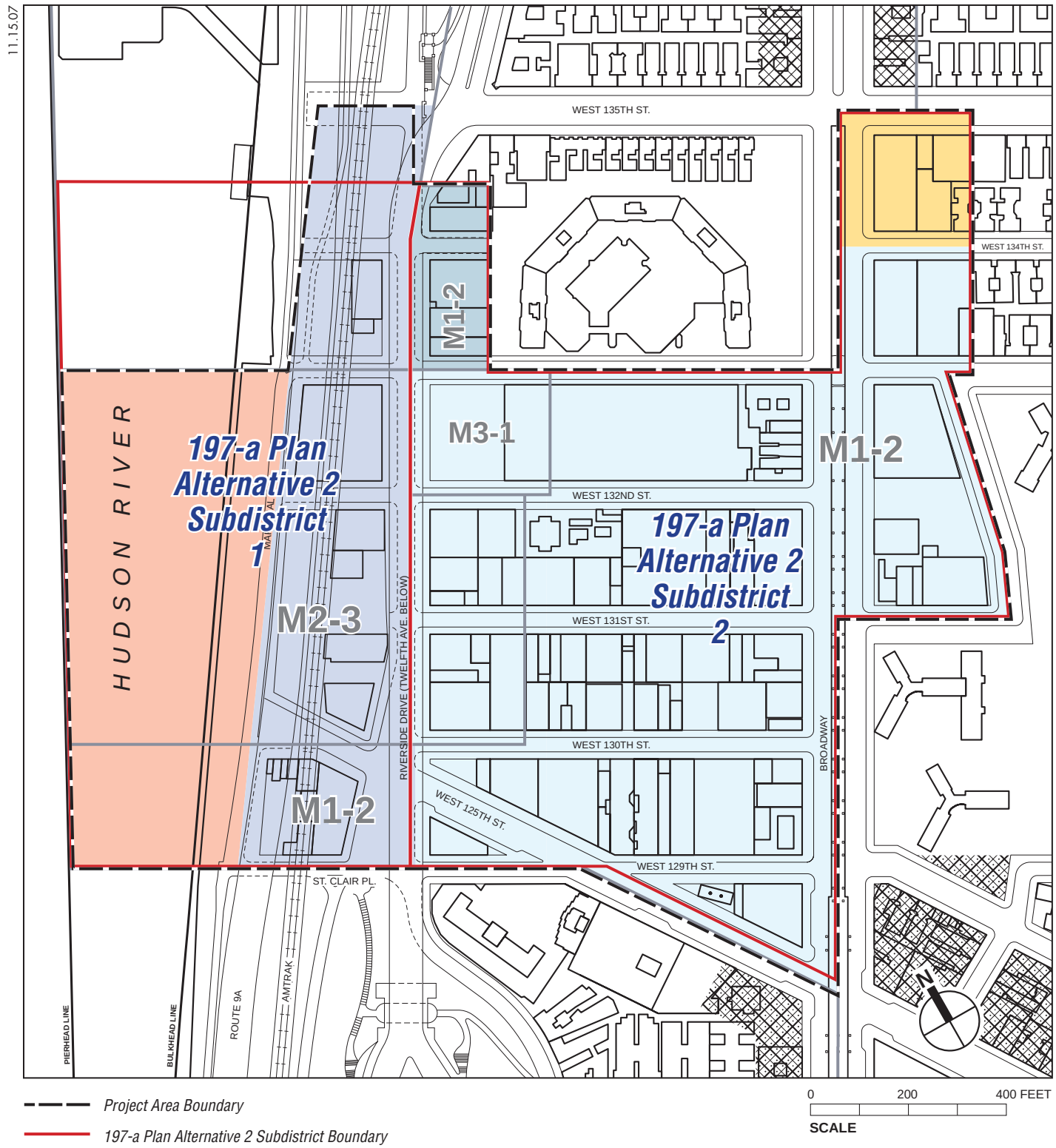

Figure 24-21

197-a Plan Alternative 2: Subdistrict Boundaries

permitted use groups include use groups 5 through 14 (retail and commercial), use group 16 (general service), and use group 17 (manufacturing). Most community facility uses, including colleges and dormitories, are not permitted as-of-right in M1 districts.

Under the 197-a Plan Alternative 2, all the permitted uses in an M1 zoning district would be allowed in Subdistrict 1, with the following exceptions:

- Use Group 17c, public transit, railroad or electric utility substations, open or enclosed with no limit on size (e.g., the Con Edison cooling station), to be allowed by Special Permit;
- Use Group 18, gas pumping station, to be allowed by Special Permit;
- Selected Use Group 18 Uses would be allowed by Special Permit if controlled by higher performance standards and if a small retail front is provided. Selected uses include microbreweries; glassblowing studios; metal treatment, such as enameling, japanning, and lacquering; monument works; and stone processing or products related to artistic work.

Under the "super specialty" bonus, retail and light production would be required to exist in combination; i.e., one of these uses would not be permitted without the other. Retail square footage would be required to be no greater than 20 percent of the total. This combination of uses under the bonus would limit retail use in Subdistrict 1 to the sale of goods which are manufactured or otherwise handled (such as wholesaled) on site.

The height requirements assumed for this district under 197-a Plan Alternative 2, are a building height limit of 40 to 45 feet throughout the district and a 40- to 45-foot street wall on the west side of Twelfth Avenue.

Development Scenario Assumptions for Subdistrict 1

Like the development scenario assumptions for Subdistrict 1 in 197-a Plan Alternative 1, new industrial development with manufacturing and related retail use is considered unlikely in this area (see discussion above) and, thus, no widespread use of the super specialty bonus or major land use change would be expected in this area under the development scenario for Subdistrict 1. In general, it is assumed that Subdistrict 1 would retain its existing uses.

SUBDISTRICT 2: NEW BROADWAY MIXED-USE DISTRICT

Subdistrict 2 of the 197-a Plan Alternative 2—generally located between Twelfth Avenue and Broadway from West 125th to West 133rd/134th Street west of Broadway and from West 131st to West 135th Street on the east side of Broadway (see Figure 24-21)—is described as a medium density mixed-use district. Under the revised 197-a Plan, which adjusts the boundary line between Subdistricts 1 and 2, this Subdistrict would be coterminous with Subdistricts A, C and Other Area of the Proposed Actions, and, as noted above, is larger than Subdistrict 2 under the original plan.

Zoning Assumptions

Proposed FAR and Uses. The zoning assumptions for 197-a Plan Alternative 2 would differ materially from 197-a Plan Alternative 1. Under the revised plan, manufacturing, commercial, residential and community facility uses would have a maximum FAR of 6, as compared with the original plan, which limited residential and community facility uses to an FAR of 4. Instead of requiring that 80 percent of the first two floors be manufacturing, as in the original plan, the revised plan would provide an FAR bonus as an incentive for providing manufacturing use. A

bonus of 1.0 FAR would apply for providing manufacturing use on both of the first two floors; the bonus would be 0.5 FAR if one of the first two floors were set aside for manufacturing use. Like the 197-a Plan Alternative 1, the triangular block on the west side of Broadway, between West 125th and West 129th Streets would be reserved for public open space.

As under 197-a Plan Alternative 1, industrial, semi-industrial, and manufacturing uses subject to the rules for Special Mixed Use Districts (Section 123-22 of the NYC Zoning Resolution). Most retail and commercial uses in use groups 6 to 15 would be permitted, including hotels, retail (clothing, furniture, food, and carpet stores limited to 10,000 sf), offices, restaurants, showrooms, medical labs, studios, and nightclubs.

Special Rules for Residential Uses. Like 197-a Plan Alternative 1, 197-a Plan Alternative 2 would contain a mandatory inclusionary housing provision for new residential buildings, requiring that at least 50 percent of the new units be affordable to tenants within the specified income categories listed below. (Note, however, that the legal authority to adopt this mandatory, as opposed to voluntary, inclusionary housing provision has not been determined. Currently, the New York City Zoning Resolution provides FAR incentives for inclusionary housing, but does not require inclusionary housing.) The mandatory mix of income categories for this affordable housing would be:

1.	10-24 percent of area median income (AMI)	34 percent of affordable units
2.	24-48 percent of AMI	33 percent of affordable units
3.	48-80 percent of AMI	33 percent of affordable units

Affordable housing units could also be constructed off-site within CB 9 at a ratio of two affordable units for every new market-rate residential unit.

Design Requirements. The following streetwall and setback requirements for Subdistrict 2 are assumed. These differ from 197-a Plan Alternative 1, which required that existing streetwall heights by maintained. Further, the development scenario under the original plan assumed the design regulations under M1-5 districts, the setbacks for which effectively limited building heights.

- Along the east side of Twelfth Avenue, maintain the existing sidewalk width.
- On the east side of Twelfth Avenue a sky exposure plane of 60 degrees would be established, starting at the base height of 45 feet, with 30-foot setbacks at 45 feet, 95 feet and 145 feet. This would permit a maximum building height of 195 feet at 90 feet from the building line (235 feet with mechanical penthouse).
- Along Broadway, a maximum base height of 120 feet would be established at the building line, followed by a setback of 15 feet, with a maximum building height of 195 feet.
- There would be no maximum building height in the midblocks.
- Flexibility of streetwall on side streets while maintaining view corridors and existing streetwall character would be permitted.

Development Scenario Assumptions for Subdistrict 2

a. Sites Owned or Controlled by Columbia

The 197-a Plan Alternative 2 development scenario assumes that all properties currently owned by Columbia would be developed for community facility use (with the exception of the Lee Brothers Storage Building in Subdistrict C and the triangle site bounded by West 129th Street, Broadway, and West 125th Street, which is assumed to be part of a public park on the triangle). Under 197-a Plan Alternative 1, the development scenario was formulated at CB9's request to be irrespective of ownership and assumed that properties owned or controlled by Columbia would nevertheless be developed (through new construction or conversion) for a mixture of office, community facility, manufacturing, or residential use.

b. Conversion of Sites of Historic Interest to CB9

The 197-a Plan identifies 12 sites in Subdistrict 2 as worthy or preservation through conversion and reuse, because of their historic and cultural value. One, the Lee Brothers Storage Building, is located in Subdistrict C; another, the Claremont Theater at 3338 Broadway, is located in Other Area. Of the remaining 10, one is the Studebaker Building, which is being preserved and reused in the future independent of the project or its alternatives, and another is the Warren Nash Service Center at 3280-3290 Broadway, which would be preserved and reused as part of the Proposed Actions as well as under this alternative. The development scenario for the 197-a Plan Alternative 2 assumes that the remaining eight such buildings, five of which are owned by Columbia University and three owned by others, as shown in Figure 24-22, would be conversion sites, rather than new construction sites. One of the Columbia-owned properties, the West Market Diner, is of historic interest only for its interior. Therefore, it was assumed to be retained within the site of a larger building, with a cantilever over it permitted.

c. Active Ground Floor Use

The revised 197-a Plan does not require ground-floor retail and would permit community facility use at the ground-floor level. However, the development scenario for the 197-a Plan Alternative 2 assumes limited ground-floor use along Broadway, 12th Avenue, and West 125th Street.

d. No Central Below-Grade Space

The CB9 August 20, 2007 Resolution reiterates CB9's opposition to the Central Below-Grade Space, and it is assumed for purposes of the development scenario for the 197-a Plan Alternative 2 that below-grade space would consist of conventional basements.

e. Assemblage of Public and Non-Columbia Private Sites by Eminent Domain

Consistent with CB9's opposition to use of eminent domain for conveyances to private parties, the 197-a Alternative projects Columbia development on sites currently owned or controlled by Columbia only.

f. Relocation of Residential Tenants on 132nd/133rd Block

Consistent with CB9's opposition to the relocation of residential tenants from the Project Area under the Proposed Actions, the 197-a Plan Alternative 2 assumes that all residential buildings in Subdistrict A would remain in place.

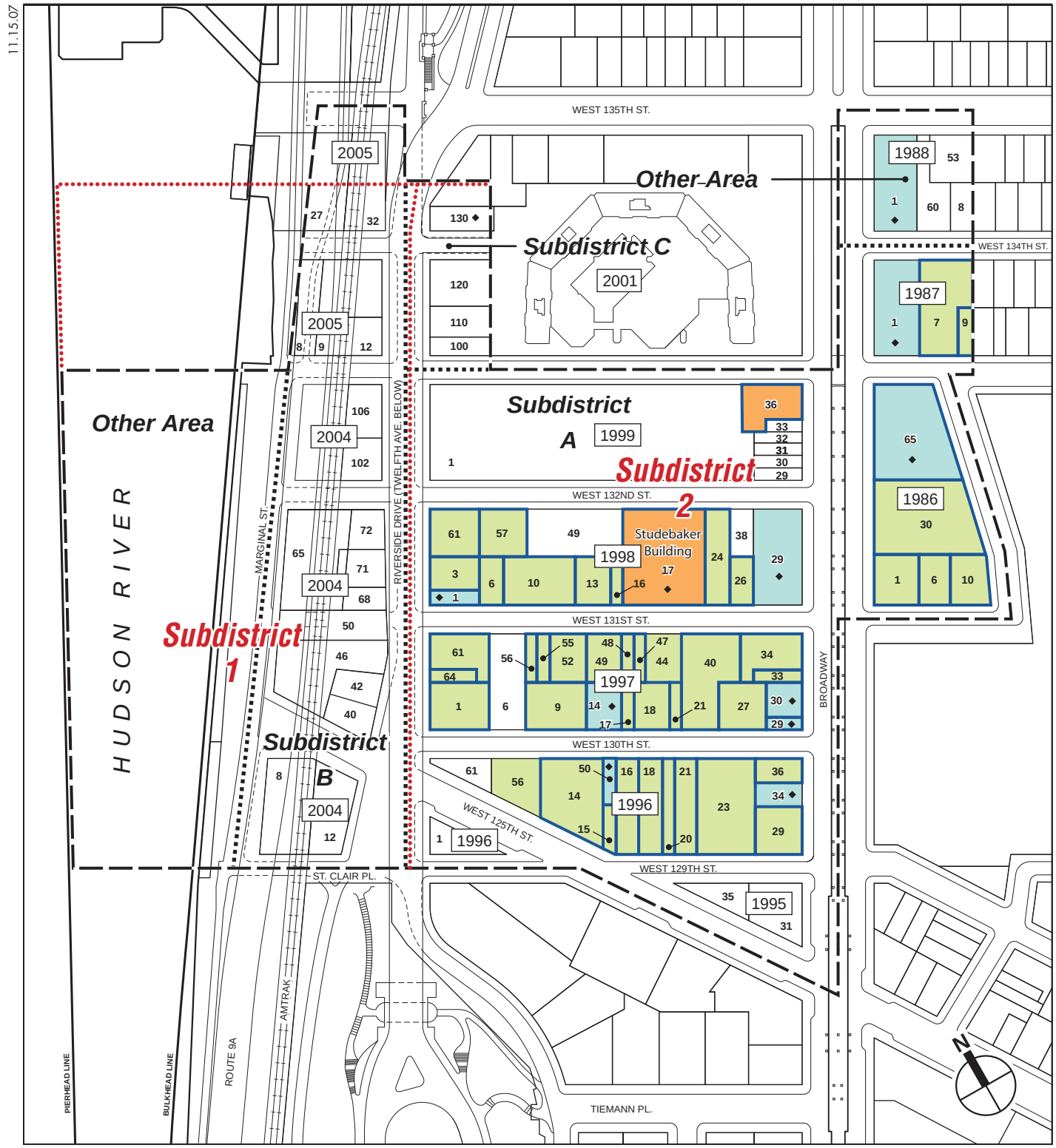

Figure 24-22

197-a Plan Alternative 2: Subdistrict 2 Location of Projected Development Sites

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

g. Minimum Floor Plate Sizes

In identifying sites appropriate for Academic Research and Academic buildings, the 197-a Plan Alternative 2 development scenario, consistent with the Proposed Actions, utilizes 25,000 sf as the minimum floor plate size for Academic Research and 15,000 sf as the minimum floor plate size for Academic use.

h. Open Space

In order to maximize opportunities for program space, given the reduced number of sites available for Columbia development relative to the Proposed Actions, the development scenario for the 197-a Plan Alternative 2 assumes that there would be no open space network as under the Proposed Actions. However, as in the original 197-a Plan, the triangular block on the corner of Broadway and West 125th Street would be reserved as a public park, despite Columbia's ownership of the Broadway frontage on that block.

i. Other Assumptions

Under the development scenario for the 197-a Plan Alternative 2, none of the new construction buildings were assumed to have received a bonus for set asides for ground floors for manufacturing use. For University buildings, the priority was instead to maximize the floor area for academic research, followed by academic use, University housing, and recreation. For this reason, it was also assumed that unused floor area on conversion sites would be incorporated into adjacent new construction sites, rather than used for enlargement of conversion sites. It was further assumed that Columbia would not use the conversion sites for program uses under the Academic Mixed-Use Program, since the floor plates and floor areas of the conversion buildings are too small to accommodate Academic Research, Academic, or University housing uses.

