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American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

Final Environmental Impact Statement

Prepared for:
American Museum of Natural History
Planetarium Authority

Prepared by:
Allee King Rosen & Fleming, Inc.

September 1996

AMERICAN MUSEUM OF NATURAL HISTORY
PLANETARIUM AND NORTH SIDE PROJECT

FINAL ENVIRONMENTAL IMPACT STATEMENT

September 5, 1996

Lead Agency: American Museum of Natural History Planetarium Authority

Lead Agency Contact: Sigmund G. Ginsburg
Senior Vice President

Prepared by: Allee King Rosen & Fleming, Inc.

AMERICAN MUSEUM OF NATURAL HISTORY
PLANETARIUM AND NORTH SIDE PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

Project Location:	American Museum of Natural History Central Park West at 79th Street New York, New York
Lead Agency:	American Museum of Natural History Planetarium Authority
Lead Agency Contact:	Sigmund G. Ginsburg Senior Vice President (212) 769-5090
Preparers:	Allee King Rosen & Fleming, Inc. 117 East 29th Street New York, NY 10016
Acceptance Date:	September 5, 1996

Copies of this Final Environmental Impact Statement are available for review at the American Museum of Natural History Planetarium Library; contact Michelle Murphy for appointments (212-769-5944).

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Foreword

This document is the Final Environmental Impact Statement (FEIS) for the Planetarium and North Side Project proposed by the American Museum of Natural History Planetarium Authority, in conjunction with the American Museum of Natural History. The Environmental Review Committee of the American Museum of Natural History Planetarium Authority issued the Draft Environmental Impact Statement (DEIS) on May 23, 1996. Its publication marked the beginning of public review under the State Environmental Quality Review (SEQR) regulations. During the public review, the Planetarium Authority met with city agencies, community groups, and members of Manhattan Community Board 7; answered questions at a Community Board hearing on the project on June 18, 1996 and at a Community Board meeting on July 2, 1996; and held SEQR public hearings on June 27, 1996 for the purpose of receiving comments on the DEIS. Spoken comments were received at the SEQR public hearings and at the other hearings and meetings; written comments were also submitted.

This FEIS reflects all substantive comments made on the DEIS. The comments are summarized and responded to in Chapter 22, "Comments and Responses." Changes to the text of the FEIS in response to comments were also made when appropriate. All additions made to the text since publication of the DEIS are indicated by *text italicized in this fashion*. One chapter, several appendices, and certain tables that are entirely new to the FEIS are indicated as such and are not italicized. In addition, changes made to certain tables and graphics are indicated with shading rather than italics, for purposes of clarity.

The DEIS included an analysis of six options that created a second access to the proposed garage from Columbus Avenue, as additional mitigation for conditions on West 81st Street. As a result of the public review, the FEIS now proposes implementation of Option 4, which would allow automobiles to enter the proposed garage from Columbus Avenue on weekends using the existing Museum service drive south of West 78th Street. Chapter 17, "Mitigation," has been revised to reflect this recommendation. ❖

A. PROJECT DESCRIPTION

IDENTIFICATION

The American Museum of Natural History Planetarium Authority, in conjunction with the American Museum of Natural History, proposes to construct new facilities for exhibition, scientific research, education, and visitor services at the north side of the Museum and Planetarium site. This project will include a replacement for the existing Hayden Planetarium; a new Columbus Avenue entrance to the Museum; a new galleria; a new three-level parking garage; a new landscaped terrace on top of the parking garage; new exhibition space; and new restaurant facilities. The Museum and Planetarium sit within a public park on a large block that extends from West 77th Street to West 81st Street, and from Central Park West to Columbus Avenue. The northern edge of the Museum's building complex is aligned approximately with West 80th Street and faces West 81st Street across the park.

The Planetarium Authority, established in 1933 by statute as a State authority and public benefit corporation, owns the Planetarium building and the land on which it sits. The American Museum of Natural History is a not-for-profit educational corporation formed by the State legislature in 1869 to establish a museum and library of natural history in New York City. The land and the buildings occupied by the Museum are owned by the City of New York under the jurisdiction of the New York City Department of Parks and Recreation (DPR).

Implementation of the proposed project will require approval from the Planetarium Authority, DPR, and the New York City Art Commission. Further, the project will receive City funding through the New York City Department of Cultural Affairs (DCA) and Department of General Services or the newly created Department of Design and Construction Services (the agencies through which DCA implements its capital budget). Although no formal approval is required, the New York City Landmarks Preservation Commission (LPC) and Manhattan Community Board 7 have reviewed the project as part of an advisory report process specified by the New York City Charter. Both issued favorable reports on the landmark aspects of the project, including the demolition of the Hayden Planetarium. The actions necessary to implement the project require environmental review under the regulations of the State Environmental Quality Review Act (SEQR). The Planetarium Authority is the lead agency for SEQR review. *Pursuant to its by-laws, the Board of Directors of the Planetarium Authority has created an Environmental Review Committee, consisting of directors and officers of the Authority, for purposes of carrying out the Authority's lead agency responsibilities.* Other City and State agencies with discretionary decision-making authority with respect to the project are involved agencies under SEQR.

THE SITE

The Museum is a New York City Landmark located within the Upper West Side/Central Park West Historic District. It was originally intended to be much grander than its current incarnation, which consists of numerous interconnected structures. The south-facing (West 77th Street) and east-facing (Central Park West) facades were finished in accordance with the original Master Plan. The north- and west-facing sides of the Museum were not. The proposed project would affect this incomplete part of the Museum complex, namely the Whitney Wing, the Hayden Planetarium, the parking lot, the Power House, and the Ichthyology Building.

The project would include:

- **Construction of a New Planetarium** to be housed in and around a 90-foot-diameter sphere enclosed by glass walls on its north and west facades. It would be connected to the Museum on various levels via its south and east walls. An entrance to the building would be provided in the same location as the current Planetarium entrance.

  Inside the sphere, the upper portion would house an updated sky theater; the lower, a multimedia exhibit space. Visitors would travel down a ramp, as if through time, with exhibits and demonstrations related to the key ages of the universe during its 12-billion-year history.

- **A Hall of Planet Earth** that would examine the earth, its evolution, climate, and various processes—oceans, continents, earthquakes, etc. The Hall would occupy the first floor of the renovated Whitney Wing *(Building 19)* and would be directly connected to the lower exhibit hall of the Planetarium.

- **An Exhibition Galleria and Walkway** that would run east-west from the Planetarium to a new entrance pavilion facing Columbus Avenue. The galleria would contain additional exhibit areas; offer visitor services, such as ticketing, coat rooms, information desks, and rest rooms; provide access to the garage and terrace; and connect to other parts of the Museum.

- **A Three-Level Garage** that would be enclosed and mechanically vented, *with two levels below grade. The garage would be* accessible from West 81st Street using the existing driveway and curb cuts. Approximately 18 feet of the north facade would be visible above the grade of the park. This would be brick, stepped back in three tiers, and planted to soften and blend it with the park's landscaping. *As additional mitigation for conditions on West 81st Street, this FEIS proposes to permit access to the garage on weekends from the existing service drive on Columbus Avenue south of West 78th Street. This is described in section I.C, "Mitigation," below.*

- **A 35,000-Square-Foot Terrace** that would be situated atop the garage. This landscaped open space would sit to the east and south of the new Planetarium and galleria. *About 33,850 square feet would be publicly accessible open space; 1,150 square feet would be for terrace dining.*

- **A Restaurant**, to be housed in the renovated Power House. It would include a larger restaurant and a smaller cafe that would be accessible from the Museum, the park and terrace, and Columbus Avenue.

- **The Ichthyology Building Bridge** would be removed, allowing the landmark facade of the smaller building to be restored to its original design.

- **A Columbus Avenue Neighborhood Entrance** at West 79th Street that would serve as a pedestrian entrance leading eastward through the park to a new entrance plaza for the Museum. Opening onto the plaza would be a new glass-enclosed pavilion. This entrance would provide access to the restaurant and the new galleria, and from there to the Planetarium and the entire Museum complex. For the first time, it would provide direct public access to the Museum from Columbus Avenue.

NEED FOR THE PROJECT

The project is a vital element is the Museum's ongoing commitment to upgrade and revitalize its facilities, as it recently did with its new dinosaur halls. The Hayden Planetarium is now out-of-date and annual attendance has decreased from a high of about 700,000 in 1976 to 361,951 in 1994. In FY 1996, attendance decreased further to 314,811. The project seeks to reestablish the Planetarium as the world's premier planetarium.

While respecting the Museum's historic architectural character, the project also would:

- Continue the Museum's historic mission, by extending its scientific and educational vision and capacity;
- Render a vast and urgently needed improvement to visitor services for the entire Museum; and
- Enhance the City and State's position both economically and as a national center for science, education, and technology.

The project would transform the north side of the Museum into a unified whole, greatly improving appearance and circulation among the various parts of the Museum. The new Museum entrance on Columbus Avenue and the new terrace proposed for the roof of the parking structure would increase access to the Museum. All of the Museum buildings and the Planetarium would be internally linked and more effectively connected, architecturally and scientifically.

The garage would *provide a safe and protected loading and unloading area for schoolchildren, with direct access to the Museum,* and would greatly reduce the traffic backup that now occurs at times of peak activity.

PROJECT SCHEDULE

SEQR review completion is anticipated for the fall of 1996. Certain preparatory work, such as utility relocation, could be done in the fall of 1996, and construction would begin in March 1997. The entire project *is expected to* be complete early in 2000. However, because attendance would be stabilized in 2001, the analyses in this Environmental Impact Statement consider conditions in that year. Any mitigation measures for significant adverse impacts associated with the project would nonetheless be implemented when the project opens. In addition, it is possible that certain project elements, such as the restaurant and Columbus Avenue entrance, would be completed at a later date. This possibility is addressed as a phasing alternative under 1.D, "Alternatives," below.

PUBLIC HEARINGS AND MEETINGS

To date, a total of 14 public hearings and meetings have been held on the Planetarium and North Side project. These include four held by the Landmarks Preservation Commission during its review of the project, on October 5, October 31, November 14, and November 21, 1995; two held by the New York City Art Commission during its review of the project, on November 13 and December 11, 1995; and four held by Community Board 7, on September 21 and October 2, 1995, and June 18 and July 2, 1996. In addition, they also include four public hearings held by the Planetarium Authority under SEQR, on November 15, 1995, at 2 PM and 7 PM and on June 27, 1996, at 2 PM and 7 PM.

STATUS

A Draft EIS (DEIS) was prepared for and reviewed by the Planetarium Authority, which issued a Notice of Completion on May 23, 1996. Public hearings on the DEIS *were* held on June 27, 1996, at 2 PM and 7 PM at the Hayden Planetarium Guggenheim Space Theater, located at the American Museum of Natural History on West 81st Street between Central Park West and Columbus Avenue. Written comments on the DEIS *were* requested and *were also* accepted by the lead agency. *This Final EIS (FEIS) responds to* all substantive comments *made on the DEIS.* After considering the completed FEIS for no less than 10 days, the Planetarium Authority's environmental review committee will adopt SEQR Findings, drawing its conclusions about any significant adverse environmental impacts of the proposed action and how to avoid or mitigate them.

B. PROBABLE IMPACTS OF THE PROPOSED PROJECT

LAND USE, ZONING, AND PUBLIC POLICY

The project represents an expansion and improvement to the existing institutional use on the project site. The publicly accessible restaurant and terrace would act as transitional elements between the institutional uses of the Museum and the open space of the northern part of Theodore Roosevelt Park. Although a 2,620-square-foot strip of parkland between the Museum and Columbus Avenue would be converted to a new entrance plaza and pavilion, the loss of parkland would be offset by the new landscaped terrace, which would add about 35,000 square feet of outdoor space and would be linked to the park by a wide stairway at its northwest corner. In addition, a 2,800-square-foot area of the subsurface service yard would be covered and made accessible *parkland* as part of the construction of the Columbus Avenue entrance.

ECONOMIC CONDITIONS

The project's economic effects would arise from the ongoing increases in expenditures in the City and State from new visitors at the Museum and Planetarium and economic activity during construction. An increase of approximately 670,300 Museum visitors annually is expected by 2001 without the project. However, Planetarium attendance, which has been declining in recent years, would increase only slightly. The proposed project would add another 673,900 visitors in 2001, the first year of "stabilized" attendance after project completion in 2000. Of these, 612,616 are projected to be paid attendance, with the remainder representing increases in general visitors and employees at the Museum and Planetarium. Total paid attendance at the Planetarium's Sky Show is projected to increase dramatically, from 314,800 today and 367,000 in the future without the project to 847,560 with the new Planetarium. These increases would bring revenue to the Museum, and those who came from out of the City would add to economic activity in the City by their expenditures at restaurants and hotels. In addition, the construction cost of the project, estimated at $130 million, including "hard" and "soft" costs, would add to the City's and State's economies and result in increases in employment and in taxes accruing to the City and State.

COMMUNITY FACILITIES AND SERVICES

The Planetarium and North Side project would create new facilities and attract new visitors to the Museum. However, the proposed project would not interfere with the Police or Fire Departments' ability to provide effective, efficient protection.

OPEN SPACE AND RECREATIONAL FACILITIES

The Planetarium and North Side project can be expected to affect open space resources by increasing the number of visitors to the Museum and Planetarium complex, which may also add to the number of people using parks in the area, and by adding slightly to the amount of publicly accessible open space in the area. Publicly accessible open space would increase by about 0.81 acres with the proposed project, as the loss of a 2,620-square-foot strip of parkland used to create the Columbus Avenue entrance would be offset by the creation of a landscaped terrace *with 33,850 square feet accessible to the public* and the conversion of a 2,800-square-foot area of the subsurface service yard (which is to be covered) to public outdoor space. The project would bring new life to the park by introducing new and exciting open space and architectural elements that create a sense of continuity between the park and Museum. With new and enhanced open spaces, the park would become livelier and give users a sense of safety and security. Even with additional visitors to the Museum and Planetarium, an ample supply of open space would remain to serve the study area and the project would have no significant adverse impacts on open space.

The northern and western sections of Theodore Roosevelt Park bounding the project site are undergoing planning for redesign and improvement independently of the proposed project. It is expected that the renovated park would retain the types of facilities now available but would benefit from improved drainage, repair and maintenance of existing vegetation, new landscaping, benches, walks, and better lighting and security. Planning and design is being overseen by a working group consisting of the Borough President, local Councilmember, DPR, the American Museum of Natural History, Community Board 7, Friends of Museum Park, the West 81st Street Block Association, and civic groups. Given the basic mandate of the working group to improve but not substantially change the park, the proposed renovation would not likely generate substantial adverse environmental impacts.

HISTORIC AND ARCHAEOLOGICAL RESOURCES

The Museum site and complex of buildings is a New York City Landmark and is individually listed on the State and National Registers of Historic Places. It is also located within both the City's Upper West Side/Central Park West Historic District and the State and National Registers' Central Park West Historic District. As mandated by the Museum's landmark status, the proposed Planetarium and North Side project has been reviewed in detail with LPC in public hearings and meetings, and LPC has issued a report on the project. The proposed project would generally meet the first of the criteria of adverse effect (destruction or alteration) that LPC uses in identifying impacts on historic resources. However, LPC found both the demolition and alteration to be appropriate to proceed with the proposed project. Regarding the Planetarium, LPC's findings included the following (quoted from its report of November 21, 1995):

- That the Planetarium "has a minimal role in establishing the distinctive architectural character of this landmark";
- That "the building is not a distinguished example of the architecture of the 1930's"; and
- That the building's inclusion in the Museum's Landmark designation "related primarily to its cultural associations as the Museum's Planetarium and to the public's experience of its programming and exhibits rather than to its architectural importance."

With regard to the proposed new construction and alterations, LPC findings in its November 21, 1995, report included the following:

- That the project would "create a single facade for this portion of the complex, unifying it architecturally";
- That "the height and massing of the addition will ensure that it relates harmoniously to the complex without overwhelming any of the significant historic buildings";
- That "the cultural associations of the Planetarium will be retained in both the location and architectural expression of the new Planetarium structure";
- That the project's garage "will enhance the appearance of the streetscape along West 81st Street within the Upper West Side/Central Park West Historic District, and that creating a finished facade on the north side will enhance the architectural relationship between the Museum complex and the buildings along the north side of West 81st Street";
- That the new Columbus Avenue entrance "will establish a visual connection between the Museum and the buildings along Columbus Avenue within the Upper West Side/Central Park West Historic District;" and
- That "this proposed construction will enhance the special architectural, historic, and cultural significance of the American Museum of Natural History complex and of the Upper West Side/Central Park West Historic District."

The disturbance or destruction of archaeological resources is not an issue for the project, because the area that would be disturbed by the project was previously extensively disturbed by construction activities for existing Museum buildings.

URBAN DESIGN AND VISUAL RESOURCES

The project would unify the Museum's north side architecturally and hide the blank facades that now give it an unfinished appearance. With height and massing in scale with existing Museum buildings, the project would relate well to the complex and not overwhelm any of the significant components. The series of planted setbacks created by the garage wall and the terrace parapet, together with the monumental stair at the northwest corner of the Power House, would create a graceful transition from building to open space. The new neighborhood entrance from Columbus Avenue would extend this sense of completion to the west side of the complex as well. Overall, the activity in the Planetarium (visible through the glass walls), on the terrace, and at the new Columbus Avenue entrance would enliven the park area nearby, bringing new visitors and a sense of activity and safety to the park.