Two of the land owners in Subdistrict 2—Tuck-It-Away and Hudson Moving and Storage—have applied for rezonings and changes to their buildings' use. The Tuck-It-Away applications, which were certified in ULURP in July 2007, propose new residential use. The development scenario for the 197-a Plan Alternative 2 therefore assumes new construction of residential use on the Tuck-It-Away sites, subject to the revised regulations of the 197-a Plan, except where the sites contain structures identified as being of historic interest to CB9, in which case it is assumed these would be converted with expansion to the FAR permitted. In the case of Hudson Moving and Storage, the scenario assumes conversion under the proposed regulations of the 197-a Plan Alternative 2 with 2 FAR of commercial uses and 4 FAR for residential use.

The development scenario further assumes that units in converted buildings would not be subject to the 197-a Plan mandatory affordability regulations, but that those in new construction would. In accordance with the plan, 50 percent of all these units would be affordable.

DEVELOPMENT SCENARIO FOR SUBDISTRICT 2 (197-A PLAN 2)

As noted above, the development scenario for Subdistrict 2 in the Academic Mixed-Use area would contain four academic research buildings, six academic buildings, one mixed-use building for academic program and University housing, and six buildings for University housing, five of which would have small footprints (see Figure 24-23). The triangular block between West 125th and West 129th Streets would be public open space. There would be no new development on the block containing the MTA Manhattanville Bus Depot, and all other publicly owned property would remain in its existing use.

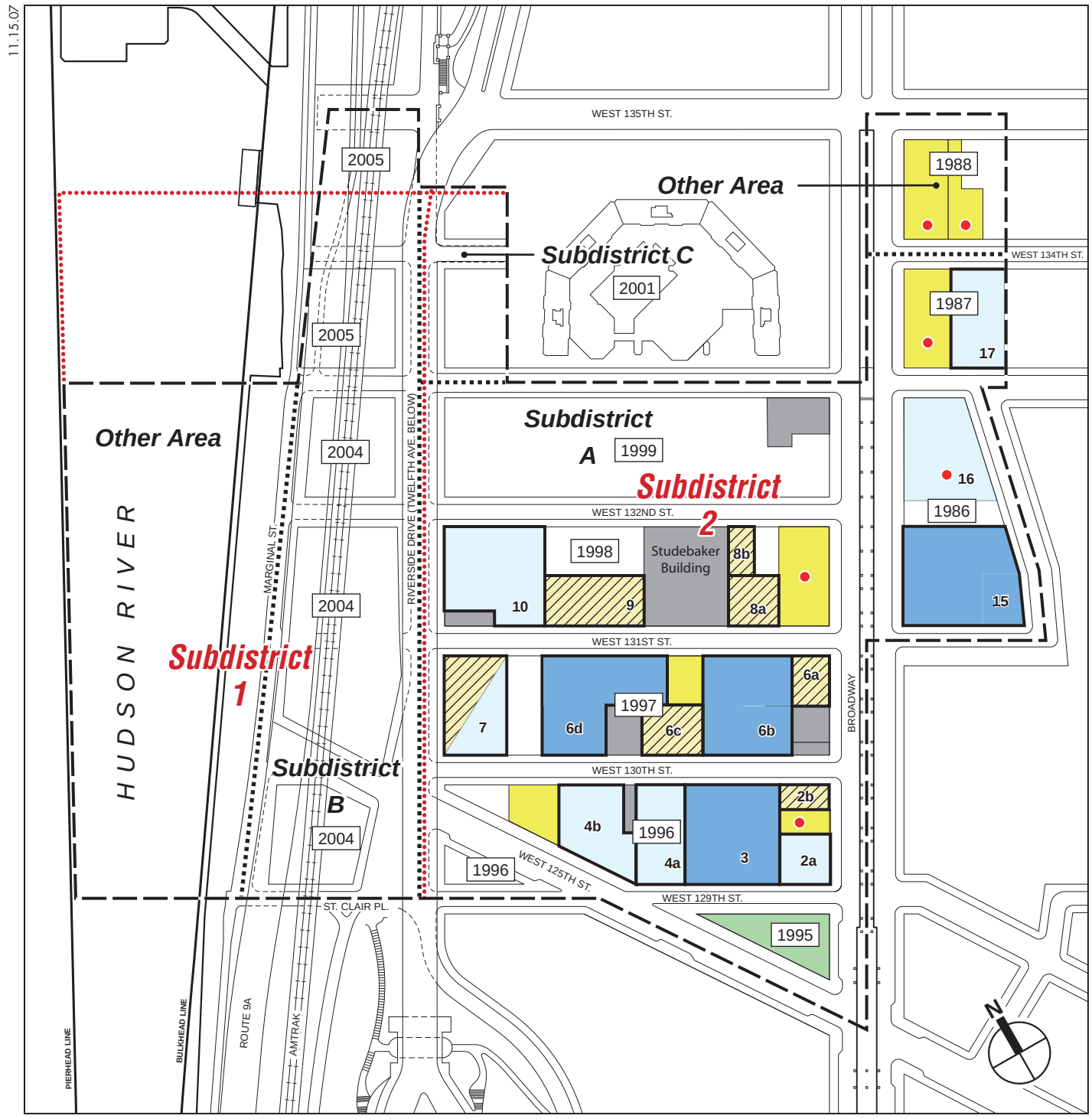

Figure 24-23

197-a Plan Alternative 2: Land Use

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Because of the setbacks and sky exposure plane regulations on Twelfth Avenue, it would not be possible to achieve a consistent minimum floor plate of 25,000 square feet along that avenue, so, with the exception of the building on Site 15, the academic research buildings would be located in the midblocks, where there are no height regulations under this alternative–and in order to produce as much academic research as possible, the buildings would have to be tall (see Figure 24-24). The academic research building on Site 3 would be 270 feet, without rooftop mechanical space, which is taller than the maximum heights of the Proposed Actions; the academic research building on Site 6d would be even higher—286 feet.

Like 197-a Plan Alternative 1, this alternative could provide no central below-grade service area, and conventional basements would be limited to one or two levels (see Figure 24-25). The result is that, like the Expanded Infill Alternative discussed above, several floors of key academic research buildings would be occupied by duplicative academic research support uses and mechanical space, and loading would have to take place in each building from the street. In addition, the alternative could not meet its own parking demand on site. As shown in Figure 24-26, the 197-a Plan Alternative 2 would require 18 loading docks in nine locations and three curb cuts for two-way car ramps, compared with the Proposed Actions, which would have only six on-street truck loading docks, and 4 curb cuts for bus and car ramps.

This scenario is substantially different from that of 197-a Plan Alternative 1. That scenario produced a development plan (see Figure 24-16) with office, community facility, housing, retail, and industrial uses on many separate sites, none of which was large enough to accommodate an academic research building, i.e., with a floor plate of at least 25,000 sf and total floor area of at least 250,000 sf. Thus, its community facility component provided only 13 percent of the program space needed by Columbia University over the long-term and accommodated in the Proposed Actions. By relaxing some of the requirements of 197-a Plan Alternative 1—primarily by permitting lot mergers on Columbia-owned or controlled property and assuming a relaxation of continuous streetwall and rear yard requirements—the community facility component increased to about a third of that of the Proposed Actions. Based on revisions to the 197-a Plan for Subdistrict 2 (expansion of the area available for community facility development; increase in the community facility FAR; and elimination of mandatory ground-floor uses) and development assumptions provided by CB9, which recognize that Columbia would develop property for its own, rather than mixed use, the 197-a Plan Alternative 2 would provide additional opportunities for the types of buildings sought by Columbia under the Proposed Actions. However, it would still provide only approximately half of the program space available under the Proposed Actions, and only 46 percent of academic research program space (see Table 24-14). There are several features of the 197-a Plan Alternative 2 that restrict the ability of Columbia to achieve its long-term needs for program space, principally as follows:

- No Below-Grade Shared Space: Without the shared academic research support space, centralized mechanical/HVAC and loading/distribution, which are only possible in the proposed central below-grade service area under the Proposed Actions, this space would all have to be provided above grade. The result would be that proportionally more space must be provided for these functions; the academic research support space would be counted as floor area, although the building size would appear to be as large as its counterpart in the Proposed Actions; and floor area for academic research laboratories would be substantially reduced.

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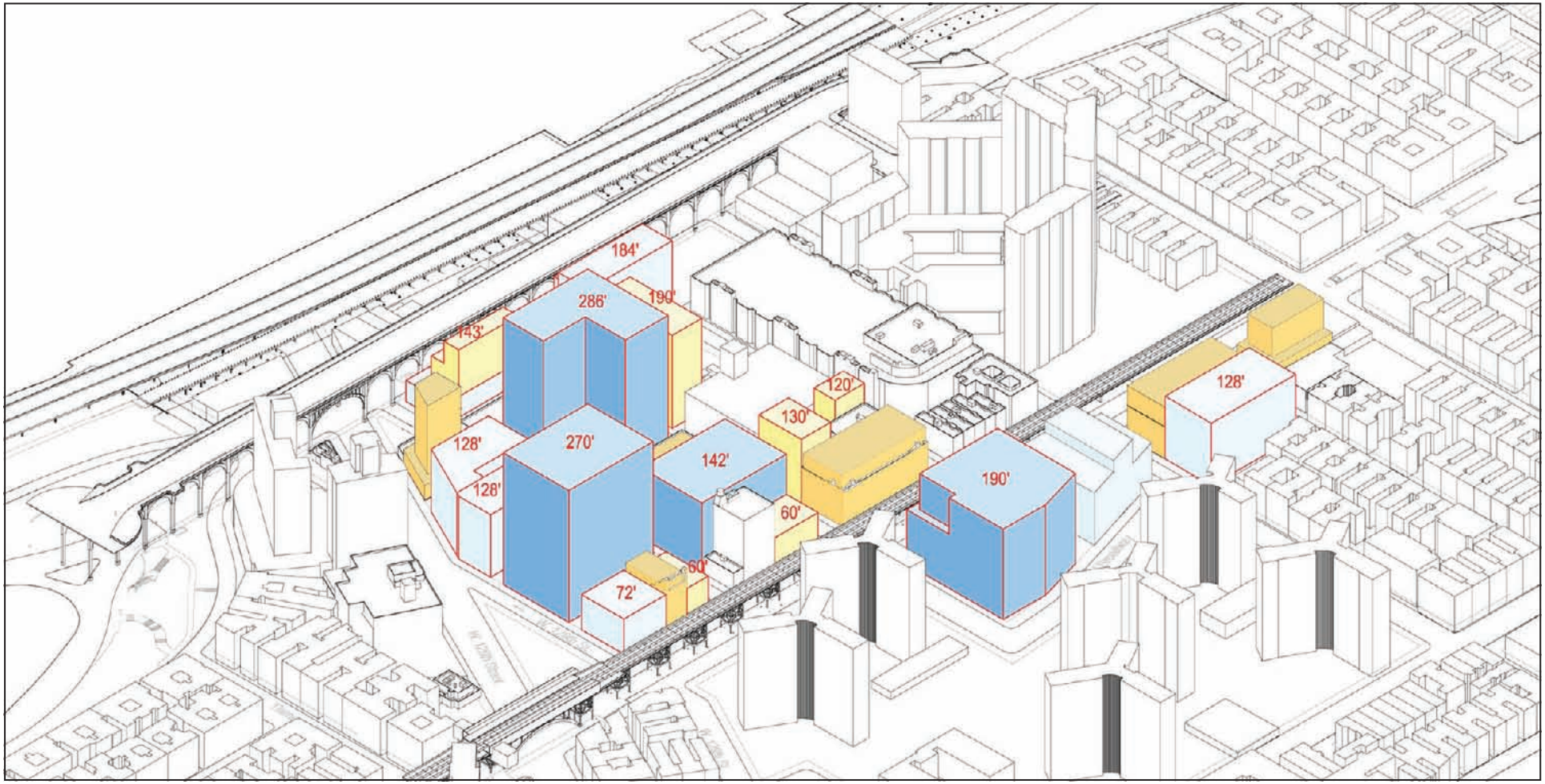

Academic Research

University Housing

Academic

Residential

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Figure 24-24

197-a Plan Alternative 2: Massing Diagram View Northwest

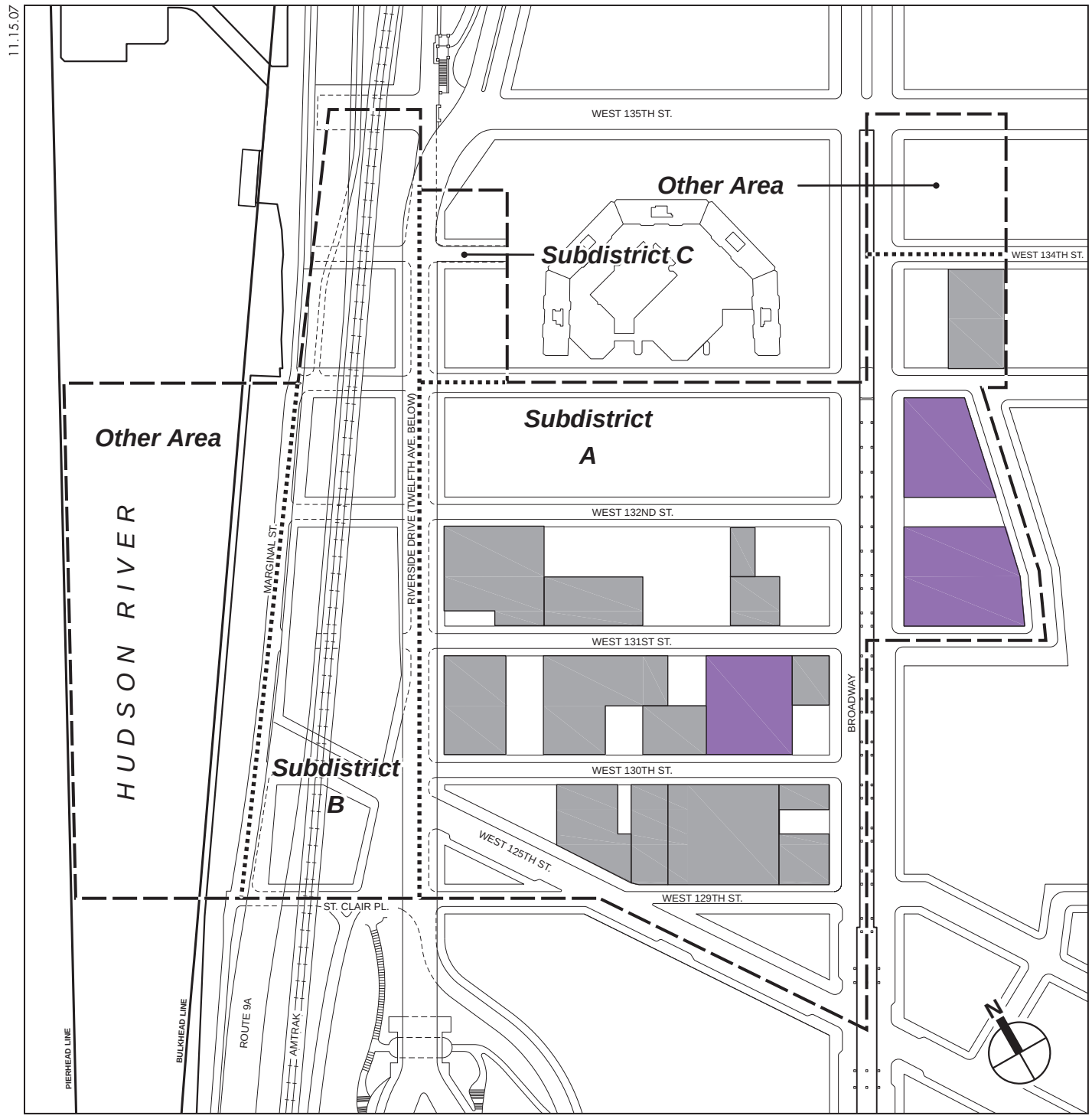

Figure 24-25

197-a Plan Alternative 2: Below-Grade Area

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

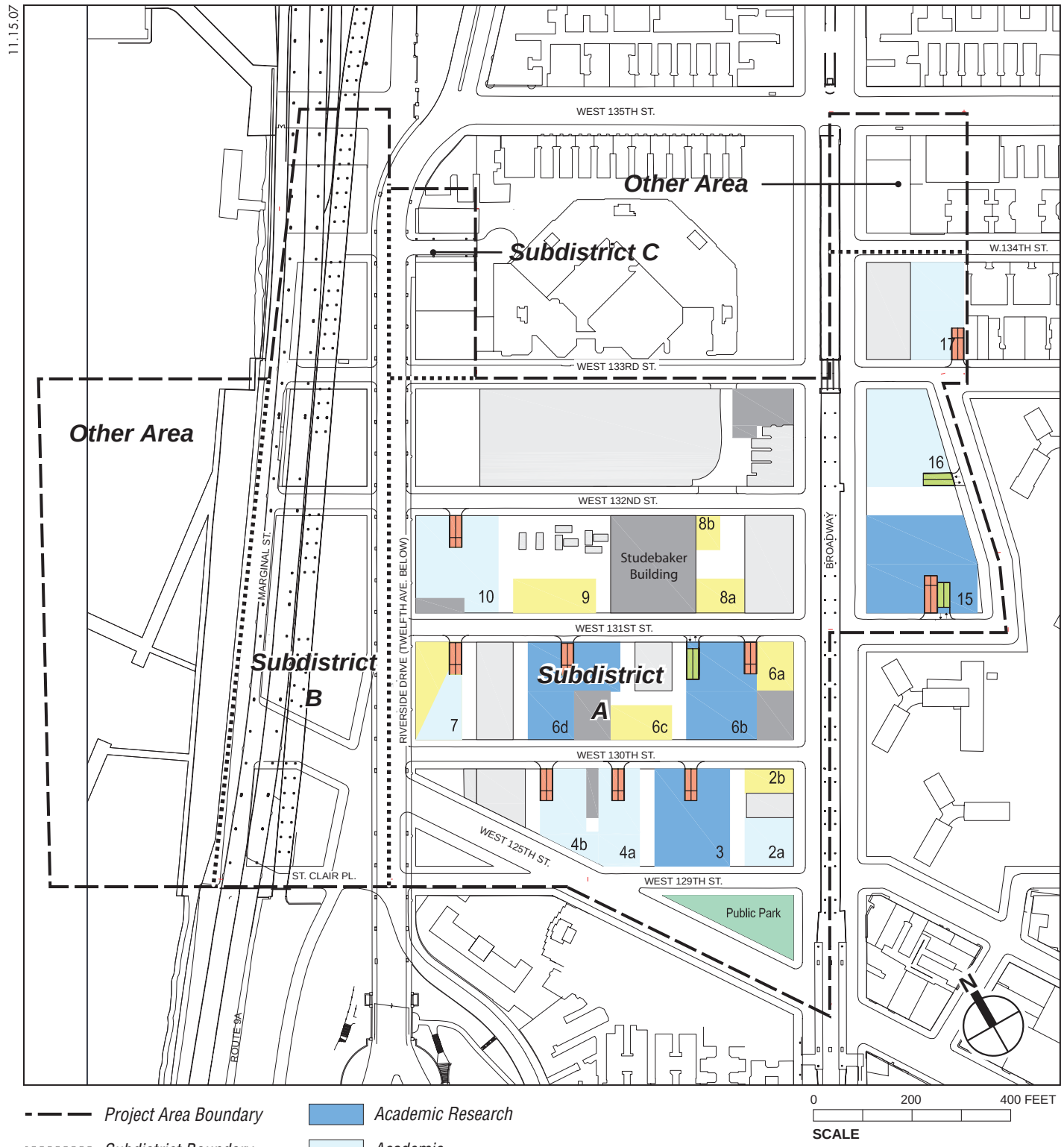

Figure 24-26

197-a Plan Alternative 2: Ground Floor Plan

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Table 24-14
Columbia University Development: Proposed Actions Compared with 197-a Plan Alternative 2 (sf in 000s)

	Proposed Actions	197-a Plan Alternative 2	Alt/PA
Above Grade			
Academic Research	2,597.0	1,196.7	
Academic	1,255.5	845.2	
University Housing	509.2	394.2	
Recreation	250.7	0	
Subtotal Program Space	**4,612.4**	**2,436.1**	**52.8%**
Retail	162.6	28.5	
Academic Research Support		218.1	
MTA Parking		0	
Parking		0	
Ramp, Mechanical, Loading, Freight, etc.		264.6	
Total Above Grade	**4,775.0**	**2,947.3**	**61.7%**
Below Grade			
Academic Research Support	296.2	0	
Below Grade Academic Program	69.8	0	
Swimming/Diving Center	145.4	0	
Subtotal Program Space	**511.5**	**0**	**0%**
Central Energy Plant	70.2	0	
Ramp, Mechanical, Loading, Freight, etc.	429.2	125.3	
Storage	189.2	125.3	
Parking	705.6	181.5	
MTA Parking	80.0	0	
Total Below Grade	**1,985.7**	**432.1**	**21.8%**
Above and Below Grade			
Academic Research	2,597.0	1,196.7	46.1%
Academic	1,325.4	845.2	63.8
University Housing	509.2	394.2	77.4
Recreation	396.1	0	0
Subtotal Academic Program	**4,827.7**	**2,436.1**	**50.5%**
Academic Research Support*	296.2	218.1	73.6%
Retail	162.6	28.5	30.5
Central Energy Plant	70.2	0	0
Ramp, Mechanical, Loading, Freight, etc*	429.2	389.9	90.8
Storage	189.2	125.3	22.8
Parking	705.6	181.5	63.7
MTA Parking	80.0	0	100.0%
Total Other Uses	**1,404.0**	**943.3**	**67.2%**
GRAND TOTAL	**6,760.7**	**3,379.4**	**50.0%**
Note: * Above grade space is less efficient than centralized below grade space.			

- No Use of Publicly Owned or Private Sites: At the present time, Columbia owns or controls approximately 65 percent of the land area in Subdistrict A and 75 percent of the lots. Thus, the basic site area from which allowable floor area is calculated would be reduced by 35 percent under this alternative.
- No New Construction on Sites of Historic Interest to CB9: As noted above, four of Columbia's owned or controlled properties are considered to be sites of historic interest and are slated for conversion only under this Alternative. These further reduce the floor area available for University development, and they have the effect of creating floor plates that do not have regular rectangular shapes. The small B.J. Harrison Chair Factory building on the south side of West 130th Street would force the development on Site 4 into two academic buildings, neither of which would meet the requirements of the Business School, and the arrangement would be inefficient.

- Streetwall Regulations on Twelfth Avenue. As shown in Figure 24-27 under the 197-a Plan Alternative 2, the regulations on Twelfth Avenue would require a streetwall of 45 feet at the lot line, with 30 foot setbacks at 95, and 145 feet. These setbacks would effectively reduce the floor plate of any building along Twelfth Avenue to less than 25,000 sf, thus reducing the number of sites available for academic research under this alternative.

With regard to non-Columbia development, the Service Station (Chevy) and Buick buildings located on the east (West 133rd to West 134th Streets) and west (West 132nd to West 133rd Streets) sides of Broadway, respectively, as resources of historic interest to CB9, would be converted to residential use with construction of new floors above. Two sites owned by Tuck-It-Away would be demolished and redeveloped with new residential buildings, one on West 125th Street east of the gas station on Twelfth Avenue, the other on West 131st Street between Broadway and Twelfth Avenue. In the portion of Subdistrict 2 containing the properties known as Other Area east of Broadway in the Proposed Actions, the Claremont Theater would be preserved with a residential overbuild.

As shown in Table 24-15, the private sites under 197-a Plan Alternative 2 would produce 402 units of housing (362,340 sf of residential use), of which 201 would be affordable units and 192,550 sf of retail use. This is slightly less than the original 197-a Plan, which was estimated to generate 420 units, of which 210 would be affordable. Total new development under the 197-a Plan Alternative 2 would be 3.57 million sf, compared with 7.09 million sf for the Proposed Actions. The potential effects of the alternative are assessed and compared with those of the Proposed Actions, below.

Table 24-15
Projected Development: Proposed Actions Compared with 197-a Plan Alternative 2

	Proposed Actions	197-a Plan Alternative 2
Subdistrict A – Overlap with Subdistrict 2		
Columbia University Uses		
Program Space - Including Academic Research Support	5,126,900	2,654,200
All other uses	1,636,800	361,900
Subtotal Columbia University	**6,763,700**	**3,016,100**
Non-Columbia University Uses		
Residential	N/A	248,580 (275 units)
Retail	N/A	132,100
Subtotal Non-Columbia University	**N/A**	**380,680**
Subtotal Subdistrict A	**6,763,700**	**3,396,780**
Subdistrict B		
Commercial Uses		
Retail	124,196	0
Office	54,808	0
Subtotal	**179,004**	**0**
Subdistrict C[1] Subtotal	**0**	**0**
Other Area East of Broadway - Overlap with Subdistrict 2		
Residential	88,819 (99 units)	113,755 (127 units)
Retail	0	60,450
Community facility	61,698	0
Subtotal	**150,517**	**174,205**
Total	**7,090,194**	**3,570,985**

Notes: 1. There are no projected development sites in Subdistrict C.

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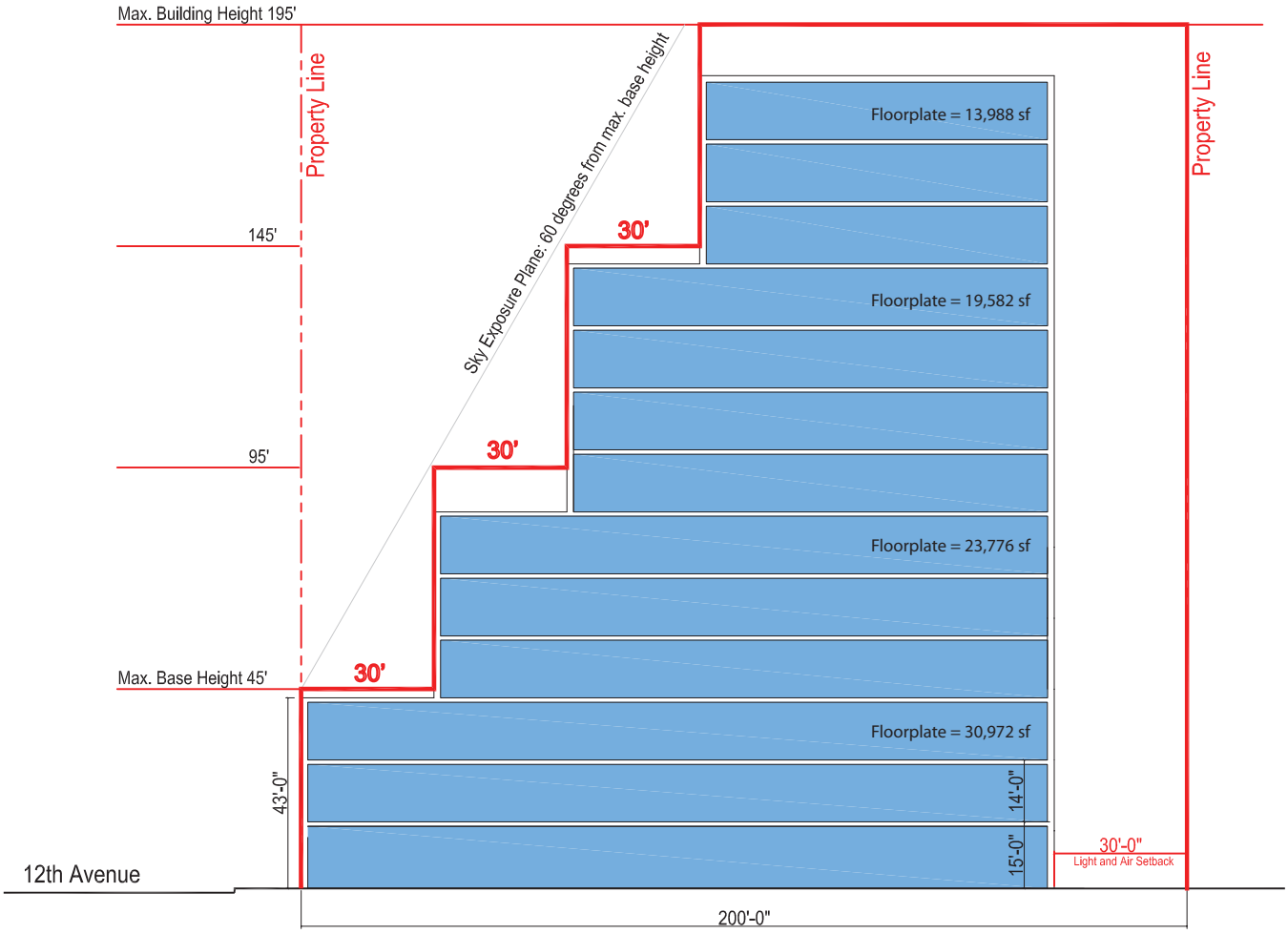

Figure 24-27

197-a Plan Alternative 2:
Twelfth Avenue Streetwall Regulations -
Analysis of Academic Research

197-A PLAN ALTERNATIVE 2 COMPARED WITH THE PROPOSED ACTIONS

LAND USE, ZONING, AND PUBLIC POLICY

Similar to the Proposed Actions and 197-a Plan Alternative 1, 197-a Plan Alternative 2 would result in no significant adverse impacts on land use, zoning, and public policy. Compared with the 197-a Plan Alternative 1, this alternative would produce a land use pattern more similar to that of the Proposed Actions, as discussed below.

Subdistrict 1

The development scenario of the 197-a Plan Alternative 2 is the same as 197-a Plan Alternative 1, in that it anticipates minimal change in Subdistrict 1. However, there are two key differences: (1) the revised alternative would alter the boundary of Subdistrict 1, reducing its size to the area from Twelfth Avenue westward to the waterfront, between West 125th and West 134th Streets (Under the rezoning for the Proposed Actions, this area corresponds to Subdistrict B; in the original 197-a Plan Alternative 1, Subdistrict 1 covered Subdistricts B and C plus the area of Subdistrict A within 200 feet of the east side of Twelfth Avenue.); and (2) a requirement for "super specialty" uses has been eliminated; instead, the super specialty use would qualify as a bonus incentive. However, like 197-a Plan Alternative 1, projected development sites were not identified for Subdistrict 1 in 197-a Plan Alternative 2, and it is not anticipated that the existing land uses in Subdistrict 1 would substantially change. Most community facilities, including colleges or dorms, or residential uses would not be permitted in Subdistrict 1.

The net result under the 197-a Plan Alternative 2 would be to retain existing uses. This contrasts with the new commercial uses that would be developed in Subdistrict B with the Proposed Actions. As discussed in Chapter 1, this development under the Proposed Actions would create active uses that would draw the public to the area of the new West Harlem Waterfront park. However, like the Proposed Actions, the changes in Subdistrict 1 would not result in any significant adverse land use, zoning, or public policy impacts.

Subdistrict 2

Under 197-a Plan Alternative 2, Subdistrict 2 would comprise the Academic Mixed-Use Area (Subdistrict A) of the proposed special district, Subdistrict C, and Other Area east of Broadway. Like 197-a Plan Alternative 1, this alternative would permit a wider variety of uses in Subdistrict 2 than the Proposed Actions, in particular, housing, affordable housing and some light industrial uses. However, by contrast with the original 197-a Plan, development under this alternative would permit a greater concentration of university uses and result in less mixed use. The alternative would produce approximately the same number of affordable housing units as 197-a Plan Alternative 1, while the Proposed Actions would produce no residential use in Subdistrict A, since University housing is classified as a community facility use. The Proposed Actions are estimated to generate 99 units of market-rate housing in Other Area east of Broadway, compared with 127 units of affordable housing under 197-a Plan Alternative 2.

SOCIOECONOMIC CONDITIONS

Like the Proposed Actions, the 197-a Plan Alternative 2 development scenario would have no significant adverse impact on direct residential or business displacement, on indirect business displacement, or on specific industries, but it could have an adverse effect on indirect residential displacement. Under the development scenario for the 197-a Plan Alternative 2, there would be an

increase of employment in the Project Area, and it would be expected that a number of new employees would seek to reside in the study area. Likewise, a build-out under the development scenario would increase the attractiveness of the neighborhood, drawing other new residents to the study area. As with the Proposed Actions, by 2030 this could result in some indirect residential displacement of the at-risk population in the 1,319 unprotected units in the primary study area, including the 823 units in the Riverside Park Community/3333 Broadway. However, the likelihood of this impact occurring would be less under the 197-a Plan Alternative 2 than with the Proposed Actions. Each area of socioeconomic analysis is discussed below.

Direct Residential Displacement and Additions to Study Area Population

The 197-a Plan Alternative 2 development scenario includes substantial new mixed-use development and assumes only a small portion of the direct displacement which would occur under the Proposed Actions. This alternative would directly displace an estimated 19 residents from the 8 dwelling units located in the Iglesia el Encuentro Con Dios,[1] as opposed to the Proposed Actions, which would displace an estimated 298 Project Area residents living in 135 units (see Table 24-16). However, as noted above and discussed in greater detail in Chapter 4, the Proposed Actions would not have a significant adverse socioeconomic impact based on direct residential displacement, and it is anticipated that by 2030, all existing residents in the Academic Mixed-Use Area would be relocated to new housing within the study areas. The 197-a Plan Alternative 2 would add up to 1,890 residents to the Project Area, including a projected 825 University faculty, researchers, students, and family members.[2]

Table 24-16
197-a Plan Alternative 2, Direct Residential and Business and Institutional Displacement, Compared with the Proposed Actions

Direct Displacement	197-a Alternative 2	Proposed Actions*
Residents	19	298
Businesses and Institutions	76	85
Employees	806	880
Note: * Numbers are for the 2030 Build year.		

Direct Business Displacement and Additions to Employment

Build-out under the development scenario for the 197-a Plan Alternative 2 would result in the direct displacement of a number of existing businesses and employees, although to a lesser extent than with the Proposed Actions. Overall, the 197-a Plan Alternative 2 development scenario would directly displace an estimated 76 businesses and institutional uses and 806 employees,[3] compared with the direct displacement of 85 businesses and 880 workers with the Proposed Actions (see Table 24-16). However, neither the Proposed Actions nor the 197-a Plan

[1] The 197-a Plan Alternative considered in the DEIS did not result in the direct displacement of the residential population at Iglesia de Dios Pentecostal, nor any other residential populations in the Project Area.