The lighting design scheme for the proposed project, like the existing scheme, would focus on the Planetarium building, while maintaining the pastoral setting of the surrounding landscape. The lighting scheme anticipated includes a series of lighted banners along the path and illuminated walls in the new Columbus Avenue entry pavilion, and a series of soft, partially shielded light sources for the Planetarium's sphere that would be dimmable and could be programmed for different effects during the course of each month. The parking garage entrance and exterior wall would also be accented by concealed light sources. The perceived brightness of most elements of the proposed lighting scheme would be comparable to the existing scheme. The proposed lighting scheme and new project elements would still be seen in the broader context, framed by the darkness of Central Park or the other Museum buildings, with the Manhattan skyline beyond.

A shadow study conducted for the FEIS found that the project shadows would create small increments of additional shadow on the portion of Theodore Roosevelt Park in front of the Planetarium. This small area of the park is not used for activities requiring sun (e.g., *sunbathing, seating, sports) nor does it contain sun-sensitive vegetation. The incremental shadows are therefore not considered significant.*

NEIGHBORHOOD CHARACTER

Overall, the changes in the Museum's appearance brought by the project would connect the north and west sides of the Museum to the surrounding streetscape, making the Museum relate more to the character of the area. This in turn would strengthen the ambience of the historic district. The project would bring some 673,900 new visitors to the Museum each year, with many of these visitors entering on the north and west sides of the complex, where few (on the north side) or no (on the west side) people enter today.

With the new garage in place to serve the Museum's visitors, the congestion and backups on West 81st Street would be reduced. *With transportation management, garage queues could be prevented.* The traffic associated with the project would not perceptibly increase noise levels in the area. *Noise mitigation for terrace events would mitigate nearly all of their intrusive effects.* Overall, these changes from the proposed project would *alter* the character of the north and west sides of the Museum, but they would not change the character of the surrounding neighborhood, which has developed around the presence of the Museum.

HAZARDOUS MATERIALS

Asbestos and lead-based paint are present in the buildings to be affected by construction of the proposed project. If unabated, this could lead to hazardous materials impacts during construction. Therefore, the project proposes the following mitigation measures: an asbestos abatement plan to remove all asbestos from the buildings prior to construction while minimizing the risk posed to the environment and neighboring residents during the abatement, proper removal of lead paint prior to construction, and proper clean up of a now-unused storeroom in the basement of the Power House, where potential leaks or spills of chemicals were identified, before construction. During construction and after completion of the proposed project, the Museum will continue to follow all applicable rules and regulations relating to the use, storage, and disposal of hazardous materials. For dewatering during construction, the project would comply with New York City Department of Environmental Protection (DEP) regulations by ensuring that the groundwater meets DEP's pretreatment requirements before discharging it to the municipal sewer system.

INFRASTRUCTURE, SOLID WASTE, AND ENERGY

Although the proposed project would increase the demand for water supply, sewage treatment, solid waste removal and energy consumption on site, it would have no significant impact on these services.

TRAFFIC AND PARKING

TRAFFIC AND PARKING IMPACTS

Development of the project would place additional service demands on the surrounding transportation network and, in response, would increase the supply of on-site parking with a new garage. *The primary study area contains all intersections from West 76th Street to West 82nd Street on Central Park West and Columbus Avenue, and from West 79th Street to West 81st Street on Amsterdam Avenue. Secondary locations include West 72nd and 86th Streets, both at Central Park West and Columbus Avenue.* Conditions in the area are already constrained by heavily trafficked intersections, school bus activity at the Museum, and an on-site parking shortage during weekend peak periods, which creates traffic friction along West 81st Street between Central Park West and Columbus Avenue. To evaluate project impacts, trip estimates were prepared for the project's primary components: increased attendance at the Museum and Planetarium, patronage of the new restaurant and travel associated with periodic events at the rooftop terrace. In addition, the analysis accounts for the increase in on-site parking supply from the new garage. Overall, the project would result in increased Museum attendance of roughly 1,700 to 1,900 new visitors on a weekday and 2,500 to 3,100 visitors on a Saturday. Estimated peak period vehicular trips for the project are shown in Table 1-1, below.

Table 1-1
Peak Period Vehicle Trips

	Auto			Taxi		
Peak Hour	In	Out	Total	In	Out	Total
Weekday 1-2	*34*	*19*	*53*	*21*	*11*	*32*
Weekday 4-5	*11*	34	*45*	6	20	*26*
Saturday 2-3	*83*	*77*	*160*	*33*	39	*63*

The addition of these project trips to the *study area* would result in significant traffic impacts at the approaches to five *of the* intersections in the study area. These intersections are Central Park West at West 72nd, 77th, 81st, and 86th Streets, and the eastbound approach to the intersection of West 81st Street and Columbus Avenue. Impacts would be greatest at West 81st Street and Central Park West, where up to three of the approaches would be affected during the weekday midday, PM, and Saturday peak hours. *There would be no significant impacts of the project at the other intersections in the study area.*

However, all of the project's traffic impacts could be mitigated by a variety of traffic improvement measures, including signal retiming, changes to parking regulations, and lane striping measures. *As additional mitigation, use of the service driveway near West 78th Street as a second automobile entrance to the garage on weekends is also proposed* (discussed below under "Mitigation").

On West 81st Street, even though the project would increase traffic, it is expected that conditions at the project driveways would improve, because the larger parking facility would reduce the severity of problems that occur when the garage is at capacity and vehicles queue on the street waiting to enter. The project's parking garage would increase the supply of on-site spaces from approximately 180 to 370. With this increase, the Museum would be better able to accommodate its parking demand. *The hours during which the garage would be full would be reduced from 11 AM to 4 PM to 1 to 3 PM. With effective transportation management in place, street queuing outside the garage when it is full could be prevented. There is sufficient available parking in the surrounding area to accommodate the project's demand.*

On weekdays, there is expected to be sufficient parking on the lower levels of the garage to accommodate the employee spaces displaced by the project. On the weekends, the service area is expected to be sufficient for employee parking and no spaces in the garage are anticipated to be needed.

TRANSPORTATION MANAGEMENT PLAN

During the environmental review of the proposed Planetarium and North Side project, the Museum committed to initiating an ongoing transportation planning effort covering all aspects of Museum-related transportation services. This will include visitors' trips by all modes (e.g., auto, taxi, subway, bus, bicycle and walking), employee trips, planning for special events, and management of parking and service and delivery vehicles. The Museum will hire a full-time employee to serve as the transportation coordinator and will provide managerial and support staff from appropriate departments to design, implement, and maintain the plan. Departments expected to participate include Operations, Communications, Visitor Services, Security, and Governmental Relations. Without successful transportation management, traffic friction currently associated with some Museum operations will continue. As part of the plan, the Museum will maintain regular communications regarding transportation-related concerns with the Community Board, local block associations, New York City Transit, the New York City Police Department, DPR Parks Enforcement Patrol, New York City Department of Transportation (NYCDOT), and elected officials. This plan will help alleviate traffic issues associated with the proposed parking garage.

In response to concerns raised in planning for the proposed project, preparation of the bus management portion of the plan was accelerated and a draft of the plan was presented during public review of the DEIS. The plan includes a summary of existing bus demand characteristics and a description of bus operations in terms of unloading, loading, and parking, followed by presentation of two related bus management plans. The first, called the Immediate Plan, addresses problems today and plans for the future. The second accommodates the Planetarium and North Side project, making use of the proposed garage in the optimum way for the management of buses at the Museum.

Current problems will be addressed by focusing on four areas: 1) instituting stronger control of bus operations through a reservation system; 2) engaging a transportation coordinator with the authority and support to control bus operations, 3) reorganizing loading operations in the lot, on the driveway, and on the street, and 4) implementing a bus parking plan. The reservation and scheduling system would be required for all buses serving school and camp groups.

The garage's top level would serve as a primary entry point for school buses. On most days all school bus loading would take place within the garage. Coach-type buses bringing school and camp groups would discharge in the West 81st Street driveway and/or on West 77th Street. Adult groups, which come exclusively in coach-type buses, would be handled on Central Park West. With this plan, the Museum would centralize all school bus loading and unloading on-site and reduce the problems associated with on-street bus loading and parking. The overall bus parking at the garage would be reduced from the approximately 30 spaces currently available. As discussed in Appendix E, studies of the garage concluded that it would not be possible to accommodate both unloading/loading and parking in the garage, except on days with relatively few buses. Although the footprint of the parking garage would be approximately that of the existing parking lot, the area of each floor devoted to parking would be less; columns, the entrance for schoolchildren including a safe pedestrian area, ramps to other floors, fire stairs and elevators, etc. all would reduce the area available for vehicles.

In a choice between unloading/loading schoolchildren or parking, unloading/loading schoolchildren was given priority in bus planning, first because of concern for the children's safety and, second, because the drop-off and pick-up operations were found by themselves to be the source of considerable traffic friction. Moreover, the loss of on-site bus parking spaces would not result in an adverse impact because the Museum expects to provide dedicated off-site bus parking. The Museum is currently in negotiation with DPR for one of three lots at Yankee Stadium. A sufficient number of off-site spaces would be provided to accommodate buses that currently use the surface lot, as well as buses that park on the streets bordering the Museum.

If the Museum is not able to design and implement a successful transportation plan, including the bus management plan, the adverse conditions currently associated with Museum operations will persist in the future and will continue to contribute parking and traffic congestion problems in the area surrounding the site.

TRANSIT AND PEDESTRIANS

The project would add pedestrians to the area's sidewalks and riders to its subways and public buses. In general, the sidewalks in the area are fairly well utilized, but given their generous widths, service conditions are good. Even with the addition of project trips, pedestrian elements at the site (sidewalks, crosswalks, and street corners) would continue to operate well with ample capacity.

The site is *very well* served by *public transportation at* the West 81st Street subway station to the B and C subway lines (as well as the A line during late-night hours). There is a direct entrance to the lower level of the Museum when the Museum is open. With the additional subway trips generated by the project, station elements would continue to exhibit good service levels. Similarly, bus routes in the area generally have available capacity. The one exception is the westbound M79 bus during the weekday midday peak period, which would have a small shortfall in capacity that could be mitigated by the addition of one extra bus run during the hour.

A key part of the Museum's Transportation Management Plan is the promotion of public transit usage. Bicycle racks would also be added close to a major entrance.

AIR QUALITY

The traffic associated with the proposed project would not result in any significant impacts to air quality. No violations of the National Ambient Air Quality Standards would occur. An analysis of the proposed parking garage also indicates that it would have no significant impact on air quality.

NOISE

Noise levels from traffic generated by the project would be barely perceptible and not significant. However, the occasional use of the outdoor terrace for events that include amplified music or sound would result in significant noise impacts to Theodore Roosevelt Park.

With scheduling that concludes amplified sound and other potentially intrusive noise at terrace events by 11 PM, the installation of a dedicated sound system (controlling speaker type, orientation, layout, and sound emissions), limiting the number of events with most intrusive noise levels and giving advance notice of such events, noise from terrace events could be *managed so as to reduce its intrusive effect on people in Theodore Roosevelt Park and in the surrounding neighborhood (see 1.C, "Mitigation," below).*

CONSTRUCTION IMPACTS

Construction of the proposed project would result in temporary effects on community facilities and parks, historic resources, transportation (traffic, transit, and pedestrians), air quality, noise, and utilities, as follows:

- Construction of the proposed project would result in unavoidable disruptions to Museum and Planetarium operations during the construction period. Planetarium operations would cease during the construction period. No public parking would be available until completion of the new garage. In addition, noise and vibration during the early phases of construction activities could potentially affect other Museum operations, such as the IMAX theater.
- Construction activities would require that portions of Theodore Roosevelt Park adjacent to the northern and western sides of the Museum complex be temporarily closed to the public throughout most of the construction period.
- A historic resource protection plan would be developed to prevent damage to the Museum buildings from pile driving, vibration, dewatering, and other activities.
- The project would generate considerable traffic resulting from movement of materials and equipment, removal of construction waste, and arriving and departing workers. Construction vehicles would enter and exit the site via the existing driveway on West 81st Street. *The closing of the parking lot at the Museum would also mean that visitors would have to seek parking at other commercial facilities in the area. The result would be greater congestion and circulation in the area, as well as a longer walk to the Museum after parking is found.*
- Possible impacts on local air quality during construction of the project include fugitive dust (particulate) and mobile source emission, but neither are anticipated to result in significant impacts during the construction period.
- Construction equipment, excavation and foundation activities, and construction and delivery vehicles traveling to and from the site would also result in noise and vibration, which would be expected to be most significant during the early stages of construction when pile-driving would occur, and would be of relatively short duration. Federal and City noise control regulations would be carefully followed, and appropriate low-noise emission level equipment and operational procedures would be used.
- Other effects would include new service connections to existing utility lines, which would be done to avoid disruptions to service; fugitive dust, to be minimized using control measures; and generation of large amounts of solid waste, to be removed by private carters specializing in transportation and disposal of construction wastes.

The Museum and the Planetarium Authority *will establish a construction coordination group that will include the Museum, its construction manager, community groups, the Community Board, the local police department precinct, and other affected groups. The Museum will also establish a phone number that neighbors would call for information or with questions or concerns.*

C. MITIGATION

Where potential impacts from the proposed project have been identified, mitigation measures are proposed to minimize or avoid them. Mitigation is proposed for historic resources, hazardous materials, traffic, public transit, *noise,* and construction period noise impacts, as follows.

HISTORIC RESOURCES

Although the project would replace the Hayden Planetarium with a new structure, LPC found that the proposed project would be appropriate, would relate harmoniously to the Museum complex and would enhance the special architectural, historic, and cultural significance of the Museum complex and the Upper West Side/Central Park West Historic District. The historic Museum complex would be protected during construction from any damage due to such construction activities as pile-driving, vibration, and dewatering, by a historic resource protection plan developed to prevent damage. This plan would be implemented by an independent structural engineer. The Museum *has already begun to* document the existing Hayden Planetarium, with photographs, plans and archival material. As part of planning for the project's design and construction, the possibility of saving and incorporating in the new project certain features or artifacts from the Hayden Planetarium is under consideration. *As part of its exhibit programming, the new Planetarium would mount an exhibit on the Hayden Planetarium, probably at the time of opening.*

HAZARDOUS MATERIALS

Because the Museum buildings to be affected by construction contain lead-based paint and asbestos, the project would implement the following mitigation measures to avoid hazardous materials impacts during construction: the areas that are to be disturbed by the project would have all asbestos and lead paint removed prior to construction activities, and potential leaks or spills of chemicals in the storeroom in the basement of the Power House would be properly cleaned up. For dewatering during construction, the project would comply with DEP regulations by ensuring that the groundwater meets DEP's pretreatment requirements before discharging it to the municipal sewer system.

TRAFFIC

The mitigation analyses for the project's traffic impacts take a two-tier approach. First, potential traffic improvement measures are reviewed on an intersection-by-intersection basis. In the second level assessment, mitigation plans are examined that couple the possible provision of a new parking garage driveway on Columbus Avenue with individual intersection improvement measures.

PROPOSED PROJECT MITIGATION

Intersection Mitigation

As discussed above, approaches at five intersections in the study area could experience significant traffic impacts as a result of increases in project-related traffic. These impacts could be completely mitigated with a variety of standard measures, including signal retiming and rephasing, changes in parking regulations, and striping plans for improving traffic flow. These improvements are subject to review and approval by NYCDOT.

- Central Park West and West 77th Street. The impact at the northbound Central Park West approach can be mitigated by retiming the traffic signal, adding 2 to 3 seconds of green time, depending on the time of day.
- Central Park West and West 81st Street. An overall redesign of the signal program and lane utilization plan is required to mitigate the project's impact in this location. Specific elements of the proposed mitigation include providing exclusive north-south left-turn lanes, adding a protected north-south left-turn signal, and restriping the westbound approach to provide an exclusive left-turn lane, a shared left-through lane, and a shared right-through lane. To achieve the additional lanes required in the north- and southbound direction on Central Park West, parking would be prohibited for a distance extending 100 feet from the intersection. This would eliminate daytime parking for three to five cars on each approach.
- Columbus Avenue and West 81st Street. During the week, this impact can be mitigated by signal retiming (1 second change). On Saturdays, there would also have to be a parking restriction on the south side of West 81st Street extending westward from the intersection for 100 feet. This would eliminate on-street parking for three to five cars during the restricted period.
- Central Park West and West 72nd Street. Depending on the time (weekday or weekend), the impact at this location (northbound approach on Central Park West) can be mitigated by signal timing change and prohibiting parking for 100 feet along this approach, which would eliminate daytime parking for three to five cars.
- Central Park West and West 86th Street. The impact at the *northbound* approach on Central Park West can be mitigated by eliminating parking on the northbound side for a distance of 100 feet extending back from the intersection and by *subtracting 1 second of green time from the leading westbound phase and adding it to the shared east-west phase.* This would *eliminate daytime parking for* three to five cars.

All of the project-related impacts would be mitigated without significantly affecting the opposing flow at the other legs of the intersection. Although on-street parking is used to capacity in the study area, the small number of spaces removed for the mitigation would not constitute a significant impact. The Museum and Planetarium Authority would coordinate with the Police Department to see that the parking regulations are enforced, particularly during peak periods.

Columbus Avenue Access

In the DEIS, six basic driveway plans were identified for study as part of the mitigation program to alleviate traffic friction on West 81st Street. The six options, for use by automobiles only, were as follows:

Options with a new curb cut and driveway in the park:

- *Option 1, with a driveway entrance/exit along Columbus Avenue between West 79th and 80th Streets.*
- *Option 2, with a driveway entrance/exit along Columbus Avenue at West 79th Street.*
- *Option 3, with a driveway entrance/exit along Columbus Avenue between West 78th and 79th Streets.*

Options using the existing curb cut and service drive south of West 78th Street:

- *Option 4, which would utilize the existing service driveway as a second auto entrance on weekends.*
- *Option 5, which would provide a full-time auto entrance by widening a portion of the existing service driveway and extending a new covered roadway that would detour away from the service road to the garage beneath the park.*
- *Option 6, which is identical to Option 5 except that it would also reconfigure and expand the Museum's below-grade service area.*

Following extensive discussions with local community organizations, a weighing of the six options' relative advantages and disadvantages, and a feasibility assessment, Option 4 is now proposed as the preferred mitigation option. Of the six options, it is the only one that would not create major problems in terms of potential impacts on Theodore Roosevelt Park, historic and archaeological resources, and visual character.