[2] University faculty and student residential population provided by Columbia University; non-University housing population based on 402 units and an average household size of 2.65. The 197-a Plan Alternative considered in the DEIS would introduce 1,116 residents to the Project Area.

[3] The 197-a Plan Alternative considered in the DEIS would directly displace 52 businesses and 620 employees.

Alternative 2 would result in significant adverse impacts due to direct business displacement; displace businesses with substantial economic value to the City, or that are the subjects of City or other policies to preserve, enhance or protect them, or define neighborhood character.

Like the Proposed Actions, the development scenario under the 197-a Plan Alternative 2 would add employment to the Project Area that would offset employment displacement. The amount and types of uses assumed under the development scenario for this alternative could generate up to an estimated 3,630 employees, of whom 3,088 would be University-generated employees (see Table 24-17).[1] This is compared with a total of 7,086 employees generated by the Proposed Actions, of which 6,399 would be University-generated employees.

Table 24-17
197-a Plan Alternative 2 Development Scenario: Employment Calculation

Uses	GSF	Employees
University-generated employment		
University space	2,987,616	2,957
Retail space in University buildings	28,500	131
Sub-total	**3,016,116**	**3,088**
Non-University-generated employment		
Residential	362,335	61
Retail	192,550	481
Sub-total	**554,885**	**542**
Total	**3,571,001**	**3,630**

Notes: University employment provided by Columbia University. Non-University employment based on the following standard employment rates: 1/5,900 sf residential, and 2.5/1,000 sf retail. University and total GSF estimates differ from Table 24-14 because this table includes only employment-generating gsf.

Indirect Residential Displacement

Under the development scenario for the 197-a Plan Alternative 2, an adverse impact could occur because, as with the Proposed Actions, build-out under the 197-a Plan Alternative 2 could initiate a trend toward increased rents in the primary study area. This alternative's University population would create a projected demand for as many as 180 housing units within the primary study area and 325 units within the secondary study area (which includes the 180-unit demand within the primary study area). This is compared with the demand generated by the Proposed Actions of 839 housing units within the primary study area and 1,131 units within the secondary study area (which includes the 839-unit demand within the primary study area). In addition to this new University-generated housing demand, the new residential and retail uses assumed under the development scenario could make the Project Area more attractive as a destination and, by increasing the residential appeal of the Project Area and study areas, could attract additional persons seeking housing in the area.

By 2030, this could result in some indirect residential displacement of the at-risk population in 1,319 unprotected units in the primary study area, including the 823 units in the Riverside Park Community/3333 Broadway. As with the Proposed Actions, this impact could be significant, but would be limited to the primary study area. However, the provision of 201 units of affordable

[1] The 197-a Plan Alternative considered in the DEIS could hypothetically generate up to 5,445 employees, based on standard employment rates for individual land uses; however, as noted in the DEIS, a number of factors suggest that the amount and type of development assumed for the development scenario under the 197-a Plan Alternative in the DEIS are unlikely to be realized under current or likely future market conditions.

housing in the 197-a Plan Alternative 2 development scenario, if realized, would help to limit the effect of the indirect displacement pressures. In addition, the Academic Mixed-Use Development with the Proposed Actions would introduce a greater population of students, faculty, and employees (some of whom would be provided housing in the University area and others who would seek housing throughout the study area) to the Project Area than under the 197-a Plan Alternative 2. For these reasons, the likelihood of an impact occurring and its extent would be less under the 197-a Plan Alternative 2 than with the Proposed Actions.

Indirect Business Displacement

Like the Proposed Actions, the 197-a Plan Alternative 2 development scenario would not result in significant adverse indirect business displacement. A major objective of the alternative is to retain manufacturing uses in the area and retain other businesses, while providing more space for residential development and retail businesses. This alternative is more likely than the Proposed Actions to leave the retail strip on Broadway and the manufacturing district on Amsterdam Avenue relatively unchanged.

Impacts on Specific Industries

Like the Proposed Actions, the 197-a Plan Alternative 2 development scenario would not have an adverse effect on specific industries either within or outside the Project Area and study areas. Businesses subject to direct displacement by both the Proposed Actions and the 197-a Plan Alternative 2 vary in type and size, and are not concentrated in any specific industry sector. In addition, none of the businesses subject to displacement are essential to the survival of an industry sector within, or outside of, the study area.

COMMUNITY FACILITIES AND SERVICES

Like the Proposed Actions, the 197-a Plan Alternative 2 development scenario would not result in any significant adverse impacts on community facilities and services. Like the Proposed Actions, it would not directly displace police, fire, public education, public day care,[1] or health care facilities.

As is the case in the No Action Alternative, in the 197-a Plan Alternative 2, Columbia University would still collaborate with the City of New York on the creation of a new public secondary school focused on education in science, math, and engineering.

In the 197-a Plan Alternative 2 development scenario, new residential uses in the Project Area would generate new demand for public schools, libraries, day care centers, and health care facilities. By 2030, the Columbia University development under the 197-a Plan Alternative 2 would include approximately 551 units of University housing. Using the same assumptions to analyze the Proposed Actions Chapter 5, Community Facilitates, these units are being assessed as moderate-high income units for a conservative schools analysis.[2] The private sites in Subdistrict A and Other Area east of Broadway would produce 402 total units of housing, of which 201 are assumed to be low-income units and 201

[1] The estimated 221 units of affordable housing under the 197-a Plan Alternative development scenario are below the *CEQR Technical Manual* threshold of 357 to 417 units required to generate more than 50 children eligible for public day care (see Table 3C-4 on page 3C-5).

[2] The University housing units for graduate students, faculty, and other employees would be considered unassisted or market-rate housing for high-income levels. However, the units have been conservatively considered as moderate-high rather than high-income households for the purpose of estimating the number of public school students generated.

are assumed to be moderate-high income units. As shown in Table 24-18, the development scenario would generate 118 elementary school children and a total of 187 public school students overall. This is compared with a total of 416 students generated by the Proposed Actions. Based on this number of students, similar to conditions in the Proposed Actions, there would be adequate capacity at public elementary and intermediate schools, libraries, and health care facilities to support this assumed level of growth. Therefore, the 197-a Plan Alternative 2, like the Proposed Actions, would not result in significant adverse impacts on community facilities.

Table 24-18
CB9 Proposed 197-a Plan Alternative 2 Development Scenario: Projected New Housing Units and Estimated Number of Students Generated by the New Housing Units

Income Level of Units	Total Units	Projected Elementary Students	Projected Middle School Students	Projected High School Students	Total Students Generated
Moderate-High income	752	90	23	30	143
Low-income	201	28	6	10	44
Total	**953**	**118**	**29**	**40**	**187**

Source: Student generation rates are based on the *CEQR Technical Manual*'s Table 3C-2, "Projected Public School Pupil Ratios in New Housing Units of All Sizes."

OPEN SPACE

Like the Proposed Actions, the 197-a Plan Alternative 2 would establish new areas of passive open space in Manhattanville that would be available to area residents, existing and future workers, and visitors. New public, passive open space, approximately 0.41 acres (17,849 sf), would be provided on the triangular block on the west side of Broadway between West 125th and West 129th Streets (Acquisition for public use would be required to create this open space, since this site currently is not in public ownership.) Although the development scenario would provide new open space, it would be less than the 93,965 sf of publicly accessible open space that would be provided by the Proposed Actions for a difference of approximately 1.75 acres (76,111 sf). Thus, the 197-a Plan Alternative 2 development scenario would not provide all the open space benefits that would be realized with the Proposed Actions.

Like the Proposed Actions the 197-a Plan Alternative 2 would add open space in the Project Area, but as it would also add population (residents, workers, and students), it would result in significant adverse open space impacts, as discussed below.

Direct Effects

Unlike the Proposed Actions, the 197-a Plan Alternative 2 would not have a significant adverse shadow impact on the I.S. 195 playground on Broadway between West 133rd and West 134th Streets. There would be no new buildings on the block immediately south of the I.S. 195 playground, between West 132nd and West 133rd Streets (no development on Sites 11-14 of the Proposed Actions). The two buildings on Site 17 would be considerable lower than those under the Proposed Actions. Along Broadway, the existing building on Site 17 would be converted to residential use and developed with new stories above, for a total of approximately 7-stories, on a private (non-Columbia) site and to the east of this site would be a Columbia academic building that would rise only approximately 130 feet. Under the Proposed Actions, Site 17 would contain an academic research building, rising along the Broadway frontage, up to a maximum height of 240 feet (360 feet with mechanical space). Therefore, the shadows from the buildings on Site 17 would not reach as far into the playground or remain on the play area for as long as the Proposed Actions' shadows.

Indirect Effects

Like the Proposed Actions, the 197-a Plan Alternative 2 would decrease open space ratios, although all passive open space ratios would remain substantially higher than established City guidelines. However, the decrease in the ratio for the non-residential study area would be large enough to constitute a significant open space impact in both the alternative and the Proposed Actions, as shown in Table 24-19. As shown in Table 24-19, this indirect passive open space impact would be less than that of the Proposed Actions.

Although the active open space ratios in the future with both the alternative and the Proposed Actions would continue to be below the levels recommended by the City, it is recognized that this goal is not feasible for many areas of the City, and these ratios are not considered impact thresholds. According to the *CEQR Technical Manual*, a 5 percent decrease in open space ratios is considered a substantial change warranting a detailed analysis. However, in areas where the open space ratio is very low (e.g., below 1.5 acres per 1,000 residents), a decrease of less than 1 percent in the open space ratio may result in a potential significant adverse impact on open space. The 197-a Plan Alternative 2 would not result in a decrease in the active open space ratio over No Build conditions in 2030, and the Proposed Actions would reduce the active open space ratio by 1.4 in the same time period. Therefore, unlike the Proposed Actions, the 197-a Plan Alternative 2 would not have a significant adverse indirect impact on active open space. Because the active open space ratio is substantially lower than established City guidelines, this decline would constitute a significant adverse impact on active open spaces in the 2030 analysis year, requiring mitigation, under both options.

Table 24-19
197-a Plan Alternative 2, Adequacy of Open Space Resources Compared with the Proposed Actions

Ratio	City Guideline Ratio	No Build Ratio	Proposed Actions Ratio	197-a Plan Alternative 2 Ratio	Percent Change Proposed Actions	Percent Change 197-a Plan Alternative 2
Non-Residential Study Area						
Passive/non-residents	0.15	4.13	1.66*	2.84*	(59.8)	(31.2)
Passive/total population	0.38	0.73	0.59*	0.68*	(19.2)	(6.8)
Residential Study Area						
Total/residents	2.50	1.52	1.52	1.52	0	0
Passive/residents	0.50	0.82	0.83	0.82	1.2	0
Active/residents	2.00	0.70	0.69	0.70	(1.4)	0
Passive/total population	0.38	0.60	0.55	0.57	(8.3)	(5.0)

Notes: Ratios in acres per 1,000 people.
* Results in a significant adverse impact

SHADOWS

Like the Proposed Actions, the 197-a Plan Alternative 2 development scenario would not result in any significant shadow impact on the West Harlem Waterfront park, the Broadway Malls, Montefiore Park, the Manhattanville Houses open spaces, or Riverside Park. Unlike the Proposed Actions, the 197-a Plan Alternative 2 development scenario would not result in a significant adverse shadow impact on the I.S. 195 Playground. The development scenario under the 197-a Plan Alternative 2 does not include any new development on the block between West 132nd and West 133rd Streets, directly south of the I.S. 195 Playground. In addition, buildings on

the east side of Broadway in Subdistrict 2 of the 197-a Plan Alternative 2 would not be as tall as those with the Proposed Actions. Assuming that the height of the new residential building on Block 1987, Lot 7 would be 110 feet high, a shadow study concluded that incremental shadows from this building would not reach the I.S. 195 Playground on the March/September, May/August and June analysis days. On the December analysis day, the building would cast an incremental shadow on a small section of the playground from approximately 10:00 AM to 11:15 AM. Therefore, the development under the 197-a Plan Alternative 2 would not cast significant new shadows on the I.S. 195 Playground north of West 133rd Street, whereas the Proposed Actions would result in a significant adverse impact on this sun-sensitive receptor.

Under the 197-a Plan Alternative 2 development scenario, there would be no new construction in Subdistrict 1, so there would be no incremental shadows on the West Harlem Waterfront park, as there would be with the Proposed Actions. However, shadows on the park from the new buildings in the Proposed Actions were found to be insignificant; accordingly, neither proposal would result in significant adverse shadow impacts on this open space.

Building heights in Subdistrict 2 under the 197-a Plan Alternative 2 would be lower than with the Proposed Actions. However, buildings with the Proposed Actions were found not to have shadow impacts on Montefiore Park, the Broadway Malls, the Manhattanville Houses open spaces, or Riverside Park. Accordingly, neither proposal would result in significant adverse shadow impacts on these facilities.

HISTORIC RESOURCES

Unlike the Proposed Actions, the 197-a Plan Alternative 2 would not require the demolition of the former Sheffield Farms Stable on Broadway between West 129th and West 130th Streets—a building that listed on the State and National Registers of Historic Places, which could result in significant adverse impacts. The 197-a Plan Alternative 2 assumes that the owner's plans for the building would be carried out; these plans propose to add four stories to the building. One story is proposed to be built to the lot line on Broadway; the other three would be set back 10 feet from the lot line. Because of these proposed alterations and additions, CPC issued a Positive Declaration on the application, requiring that this issue be addressed in an EIS. It is assumed for analysis purposes that the issue will be resolved through redesign or mitigation, so the conversion assumed as part of the 197-a Plan Alternative 2 would not have an adverse impact on historic resources.

Similar to the Proposed Actions, Columbia would relocate the West Market Diner's 1948 dining car to a new site in the Project Area or study area and consult with OPRHP regarding its relocation and rehabilitation. Moving the 1948 dining car and rehabilitating it would not result in significant adverse impacts. Like the Proposed Actions, the 197-a Plan Alternative 2 assumes that in the Other Area east of Broadway development that could result from the rezoning would preserve the historic Claremont Theater building, so there would be no significant adverse impact on that resources, either.

Similar to the Proposed Actions, new construction adjacent to historic buildings could result in inadvertent damage, including ground-borne vibration, falling debris, and accidental damage from heavy machinery. Historic resources that could be affected through adjacent construction and/or overbuilding include the former Warren Nash Service Station building, the Studebaker Building, the former Sheffield Farms Stable, the Claremont Theater building, and the Manhattan Valley IRT viaduct. Like the Proposed Actions, under the 197-a Plan Alternative 2, to avoid construction-related impacts on architectural resources within 90 feet of project construction,

including the West Market Diner, the Manhattan Valley IRT viaduct, the 125th Street IRT Subway Station, the Riverside Drive viaduct, and—to the extent necessary—the former Warren Nash Service Station building and the Studebaker Building, the protection measures contained in the CPP approved by OPRHP and LPC would be implemented by a professional engineer before any demolition, excavation, and construction.

In contrast to the Proposed Actions, under the 197-a Plan Alternative 2, transit mitigation would not be require that modifications be made at the 125th Street IRT Subway Station and the Manhattan Valley IRT viaduct. As-of-right construction in the Other Area east of Broadway would comply with the procedures set forth in DOB's *Technical Policy and Procedure Notice* (TPPN) #10/88, which is designed to provide for the protection of historic resources during construction.

URBAN DESIGN AND VISUAL RESOURCES

Like the Proposed Actions, the 197-a Plan Alternative 2 development scenario would not result in significant adverse impacts on the urban design and visual resources of the study area.

In Subdistrict 1, the development scenario assumes that the area's urban design would remain relatively unchanged from current conditions, except for the possible introduction of a small number of "super specialty" manufacturing uses with retail outlets that would enliven portions of the streetscape. By contrast with the Proposed Actions, the Twelfth Avenue corridor would not contain the retail and commercial buildings on the west side of the avenue. On the east side of the avenue within Subdistrict 2, the 197-a Plan Alternative 2 would result in the development of two new academic buildings between West 130th and 132nd Streets. These two buildings would maintain the existing sidewalk widths and streetwalls close to the Riverside Drive viaduct, and they would rise in a series of setbacks to maximum heights of 195 feet. This contrasts with the Proposed Actions' community facilities buildings that would also be tall, but would be set back from the viaduct at ground level to increase light and air to the avenue. On the other blocks along the east side of the avenue within Subdistrict 2, the 197-a Plan Alternative 2 would maintain the generally low-scale buildings that line Twelfth Avenue, including the market diner at West 131st Street that would be retained within the footprint of one of the new buildings. Under the 197-a Plan Alternative 2, the existing bus depot on the full block bounded by Twelfth Avenue, Broadway, and West 132nd and 133rd Streets, would remain, leaving the bus parking lot to front on the avenue in Subdistrict 2. In general, Twelfth Avenue, along with portions of the blocks to the east, would retain a manufacturing character defined by one- and two-story masonry buildings adjacent to the two new, tall academic buildings. Along the west side of the avenue within Subdistrict 1, mostly blank masonry walls and ground-floor openings covered by roll-down metal security gates would continue to define the streetwalls, and other remaining elements of the streetscape would be bus parking and narrow sidewalks and curb cuts. On the east side of the avenue, these streetscape elements would be mixed with the new ground floors of the two new academic buildings. There would be no open market area along the east side of Twelfth Avenue and no widened sidewalks along the side streets that would open views through the area to the waterfront.