Option 4 would make use of the existing service driveway just south of West 78th Street on weekends to provide an automobile entrance to the new parking garage. Cars would travel through the Museum's existing loading area and enter the garage at the basement level. The drive would serve only entering automobiles. Buses entering the garage and all exiting vehicles would use the existing driveways on West 81st Street. During weekdays, when the service driveway would be more heavily used by vehicles accessing the loading areas, parking garage entry and exit would continue to be provided only along West 81st Street.

Option 4, like the other options studied, has the advantage of providing access from a main arterial (i.e., Columbus Avenue). It would provide direct access from the north and good access from the west. Unlike Options 1, 2, and 3 it would not add a new curb cut to Columbus Avenue.

In general, the significant traffic impacts predicted to occur with the project without this mitigation option would also occur with this option. However, at three locations bordering the project site, this option would have different impacts than those predicted for the project without this option. Those changes would be as follows.

- *The impact at the eastbound West 81st Street approach at Columbus Avenue that was predicted with the proposed project would be eliminated under this scenario.*
- *A new significant impact would occur at the southbound Columbus Avenue approach at West 76th Street.*
- *A new significant impact would occur at the southbound Columbus Avenue approach at West 77th Street.*

These two new impacts could be mitigated by simple signal retiming.

Because of the diversion of traffic associated with the Columbus Avenue driveway, this mitigation option would decrease the traffic on West 81st Street between Amsterdam Avenue and Central Park West and on Amsterdam Avenue between West 79th and 81st Streets, and would increase the volume of weekend Museum traffic traveling on West 79th Street between Amsterdam and Columbus Avenues. (The maximum increase would be approximately 30 arriving vehicles in a peak hour.) This block of West 79th Street is relatively lightly traveled for a crosstown street because it ends at a "T" intersection with Columbus Avenue and consequently does not provide an east-west through route. Therefore, even with diverted *traffic, good service conditions with LOS C or better would prevail on West 79th Street during all peak periods. The increased traffic would not result in significant changes in service conditions at the intersection with Columbus Avenue, and all traffic movements would continue to operate acceptably. With the location of the service drive entry south of West 78th Street, no queue on West 79th Street is expected. During weekdays, when the driveway would not be open to Museum visitors, the mitigation plan would not have any effect on West 79th Street traffic conditions.*

Based on an examination of the project-generated traffic patterns, it was determined that approximately 45 percent of the Museum visitors and 75 percent of the restaurant patrons arriving at the garage would use the Columbus Avenue driveway to access the garage. This represents a total shift of approximately 46 auto trips (including project trips, as well as reassigned No Build trips) from West 81st Street to Columbus Avenue during the Saturday peak hour.

The provision of a new entrance utilizing the service driveway would have the potential to create an additional queue of cars on Columbus Avenue waiting to enter the garage when it is full. However, the transportation plan proposed by the Museum anticipates stationing personnel at the Columbus Avenue entrance to direct entering vehicles and prevent cars from queuing illegally as they wait for entry to the driveway. With this enforcement, it is expected that the formation of vehicle queues on Columbus Avenue can be avoided. This approach would be applied similarly to the West 81st Street entrance.

Without this enforcement, it is possible that two self-limiting lines may form, one at each driveway access. Conservatively assuming the worst-case scenario, in which the queue on Columbus Avenue would consist of as many as 15 vehicles, this would result in the loss of a moving lane on Columbus Avenue at both the West 78th and 79th Streets approaches (a distance of approximately 300 feet). This lane loss would not be acceptable; therefore, the Museum is committed to seeing that such illegal queuing would not occur.

Unlike the five other options, the preferred option would not carve a new path through or under Theodore Roosevelt Park and so would not disturb it or create any changes in visual character. With the increased weekend use of the service drive, this option would create occasional disruption of pedestrian flow along Columbus Avenue (but would not create a new curb cut with additional pedestrian disruption). Construction activities associated with this option would be limited and would occur entirely within the site. The other options would have required construction work on the park and in the street.

PUBLIC TRANSIT

The project could result in a minor impact on the westbound M79 bus line during the midday peak period. This impact could be mitigated by adding one extra bus during the hour.

NOISE

Events on the terrace might result in intrusive noise in Theodore Roosevelt Park and at residences on West 81st Street. Mitigation steps would include the following measures:

- *A dedicated sound system, controlling speaker type, orientation, layout, and sound emissions required for all instruments that use amplification.*

- *Proper scheduling concluding amplified sound and other potentially intrusive noise at terrace events by 11 PM.*
- *Limiting the number of events with the most intrusive noise.*

CONSTRUCTION

Construction of the project could result in temporary impacts on Theodore Roosevelt Park on traffic, parking, transit, and pedestrians, and on local noise levels. Mitigation for the park impacts would include a tree protection plan, erosion control measures, maintenance of drainage, and restoration of disturbed lawn areas.

Transportation management to reduce construction period impacts would include:

- Institution of parking strategies and plans for managing bus drop-offs and parking. This may include the identification of satellite locations for bus parking and the use of traffic management personnel to direct the unloading and parking of buses;
- Regulation of on-site construction activities, storage, and deliveries to minimize disruptions to adjacent sidewalks and streets;
- Coordination of materials delivery and handling to limit this activity to on-site areas as much as possible, to minimize conflict among construction sites, and to avoid (to the extent feasible) possible peak traffic and pedestrian periods;
- Coordination, if necessary, of traffic routes, detours, and enforcement;
- Coordination of construction scheduling on project sites to minimize conflict and impact; and
- Constant monitoring to determine the effectiveness of the measures taken.

Mitigation for impacts on community noise levels would include use of bearing piles to the maximum extent possible, compliance with New York City and U.S. Environmental Protection Agency (EPA) noise standards for construction equipment, and inclusion of noise control measures in the construction documents.

D. ALTERNATIVES

A number of alternatives to the proposed action have been considered in its planning and analysis. These include a No Build alternative, in which the project does not go forward; alternatives that retain the Hayden Planetarium, either for refurbishment as a planetarium or for reuse, with the new Planetarium at a different location; alternative garage size and locations; and phased implementation of the project. These alternatives were assessed and compared with the proposed project, as summarized below.

NO ACTION ALTERNATIVE

Under this alternative, the proposed project would not be built. However, by 2001 Theodore Roosevelt Park would be improved, and some changes would occur from general increases in Museum attendance, and in population, employment, and traffic in the surrounding neighborhood. Key differences from the proposed project would be as follows:

- Anticipated increases in Museum attendance of 5 percent per year would take place, but the additional 673,900 visitors and new employees associated with the project would not materialize, nor would the revenues associated with their trips accrue to the Museum or the City and State.
- The Planetarium would remain obsolete as an educational tool.
- Without the new Columbus Avenue entrance, there would be no increased neighborhood access to the Museum.
- The 35,000-square-foot publicly accessible terrace would not be created, and a new pavilion and plaza at the Columbus Avenue entrance would also not be added. Without the proposed project, no new uses would be added to enliven the north and west sides of the Museum and the nearby park areas. As with the proposed project, open space ratios in the area would be acceptable.
- Under the No Build alternative, the Hayden Planetarium would remain intact. No single facade would be created on the north side of the Museum, enhancing the architectural relationship between the Museum and West 81st Street in the Central Park West historic district. The north side would remain an unfinished, ragged edge to the historic Museum complex. The opportunity to create a new Planetarium that would enhance the complex would be foregone. In addition, there would be no new entrance from Columbus Avenue and thus no contemporary focal point and visual connection between the Museum and the buildings along Columbus Avenue in the historic district.
- The north side would not present a cohesive facade to its neighbors, nor would it contain the strong, active visual element proposed for the new Planetarium and adjacent terrace and galleria. On the west side, visual and physical access to the Museum would not be introduced, nor would there be a lit pavilion and entry plaza to help make this section of the park safer and more attractive to its users.
- Under this alternative, impacts at five intersections in the study area would not occur. However, the No Build increase in attendance would increase demand for parking and, without the garage, this would exacerbate congested conditions on West 81st Street, extending the time of the queuing to cover most of a weekend day.
- Under this alternative, there would be no need to add a bus to the M79 route in the weekday midday peak period.
- This alternative would have no terrace and, so, no noise impacts on Theodore Roosevelt Park during special events on the terrace.
- None of the impacts associated with project construction would occur in the No Build alternative.

RENOVATION OR REUSE OF THE HAYDEN PLANETARIUM

RENOVATION ALTERNATIVE

This alternative would avoid demolition of a historic resource. However, the alternative would not meet the Museum's goals for a modern scientific facility, nor would it increase attendance at the Planetarium. In particular, its physical structure limits its ability to accommodate new technologies; its current space is inadequate to meet existing needs and could not at all accommodate a new state-of-the-art exhibition space to explain adequately the workings of the universe.

REUSE ALTERNATIVE

Reuse of the Hayden Planetarium for another purpose, such as a restaurant or storage space, with a new planetarium nearby would create identity problems and confusion: both buildings would be clearly identifiable as planetariums. Further, eliminating the actual planetarium use from its current site at the Museum also would remove the "memory" of the planetarium from its original location and therefore not respect the historic layout of the Museum. In addition, it was not possible to find a suitable location on site for a new Planetarium; three locations—the parking lot, on the site of the current Power House, or atop the IMAX theater—all proved unsuitable as sites for a new Planetarium.

GARAGE ALTERNATIVES

REDUCED-SIZE GARAGE

This alternative would create a covered, one-level, at-grade garage with slightly less capacity than the existing parking lot. This alternative would look the same as the proposed project, but would actually be closer to the No Build condition. The only difference in terms of environmental effects between the proposed project and the project with this reduced-size garage would be related to traffic and parking. As discussed above, this alternative, like the No Build alternative, would be inadequate to handle existing and future parking demand, would exacerbate conditions on West 81st Street, and would increase traffic in the area as visitors circulate to find parking.

ALTERNATIVE GARAGE LOCATIONS

As part of early planning, the Museum examined a different garage on the site of the surface parking lot (Site 1) and two other locations for a new parking garage: Site 2, which set the lot on a parcel roughly in line with West 79th Street south of the Power House; and Site 3, beneath the southern edge of the Museum, facing West 77th Street, between Central Park West and Columbus Avenue. Key differences with the proposed project are as follows:

- Site 1, which was at grade, would place a structure on north-south axis with the Museum's central spine, preventing potential continuation of the inner transept. This would make it impossible to construct the Planetarium as designed for the proposed project and would offer no opportunity to provide the publicly accessible terrace. However, without the terrace there would be no noise impact on Theodore Roosevelt Park.
- Site 2, proposed as below grade, would have the advantage of drawing traffic to Columbus Avenue as well as West 81st Street, but would have the following planning and environmental problems: it would provide poor access to the Museum complex; it would require demolition of the Ichthyology Building, a historic structure, which would be a significant historic effect; it would require keeping the existing lot for bus parking—only the extra expenditure of funds to enclose the lot with terrace on top would permit the project to be built as otherwise proposed; it would require considerable disturbance to Theodore Roosevelt Park during construction and would have to place either one or two driveways cutting through the park.
- Site 3, also below grade, would function well if built, but would require demolition of the grand staircase at the 77th Street entrance and its rebuilding without the existing curved

driveway. In addition, the park would greatly be disturbed and no mature trees would remain in that section of the park, and it would be very expensive to build.

ALTERNATIVE PROJECT PHASING

The Museum may construct certain elements at a later date. These would be likely to include the renovation of the Power House, the portion of the galleria west of the garage entrance, and the new entrance pavilion and plaza on Columbus Avenue at West 79th Street. During the period when the project was not complete, it would differ from the proposed project as follows:

- It would generate slightly less traffic.
- There would be no new neighborhood entrance to the Museum, and no new activity and no improved maintenance and safety in that part of Theodore Roosevelt Park.
- The terrace would not function as well as it would with a restaurant on its westerly edge, and the north side of the Museum complex would not look as complete. There would be no visual improvement to the Columbus Avenue side of the Museum complex.
- Disruption from construction would take place twice. Total construction costs would also be greater, if the project were split into two phases.

E. UNAVOIDABLE ADVERSE IMPACTS

As described above, measures have been identified to avoid and mitigate significant adverse impacts associated with the proposed project. However, two significant adverse impacts could not be mitigated as follows:

- The proposed project would generally meet the first of the criteria of adverse effect (destruction or alteration) that LPC uses in identifying adverse impacts on historic resources. However, as described above under "Historic and Archaeological Resources," in its report of November 21, 1995, LPC found both the demolition and alteration to be appropriate to proceed with the proposed project. LPC's findings included the following: that the Planetarium "has a minimal role in establishing the distinctive architectural character of this landmark"; that "the building is not a distinguished example of the architecture of the 1930's"; and that the building's inclusion in the Museum's Landmark designation "related primarily to its cultural associations as the Museum's Planetarium and to the public's experience of its programming and exhibits rather than to its architectural importance." LPC also found that the project would "create a single facade for this portion of the complex, unifying it architecturally"; and that "this proposed construction will enhance the special architectural, historic, and cultural significance of the American Museum of Natural History complex and of the Upper West Side/Central Park West Historic District." More information about LPC's report is provided above under "Historic and Archaeological Resources."
- *As described in Chapter 15, "Noise," use of the project's outdoor terrace for events that include amplified music or sound would result in noise impacts. Control measures have been proposed that would mitigate impacts from most events. However, noise emissions from events with fully amplified music or heavy percussion can be reduced, but not fully mitigated. Therefore, the number of such events would be limited.* ❖

A. PROJECT IDENTIFICATION

The American Museum of Natural History Planetarium Authority, in conjunction with the American Museum of Natural History, proposes to construct new facilities for exhibition, scientific research, education, and visitor services on the north side of the Museum and Planetarium site, consisting of a new center for earth and planetary science that will replace the existing Hayden Planetarium, a new Columbus Avenue entrance to the Museum, a new galleria, a new three-level parking garage, a new landscaped terrace on top of the parking garage, new exhibit space, and new restaurant facilities. As shown in Figure 2-1, the Museum and Planetarium sit within a public park on a large block that extends from West 77th Street to West 81st Street, and from Central Park West to Columbus Avenue. The northern edge of the Museum's building complex is aligned approximately with West 80th Street and faces West 81st Street across the park.

The Planetarium Authority, established in 1933 by statute as a State authority and public benefit corporation, owns the Planetarium building and the land on which it sits. The American Museum of Natural History, a not-for-profit educational corporation, was formed by the State legislature in 1869 to establish a museum and library of natural history in New York City and to encourage the study of natural science. The land and buildings occupied by the Museum are owned by the City of New York under the jurisdiction of the New York City Department of Parks and Recreation (DPR).

Implementation of the proposed project will require approval from the Planetarium Authority, DPR, and the New York City Art Commission. Further, the project will receive City funding through the New York City Department of Cultural Affairs (DCA) and Department of General Services or the newly created Department of Design and Construction Services (the agencies through which DCA implements its capital budget). Although no formal approval is required, the New York City Landmarks Preservation Commission (LPC) and Manhattan Community Board 7 have reviewed the project as part of an advisory report process specified by the New York City Charter. Both issued favorable reports on the landmark aspects of the project, including the demolition of the Hayden Planetarium. The project is not located in the Coastal Zone, and thus not subject to coastal policies.

The actions necessary to implement the project require environmental review under the regulations of the State Environmental Quality Review Act (SEQR). The Planetarium Authority is the lead agency for SEQR review. Other City and State agencies with discretionary decision-making authority with respect to the project are involved agencies under SEQR.

B. BACKGROUND AND CURRENT CONDITIONS

In 1874, the American Museum of Natural History began construction at its current site—then called Manhattan Square—which had been designated as a public park. The Museum's original master plan contemplated a facility that would cover much of the site, with buildings laid out to form a quadrangle; four peripheral structures were planned to surround four inner courtyards to be joined to a central pavilion by four central wings (see Figure 2-2). Work began at the south end of the site, near West 77th Street, and over the next 60 years, the Museum extended along 77th Street to Central Park West and Columbus Avenue, and then along Central Park West northward to as far as West 80th Street. Four buildings were constructed in the originally planned inner courtyards during that time: the Dana Education Wing and the Hall of Ocean Life in the two southern courtyards, and the Power House and the Hayden Planetarium in the two northern courtyards.

Today, the Museum consists of many interconnected structures. The south-facing (West 77th Street) and east-facing (Central Park West) facades were completed in accordance with the outlines of the master plan. The Museum, including the Planetarium building, is a New York City Landmark and is located within the Upper West Side/Central Park West Historic District, and is also listed on the State and National Registers of Historic Places. The north- and west-facing sides of the Museum are incomplete in terms of the master plan and contain a variety of facilities, structures, and openings, giving the impression that one is looking at the back of the Museum (see Figures 2-3 through 2-5). Along the north and west sides, the complex contains the following elements:

- Whitney Wing. This section of the Museum, completed in 1933, is one of two wings flanking the main Museum entrance on Central Park West. Although it is well-articulated with granite along Central Park West, it presents a plain, six-story brick face to the north and west. The building contains the Biology of Birds and Oceanic Birds exhibits on its first and second floors, respectively. The upper floors contain curatorial offices.
- Hayden Planetarium. Located directly west of the Whitney Wing and not visible on the Central Park West elevation, the Hayden Planetarium, completed in 1935, is a brick building topped with a copper-clad dome in the Moderne style of its era (see Figure 2-6). The building is set back from the Museum Park at the bottom of a gentle slope. Views of the Museum from the north are partially obscured by trees and shrubbery in the park, and by a change in grade, with the building's entrance situated 9 feet below the elevation of West 81st Street. The building contains the Sky Theater, the Guggenheim Theater, and a variety of exhibits on the planets and the universe.
- Parking Lot. Adjacent to and west of the Planetarium is the Museum's surface parking lot, situated 9 feet below the grade of West 81st Street. It provides 180 parking spaces and is operated with valet service. During the week, the passenger car capacity of the lot is reduced to accommodate school buses. A semicircular driveway gives access into and out of the lot from West 81st Street.
- Power House. To the west of the parking lot is the brick Power House. This building is no longer used as a power plant; its five stories and basement are occupied by exhibition offices, ichthyology laboratories and storage, whale skeleton storage, and mechanical equipment. A driveway on Columbus Avenue south of West 79th Street gives vehicular service access to the structure in a below-grade courtyard, creating a fenced "moat" around the building. This service yard is used for delivery trucks and employee parking as well as container storage.
- Ichthyology Building. Just south of the Power House is the Museum's Ichthyology Building, a small, three-story gabled structure. A bridge built through one of its third-floor bay windows connects it to the Power House. The north facade of this Romanesque Revival-style building is made of stone, brick, and copper, with a slate roof. Its west facade consists of unadorned stucco, surrounded by a fenced moat.

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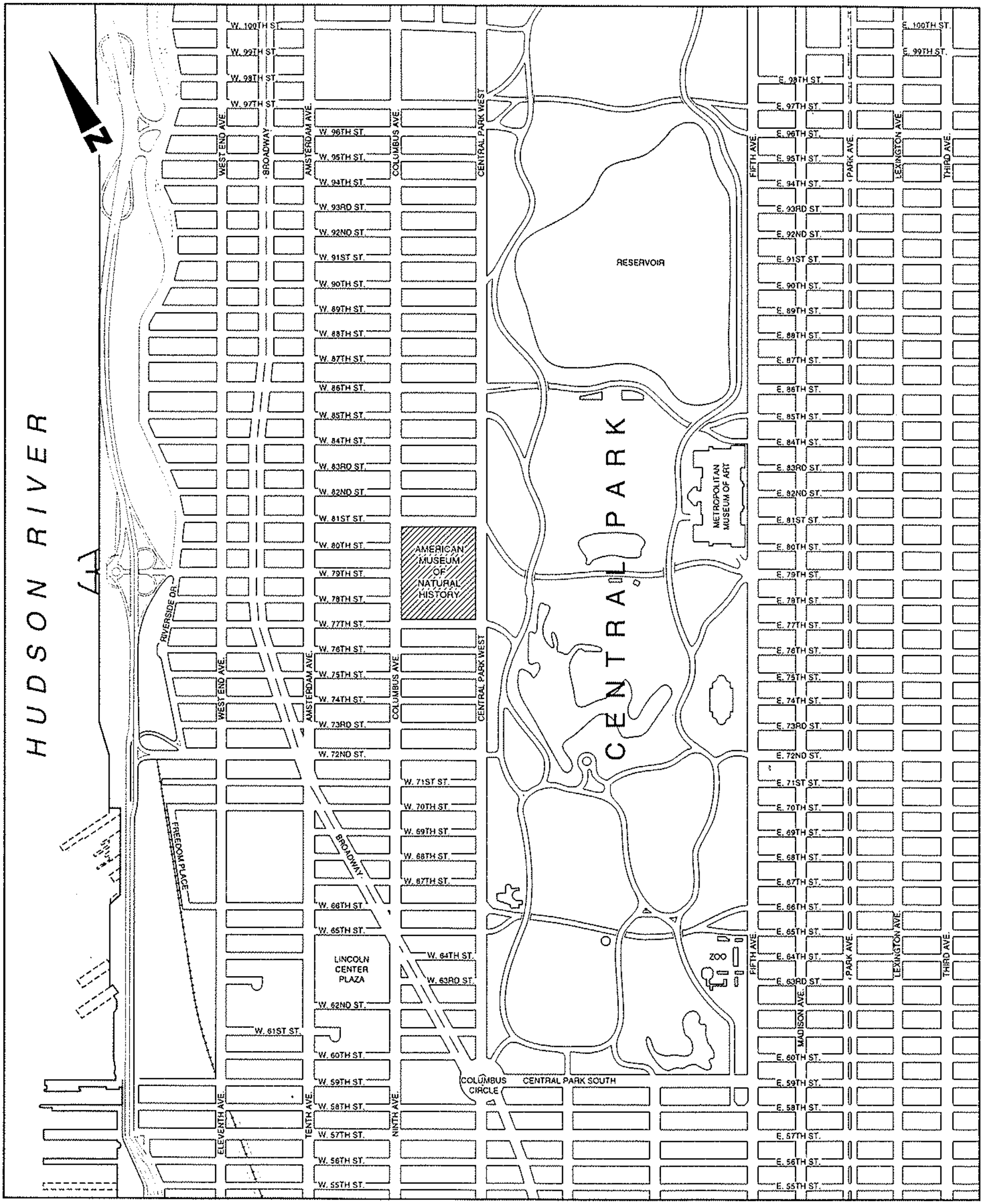


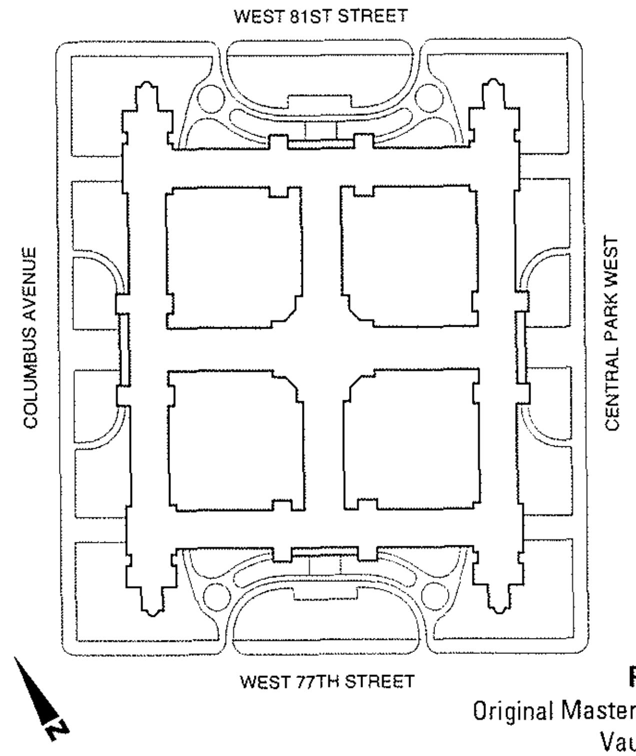
Project Site

0 1000 FEET
SCALE

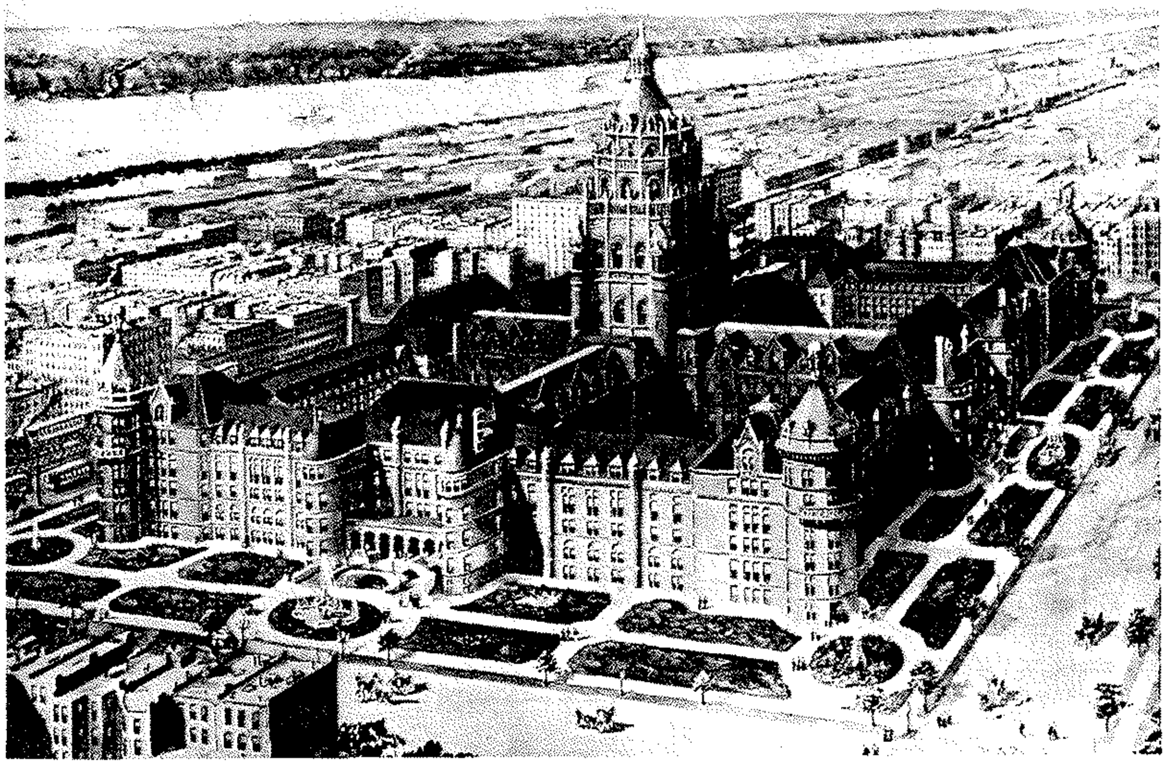
Project Location

Figure 2-1

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT



Plan View
Original Master Plan, 1871
Vaux & Mould

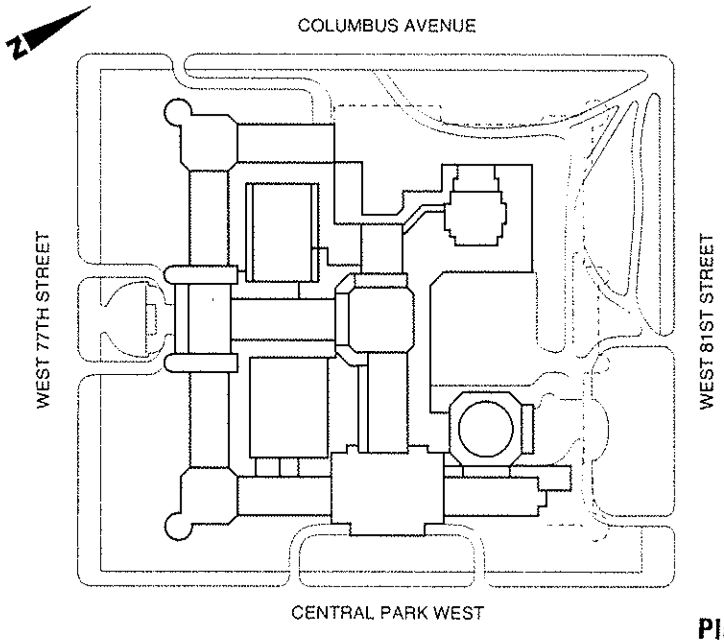


Aerial View
Revised Master Plan, 1891
Cady, Berg & See

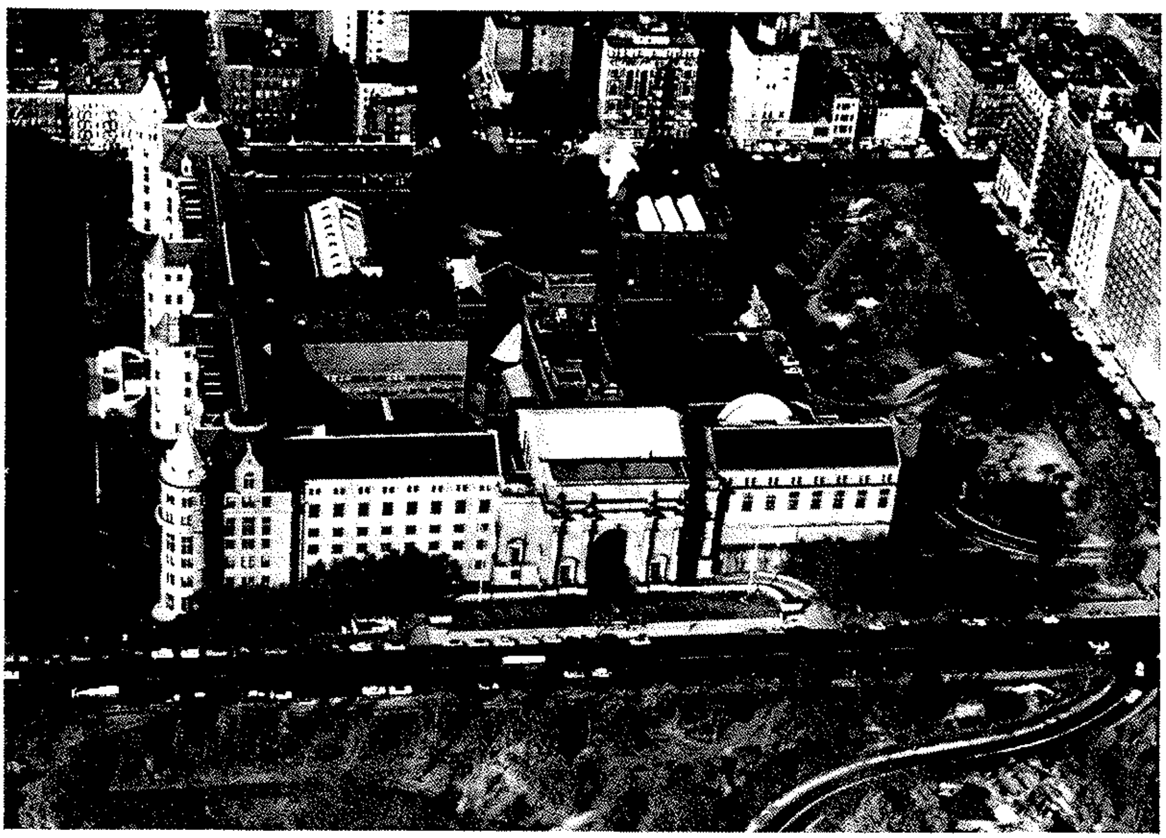
Early Museum Plan

Figure 2-2

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT



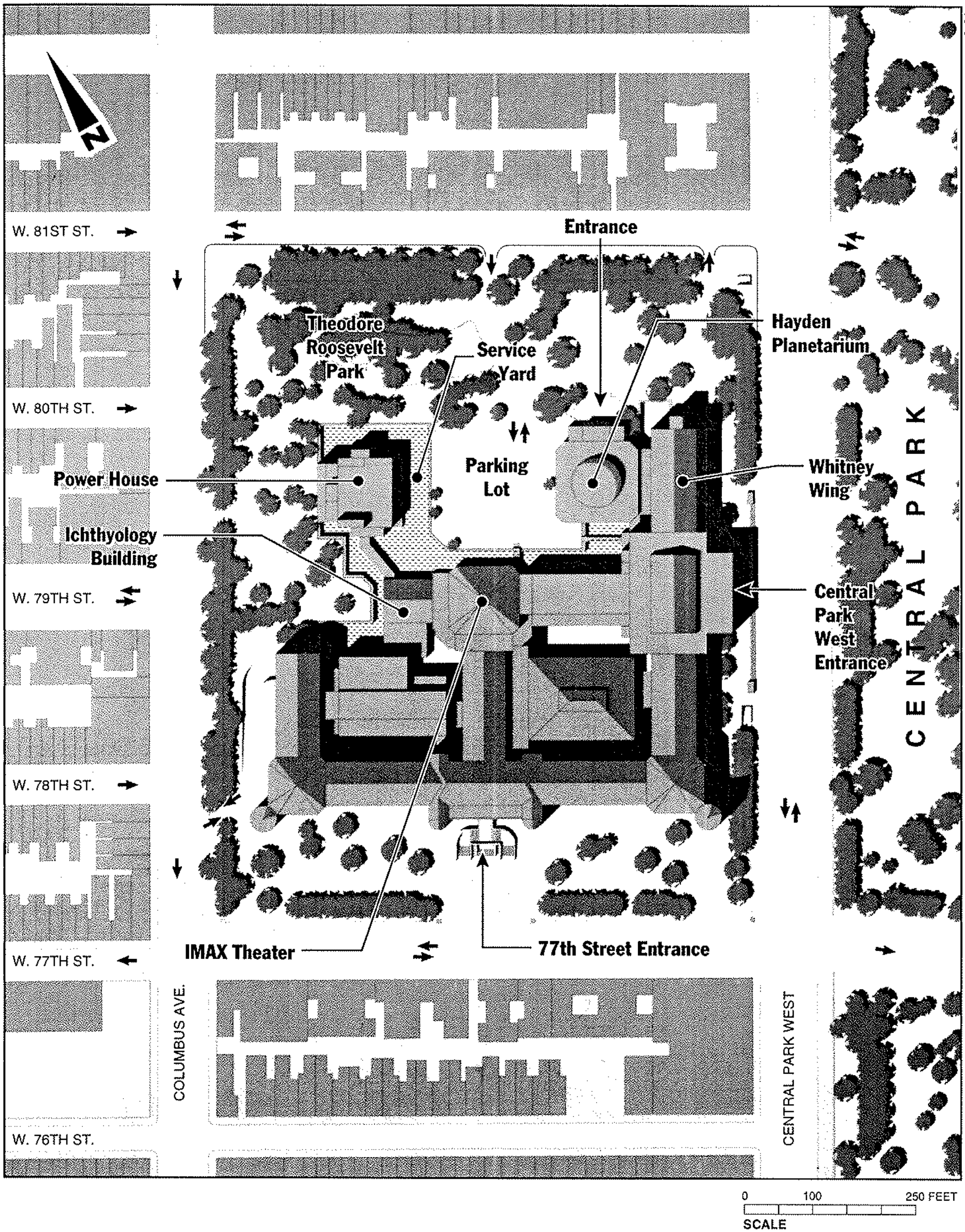
Plan View



Aerial View
1950's

Existing Museum Plan

Figure 2-3



Existing Site Plan

Figure 2-4

Photograph © Jeff Goldberg/Esto

Photograph of North Side of Museum

Figure 2-5

Photograph © Jeff Goldberg/Esto

Photograph of Hayden Planetarium

Figure 2-6

The Museum is situated in Theodore Roosevelt Park, a City park known familiarly as Museum Park. The park serves as an open space resource for the neighborhood and for Museum *visitors*. A dog run is located in the northern portion of the site. The northern and western portions contain lawns and trees, crisscrossed by bench-lined paths. This area suffers from an inadequate drainage system and a lack of maintenance and repair, which is evident in the unkempt and patchy vegetation, cracked paving, puddles, and soggy soil.