In the development scenario, new uses in Subdistrict 2 would be residential and community facility or commercial with some ground-floor retail and manufacturing space. The development scenario would include the institutional uses with ground-floor retail that would be developed with the Proposed Actions, but it would only provide approximately half of the program space available under the Proposed Actions. The total new floor area (new construction, conversion,

and conversion with expansion), if realized, would be considerably lower than that of the Proposed Actions. In addition, the 197-a Plan Alternative 2 development scenario assumes that 16 existing structures would be retained and converted to other uses, and therefore more of the existing built form would remain in the Project Area than with the Proposed Actions, which would retain only the former Warren Nash Service Station building (the Studebaker Building would be preserved and reused in the future without either the Proposed Actions or the 197-a Plan Alternative 2). Thus, in Subdistrict 2, the 197-a Plan Alternative 2 would create a mixture of new, mid- and high-rise buildings interspersed with other existing mid- and low-rise structures, many of which would be converted to new uses. Two of the academic research buildings developed under the 197-a Plan Alternative 2, at 286 and 270 feet (less mechanical space) would be taller than the tallest of the Proposed Actions' buildings.

Comparing the 197-a Plan Alternative 2 development scenario directly with the scenario for the rezoning's Subdistrict A (which includes all of the 197-a Plan Subdistrict 2), the majority of new buildings would be located midblock between Broadway and Twelfth Avenue, and West 129th and West 132nd Streets with two new buildings on Twelfth Avenue, one new building on the east side of Broadway, and three new buildings on the west side of Broadway. Broadway would experience both building conversions and new development and there would be no new development on the block between Broadway and Twelfth Avenue/West 132nd and West 133rd Street. This contrasts with the Proposed Actions, which would place new development all along the Broadway corridor and along Twelfth Avenue, extending up to West 133rd Street. Under the 197-a Plan Alternative 2, buildings on the east side of Twelfth Avenue would have maximum base heights of 45 feet, maximum heights of 195 feet, and 30-foot setbacks at 45 feet, 95 feet, and 145 feet; buildings along Broadway would have maximum base heights of 120 feet, a 15-foot setback above the maximum base height, and maximum heights of 195 feet; and there would be no height restrictions in the midblock. Under the 197-a Plan Alternative 2, most buildings would be less bulky and shorter than the majority of buildings in the Academic Mixed-Use Development with the Proposed Actions; however, the three academic research buildings lining West 130th Street and the one academic research building on the east side of Broadway between West 131st and 132nd Streets would have large footprints and would be as bulky as the majority of the Proposed Actions' buildings. In addition, as mentioned above, two of the new academic research buildings would be taller than the tallest of the buildings in the Academic Mixed-Use Development with the Proposed Actions and they would be located midblock on West 130th Street. Most of the buildings constructed under the 197-a Plan Alternative 2 development scenario would have smaller and more varied footprints than those built with the Proposed Actions, because it is assumed they would conform to existing lot sizes and would be interspersed with existing buildings. Under the 197-a Plan Alternative 2, there would be a range of building heights from 60 feet to 286 feet with two buildings close to 300 feet tall and three buildings close to 200 feet tall.

Under the reasonable worst-case development scenario for the Proposed Actions, buildings in the Academic Mixed-Use Development would have large footprints and would be constructed within maximum building heights, resulting in heights ranging from 120 to 260 feet (160 to 320 feet with mechanical space). Under the 197-a Plan Alternative 2, there would be a less dramatic change to the streetscape than with the Proposed Actions, as there would be fewer new building façades and entrances that would be interspersed with existing buildings, more curb cuts and industrial entrances would remain, there would be more new curb cuts for loading areas and car ramps, there would be requirements for side-street sidewalks to be widened, and no publicly accessible open space areas would be created between West 129th and West 133rd Streets. The

open space assumed to be created under the 197-a Plan Alternative 2 would be a public park on the triangular block bounded by Broadway and West 125th and West 129th Streets, at the southern end of the Project Area. New ground-floor retail uses would enliven sections of the streetscape, intermixed with existing manufacturing and automotive-related uses. The settings of the area's visual resources-the Riverside Drive and Manhattan Valley IRT viaducts, the Studebaker Building, and the waterfront-would be altered, but not as dramatically as under the Proposed Actions. There would be no widened views through the Project Area to the waterfront and the new park, and there would be no new midblock open areas from which to view the Studebaker Building.

Overall, the 197-a Plan Alternative 2 would retain more of the existing urban design and visual character of the Project Area than the Proposed Actions. Overall development would be less dense, most buildings would be shorter while two would be taller, a large number of existing low-rise industrial and residential buildings would remain, sidewalks would continue to be narrow, and there would be no interconnected system of publicly accessible open spaces within the Project Area. Like the Proposed Actions, the 197-a Plan Alternative 2 would not have an adverse impact on Urban Design and Visual Resources.

NEIGHBORHOOD CHARACTER

Like the Proposed Actions, the 197-a Plan 2 Alternative would clearly and substantially alter the Project Area's neighborhood character, as defined by CEQR. In Subdistrict 2, most of the aging industrial area would be replaced primarily with University uses, but also with some market rate and affordable housing and ground-floor retail uses. Two service station uses, the Con Edison cooling facility, and the MTA Manhattanville Bus Depot, all of which have an industrial/transportation character, would remain. The Chevy and Buick Service Station buildings on either side of Broadway would be converted to residential use, and the Sheffield Farms Stable is assumed to be converted and expanded with residential and commercial use. The housing in Subdistrict 2 would remain. In Subdistrict 1, which corresponds to the Proposed Actions' Subdistrict B, land uses and neighborhood character would remain industrial. This contrasts with the Proposed Actions, which are estimated to see some new construction of commercial and retail uses in that area.

Like the Proposed Actions this alternative would preserve the former Warren Nash Service Station building and the Claremont Theater which are historic resources. The alternative would not adversely affect the context for the Nash Building or the Studebaker Building, and (unlike the Proposed Actions) it would retain two additional automobile service station buildings (Chevy and Buick), as well. Also unlike the Proposed Actions, this alternative would not result in demolition of the former Sheffield Stables, thus preserving an additional historic resource. However, the demolition of the former Sheffield Stables is not considered to be a significant adverse neighborhood character impact of the Proposed Actions. Both 197-a Alternative 2 and the Proposed Actions would not adversely affect neighborhood character through changes to historic resources of their contexts. Because it would not widen sidewalks on the side streets or provide the network of open spaces and midblock open areas of the Proposed Actions, the 197-a Plan Alternative 2 would not be as effective in improving access to the waterfront compared with the Proposed Actions.

Both the Proposed Actions and the 197-a Plan Alternative 2 would displace jobs, some of which are held by study area residents, and replace them with a greater number of job opportunities in a broader range of job classifications, thus preserving and expanding the potential employment

base for local residents. Both the alternative and the Proposed Actions would introduce new residents to the Project area, including those living in University Housing and those living in the new residential buildings. The 197-a Plan Alternative 2 would also introduce affordable housing and more new market rate housing in the Project Area than the Proposed Actions. By 2030, the new residential demand from faculty, researchers, and graduate students, coupled with the effect that redevelopment of the Project Area would have on the attractiveness of the study areas as places to live, could lead to rent increases in units not protected by rent control, rent stabilization, or a public housing program. However, the demand would be lower under 197-a Plan Alternative 2. Nonetheless, like the Proposed Actions, this could create a significant adverse indirect residential displacement impact in the primary study area. However, housing in the primary study area would remain typified by large publicly subsidized housing complexes and other rent-regulated housing (representing 73.1 percent of all units), which would be unaffected by the Proposed Actions or 197-a Plan Alternative 2. Therefore, like the Proposed Actions, the significant adverse indirect residential displacement impact of 197-a Plan Alternative 2 would not result in a significant adverse impact on neighborhood character.

Like the Proposed Actions, the population characteristics of the new residents would probably more closely reflect the characteristics of Manhattan residents as a whole, but the numbers of new residents would not be high enough to make a significant difference in the population characteristics prevailing in the study areas. The limited indirect retail displacement that could result from increased rents in the immediate vicinity of the Project Area would not lead to major changes within the primary study area's commercial strips, and would not result in adverse changes to neighborhood character.

Like the Proposed Actions, the 197-a Plan Alternative 2 would increase vehicular, transit, and pedestrian demand, although not to the extent of the Proposed Actions. Like the Proposed Actions, these increases would not cause significant neighborhood character impacts from changes in traffic. Unlike the Proposed Actions, under the 197-a Plan Alternative, which would not include a traffic light on West 125th Street between Broadway and Twelfth Avenue, would not have a significant adverse noise impact at that intersection.

In summary, the like the Proposed Actions, 197-a Plan Alternative 2 would significantly change neighborhood character in the Project Area and, overall, in the primary and secondary areas, but this change would not be adverse, and there would be no significant adverse impact on neighborhood character.

NATURAL RESOURCES

Like the Proposed Actions, the 197-a Plan Alternative 2 development scenario would increase the concentration of pollutants during a combined sewer overflow discharge to the Hudson River, although to a lesser extent than the Proposed Actions. The potential for an increased loss of migratory birds due to building collisions would be lower, due to the reduced level of development expected with the 197-a Plan Alternative 2 development scenario. As discussed in Chapter 11, "Natural Resources," the Proposed Actions would not result in significant adverse impacts on water quality, terrestrial resources, wetlands, floodplains, aquatic resources, or endangered, threatened, or special concern species. The lower amounts of development under the 197-a Plan Alternative 2 development scenario would therefore similarly not result in significant adverse impacts on natural resources.

HAZARDOUS MATERIALS

Generally, developments that may occur within the Project Area in the 197-a Plan Alternative 2 could result in the exposure of construction workers and nearby residents to hazardous materials, if development were to occur on any lot in the Project Area that has the potential for hazardous materials contamination. However, it is assumed that E-designations would be assigned to all projected development sites in Subdistrict 2 for the 197-a Plan Alternative 2 development scenario, and, therefore, the 197-a Plan Alternative 2, like the Proposed Actions, would not result in significant adverse hazardous materials impacts. Unlike the Proposed Actions, under the 197-a Plan Alternative 2, a few sections of the Project Area would remain in their current condition, and subsurface conditions would be largely the same as they are now. There would be a low potential for disturbance of hazardous materials at these locations, but unlike with the Proposed Actions (where remediation would be performed in health and safety plans), there would be little or no remediation of hazardous materials at these locations.

WATERFRONT REVITALIZATION PROGRAM

Like the Proposed Actions, the 197-a Plan Alternative 2 would conform to the policies of the City's Waterfront Revitalization Program and would further the goal of encouraging commercial and residential development within an appropriate coastal zone area. The 197-a Plan Alternative 2 would result in less development within the coastal zone than the Proposed Actions. The 197-a Plan Alternative 2 development scenario, if realized, would replace some of the existing automotive uses, storage facilities, and industrial uses with new residential, commercial, community facility, and manufacturing development. While this development would not occur to the same extent as with the Proposed Actions, it would enliven and attract residents and visitors to the Manhattanville waterfront and the new West Harlem Waterfront park. However, the streetwall requirements for the 197-a Plan Alternative 2 would not provide the widened view corridors that would result from the setback requirements with the Proposed Actions. Overall, with less development than the Proposed Actions, the 197-a Plan Alternative 2 would generate fewer visitors, residents, and workers to the coastal zone and the proposed West Harlem Waterfront park than the Proposed Actions.

INFRASTRUCTURE

The 197-a Plan Alternative 2 would generate less demand for City water supply and sewer services than the Proposed Actions. Based on the projected development scenario, the water demand for the 197-a Plan Alternative 2 is estimated at 556,839 gallons per day (gpd) of water. Like the Proposed Actions, this increased demand would not be large enough to significantly impact the water supply system's ability to deliver water reliably based on the *CEQR Technical Manual* criteria, and demand for water would not be expected to affect local water pressure. Based on the development scenario, the anticipated new sewage generation under the 197-a Plan Alternative 2 development scenario, if realized, would be 258,980 gpd, which would be conveyed to the North River Water Pollution Control Plant (WPCP). This volume is about 0.15 percent of the State Pollutant Discharge Elimination System (SPDES) permitted flow to the North River WPCP. Like the Proposed Actions, the additional sanitary sewage expected to result from the CB9 proposed 197-a Plan Alternative 2 would not cause the North River WPCP to exceed its design capacity or SPDES permit flow limit.

The 197-a Plan Alternative 2 would also require the additional sewer segment upgrades and replacements needed with the Proposed Actions. Like the Proposed Actions, any new

connections and sewer upgrades in the 197-a Plan Alternative 2 would require DEP-approved Drainage Plan amendments. Stormwater from development under the 197-a Plan Alternative 2 development scenario would flow into the existing combined sewers in the Project Area, whereas in the Proposed Actions, stormwater from West 133rd to West 130th Streets between Twelfth Avenue and Broadway would be collected through new storm sewers installed in those streets to reduce the total design flow to the sewers and at the North River WPCP. However, like the Proposed Actions, the 197-a Plan Alternative 2 would not cause any significant adverse impacts to infrastructure systems.

SOLID WASTE AND SANITATION SERVICES

Like the Proposed Actions, the 197-a Plan Alternative 2 development scenario would not result in a significant adverse impact on solid waste and sanitation services. Solid waste generated from the Project Area in the 197-a Plan Alternative 2 development scenario, if realized, would total about 125,133 pounds (or less than 63 tons) per week. Unlike the Proposed Actions, private carters and not the New York City Department of Sanitation (DSNY) would collect, transport, and dispose of the majority of the solid waste in the 197-a Plan Alternative 2. This increase in solid waste generation is not expected to overburden New York City's solid waste handling services.

The 197-a Plan also recommends that a "Zero Waste Zone" be created for all of Community District 9. It is unclear, however, how a "Zero Waste Zone" would be implemented, or whether it is feasible to do so. Accordingly, the amount of solid waste cited above for the 197-a Plan Alternative 2 development scenario conservatively assumes that solid waste would be generated by this alternative at the normal rate.

ENERGY

Like the Proposed Actions, the 197-a Plan Alternative 2 would not result in any significant adverse impacts to energy systems. The increase in energy consumption in the 197-a Plan Alternative 2 development scenario, if realized, would be about 247,481 million British Thermal Units (BTUs) per year, compared with 563,246 million BTUs per year under the Proposed Action. These amounts of additional consumption would be very small compared with the existing energy demands in the Con Edison service area, which total to 513 trillion BTUs per year. Further, this additional demand would not be expected to overburden the energy generation, transmission, and distribution system, and would not cause a significant adverse energy impact. In the 197-a Plan Alternative 2, the Con Edison cooling station located between West 131st and West 132nd Streets and Broadway and Twelfth Avenue would not have to be relocated.

TRAFFIC AND PARKING

Like the Proposed Actions and the Expanded Infill Alternative, the 197-a Plan Alternative 2 development scenario would maintain the same range of uses considered for the Academic Mixed-Use Area under the Proposed Actions but at different space allocations. It does not, however, include the commercial uses permitted in the Proposed Actions' Subdistrict B west of Twelfth Avenue (Subdistrict 1 under this Alternative), but encompasses various residential and retail uses in Subdistrict 2, similar to what was assumed for the Other Area under the Proposed Actions. Although overall, this alternative would yield only approximately 50 percent of the total person- and vehicle-trips projected for the Proposed Actions, the 197-a Plan Alternative 2 development

scenario, when compared with the Proposed Actions without transportation improvements, would likely result in similar significant adverse traffic impacts at several locations in the Project Area (Subdistricts 1 and 2 in the Plan) and along 125th Street east of the Project Area. Since the magnitudes of these impacts are expected to be lower with the 197-a Plan Alternative 2 development scenario, the mitigation required are anticipated to be similar but less extensive. And because all impacted intersections under the Proposed Actions could be fully mitigated, any potential traffic impacts associated with the 197-a Plan Alternative 2 development scenario could be fully mitigated as well. Similar to the Proposed Actions, this alternative would result in the removal of existing parking. However, it would provide a substantially more modest supply of on-site parking for the development components considered. Hence, a greater parking shortfall and significant adverse parking impact than the Proposed Actions would result with this alternative.

An analysis was prepared to compare the potential impacts of the Proposed Actions with those of the 197-a Plan Alternative 2 development scenario. This analysis includes developing trip generation estimates for the 197-a Plan Alternative 2 development scenario, comparing these estimates against projected trips generated by the reasonable worst-case transportation scenario for Subdistrict A of the Proposed Actions and the surrounding projected development (in Subdistrict B and the Other Area east of Broadway) in 2030, and identifying similarities and differences in traffic- and parking-related issues between the 197-a Plan Alternative 2 and the Proposed Actions without project improvements, as presented in Appendix M, "Impacts of the Proposed Actions without Transportation Improvements." The trip generation results and assessment of potential traffic impacts for the 197-a Plan Alternative 2 development scenario are summarized below.

Trip Generation

The projection of future trips associated with the 197-a Plan Alternative 2 development scenario considers the same range of uses as what was analyzed for the Proposed Actions. Based on the trip generation estimates summarized in Tables 24-20 and 24-21, the 197-a Plan Alternative 2 development scenario would generate 51, 50, and 48 percent fewer total person trips and 51, 48, and 49 percent fewer total vehicle trips than the Proposed Actions during the AM, midday, and PM peak hours, respectively.