Because of its poor condition, the northern and western sections of Theodore Roosevelt Park surrounding the project site are undergoing planning for redesign and improvement. It is expected that the renovated park would retain the types of facilities now available, such as the dog run (which may be relocated), but would benefit from improved drainage, repair and maintenance of existing vegetation, new landscaping, benches, walks, and better lighting and security. Park renovation planning and design are being overseen by a committee consisting of the Borough President, the local Councilmember, DPR, the American Museum of Natural History, Community Board 7, Friends of Museum Park, the West 81st Street Block Association, and civic groups. Planning for the park renovation, which will be undertaken using funding from the Museum and the City, is proceeding under different auspices and on a different schedule from that of the Planetarium project. The details of the proposal are not yet developed.

Because the park renovation is taking place independent of the proposed project, its impacts—to the extent they are identifiable at this stage—are assessed in "The Future Without the Project" section of this Environmental Impact Statement (EIS).

C. PROJECT DESCRIPTION

The northern side of the Museum and Planetarium complex forms a ragged edge—a combination of buildings and uses that have been added over time and do not form a coherent development. The proposed project would improve this condition through demolition, new construction, and opening of a new Museum entrance on Columbus Avenue. The project would more effectively connect the north-end buildings to the Museum and to the neighborhood west of the site (see Figures 2-7 through 2-14). The proposed project would include the following components:

- Construction of a New Planetarium. This facility would replace the existing Hayden Planetarium and would be housed in and around a 90-foot-diameter sphere enclosed within glass curtain walls on its north and west facades. It would be connected to the Museum on various levels through its south and east walls. An entrance to the building would be provided in the same location as the Planetarium's existing entrance (see Figures 2-7 and 2-8).

  The interior space would include a variety of exhibits on and around the surface of the sphere, demonstrating for the visitor the relative sizes of elements in the universe and providing current information on events in space. Inside the sphere, the upper portion would house an updated sky theater; below would be a multimedia exhibit space. From there, the visitor would travel down a ramp, as if through time, with exhibits and demonstrations related to the key ages of the universe set over its 12-billion-year history. At the lowest level, there would be exhibits explaining the physical phenomena of the universe, such as spectroscopy and gravity. Connections to other institutions and research facilities would permit the Museum's scientists to interpret information and images, display it immediately within the Museum, and then transmit it to area schools and national and international science museums and centers.

- Hall of Planet Earth. The first floor of the Whitney Wing would be renovated to include a new exhibit hall. The new hall would examine our "planet," explaining how the earth evolved and examining various earth processes, such as oceans, continents, earthquakes, mountains, and volcanoes. It would also explore the forces that influence our climate, the geochemical cycles that link the physical and biological parts of the planet, and the special circumstances that make earth habitable. This new hall would provide the transition between the Planetarium—which focuses on the formation of the universe and interaction among all its components—and the Museum itself—which addresses all of the natural phenomena on this planet (see Figure 2-9).

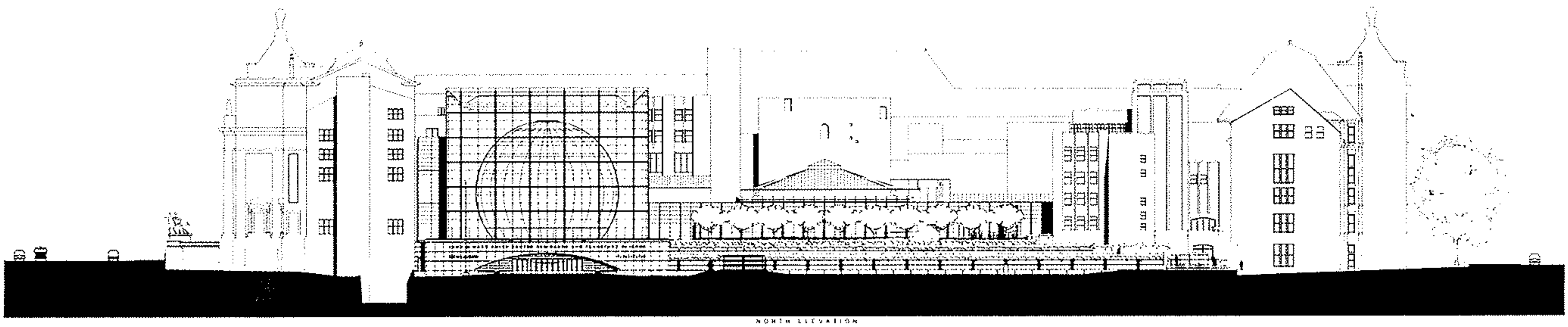
- Galleria. The new Planetarium would also connect to a new, two-story exhibition galleria and walkway, running east-west from the Planetarium to a new entrance pavilion facing Columbus Avenue (see Figure 2-10). The galleria would contain additional exhibit areas; offer visitor services, such as ticketing, coat rooms, information desks, and rest rooms; provide access to the garage and terrace; and connect to other parts of the Museum.

- Garage. On the site of the existing surface parking lot, the project would construct an enclosed and mechanically vented, three-level parking garage, with access from West 81st Street using the existing driveway and curb cuts. *An additional entrance to the garage from Columbus Avenue, using the Museum's existing service drive south of West 78th Street, is proposed as mitigation. This entrance, to be used during peak periods (predominantly weekends), is described in Chapter 17, "Mitigation."* Two parking levels would be below grade; the uppermost level would be at the elevation of the existing lot, 9 feet below the grade of West 81st Street. Approximately 18 feet of the north facade would be visible above the grade of the park and would be brick, stepped back in three tiers, and planted to soften the facade and blend it with the park's landscaping.

  From within the garage, visitors *could* enter the galleria under cover. School buses bringing children to the Museum would drop off *schoolchildren in the garage. On weekdays, the top parking level would be used for school buses dropping off and picking up schoolchildren, providing a safe and protected loading and unloading area. Some bus parking would also be available on this level.* The capacity of the garage would depend on its operations. With valet parking, the three levels could hold approximately 370 passenger cars. Park-and-lock configuration would decrease this capacity by about one-third. *On weekdays, when the upper level would be reserved for bus unloading, loading, and parking,* the total vehicular capacity would be reduced, since buses take up more space than passenger cars.

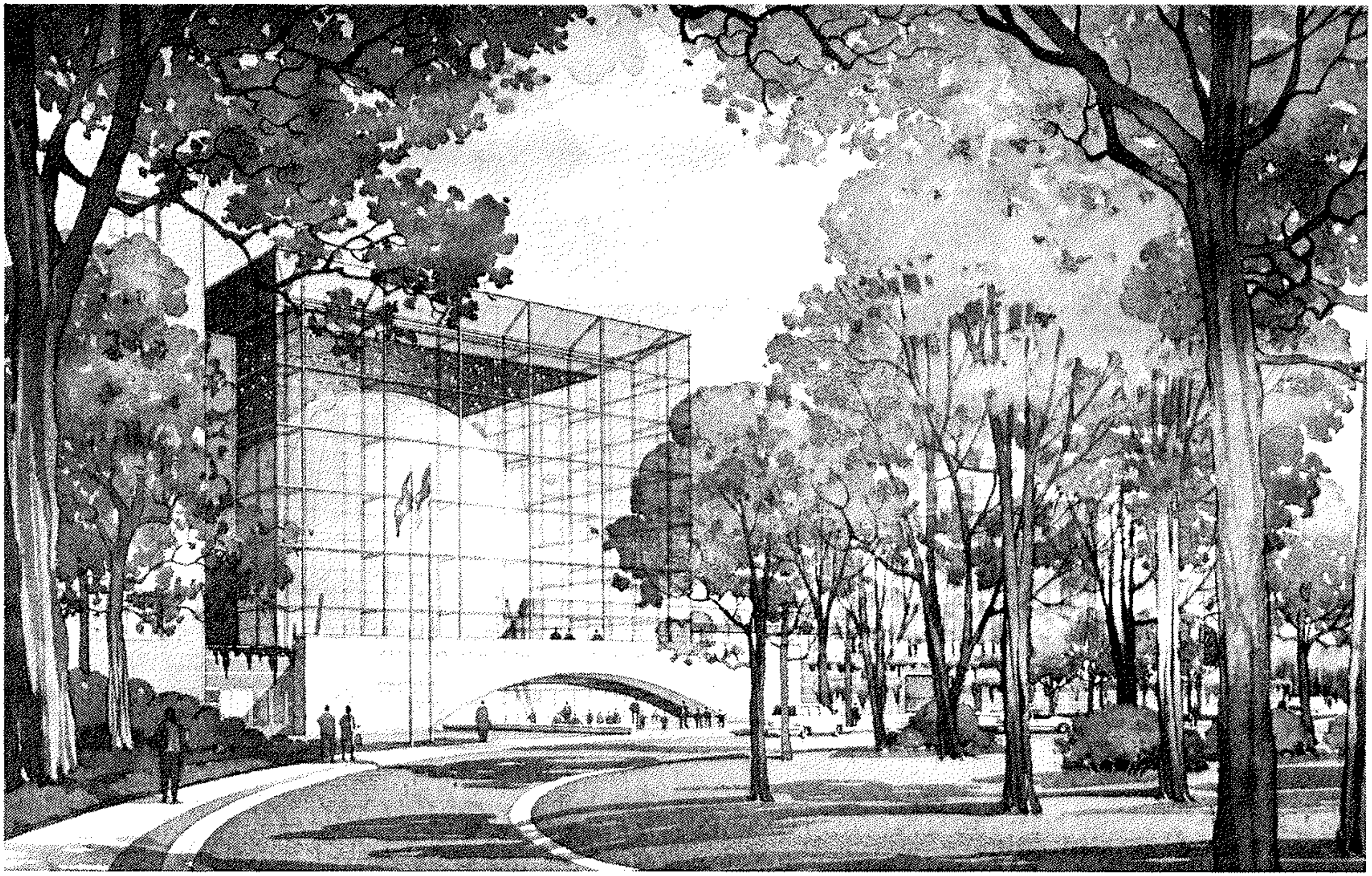
- Terrace. The new Planetarium and galleria would face the east and south sides of a 35,000-square-foot terrace built atop the garage (see Figure 2-11). This facility would be connected to the park by a wide stairway at its northwestern corner (see Figure 2-12). *Although the design of the terrace has not been finalized, it is expected to include such elements as a lawn, benches, tables, and chairs,* and would extend to the Power House, which would be renovated as described below.

  About 33,850 square feet would be publicly accessible and open free of charge when the Museum is open. It may also remain open late during the summer, and close during inclement weather. The Museum may mount special programs on the terrace. As is the case for all Museum halls, the terrace may occasionally close for private, special events *or Museum-related activities* scheduled during good weather (June through September). *The number and type of* such events *will be determined with a view toward minimizing or avoiding*



North Elevation

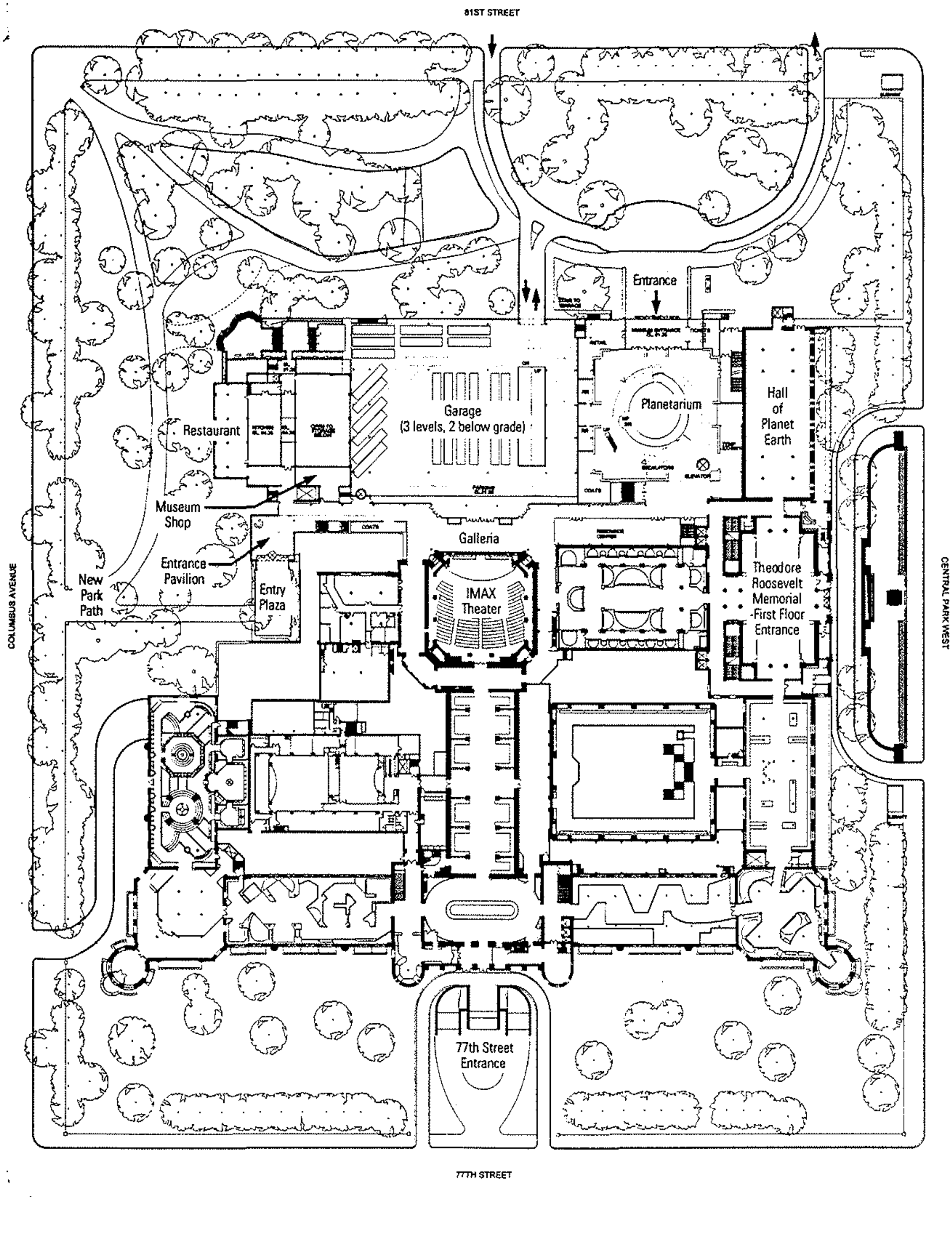
Figure 2-7



Planetarium

View Southwest from West 81st Street

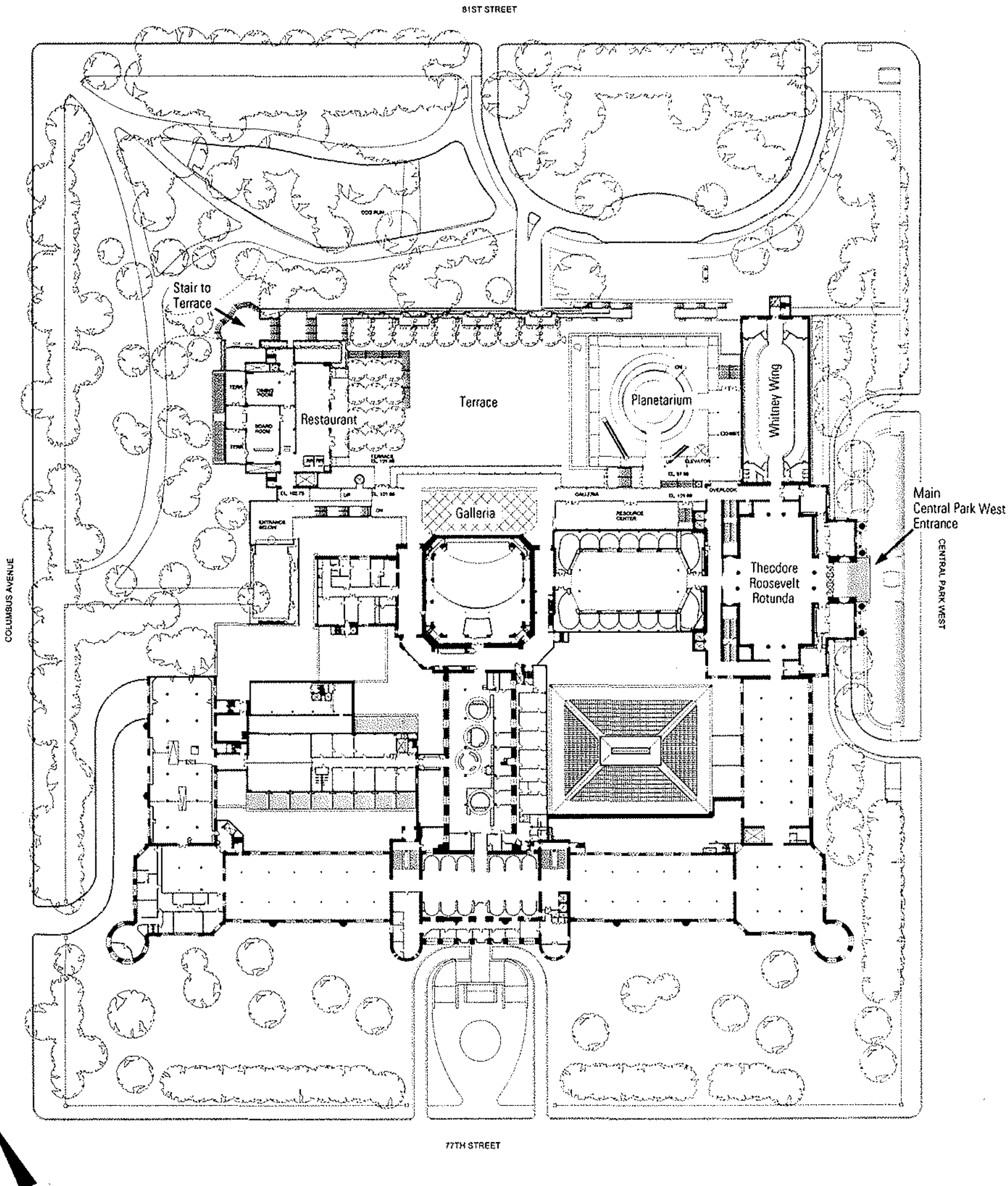
Figure 2-8



American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Proposed Plan – First Floor

Figure 2-9



Proposed Plan – Second Floor

Figure 2-10

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

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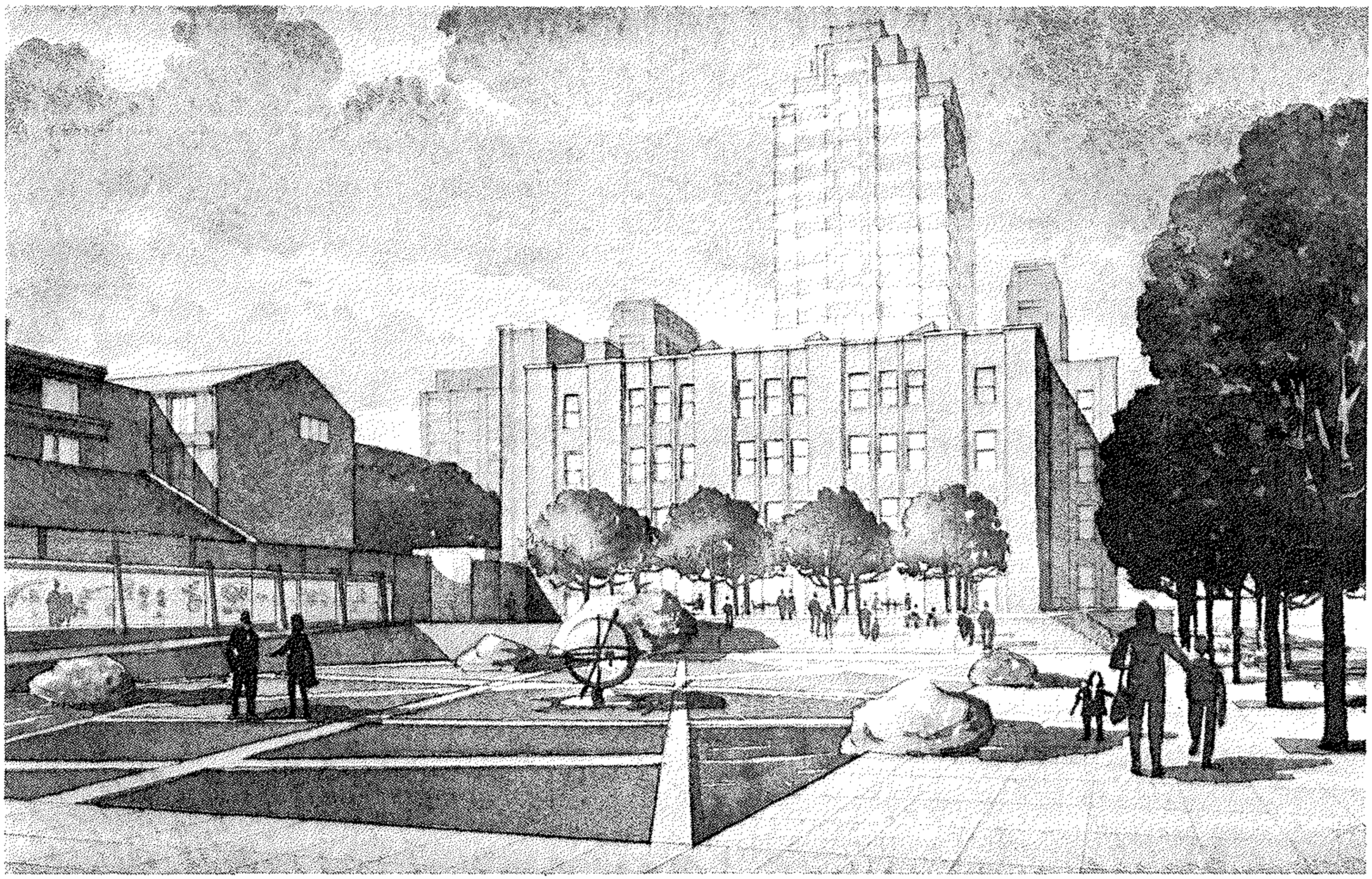

Terrace, Galleria, and Restaurant
View West

Figure 2-11

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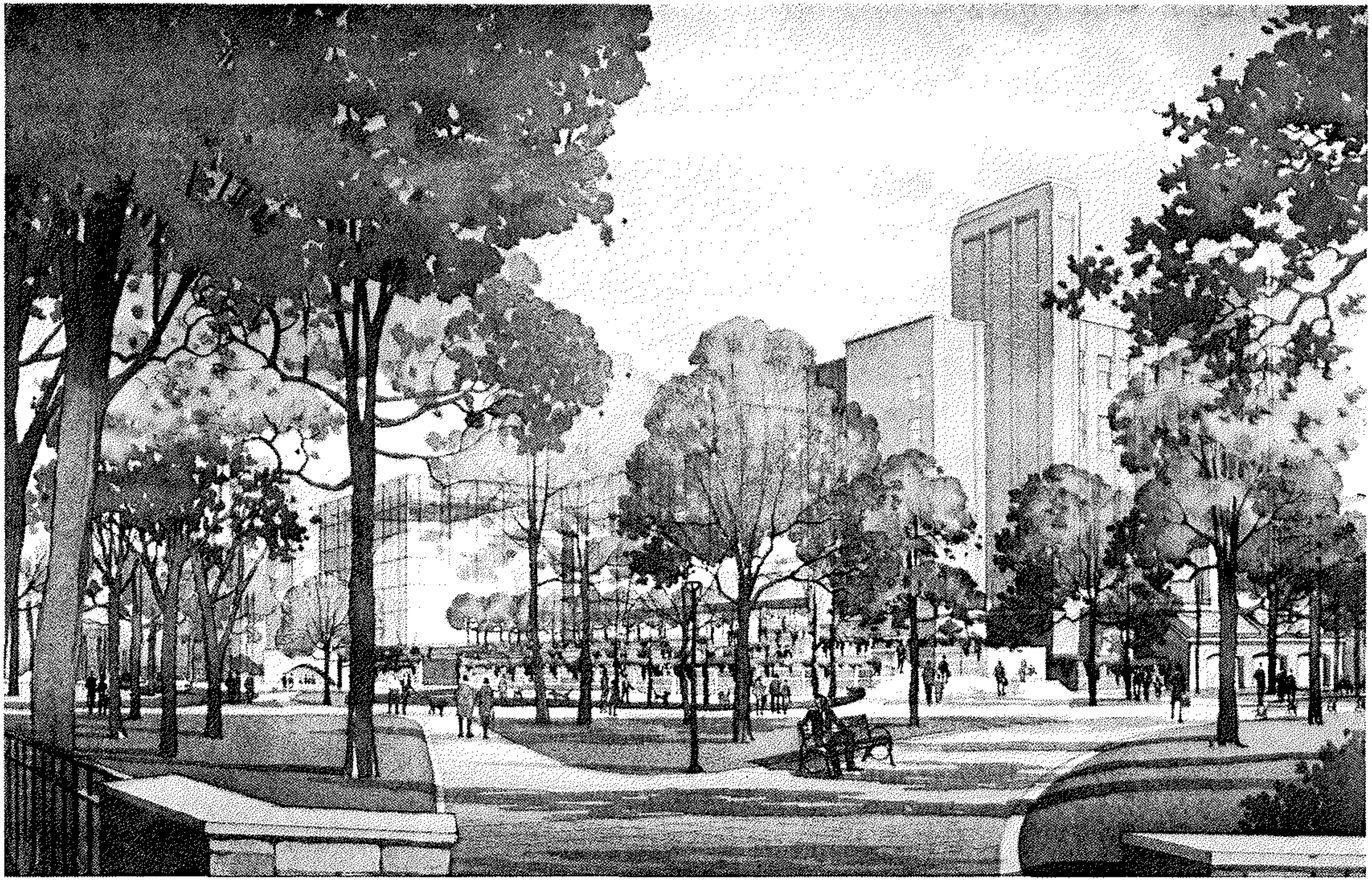


Planetarium and Terrace

View Southeast from Columbus Avenue and West 81st Street

Figure 2-12

excessive noise, as described in Chapter 15, "Noise," and Chapter 17, "Mitigation." Approximately 1,150 square feet would be used by the restaurant (see below) for outdoor dining.

- Restaurant. The Power House would be renovated and reused to provide new restaurant facilities open to Museum *visitors* and the public, and would be accessible from the Museum, the park and terrace, and Columbus Avenue. The restaurant may include a garden cafe facing Columbus Avenue, and one level above, a restaurant facing the new Planetarium across the terrace; in good weather, there would be dining outdoors on the terrace. The specific restaurant program is not yet known. For EIS purposes, a reasonable worst case has been identified. This scenario would include a large restaurant and a smaller cafe.
- Ichthyology Building. As part of the project, the bridge between the Ichthyology Building and the Power House would be removed, allowing the landmark north facade of the smaller building to be restored to its original design. This facade would be visible from the galleria.
- Columbus Avenue Entrance. At West 79th Street on Columbus Avenue, a pedestrian entrance would be introduced, leading eastward through the park and to a new entrance plaza for the Museum. Opening onto the plaza would be a new glass-enclosed pavilion (see Figures 2-13 and 2-14). Its glass enclosure would allow park users and approaching visitors to see into the Museum; the lights within would create a glow in the park, a sense of activity, and add to the safety of both park users and Museum visitors. This entrance would give access to the restaurant and the new galleria, and, from there, to the Planetarium and the entire Museum complex. It would provide direct access to the complex for the first time for the neighborhood west of the museum.

D. NEED FOR THE PROJECT

The project is a vital element in the Museum's ongoing commitment to upgrade and revitalize its facilities, as it recently did with its new dinosaur halls. The Hayden Planetarium, which many adult New Yorkers remember as a thrilling and inspiring introduction to the wonders of space and astronomy, is now out-of-date. The need to replace the obsolete and inadequate exhibits in the Planetarium is reflected in the steady drop in visitors there. Annual attendance at the Planetarium decreased from a high of about 700,000 in 1976 to 361,951 in 1994. In 1996, this decreased to 314,811. This is in sharp contrast to the marked increase in the number of visitors to the Museum overall and to the ongoing strong public interest in astronomy and space. The project is intended to foster the reestablishment of the Planetarium as the premier planetarium in the world.

The new Planetarium would allow the Museum to create exhibits that cannot be developed in the existing buildings.

This new exhibit space would be contiguous, enabling visitors to travel from exhibits about the universe, to those about the earth processes, to the Museum's existing exhibits about natural life and human culture. By using the spherical shape, the proposed facility would allow visitors to break free from the conventional exhibition hall format, bringing the architecture to life in service of science and education. By taking full advantage of new technologies, the Museum would substantially enhance its capacity to engage fully its visitors, and to reach beyond its physical boundaries to fulfill its educational and scientific mission.

At the same time, the project would also address other longstanding issues. It would transform the north side of the Museum into a unified whole, greatly improving appearance and circulation among the various parts of the Museum. The new Museum entrance on Columbus Avenue and the new terrace proposed for the roof of the parking structure would increase access to the Museum. All of the Museum buildings and Planetarium would be internally linked and more effectively connected.

The garage would permit creation of a safer dedicated entrance for *schoolchildren*. School buses that bring children to the Museum would enter the garage to load and unload passengers. The presence of the garage should also help to reduce the traffic that now circulates on nearby streets in search of parking. Further, the proposed garage, with adequate internal holding space for cars waiting to enter and exit, would greatly reduce the backup that now occurs at times of peak activity.

E. PROJECT SCHEDULE

It is anticipated that the SEQR review will be complete in the fall of 1996 (see discussion below). If the proposed action is approved, work can begin immediately with site preparation and utility relocation. Work on the Planetarium and excavation for the garage would begin in March 1997. The entire project *is expected to* be complete early in 2000. However, because attendance would be stabilized in 2001, the analyses in this *EIS* consider conditions in that year. Any mitigation measures for significant adverse impacts associated with the project would nonetheless be implemented when the project opens. Additionally, it is possible that certain project elements, such as the restaurant and Columbus Avenue entrance, would be completed at a later date. This possibility is addressed as a phasing alternative in Chapter 18.

F. PUBLIC HEARINGS AND MEETINGS

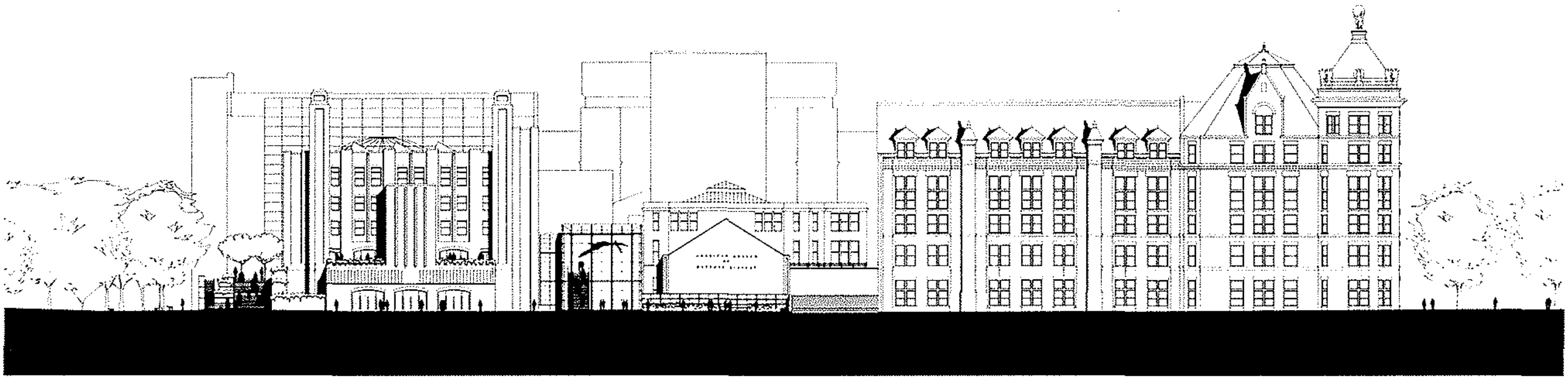
To date, a total of 14 public hearings and meetings have been held on the Planetarium and North Side project. These include four held by the Landmarks Preservation Commission during its review of the project, on October 5, October 31, November 14, and November 21, 1995; two held by the New York City Art Commission during its review of the project, on November 13 and December 11, 1995; and four held by Community Board 7, on September 21 and October 2, 1995, and June 18 and July 2, 1996. In addition, they also include four public hearings held by the Planetarium Authority under SEQR, on November 15, 1995, at 2 PM and 7 PM and on June 27, 1996, at 2 PM and 7 PM. These SEQR hearings are described below.

G. ENVIRONMENTAL REVIEW

REVIEW PROCEDURES

The Planetarium Authority is the lead agency for purposes of environmental review of the proposed project under *SEQR*. Pursuant to its bylaws, the Board of Directors of the Planetarium Authority has created an Environmental Review Committee, consisting of directors and officers of the Authority, for purposes of carrying out the Authority's lead agency responsibilities.