Table 24-20
Comparison of 197-a Plan Alternative 2 and Proposed Actions: Person Trips

Peak Hour	Scenarios	Mode of Travel						
		Auto	Taxi	Subway	Bus	Other	Walk	Total
AM	Proposed Actions	1,126	126	2,457	504	133	1,489	5,835
	197-a Plan Alternative 2	537	60	1,208	244	64	754	2,867
Midday	Proposed Actions	546	192	889	409	118	4,192	6,346
	197-a Plan Alternative 2	282	88	471	195	58	2,067	3,161
PM	Proposed Actions	1,341	182	2,660	608	134	1,983	6,908
	197-a Plan Alternative 2	690	92	1,351	305	65	1,106	3,609

Notes:
Proposed Actions = Reasonable Worst-Case Transportation Scenario + Subdistrict B and the Other Area developments
CB9 Proposed 197-a Plan = Mixed-use development scenario within Subdistrict 2
Other = Columbia shuttle and commuter rail

Table 24-21
Comparison of 197-a Plan Alternative 2 and Proposed Actions: Vehicle Trips

Peak Hour	Scenarios	Type of Vehicle				
		Auto	Taxi	Truck	Shuttle	Total
AM	Proposed Actions	925	180	90	24	1,219
	197-a Plan Alternative 2	435	88	50	24	597
Midday	Proposed Actions	400	214	92	24	730
	197-a Plan Alternative 2	204	100	50	24	378
PM	Proposed Actions	1,061	242	38	24	1,365
	197-a Plan Alternative 2	532	122	20	24	698

Notes:
Proposed Actions = Reasonable Worst-Case Transportation Scenario + Subdistrict B and the Other Area developments
CB9 Proposed 197-a Plan = Mixed-use development scenario within Subdistrict 2

Traffic

As demonstrated above, the 197-a Plan Alternative 2 development scenario would generate substantially fewer vehicle trips to and from the Project Area than the Proposed Actions. These trips would also flow in a similar pattern as that of the Proposed Actions without project improvements. The analyses results presented in Appendix M, "Impacts of the Proposed Actions without Transportation Improvements," concluded that the Proposed Actions absent the transportation improvements would result in significant adverse traffic impacts at 11, 9, and 11 Project Area intersections during the AM, midday, and PM peak hours, respectively. The 197-a Plan Alternative 2 development scenario would likely result in similar significant adverse traffic impacts at some or all of these locations. In addition, it is expected to result in significant adverse traffic impacts at intersections along 125th Street east of the Project Area and possibly at other primary/secondary study area locations identified in Chapter 17, "Traffic and Parking." Since the magnitudes of these impacts are expected to be lower with the 197-a Plan Alternative 2 development scenario, the mitigation required are anticipated to be similar but less extensive. Since all impacted intersections under the Proposed Actions could be fully mitigated, any potential traffic impacts associated with the 197-a Plan Alternative 2 development scenario could be fully mitigated as well.

Parking

Similar to the Proposed Actions, the 197-a Plan Alternative 2 development scenario would provide on-site parking for Columbia University uses. Based on the programming described above, approximately 535 on-site parking spaces would be created with this alternative. This parking supply is estimated to meet only approximately half of the projected demand from this alternative. While some of the demand shortfall could be accommodated on-street, the 197-a Plan Alternative 2 development scenario would yield a greater off-street parking shortfall and significant adverse parking impact, totaling up to approximately 950 spaces, than the Proposed Actions (shortfall of just over 120 spaces). As presented in Chapter 23, the potential public parking facility north of West 135th Street under the Henry Hudson Parkway and additional spaces from the 560 Riverside Drive Columbia University accessory parking garage could partially mitigate this projected parking impact. However, unlike the Proposed Actions, there would still be an unmet parking demand with this alternative, resulting in an unmitigatable significant adverse parking impact.

TRANSIT AND PEDESTRIANS

Subways

Significant adverse subway impacts were identified for the Proposed Actions at the E101 and E102 escalators at the 125th Street No. 1 subway station. With substantially fewer projected peak hour subway trips, the 197-a Plan Alternative 2 development scenario would not be expected to result in significant adverse impacts at these station elements. Hence, it would also not warrant the recommended replacement of the existing escalators, as proposed mitigation for the Proposed Actions, with wider and more efficient escalators.

Buses

As shown above, the 197-a Plan Alternative 2 development scenario would generate fewer bus trips than the Proposed Actions. While significant adverse bus impacts are still expected to occur, they would be at lower magnitudes and require fewer additional buses to mitigate the projected impacts.

Pedestrians

With fewer overall person-trips projected for the 197-a Plan Alternative 2 development scenario, as compared with the Proposed Actions, there would also be fewer pedestrian trips made on the analyzed pedestrian elements. Therefore, some of the projected significant adverse pedestrian impacts identified in Appendix M, "Impacts of the Proposed Actions without Transportation Improvements," would not occur with this alternative, and where impacts may occur, the required mitigation would be less extensive.

AIR QUALITY

The 197-a Plan Alternative 2 development scenario, if realized, would add new community facility, commercial, open space, and residential uses to a portion of the Project Area, although at a much lower density as compared with the Proposed Actions. As described above in "Traffic and Parking," travel to the destination uses proposed in the 197-a Plan Alternative 2 development scenario, including community facilities, offices, manufacturing space, and local retail, would share similar vehicular characteristics and peaking patterns with those with the Proposed Actions, although direction and location of traffic flow would differ. Overall, the volume of vehicles would be lower than with the Proposed Actions, and even in the few locations where the number of cars and trucks would be greater than with the Proposed Actions, the difference would not be great enough to create substantial increases in CO concentrations. Like the Proposed Actions, the 197-a Plan Alternative 2 would not be expected to have a significant adverse impact on air quality from mobile sources of pollution.

Under the 197-a Plan Alternative 2 development scenario, it is anticipated that new buildings would have separate HVAC systems, whereas most of the heating and cooling for the University buildings with the Proposed Actions would be provided by the proposed central energy plants. As part of the studies of the 197-a Plan Alternative for the DEIS, screening analyses (using the methodology described in the *CEQR Technical Manual*) as well as detailed analyses (using the EPA AERMOD dispersion model), assuming No. 4 fuel oil and/or natural gas, were performed to assess air quality impacts from the 197-a Plan Alternative development scenario HVAC systems. The analyses determined that at most of the development sites, utilizing either fuel would not result in significant adverse air quality impacts. For a small number of sites, analyses showed that the fuel had to be restricted to natural gas and/or the HVAC stacks would need to be placed a

minimum distance from the nearest receptor site to avoid significant impacts and to ensure that maximum pollutant concentrations would be below NAAQS. This could be achieved by incorporating E-designations into the rezoning proposal for each of the affected sites. The E-designation would provide restrictions regarding the location of HVAC exhaust stacks and/or require the use of natural gas for fossil fuel-fired HVAC equipment.

Similarly for the 197-a Alternative 2 development scenario, some E-designations would be necessary to avoid potential significant impacts. Therefore, like the Proposed Actions, the 197-a Plan Alternative 2 development scenario would not be expected to result in significant adverse impacts on air quality from stationary sources of pollution. It is expected that no violations of the NAAQS would be predicted to occur in the 197-a Plan Alternative 2, and this alternative would be consistent with the New York SIP.

The juxtaposition of new community facilities and existing or new manufacturing operations that would coexist as part of the 197-a Plan Alternative 2 raises the question of possible air quality issues with respect to manufacturing or processing facilities and potential sensitive uses under the 197-a Plan Alternative 2 development scenario. However, none of the properties that would remain with the 197-a Plan Alternative 2 within the Academic Mixed-Use Area were found to possess a federal, state or local air permit. Therefore, no additional sources of air emissions from manufacturing or processing facilities would be present as compared with the Proposed Actions.

With regard to potential impacts from an accidental chemical spill within a fume hood at an academic research building in the Academic Mixed-Use Area under the 197-a Plan Alternative 2 development scenario, some design modifications might be necessary to avoid potential impacts from an accidental chemical spill within a fume hood. However, with these modifications no significant adverse impacts would be expected to occur.

NOISE

The 197-a Plan Alternative 2 development scenario would, if realized, generate fewer vehicle trips than the Proposed Actions, and those trips would be distributed differently on the network than for the Proposed Actions; this condition applies to the Proposed Actions both with and without transportation improvements. However, noise levels with the 197-a Plan Alternative 2 development scenario would be comparable to noise levels with the Proposed Actions without traffic improvements. Both the 197-a Plan Alternative 2 development scenario and the Proposed Actions scenario without transportation improvements would not have a midblock traffic signal on West 125th Street between Broadway and Twelfth Avenue (to facilitate pedestrian movements), and, therefore, both scenarios would result in significant noise impacts at receptor Site 10. At all other locations, the 197-a Plan Alternative 2 development scenario, similar to the Proposed Actions, both with and without traffic improvements, would not result in any significant noise impacts. In addition, it would be expected that comparable levels of attenuation, at the same locations, would be necessary under the 197-a Plan Alternative 2 development scenario as those specified under the Proposed Actions.

CONSTRUCTION

The 197-a Plan Alternative 2 development scenario, if realized, would result in new manufacturing, community facility, commercial, open space, and residential uses on a portion of the Project Area, although to a lower density as compared with the Proposed Actions. Of the 35 sites identified as possible for development in Subdistrict 2 of the 197-a Plan Alternative 2, 15 would likely undergo conversion, and 20 would require new construction. The 197-a Plan does

not assume the implementation of the state-of-the-art air quality pollutant emission reduction program nor assure the implementation of the noise reduction measures committed to by Columbia University for construction in Subdistrict A for the Proposed Actions (see Chapter 21 for a discussion of the emission reduction and noise reduction program commitments). Accordingly, although the alternative would be smaller in scale and its construction activities shorter in duration than those of the Proposed Actions, the potential for construction impacts would exist. However, similar to construction on sites under the Proposed Actions located outside the Academic Mixed-Use Area, E-designations or similar measures could be applied to development sites in order to provide for emission and noise reduction measures. In the event that comparable E-designations were not enacted as part of any rezoning required for the 197-a Plan Alternative 2, construction associated with the 197-a Plan Alternative 2 could result in significant adverse air quality impacts.

Economic benefits attributable to construction expenditures and construction jobs are a direct function of the cost of construction. Since the 197-Plan Alternative 2 development scenario, if realized, would result in a development that would be considerably smaller than that of the Proposed Actions, its economic benefits during construction would be proportionally smaller, as well. Although no projection of likely construction cost are available, based on typical cost per square foot the 197-a Plan Alternative 2 development would likely entail construction costs of about 10 percent of those under the Proposed Actions. As a result, the economic benefits attributable to construction expenditures and construction jobs would be approximately 10 percent of those that would result with the Proposed Actions, or about $1 billion in total economic activity.

PUBLIC HEALTH

As with the Proposed Actions, with emissions reduction measures in place, but with less intensive construction activities, no significant adverse public health impacts with respect to air quality would be expected from construction activities in the Project Area. Similar to the Proposed Actions, while construction activities would produce noise levels of a magnitude that at times are annoying and intrusive, construction activities for the 197-a Plan Alternative 2 would only occur for a limited number of hours per day, and for a limited time period. Based upon the limited durations of these noise levels, the noise produced by construction activities would not result in a significant adverse public health impact.

197-A PLAN ALTERNATIVE 2 WITH FURTHER REVISIONS

As discussed above, CB9 also proposed a "relaxed" version of the development assumptions for 197-a Plan Alternative 2, under which the requirement to preserve buildings of historic interest to CB9 would be removed. As a result, the Chevy and Buick Service Station buildings, owned by Columbia and Tuck-It-Away, were assumed to be demolished and replaced by new construction. The West Market Diner was assumed to be relocated to another site in Subdistrict 1. In addition, this plan acknowledged Columbia's ownership of the Broadway frontage on the triangular site for the proposed park on West 125th Street and assumed that Columbia would build an academic building there. Thus, the size of the park would be reduced.

DEVELOPMENT SCENARIO FOR SUBDISTRICT 2 (197-A PLAN 2-RELAXED)

As shown in Figure 24-28, under the relaxed version of 197-a Plan Alternative 2, the development scenario for Subdistrict 2 in the Academic Mixed-Use area would contain four academic research buildings, five academic buildings, one mixed-use building for academic

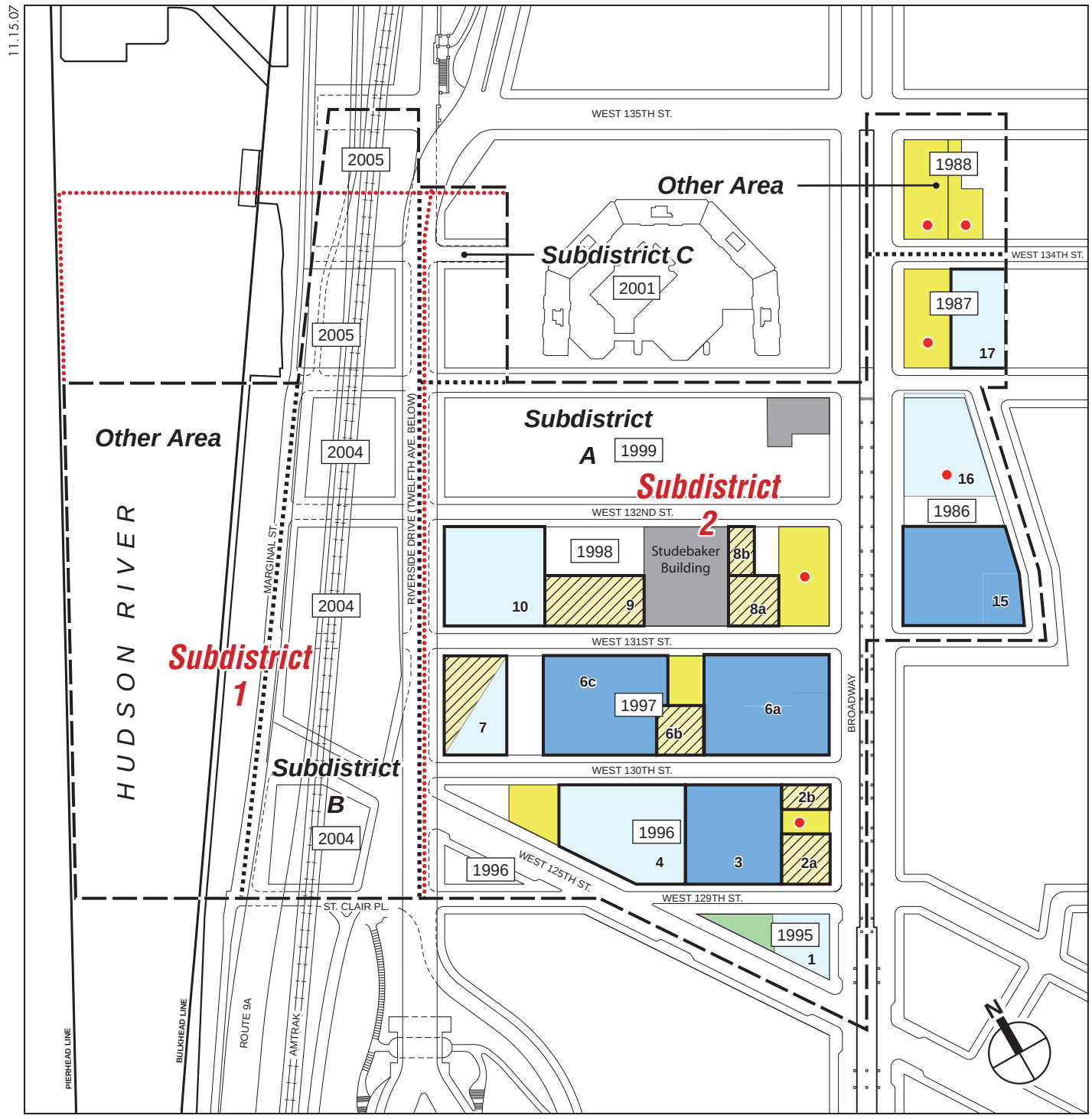

Figure 24-28

197-a Plan Alternative 2 Relaxed: Land Use

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

program and University housing, and six buildings for University housing, five of which would have small footprints. The triangular block between West 125th and West 129th Streets would contain an academic building with a smaller public open space. In order to produce as much academic research as possible, the buildings would have to be tall, although not as tall their counterparts under 197-a Plan Alternative 2. The academic research building on Sites 3 and 6d would be 254 feet, without rooftop mechanical space, which is near but not taller than the maximum heights of the Proposed Actions (see Figure 24-29).