In accordance with its responsibilities as lead agency, in 1995 the Planetarium Authority reviewed the project's potential for impact in an Environmental Assessment Form—distributed with a notice regarding the Lead Agency status on August 25—and determined that the project may generate significant adverse impacts on the environment and that an EIS must be prepared. As a first step, the Planetarium Authority issued a positive declaration indicating the project's potential for environmental impacts, together with a Draft Scope of Analyses for the EIS. These



West Elevation

Figure 2-13

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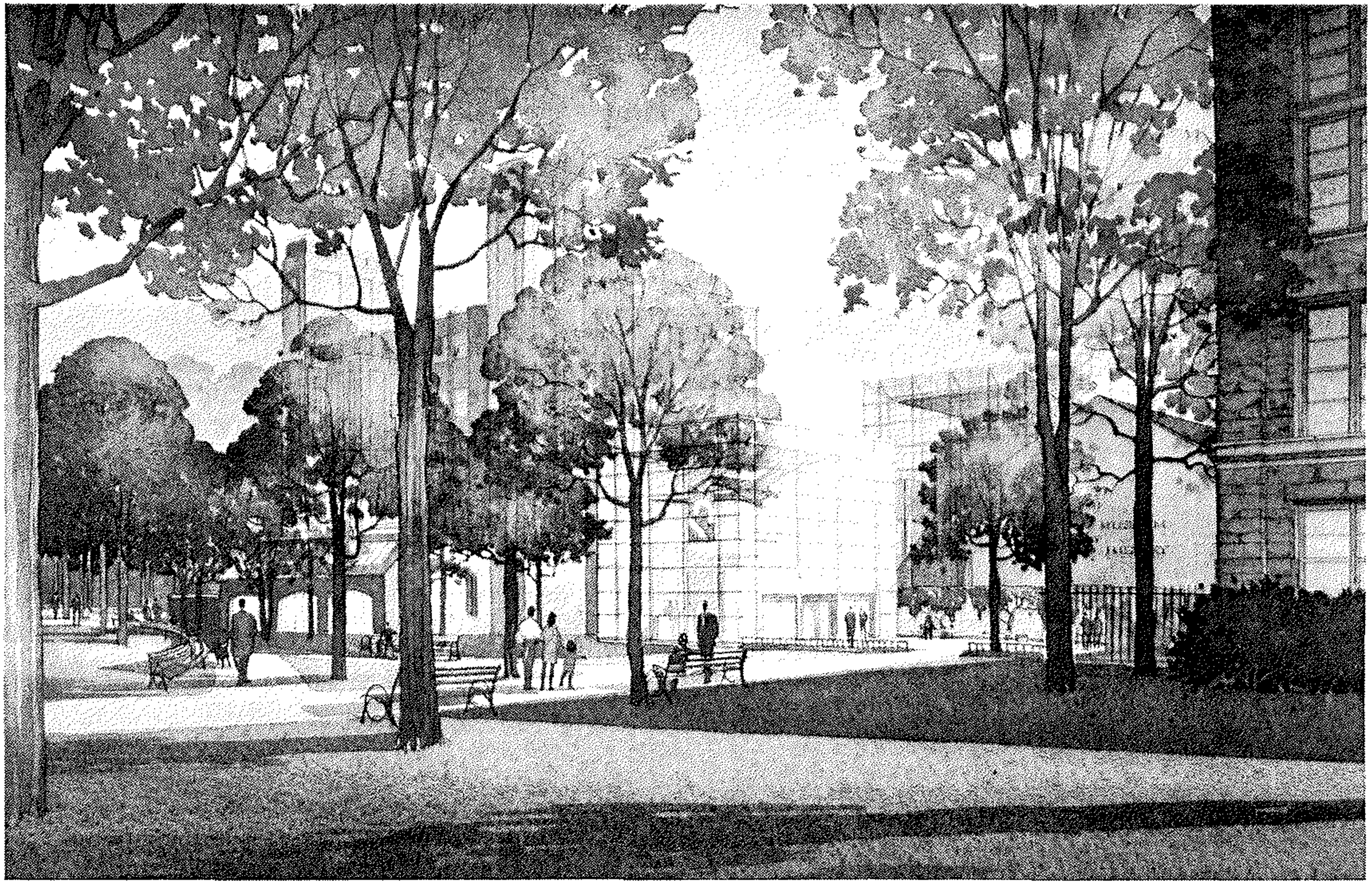


Columbus Avenue Entrance
View Northeast

Figure 2-14

were distributed to involved agencies and the public on October 17, 1995. Public scoping meetings were held at the Planetarium at 2 PM and 7 PM on November 15, 1995. Public review continued after the meeting until November 30, 1995. In response to comments made at the scoping meeting and other comments received during public review, the Draft Scope was revised and a Final Scope of Analysis was issued on December 14, 1995. The Planetarium Authority has continued to meet with the community board and other community groups as part of project planning and preparation of this EIS.

Following scoping, a Draft EIS (DEIS) was prepared for and reviewed by the Planetarium Authority, which issued a Notice of Completion on May 23, 1996. Public hearings on the DEIS *were* held on June 27, 1996, at 2 PM and 7 PM at the Hayden Planetarium Guggenheim Space Theater, located at the American Museum of Natural History on West 81st Street between Central Park West and Columbus Avenue. Written comments on the DEIS *were* requested and *were* accepted by the lead agency, provided they *were* received by 5 PM on July 17, 1996. After the close of public review, *this Final EIS (FEIS) was prepared, responding to* all substantive comments *made on the DEIS, including additional comments received after the close of the comment period.* The Planetarium Authority's environmental review committee will review the FEIS and, when appropriate, issue a Notice of Completion. After considering the completed FEIS for no less than 10 days, the Planetarium Authority's environmental review committee will adopt SEQR Findings, drawing its conclusions about any significant adverse environmental impacts of the proposed action and how to avoid or mitigate them. Each involved agency must also adopt SEQR Findings based on the FEIS. Once the lead and involved agencies give notice of their adoption of SEQR Findings, each may then take its action.

CONTENT OF THE EIS

The lead and involved agencies are required to take a "hard look" at the environmental effects of a proposed action and, to the maximum extent practicable, modify or even deny the proposed project to avoid or mitigate adverse impacts on the environment, as consistent with social, economic, and other essential considerations. The EIS identifies and analyzes the significant environmental effects of a proposed action and how those effects could be avoided or minimized, providing a means for agencies to consider environmental factors and choose among alternatives in their decision-making processes.

In undertaking to examine and disclose impacts, the EIS considers the proposed action's effects on its environmental setting. Because the project, if approved, would take place in the future, its environmental setting is not the current environment, but the environment as it would exist at project completion, in the future. This is known as "the future without the project" or the No Build condition. For the Planetarium and North Side project, the year of completion is anticipated to be 2000. The future analysis year in this EIS is 2001, the first year in which stabilized attendance would be expected with the project. Therefore, the technical analyses and consideration of alternatives in Chapters 3 through 18 assess conditions today, and forecast these conditions to the future in 2001 without and with the proposed project to assess impacts. Although the future analysis year is 2001, any mitigation measures identified to ameliorate the project's significant adverse impacts would be in place in 2000, the year the completed project would be in place if approved.

A. INTRODUCTION

This analysis of land use and zoning characterizes the existing conditions in the project area, anticipates and evaluates those changes in land use and zoning that are expected to occur independently of the proposed project, and identifies and addresses any potential impacts to land use and zoning associated with the proposed project.

To determine existing conditions and assess the potential for impacts, the land use study area has been defined as the area within a 400-foot radius of the project site, the area in which the project has the potential to affect land use or land use trends. Various sources have been utilized to prepare a comprehensive analysis of the land use and zoning characteristics of the study area, including field surveys, evaluation of land use and zoning maps, and consultation of other sources, such as municipal documents and regulations. To determine future conditions without the proposed project, those changes in land use and zoning that are planned to occur by the year 2000 were evaluated.

B. DEVELOPMENT HISTORY

Although its history can be traced back as far as the 17th century, the Upper West Side remained largely undeveloped until the 1880's. The area was laid out according to the Commissioners' Plan of 1811, which imposed the grid of avenues and cross streets in Manhattan that remains today. At that time, Manhattan Square, now the project site, was established along with several other squares and parks in Manhattan, including Tompkins Square, Madison Square, and Union Square. However, even with the creation of Manhattan Square and the introduction of the planned grid, the area would remain rural and largely undeveloped for many years. It was not until the creation of Central Park, begun in 1857, that significant development began to take place, much of it along the park's perimeter. As development proceeded steadily northward in Manhattan, the area became increasingly accessible and less remote, spurred first by the extension of the Eighth Avenue horsecar line and later by the construction of the Ninth Avenue El.

Central Park West was envisioned, like its east side counterpart Fifth Avenue, as a residential boulevard. By the end of the decade and into the 1890's, the Upper West Side, particularly between Broadway and Central Park West was experiencing a development boom most of which took the form of row houses and residence hotels. During the late 1920's and early 1930's, some of the older residence hotels along Central Park West were demolished to make way for the apartment, cooperative, and condominium buildings that now face the park, such as the Majestic, Beresford, and San Remo.

In 1874, construction of the Museum was begun in the southern portion of Manhattan Square, the large block bounded by West 77th and 81st Streets, Central Park West, and Columbus Avenue. This block is now Theodore Roosevelt Park, also called Museum Park. Having undergone numerous additions and expansions during the 60 years following its creation, the

Museum is presently an assemblage of 19 interconnected structures, including the Hayden Planetarium, that extends as far north as 80th Street.

C. EXISTING CONDITIONS

LAND USE

PROJECT SITE

There are generally two types of land uses within the project site, which is defined as the large (17½-acre) block bounded by West 77th Street on the south, West 81st Street on the north, Columbus Avenue to the west, and Central Park West to the east. Although the entire site is considered Theodore Roosevelt Park, the majority south of 80th Street is occupied by the Museum and the Hayden Planetarium. The remainder of the site is devoted to the open space and recreational uses that surround the Museum, including the park to the north and west, and the landscaped areas to the south and east.

American Museum of Natural History

The Museum is a complex of interconnected buildings, structures, and utility areas. It is a cultural institution of major importance not only for the West Side, but for all of New York City as well as for the nation and the world. The primary components of the Museum, as well as their general function, are as follows:

- Roosevelt Memorial and Central Park West Wings. The Theodore Roosevelt Memorial and Rotunda is the main building on Central Park West and the largest in the Museum complex. The building is the formal east entrance to the Museum and is flanked by wings to the north and south. The north, or Whitney Wing, houses the Biology of Birds and Oceanic Birds exhibits, as well as curatorial space. The southern wing contains exhibition space devoted to dinosaurs, invertebrates, reptiles and amphibians, and Asian mammals.
- Hayden Planetarium. Located directly west of the Whitney Wing, the Hayden Planetarium contains the Sky Theater, the Guggenheim Theater, and a variety of exhibits on the planets and the universe. The Planetarium is unique on the project site, because it and the land beneath are owned by the Planetarium Authority, a State entity created at the time of construction. The Authority issued bonds to repay a loan from the Federal Reconstruction Finance Corporation, which had financed the construction of the Planetarium. Although the Planetarium Authority is a separate legal and financial entity from the American Museum of Natural History, the Board of the Planetarium Authority is composed of the same trustees as the Board of the Museum.
- Power House. The northwesternmost building in the Museum complex is the brick Power House. No longer used as a power plant, it houses offices, ichthyology laboratories, whale skeleton storage, and mechanical equipment.
- Parking Lot. Adjacent to and west of the Planetarium is the Museum's surface parking lot. During the week, the passenger car capacity of the lot is reduced to accommodate school buses. On weekends, valet service provides 180 spaces. A cobblestone-paved semicircular drive on West 81st Street serves as the main vehicular entrance and exit for the Museum's public parking lot.
- Service Yard ("Moat"). Along much of the north and west sides of the Museum and in courtyard areas between many of the existing buildings is a below-grade service yard.

Vehicles arrive at and depart from this yard using the sloped service drive from Columbus Avenue just south of 78th Street. This drive turns north, parallel to Columbus Avenue, to just south of 79th Street, where it turns east and enters a portal beneath a building. This service yard contains the Museum's loading docks, entrances to the institution's freight elevators, trash containers and compactors, employee parking, and some storage areas. On the north and west sides of the Museum, where the service yard abuts Theodore Roosevelt Park, a fence prevents access to the below-grade yard from the park.

- Ichthyology Building. Just south of the Power House is the Museum's Ichthyology Building, connected to the Power House by a bridge built through one of its third-floor bay windows.
- 77th Street Entrance and Wings. The part of the Museum facing West 77th Street contains a variety of administrative, curatorial, and display spaces, including exhibits for Asian, Pacific, and South American Peoples; minerals, gems, and meteorites; Mexico and Central America; and the environment of New York State.
- IMAX Theater. At the center of the grouping of Museum buildings is the IMAX theater, which shows films, generally related to science and nature, projected on an oversized screen, and is also used as a lecture hall.
- Bickmore Wing, Dana Education Wing, Oceanic Hall, and African Hall. The Bickmore Wing, just south of the IMAX theater, contains the exhibits for Northwest Coast Indians and African Peoples. Directly west of the Bickmore Wing is the Dana Education Wing, with a library and theater space devoted to educational and instructional programs. East of the Bickmore Wing are the Ocean Life and Biology of Fishes exhibits. Connecting the IMAX theater and the Roosevelt Memorial Wing is the African Hall, containing the African and North American mammal exhibits, as well as dinosaurs. The lower level of the African Hall contains a cafeteria and restaurant.

Theodore Roosevelt Park

The Museum is set within, and bounded by, Theodore Roosevelt Park, also known as Museum Park. The northern part of this city park features a network of bench-lined pathways that wind through the park. A dog run, located east of the park entrance at the corner of West 81st Street and Columbus Avenue, allows unleashed dogs to exercise and play and provides seating for owners. Connecting the northern and western sides of the park is a single pathway, which permits pedestrian access from Columbus Avenue at 79th Street and provides a quiet area for sitting or strolling among the park's many mature trees.

The southern and eastern parts of Theodore Roosevelt Park are essentially landscaped yards that establish the setting for the Museum's south and east entrances. The well-maintained lawns, trees, and shrubs are enclosed by an iron fence, and no pedestrian or seating amenities are provided.

STUDY AREA

Today, land uses within 400 feet of the project site reflect the area's long history as a residential neighborhood, with commercial activity generally limited to ground-floor shops along Columbus Avenue, and a few cultural and institutional uses found at the periphery of the study area (see Figure 3-1). At the eastern end of the study area is part of Central Park, a large open space and recreational resource totaling 843 acres. Overall, the study area is heavily developed, and a recently conducted field survey identified no vacant lots or derelict buildings.

The majority of the study area consists of residential land uses in the form of row houses, walk-up apartments, and larger cooperative and condominium buildings. Brick, limestone, and brownstone town houses, generally elegant four- and five-story homes dating from the turn of the century, line the midblocks. The avenues and wider cross streets (West 79th Street and West 77th and 81st Streets along the Museum block) are generally lined with taller residential buildings. Along Columbus Avenue, there is a mix of small-scale walk-up apartments, multi-unit residences, and 7- to 12-story apartment buildings. The largest residential buildings are those just north and south of the project site, across West 77th and 81st Streets, ranging in size from 12 to 20 stories. Acknowledging the age and quality of the buildings along Central Park West and in the Museum complex, these portions of the study area have been designated as historic districts (see Chapter 7).

Almost all commercial uses are at the first and second stories of residential buildings. Concentrated along the length of Columbus Avenue, commercial uses comprise a mix of smaller boutiques, hardware and home furnishing stores, restaurants, cafes, and food shops. In addition, there are some national retail chains, such as the Gap (at the corner of West 76th Street) and Laura Ashley (at the corner of West 79th Street). Private medical offices can also be found scattered throughout the area.

Among the residential and commercial uses that make up the majority of the study area are a few institutional uses and community facilities. The New York Historical Society is located on Central Park West, between West 76th and 77th Streets. Just south of that, across West 76th Street, is the Universalist Church of New York, which also houses the small Winston Preparatory School. A much larger educational institution (serving almost 1,500 schoolchildren), Junior High School 44 (the William J. O'Shea School), occupies the eastern end of the block bounded by Columbus Avenue, Amsterdam Avenue, and West 76th and 77th Streets. The school is separated from Columbus Avenue by its paved play area, which is home to a popular flea market and greenmarket on weekends. At the northwestern edge of the study area, at 120 West 82nd Street, is the 20th Precinct of the New York City Police Department, which serves the area west of Central Park from 59th to 86th Street.