Table 24-22
Columbia University Development: Proposed Actions Compared with 197-a Plan Alternative 2 -Relaxed (sf in 000s)

	Proposed Actions	197-a Plan Alternative 2-Relaxed	Alt/PA
Above Grade			
Academic Research	2,597.0	1,286.7	
Academic	1,255.5	906.5	
University Housing	509.2	386.4	
Recreation	250.7	0	
Subtotal Program Space	**4,612.4**	**2,579.6**	**55.9%**
Retail	162.6	31.8	
Academic Research Support		257.9	
MTA Parking		0	
Parking		0	
Ramp, Mechanical, Loading, Freight, etc.		285.2	
Total Above Grade	**4,775.0**	**3,154.5**	**66.1%**
Below Grade			
Academic Research Support	296.2	0	
Below Grade Academic Program	69.8	0	
Swimming/Diving Center	145.4	0	
Subtotal Program Space	**511.5**	**0**	**0%**
Central Energy Plant	70.2	0	
Ramp, Mechanical, Loading, Freight, etc.	429.2	136.3	
Storage	189.2	136.3	
Parking	705.6	211.4	
MTA Parking	80.0	0	
Total Below Grade	**1,985.7**	**484.0**	**24.4%**
Above and Below Grade			
Academic Research	2,597.0	1,286.7	49.5%
Academic	1,325.4	906.5	68.4
University Housing	509.2	386.4	75.9
Recreation	396.1	0	0
Subtotal Academic Program	**4,827.7**	**2,579.6**	**53.4%**
Academic Research Support*	296.2	257.9	87.1%
Retail	162.6	31.8	19.6
Central Energy Plant	70.2	0	0
Ramp, Mechanical, Loading, Freight, etc*	429.2	421.5	98.2
Storage	189.2	136.3	72.0
Parking	705.6	211.4	30.0
MTA Parking	80.0	0	0
Total Other Uses	**1,404.0**	**1,058.9**	**75.4%**
GRAND TOTAL	**6,760.7**	**3,638.6**	**53.8%**
Note: * Above grade space is less efficient than centralized below grade space.			

The footprints of the larger buildings would be more regular, because this version assumes that the Columbia owned or controlled buildings marked for preservation by 197-a Plan Alternative 2, but not found to be eligible resources by LPC or OPRHP, would be demolished. Because the Service Station (Chevy) and Buick buildings, owned by Tuck-It-Away, were also not determined eligible for landmarking or listing on the State and National Registers of Historic Sites, in this alternative

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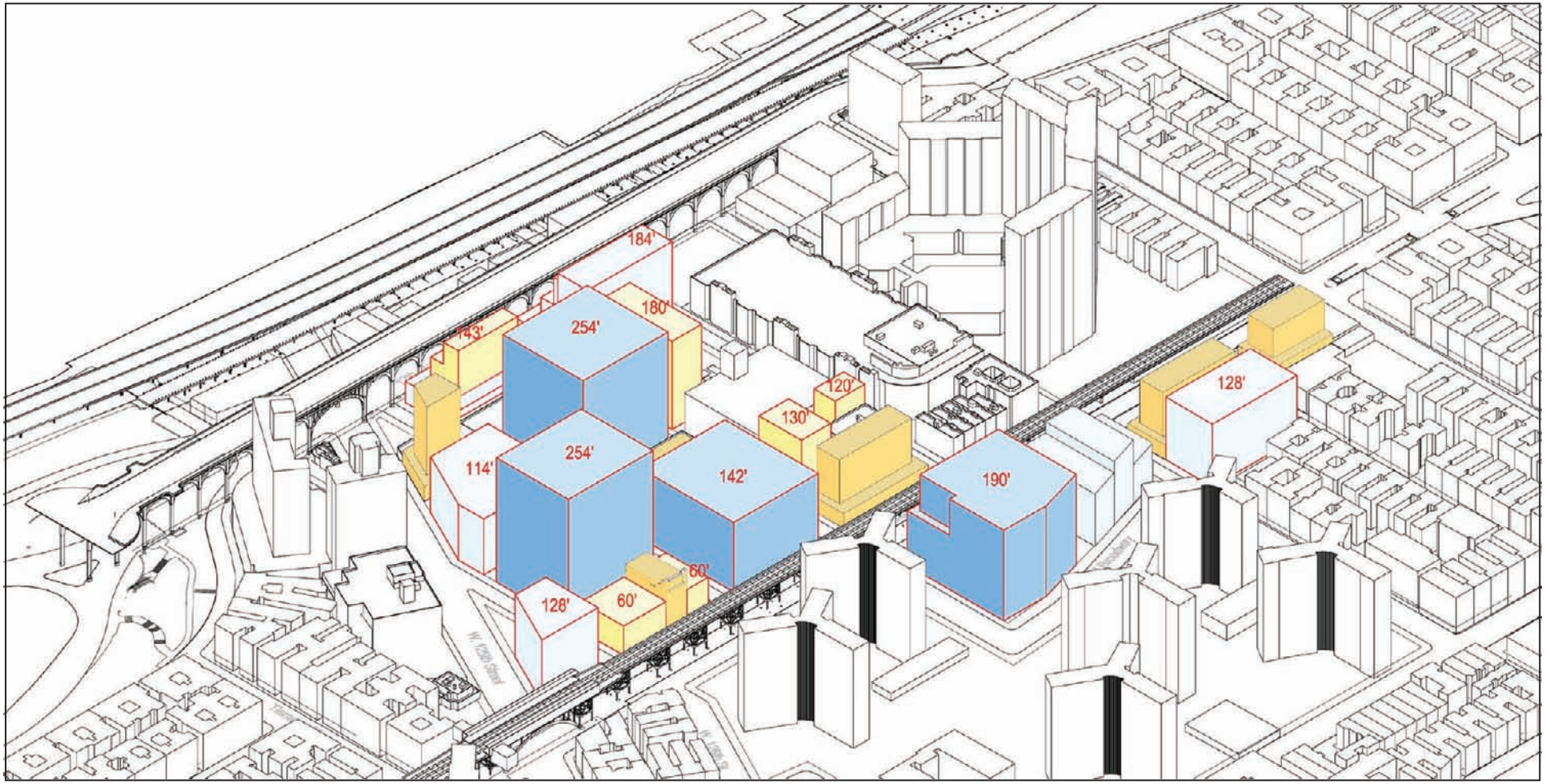

Academic Research

University Housing

Academic

Residential

MANHATTANVILLE IN WEST HARLEM REZONING AND ACADEMIC MIXED-USE DEVELOPMENT

Figure 24-29

197-a Plan Alternative 2 Relaxed: Massing Diagram View Northwest

they are assumed to be demolished and their sites redeveloped with residential use and ground-floor retail. The other two sites owned by Tuck-it-Away would be demolished and redeveloped with new residential buildings, as in 197-a Plan Alternative 2. There would be no new development on the block containing the MTA Manhattanville Bus Depot, and all other publicly owned property would remain in its existing use. There would be no new development in the portion of Subdistrict 2 that corresponds to Subdistrict C in the Proposed Actions. In the portion of Subdistrict 2 containing the properties known as Other Area east of Broadway in the Proposed Actions, the Claremont Theater would be preserved with residential use built next door.

Like the 197-a Plan Alternative 2, the development scenario for the relaxed version is substantially different from that of 197-a Plan Alternative 1; because it accommodates large footprint buildings on merged lots. The 197-a Plan Alternative 2-Relaxed would offer more opportunities for the types of buildings accommodated in the Proposed Actions than the 197-a Plan Alternative 2, but it would still provide only 53 percent of the program space available under the Proposed Actions, and only half of academic research program space (see Table 2-22).

As shown in Table 24-23, the private sites under 197-a Plan Alternative 2-Relaxed would produce the same amount of housing as they would with the 197-a Plan Alternative 2, because the residential maximum FAR of 4 would limit that use, whether it was produced through conversion or new construction. Total new development under the 197-a Plan Alternative 2-Relaxed would be 3.79 million sf, compared with 7.09 million sf for the Proposed Actions.

Table 24-23
Projected Development: Proposed Actions Compared with 197-a Plan Alternative 2- Relaxed

	Proposed Actions	197-a Plan Alternative 2-Relaxed
Subdistrict A – Overlap with Subdistrict 2		
Columbia University Uses		
Program Space - Including Academic Research Support	5,126,900	2,837,500
All other uses	1,636,800	392,800
Subtotal Columbia University	**6,763,700**	**3,230,300**
Non-Columbia University Uses		
Residential	N/A	248,580 (275 units)
Retail	N/A	132,100
Subtotal Non-Columbia University	**N/A**	**380,680**
Subtotal Subdistrict A	**6,763,700**	**3,610,980**
Subdistrict B		
Commercial Uses		
Retail	124,196	0
Office	54,808	0
Subtotal	**179,004**	**0**
Subdistrict C[1] Subtotal	**0**	**0**
Other Area East of Broadway - Overlap with Subdistrict 2		
Residential	88,819 (99 units)	113,755 (127 units)
Retail	0	60,450
Community facility	61,698	0
Subtotal	**150,517**	**174,205**
Total	**7,090,194**	**3,785,185**

Note: 1. There are no projected development sites in Subdistrict C.

ABILITY TO MEET THE GOALS AND OBJECTIVES OF THE PROPOSED ACTIONS

Both 197a Plan Alternative 2 and its "relaxed" scenario would not meet the goals and objectives of the Proposed Actions for the following reasons:

- The Alternative could not accommodate Columbia's long-term needs for space. Whereas the Proposed Actions would produce 4.8 million sf of academic program space, 197-a Plan Alternative 2 would produce only 2.4 million square feet of academic program space, or 50 percent of the required floor area. The relaxed scenario would raise this total to 2.6 million sf, or 53 percent of the required floor area. Space for academic research, the University's key program objective, would be only 46 percent of that of the Proposed Actions (1.2 million sf compared with 2.6 million square feet) in the 197-a Plan Alternative 2 or 50 percent with the relaxed scenario. Because this Alternative would not fulfill long-term needs for space, the University would not be able to avoid ad hoc acquisition of properties in neighborhoods outside of Columbia's existing campuses.
- The reduced floor area compared with the Proposed Actions would occur at critical locations, which would further reduce the Alternative's ability to meet project goals and objectives. In particular, the alternative could not accommodate the Phase 1 uses of the Proposed Actions. The tall academic research building on Site 3 would be sufficient to meet the program floor area goals (350,000 sf) for the Jerome L. Greene Science Center but there would be insufficient space and floor area for the Business School and the School of the Arts. Columbia would be unable to achieve the diverse mix of major anchor programs planned for Phase I, and advises that the likelihood that the Jerome L. Greene Science Center would alone advance is uncertain. In addition, according to Columbia University, SIPA has been attracted to a location in Manhattanville based largely on the presence of the Business School, with which it enjoys a strong relationship; Columbia advises that if the Business School were unable to come to Manhattanville, a relocation of SIPA would be unlikely as well. There would also be less room for active, contiguous ground-floor retail, no space at all for the small Square, and the land for the Grove would not be available. Thus, this Alternative would not achieve the Phase I objectives of transforming West 125th Street as a gateway to the waterfront and the West Harlem Waterfront Park, or of acting as a major entrance to the proposed new graduate Manhattanville campus for Columbia University. The relaxed scenario would provide slightly more floor area in this location, but with a smaller park. This would not alter the conclusion for the 197-a Plan Alternative 2.
- The lack of the full central below grade service area would reduce the functionality of the Academic Mixed-Use Development, the ability of the University to produce buildings with full program space and limit the ability to create a campus environment. Specifically, without the central below-grade service area, there would be no central loading facility and centralized parking, no major shared academic support space, no centralized mechanical/HVAC systems, and no additional floor area for business school classrooms, and other academic programs. As a result, each building would have its own truck loading docks and those buildings with below grade parking would each have car ramps on the streets. These activities would be generally disruptive to a campus atmosphere. In addition, support uses that would be shared among buildings when located below grade, if located above grade would have to be duplicated in each building—each building would have its own boilers and HVAC system, each would have to have a mechanical floor above grade, and each academic research building would have academic research support space occupying at least two above-grade floors. Locating support uses above grade would restrict the amount of program

space that could be achieved in each building and the ability of the University to achieve its program goals would be constrained.

- This Alternative would achieve only limited success in creating a campus with open space and amenities for university and community users, improved pedestrian conditions and improved visual and physical access to the waterfront. As noted above, the open spaces would be fewer and smaller than under the Proposed Actions and there would be no north-south pedestrian path, central Large Square, or Small Square. The curb cuts and truck docks would diminish the attractiveness of the area for pedestrians. The reduction in active ground floor uses and their lack of contiguity would also decrease the area's attractiveness for pedestrians. The absence of widened sidewalks on the narrower side streets would also reduce this alternative's ability to improve views of and access to the waterfront. As noted above, the inability to create the full Phase 1 program, with the Jerome L. Greene Science Center and three key graduate schools plus new open space, would reduce this Alternative's ability to enliven and activate West 125th Street as a gateway to the waterfront.

G. COGENERATION ENERGY SUPPLY ALTERNATIVE

The academic research facilities proposed for the Academic Mixed-Use Area would have high year-round energy requirements and would need highly reliable utilities. A cogeneration plant, which could generate a portion of the electricity needed to serve the academic research buildings and the other campus facilities, instead of purchasing electricity from Con Edison, is being considered as an option to increase reliability of electrical service and potentially decrease its costs. In the Cogeneration Energy Supply Alternative, a cogeneration plant would be constructed to provide power, as well as heating and cooling, to the buildings for the Academic Mixed-Use Area within the area bounded by Broadway, West 125th Street, Twelfth Avenue, and West 132nd Street. The cogeneration system would generate a portion of the electricity needed to serve the academic research buildings, instead of requiring the purchase of electricity from Con Edison. This could reduce operating costs by producing electrical power at a lower cost than purchased electricity from the local grid. The cogeneration system would also simultaneously produce waste heat, which would reduce the amount of required fuel for steam generation at central plant boilers. In addition, the Cogeneration Energy Supply Alternative would allow Columbia University to provide a significant amount of standby power and steam to critical campus functions during a utility outage. Cogeneration systems are also an important component of energy and environmental design objectives.

This section considers the potential impacts from the Cogeneration Energy Supply Alternative. The cogeneration plant would be located beneath Site 3, in the southern portion of the service area. In this alternative, the central energy plant proposed at Site 14, and package boiler systems proposed for the three buildings east of Broadway and one building on Site 1 south of West 129th Street, would be identical in terms of equipment and operation to those proposed as part of the Proposed Actions. (Refer to Chapter 19 for a description of the boiler systems proposed at these sites.)

2015

In this alternative, the cogeneration plant in 2015 would have a maximum capacity of 5 megawatts (MW). It would provide a portion of the electricity needed for the south central energy plant's service area. Additional electric power would be provided by Con Edison. By 2015, the central energy plant would serve a portion of this area, specifically Sites 2, 3, 4, and 7.

The cogeneration plant would include a combustion turbine, a duct burner, and a heat recovery steam generator (HRSG). Steam generated by the HRSG would be used to service a portion of the Academic Mixed-Use Area's steam heating demand and to drive mechanical air-conditioning equipment. The total steam generating capacity of the cogeneration plant would be approximately 35,000 pounds per hour (lb/hr). Additional steam would be provided by two 40,000 lb/hr boilers (one operating and one spare) as needed, to serve the buildings that would be constructed by 2015 within the central energy plant's service area. The maximum steam demand in the 2015 analysis year is therefore anticipated to be approximately 75,000 lb/hr. In the event the cogeneration plant was not available due to maintenance or other reasons, the conventional boilers would be used to generate steam.

The cogeneration plant would use natural gas as its primary fuel, or ultra-low-sulfur distillate (ULSD) fuel oil (a maximum of 0.003 percent by weight) as a secondary fuel. The duct burner would utilize natural gas exclusively. The cogeneration plant would be equipped with a selective catalytic reduction (SCR) system to minimize emissions of nitrogen oxides (NO_x), and an oxidation catalyst to control carbon monoxide (CO) and Volatile Organic Compounds (VOCs). The SCR system would be urea-based. The urea would be converted to ammonia and then injected downstream of the HRSG, which would then react with the NO_x present in the gas stream. Ammonia slip (unreacted ammonia that is emitted from the exhaust stack) would be limited to 2.5 parts per million by volume at 15 percent oxygen (based on a 90 minimum reduction in NO_x emissions). Emissions of CO would also be reduced by a minimum of 90 percent through the use of an oxidation catalyst.

Liquid urea would be stored in a tank in the central energy plant basement in a separate enclosed space. Urea is commonly used as a fertilizer and is relatively non-toxic. It is not classified as an inhalation hazard under U.S. Environmental Protection Agency (EPA) or U.S. Occupational Safety and Health Administration (OSHA) regulations and does not require the special transportation and handling procedures associated with anhydrous or aqueous ammonia. In the unlikely event of a tank leak or rupture, the urea spill would be contained by a secondary containment structure, and the urea tank storage area would be ventilated using the building's own ventilation exhaust system. Since urea is not considered to be inhalation hazard, no adverse air quality impacts to public health or the environment would occur from urea storage under normal operations or in the unlikely event of a release.

The exhaust stacks for the combustion turbine would be located on Site 2.

2030

By 2030 the maximum capacity of the cogeneration plant would be increased to 15 MW. For analysis purposes, the cogeneration plant is assumed to consist of two 7.5-MW natural gas-fired combustion turbines, each equipped with a duct burner and HRSG. Each combustion turbine would be capable of producing up to 75,000 lb/hr of steam when duct firing is used, to generate sufficient steam for the central energy plant's service area. The two 40,000 lb/hr boilers installed as part of the initial cogeneration plant would remain, and an 80,000 lb/hr boiler would be installed beneath Site 3 to provide additional backup steam generating capability in the event the cogeneration plant was not available due to maintenance or other reasons. The central energy plant beneath Site 3 would therefore consist of two 40,000 lb/hr boilers and one 80,000 lb/hr boiler. A maximum of 80,000 lb/hr of boiler capacity would operate in conjunction with cogeneration, with the remaining capacity as standby.

As with the Proposed Actions, a second central energy plant would be constructed on Site 14 to serve the entire block bounded by Broadway, West 132nd Street, Twelfth Avenue, and West 133rd Street. This central energy plant would have the same design and operating configuration as presented for the Proposed Actions (see Chapter 18, "Air Quality"). The final configuration would therefore consist of two 7.5-mw combustion turbines with duct burner HRSGs and two 40,000 lb/hr boilers in the central energy plant beneath Site 3; and two 40,000 lb/hr burners and one 80,000 lb/hr boiler in the central energy plant beneath Site 14.

As with the 2015 design, SCR/oxidation catalyst control technology would be used to reduce NO_x and CO emissions from the combustion turbines and duct burners.

CENTRAL ENERGY PLANT EMISSIONS

Stack exhaust parameters and emission estimates for the proposed central energy plant sources with cogeneration were conservatively estimated for the 2015 and 2030 Build years.

Short-Term Emissions

Short-term emissions rates were calculated based on emission factors obtained from various sources, including vendor guarantees and equipment specifications, and the EPA *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources.* The SO_2 emission factors when burning fuel oil were calculated based on the maximum sulfur content of the fuels using the appropriate AP-42 formula. PM_{10} and $PM_{2.5}$ emissions include both the filterable and condensable fractions and are based on AP-42. For the full build-out in 2030, the combustion turbines and central energy plant boilers would utilize natural gas exclusively. A Restrictive Declaration would be required to ensure that no significant adverse impacts occur from emissions of $PM_{2.5}$ from the Cogeneration Energy Supply Alternative. This would include limitations on the annual fuel usage and minimum stack heights for the combustion turbines and boilers.

Multiple scenarios were modeled to estimate emissions and predict short-term stationary source impacts from the cogeneration plant in this alternative. The combustion turbines would operate on either natural gas or ULSD, and the boilers would operate on either natural gas or distillate fuel oil. In addition, the cogeneration plant equipment would be capable of operating at various loads depending on the steam and electrical demands of the buildings in the Academic Mixed-Use Area. The combustion turbines would normally operate at full (100 percent) load to the maximum extent possible; however, they could potentially operate at between 75 percent and 100 percent. In addition, the turbines would operate with duct firing to maximize steam output; however, under partial load conditions duct firing would not be employed. For the air quality analysis, the 2015 cogeneration plant was assumed to operate without duct firing, while a single 40,000 lb/hr boiler was assumed to operate at maximum (100 percent) load. The 2030 air quality analysis assumed both combustion turbines operating at full load. The stack exhaust parameters and the estimated maximum short-term emission rates for the cogeneration plant sources are provided in Table 24-24 for the 2015 and 2030 Build conditions.

Table 24-24
Cogeneration Plant Alternative
Short-Term Emissions and Stack Parameters

Parameter			2015 Natural Gas	2015 Oil	2030 Natural Gas
Liquid Fuel Sulfur Content %			N/A	0.003	N/A
Ambient Temperature (°F)			0	0	0
Load			100%	100%	100%
Combustion Turbine Heat Input (MMBtu/hr, HHV)			66.7	66.1	95.4
Combustion Turbine Emissions	Lb/MMBtu, HHV	NOx	--	--	--
		CO	--	--	--
		$PM_{10}/PM_{2.5}$	0.0066	0.012	0.0066
		SO_2 (1)	--	0.0030 (4)	--
	Lb/hr	NO_x (2)	3.60	25.10	8.60
		CO (2)	3.70	8.00	10.40
		$PM_{10}/PM_{2.5}$	0.44	0.79	0.63
		SO_2	0.20 (4)	0.20	0.30
Duct Burner			N	N	Y
Duct Burner Fuel			--	--	Natural Gas
Duct Burner Load			0%	0%	100%
Duct Burner Fuel Flow (lbs/hr)			0	0	1,963
Duct Burner Heat Input (MMBtu/hr, HHV)			0.0	0.0	44.8
Duct Burner Emissions	Lb/MMBtu, HHV	NOx(2)	0.080	0.080	0.080
		CO(2)	0.080	0.080	0.080
		$PM_{10}/PM_{2.5}$	0.010	0.010	0.010
		SO_2 (3)	--	---	--
	Lb/hr	NO_x	0.00	0.00	3.58
		CO	0.00	0.00	3.58
		$PM_{10}/PM_{2.5}$	0.00	0.00	0.45
		SO_2	0.00	0.00	0.20 (3)
Stack Height (above datum, ft) (6)			335.7	335.7	335.7
Stack Height (above building roof, ft) (6), (7)			135	135	135
Stack Exhaust Temperature (°F)			326	326	299
Stack Exhaust Flow (lbs/hr)			165,896	166,224	231,132
Stack Exhaust Flow (ACFM)			55,680	55,790	74,909
Stack Exhaust Diameter (feet)			4	4	5
Stack Exhaust Velocity (ft/s)			73.8	74.0	63.6
Stack Exhaust Emissions	Lb/hr	NOx	0.36	2.51	1.22
		CO	0.37	0.80	1.40
		$PM_{10}/PM_{2.5}$	0.44	0.79	1.08
		SO_2	0.20	0.20	0.50

Notes:
(1) Combustion turbine SO_2 natural gas emission factors based on vendor data.
(2) NOx and CO emission factors based on vendor data.
(3) SO2 duct burner emissions based on vendor data.
(4) SO2 fuel oil emission factor based on AP-42, Table 3-1.2a. Assumed use of ultra-low sulfur fuel oil with a sulfur content of 0.003%.
(5) 2030 emission rates are for each combustion turbine/duct burner.
(6) Manhattan datum is defined as 2.75 feet above mean sea level.
(7) Stack heights referenced above roof are measured from the roof itself, i.e., do not include any building mechanical space above the roof.

Annual Emissions

Annual emissions and air quality impacts for the Cogeneration Energy Supply Alternative were determined assuming conservative estimates of annual use. For the cogeneration plant, it was assumed that maximum operations would include the combustion turbine operating at 100 percent load without duct firing on an annual average basis. Based on steam demand projections for the 2015 Build condition, one 40,000 lb/hr boiler was assumed to operate at 27 percent load

on an annual average basis. For the 2030 Build condition, the air quality analysis assumed both 7.5 MW combustion turbines would operate at full load without duct firing, which is sufficient to meet anticipated steam demand. Boilers would also need to provide supplemental steam when sufficient demand is present; however, for modeling purposes, the cogeneration plant was assumed to provide the steam necessary for the buildings since it results in higher modeled emissions for the primary pollutant of concern ($PM_{2.5}$).

The worst-case scenario assumed that in 2015 the combustion turbines would operate up to 30 days per year on fuel oil and the remaining period on natural gas, while in 2030, the combustion turbines would operate on natural gas exclusively. For the central energy plant boilers, the 2015 Build analysis conservatively assumed that they would operate exclusively on oil, while in the 2030 Build analysis, the boilers would operate exclusively on natural gas (to minimize pollutant impacts). The package boiler systems at Sites 1, 16, and 17 would be dual-fueled (natural gas and distillate fuel oil with a maximum sulfur content of 0.2 percent by weight), and the package boiler system at Site 15 would operate exclusively on natural gas. The assumptions and limitations for the fuels to be used for the central energy and package boiler systems are identical to the Proposed Actions. Tables 24-25 and 24-26 present the annual emission rates and stack parameters for the 2015 and 2030 cogeneration plant designs, respectively, while Table 24-27 presents the total annual emissions from the cogeneration plants and boilers in the Academic Mixed-Use Area in tons per year, assuming the equipment operates at its maximum anticipated capacity.

Table 24-25
2015 Cogeneration Plant Alternative
Annual Average Emissions and Stack Parameters

Parameter	Cogeneration Plant Operates on Natural Gas Exclusively	Combustion Turbine Operates on Fuel Oil 720 hr/yr, Natural Gas 8040 hr/yr	
Fuel	Natural gas	Oil	Natural gas
Liquid fuel sulfur content (percent)	N/A	0.003	N/A
Turbine Load	100%	100%	100%
Maximum annual operating hours	8760	720	8,040
Turbine Heat input (MMBtu/hr, HHV)	66.7	66.1	66.7
Stack exhaust temperature (°F)	326	326	326
Stack Height (above datum, ft)	335.7	335.7	335.7
Stack Height (above building roof, ft)	135	135	135
Stack exhaust flow (lbs/hr)	165,896	166,224	165,896
Stack exhaust flow (ACFM)	55,680	55,790	55,680
Stack exhaust diameter (feet)	4	4	4
Stack exhaust velocity (ft/s)	73.8	74.0	73.8
Stack Exhaust Emissions (Avg lb/hr)			
NO_x	0.36	0.21	0.33
CO	0.37	0.07	0.34
$PM_{10}/PM_{2.5}$	0.44	0.07	0.40
SO_2	0.20	0.016	0.18
Notes: Average emissions and stack parameters are based on a 0°F ambient temperature.			

Table 24-26
2030 Cogeneration Plant Alternative
Annual Average Emissions and Stack Parameters

Parameter	Value
Fuel	Natural gas
Liquid fuel sulfur content (percent)	N/A
Turbine Load	100%
Maximum annual operating hours	8,760
Turbine Heat input (MMBtu/hr, HHV)	95.4
Stack exhaust temperature (°F)	300
Stack height (above datum, ft)	335.7
Stack height (above building roof, ft)	135
Stack exhaust flow (lbs/hr)	229,169
Stack exhaust flow (ACFM)	74,371
Stack exhaust diameter (feet)	5
Stack exhaust velocity (ft/s)	63.1
Stack Exhaust Emissions (Avg lb/hr)	
NO_x	0.86
CO	1.04
$PM_{10}/PM_{2.5}$	0.63
SO_2	0.30
Notes: Average emissions and stack parameters are based on a 0 °F ambient temperature.	

Table 24-27
Annual Emissions (Tons per Year)

	2015		2030	
Pollutant	**Proposed Actions**	**Cogeneration Energy Supply Alternative**	**Proposed Actions**	**Cogeneration Energy Supply Alternative**
NO_x	19.8	8.8	37.2	40.4
CO	5.8	3.5	19.2	25.7
PM_{10}	3.2	2.7	7.8	10.4
$PM_{2.5}$	2.1	2.4	7.1	9.6
SO_2	39.2	13.7	30.3	32.7

COGENERATION ENERGY SUPPLY ALTERNATIVE COMPARED WITH THE PROPOSED ACTIONS

Overall, annual emissions from the Cogeneration Energy Supply Alternative are predicted to be similar to the Proposed Actions (see Table 24-27). In 2015, emissions of NO_x, CO and SO_2 would be lower, due to the use of the predominantly gas-fired cogeneration plant to provide energy, as compared with oil-fired conventional boilers in the Proposed Actions. In 2030, both the central energy plant boilers and the cogeneration plant would utilize natural gas exclusively; in this case the emissions under the Cogeneration Energy Supply Alternative would be slightly higher than those of the Proposed Actions due to the electrical energy demand being serviced by the cogeneration plant.

Tables 24-28 and 24-29 show maximum predicted concentrations for NO_2, SO_2, CO, and PM_{10} at sensitive receptors from the Cogeneration Energy Supply Alternative for the 2015 and 2030 analysis years, respectively. As with the Proposed Actions, when added to measured background concentrations, the maximum concentrations would be well below the standards.

Table 24-28
Future (2015) Maximum Modeled Pollutant Concentrations from Cogeneration Energy Supply Alternative (in μg /m^3)

Pollutant	Averaging Period	Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2	Annual	0.78	68	68.8	100
SO_2	3-hour	53.40	183	236.4	1,300
	24-hour	21.70	99	120.7	365
	Annual	1.17	29	30.2	80
CO	1-Hour	41.12	2,971	3,012.1	40,000
	8-Hour	9.67	2,286	2,295.7	10,000
PM_{10}	24-hour	2.44	60	62.4	150

Notes: [1] NO_2 impacts were estimated using a NO_2/NO_x ratio of 0.57. This ratio has been revised since the DEIS to reflect updated ambient air monitoring data.

Table 24-29(1)
Future (2030) Maximum Modeled Pollutant Concentrations from Cogeneration Energy Supply Alternative (in μg /m^3)

Pollutant	Averaging Period	Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2 (2)	Annual	2.19	68	70.2	100
SO_2	3-hour	108.80	183	291.8	1,300
	24-hour	36.00	99	135.0	365
	Annual	3.92	29	32.9	80
CO	1-Hour	75.10	2,971	3,046.1	40,000
	8-Hour	25.10	2,286	2,311.1	10,000
PM_{10}	24-hour	3.28	60	63.3	150

Notes:
[1] The values shown in this table were calculated assuming use of No. 2 fuel oil in the package boilers at Site 15. However, the package boilers at Site 15 will be restricted to natural gas only. Therefore, with this restriction, the resulting concentrations would be the same as or less than the values shown in the table.
[2] NO_2 impacts were estimated using a NO_2/NO_x ratio of 0.57. This ratio has been revised since the DEIS to reflect updated ambient air monitoring data.

The air quality modeling analysis for the Cogeneration Energy Supply Alternative also determined the highest predicted increase in 24-hour and annual average $PM_{2.5}$ concentrations from the central energy plants and package boilers. As shown in Tables 24-30 and 24-31, the maximum 24-hour incremental impacts at any discrete receptor location would be slightly less than the applicable interim guidance criterion of 5 μg/m^3. On an annual basis, the projected $PM_{2.5}$ impacts would be less than the applicable interim guidance criterion of 0.3 μg/m^3, and the DEP interim guidance criterion of 0.1 μg/m^3 for neighborhood scale impacts. These results are similar to the Proposed Actions, and would result in no significant adverse air quality impacts.

Table 24-30
Future (2015) Maximum Predicted $PM_{2.5}$ Concentrations from Cogeneration Energy Supply Alternative (in µg/m^3)

Pollutant	Averaging Period	Maximum Concentration	Threshold Concentration (µg/m^3)
$PM_{2.5}$	24-hour	2.44	5/2
	Annual (discrete)	0.10	0.3
	Annual (neighborhood scale)	0.0095	0.1

Table 24-31
Future (2030) Maximum Predicted $PM_{2.5}$ Concentrations from Cogeneration[(1)] Energy Supply Alternative (in µg/m^3)

Pollutant	Averaging Period	Maximum Concentration	Threshold Concentration (µg/m^3)
$PM_{2.5}$	24-hour	2.23	5/2
	Annual (discrete)	<0.299	0.3
	Annual (neighborhood scale)	0.054	0.1

Note: [(1)] The annual $PM_{2.5}$ values shown in this table were evaluated assuming use of No. 2 fuel oil in the package boilers at Site 15. However, the package boilers at Site 15 will be restricted to natural gas only. Therefore with this restriction the resulting annual $PM_{2.5}$ concentrations would be the same as or less than the values shown in the table.

$PM_{2.5}$ concentrations from the Cogeneration Energy Supply Alternative were also compared with the 2 µg/m^3 interim guidance value. The $PM_{2.5}$ 24-hour standard was derived based on continual exposure. In 2015, the receptor location with the maximum continual 24-hour exposure would be at the Riverside Park Community apartment complex. At this location, 24-hour $PM_{2.5}$ impacts would be 2.07 µg/m^3. A total of two receptors were predicted to have maximum concentration greater than 2.0 µg/m^3. The concentrations above 2.0 µg/m^3 were predicted to occur at a frequency of only once over five years. At other locations in the community and beyond, maximum 24-hour concentrations of $PM_{2.5}$ would be less than 2.0 µg/m^3, the updated $PM_{2.5}$ interim guidance criterion. In 2030, the receptor location with the maximum continual 24-hour exposure would be at the Columbia graduate student housing complex on Riverside Drive. At this location, 24-hour $PM_{2.5}$ impacts would be 2.23 µg/m^3. The concentrations above 2.0 µg/m^3 were predicted to occur at a maximum frequency of two days per year and only three days over five years. At other locations in the community and beyond, maximum 24-hour concentrations of $PM_{2.5}$ would be less than 2.0 µg/m^3, the updated $PM_{2.5}$ interim guidance criterion.

CONCLUSION

In the Cogeneration Energy Supply Alternative, a cogeneration plant would be constructed to provide a portion of the power, as well as heating and cooling, to the buildings for the Academic Mixed-Use Area within the area bounded by Broadway, West 125th Street, Twelfth Avenue and West 132nd Street. It would be located beneath Site 3, in the southern portion of the service area. In this alternative, the central energy plant proposed at Site 14 and package boiler systems proposed for the three buildings east of Broadway and one building on Site 1 south of West 129th Street would be identical in terms of equipment and operation to those proposed as part of

the Proposed Actions. (Refer to Chapter 19 for a description of the boiler systems proposed at these sites.)

Compared with the Proposed Actions, the Cogeneration Energy Supply Alternative would result in similar levels of pollutant emissions. Like the Proposed Actions, no significant adverse air quality impacts are expected from the Cogeneration Energy Supply Alternative. The decision to choose this alternative would depend on the cost of production of electricity under the alternative compared with the price of purchasing electricity under the Proposed Actions. ✷