ZONING AND PUBLIC POLICY

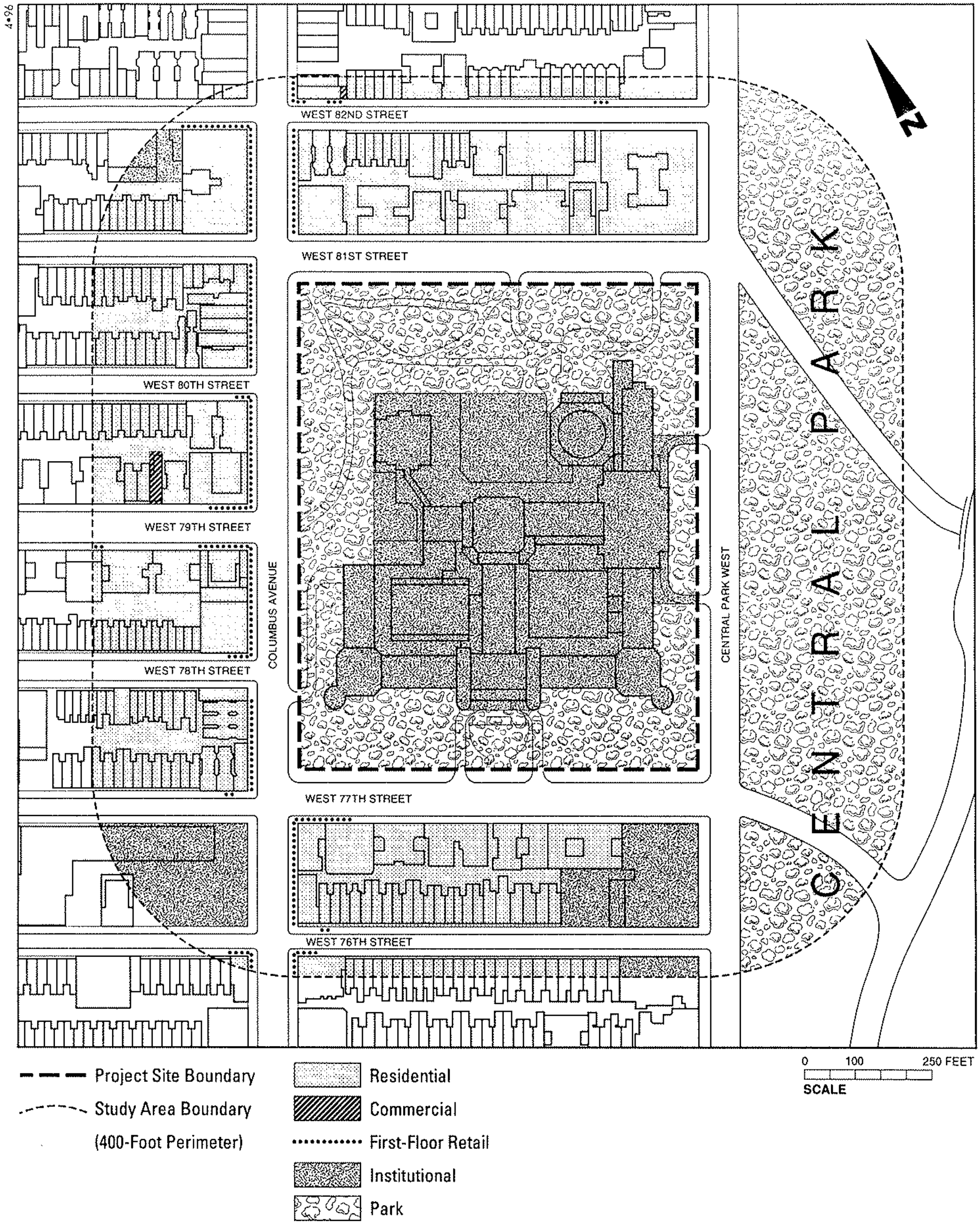
PROJECT SITE

The project site, defined as the area bounded by West 77th and 81st Streets and Columbus Avenue and Central Park West (see Figure 3-2), is a mapped city park that bears no zoning designation. As provided in Article I, Chapter 1 of the *New York City Zoning Resolution*, "District designations indicated on zoning maps do not apply to public parks." (Section 11-13).

STUDY AREA

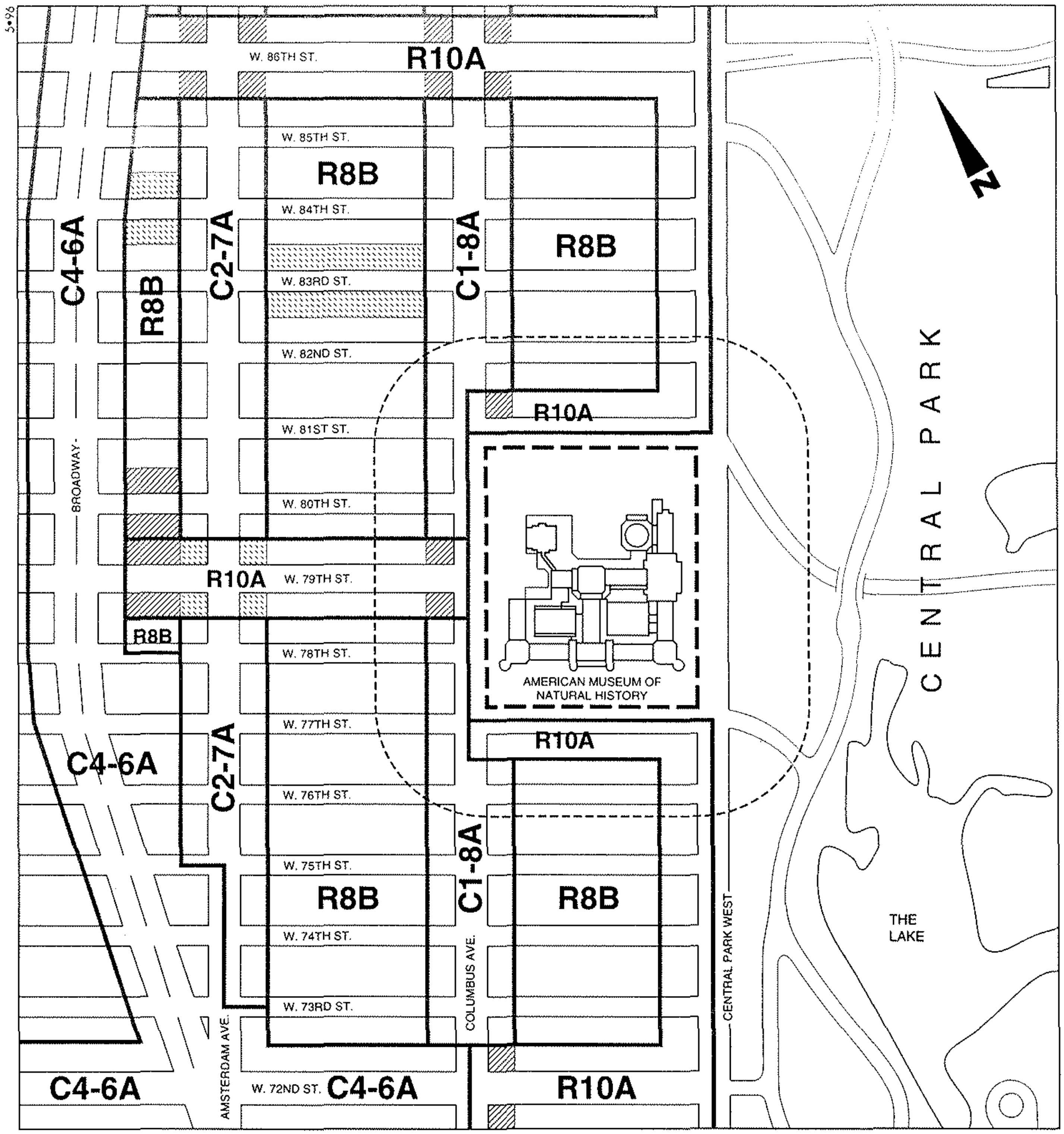
Generally, zoning in the study area is typical of that found throughout the Upper West Side and in other parts of Manhattan. Medium- and higher-density residential districts are concentrated along the midblocks, while neighborhood and higher-density commercial uses are mapped along the avenues. There are three zoning district designations within the 400-foot land use and zoning study area, R8B, R10A, and C1-8A. In addition, portions of the R10A districts along Columbus Avenue have C1-5 overlays.

Within the study area, there are four distinct R8B districts. R8B districts are contextual residential zones that encourage high coverage buildings compatible with existing low-rise development. North of the project site, a midblock R8B district incorporates the south side of West 82nd



Land Use

Figure 3-1



Project Site Boundary

Study Area Boundary (400-Foot Perimeter)

Zoning District Boundary

C1-5 Overlay

C2-5 Overlay

Existing Zoning

Figure 3-2

American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

Street and extends north beyond West 85th Street. A similar district is mapped south of the project site that includes the north side of West 76th Street and extends southward. Between Columbus and Amsterdam Avenues, two midblock R8B districts extend northward from the south side of West 80th Street and southward from the north side of West 78th Street.

Areas designated R10A are high-density contextual residential districts, intended to encourage development that is compatible with older neighborhoods. These districts, found throughout the Upper West Side and Upper East Side, are mapped only in Manhattan. In the study area, R10A districts are found along Central Park West, wrapping westward as far as Columbus Avenue to include the blockfronts of West 77th and 81st Streets that face the project site. The northeast corner of West 81st Street and Columbus Avenue has a C1-5 overlay, a designation which permits local shopping and services in otherwise residentially zoned neighborhoods. The length of West 79th Street in the study area is also mapped R10A, with C1-5 overlays at the corners on Columbus Avenue.

A C1-8A designation applies to Columbus Avenue from the north side of West 85th Street to the south side of West 73rd Street, interrupted only by the R10A districts immediately north and south of the project site and along West 79th Street. C1-8A districts permit retail and personal service shops needed in residential neighborhoods, with a maximum commercial Floor Area Ratio (FAR) of 2.0. Residential bulk permitted in these districts is equivalent to that allowed in areas zoned R9A.

D. THE FUTURE WITHOUT THE PROJECT

LAND USE

No development projects have been approved or proposed for the study area or immediate vicinity for completion by 2001. In general, the study area is unlikely to experience significant changes in land use patterns by the year 2001, largely because of the dearth of available building lots as well as the development constraints afforded by its incorporation in the Upper West Side/ Central Park West Historic District. Therefore, the current mix of residential and commercial uses is likely to persist in the future without the project.

Just outside the study area, a new 65,000-square-foot community center is planned at the southwest corner of Amsterdam Avenue and West 77th Street, for completion by 2001. Farther away, a new 265-unit, 16-story apartment building is planned on the east side of Amsterdam Avenue between West 89th and 90th Streets. This project is to be completed by the end of 1997.

The EIS assumes that if the project does not go forward, the existing Hayden Planetarium and the adjacent surface parking lot will remain operational and the north and west sides of the Museum will remain in their current condition. However, improvements to Theodore Roosevelt Park are currently in the planning stages and are likely to be implemented by 2001. These improvements will include better drainage and new landscaping (for more information about these renovations to the park, see Chapter 6, "Open Space and Recreational Resources").

ZONING AND PUBLIC POLICY

No changes in zoning or public policy are proposed for the study area. Without a foreseeable change in these conditions, it is expected that the R8B, R10A, C1-8A zoning districts, and C1-5 overlay areas will remain in place.

E. PROBABLE IMPACTS OF THE PROPOSED PROJECT

LAND USE

The project represents an expansion and improvement to the existing institutional use on the project site. The publicly accessible restaurant and terrace would act as transitional elements between the institutional uses of the Museum and the open space of the northern part of Theodore Roosevelt Park, and would bring people and vitality to this area. The restaurant would be situated in the renovated Power House and would be open to the public as well as Museum visitors. The terrace would be open to all. Although a 2,620-square-foot strip of parkland between the Museum and Columbus Avenue would be converted to a new entrance plaza and pavilion, the loss of parkland would be offset by the new landscaped terrace, which would add about 35,000 square feet of outdoor space, *including an approximately 1,150-square-foot outdoor dining area for the restaurant,* and would be linked to the park by a wide stairway at its northwest corner (for more information, see Chapter 6, "Open Space and Recreational Facilities"). In addition, a 2,800-square-foot area of the subsurface service yard would be covered and made accessible *parkland* as part of the construction of the Columbus Avenue entrance.

The new parking garage would occupy a slightly larger footprint than the current surface parking lot, by incorporating part of the Museum's existing below-grade service yard. The garage would hold approximately 370 passenger vehicles and would feature a new multilevel parking facility for buses and autos, with two levels below-grade and one above. The top of the garage would serve as the outdoor terrace discussed above. Although the project would entail major alterations to the Museum complex and north side, it would continue existing cultural and educational uses on the project site.

ZONING AND PUBLIC POLICY

The project site bears no zoning designation, and no changes in zoning or public policy are proposed as part of the project. The project, as a continuation of the existing land use on the site, would remain consistent with the surrounding mapped city parkland. ❖

A. INTRODUCTION

Although the American Museum of Natural History and Hayden Planetarium are widely appreciated as cultural institutions, their economic importance to the City and State is often overlooked. This chapter reviews the Museum as an economic entity in the broader society and examines it in terms of the same factors as any other contributor to the City and State economies—jobs, wages and salaries, consumption of services, direct expenditures, tax revenues, and overall impact on the region.

The principal economic effects of the proposed project come in two ways: one-time effects, generated by spending on construction activity; and ongoing effects, generated by new spending attributable to the increased attendance that would result from the project's implementation. Those financial benefits accruing to the City and State are likely to be positive, even considering that public money may be used to partially fund the project.

To assess ongoing effects of the proposed project, it is necessary to estimate the numbers of new visitors and understand where they are likely to come from, to estimate the extent to which their spending is new to the economies of the City and State. Attendance increases are also important in the EIS because they form the basis for the assessment of all impacts related to Museum and Planetarium visitors—i.e., open space demand; traffic, transit, pedestrians, and parking increases; and demand for other infrastructure, such as water supply, sewage treatment, and sanitation services (solid waste management). This chapter therefore begins with a discussion of attendance estimates, followed by an assessment of the economic effects of the proposed project on the local and regional economies during its construction and operation.

B. ATTENDANCE AT THE MUSEUM AND PLANETARIUM

OVERVIEW OF ANALYSIS METHODOLOGY

Based on turnstile and manual counts at the Museum's entrances, an estimated 2.77 million people came to the Museum during its fiscal year (FY) 1994 (July 1, 1993 to June 30, 1994). These numbers include those attending exhibits and shows at the Museum and Planetarium, employees and visitors on business with the Museum, and school children on class trips. In considering the impact of the proposed project on Museum attendance, the analysis focuses primarily on those attending exhibits. The numbers of employees may change with the proposed project (as discussed in the section on economic effects, below), but the increase as a proportion of the current staff of 800, would be relatively minor compared with overall attendance. The numbers of children on class trips is more a function of the capacity of the Museum to handle the groups than of the exhibits offered, and so would be relatively independent of the proposed project. Nearly all of the increase in annual attendance can be expected from those attending the Museum's exhibits and other facilities. These visitors are counted at the ticket booths as *paid* attendance. In FY 1994, paid attendance at the Museum and Planetarium stood at 1.87 million, about a third less than the turnstile counts. That year, Planetarium paid attendance (defined as synonymous with Sky Show attendance) totaled about 361,951. In FY 1996, paid attendance has risen to an estimated 2.33 million, but Planetarium paid attendance is only about 315,000.

The attendance analysis, prepared by Hamilton, Rabinovitz & Alschuler, Inc. (HR&A), uses the concept of market penetration to gauge increases in attendance—as compared with current levels, what percentages of the City's and region's residents, and U.S. and foreign tourist markets can the new Planetarium be expected to capture? The first step was to calculate existing market penetration levels for the facility.

The next step was to grow the Museum's baseline attendance figure and each of the markets to the year 2001. The baseline attendance was grown using the Museum's own historic growth rate of 5 percent. The primary region (the City) and the secondary region (the 26 counties surrounding the City as defined by the Regional Plan Association) were grown using U.S. Census projections. The foreign and U.S. tourist markets were grown based on projections by the Port Authority of New York and New Jersey and the New York Convention and Visitors' Bureau. Using these markets, the penetration of the 2001 baseline was calculated considering the following factors:

- The potential increment as a function of past attendance levels and Museum policy.
- Analysis of comparable facilities.
- Analysis of market penetration through independent market research.

ATTENDANCE INCREMENT TO PAST ATTENDANCE LEVELS

This analysis considered the past 10 years of attendance at the Museum within the context of the various program changes, renovations, new exhibits, and special events that took place and ticketing and advertising policies during that time, to understand the relationship between Museum policy and attendance trends. This information also is key to interpreting how overall changes at the Museum affect attendance at the Planetarium's Sky Show as well. In general, the Museum reports that annual paid attendance has increased by about 5 percent a year in recent years and, with a continuation of current policy (but without the proposed project), that growth rate can be expected to continue through 2001.

COMPARABLE FACILITIES

The assessment of comparable facilities addressed two categories of cultural institutions:

- Those facilities that operate within New York City under the same regional economic, demographic and tourism conditions as the Museum and Planetarium, such as the Metropolitan Museum of Art and other local cultural and science-related institutions.
- Other planetariums throughout the nation, such as the Adler Planetarium in Chicago and Buhl in Pittsburgh.

The analysis revealed several benchmarks for the project's attendance projections. Among the most important are:

- Attendance at comparable facilities shows a typical pattern when major new facilities, renovations, or special events are added: during the first year, attendance surges, after which it settles back to a new "normal" condition, usually higher than the previous norm. Although a "stabilized year" is difficult to project absent specific information about the introduction of exhibitry, the analysis endeavors to move beyond this initial surge by making the projections of attendance for the year *after* the Planetarium's opening, or 2001.

- Planetarium attendance in this country is declining generally. Although some increases do occur when external events, such as the appearance of Halley's Comet or the collision of the Shoemaker-Levy comet with Jupiter, excite new interest, all of the planetariums in the five cities surveyed (i.e., Adler in Chicago, Griffith in Los Angeles, Buhl in Pittsburgh, Hayden in Boston, and existing Hayden in New York) reported steady declines. This decline is likely attributable to the increased role of science and technology in entertainment facilities, such as Disney's Epcot Center and New York's Sony Wonder, which have sprung up by the hundreds around the country.

INDEPENDENT MARKET RESEARCH

The analysis includes the results of several interview surveys to understand the patterns of attendance today and the potential for new or increased attendance in the future with the proposed project. Museum visitors were surveyed at the facility; the membership was surveyed by telephone; and, in a random digit-dial survey, approximately 200 residents of New York and the region were also questioned. The results helped to define current and future market penetration, understand the role that the various Museum facilities play in attracting attendance, and gauge the potential for the proposed new Planetarium to change current patterns and attract more attendance. In general, the response to the proposed project was somewhat positive. However, while there will clearly be increased interest in a new facility, there will also have to be significant marketing efforts to ensure that the word gets out and that the Planetarium's base, currently dominated by school groups, is expanded.

HIGH AND LOW CASE ESTIMATES OF PLANETARIUM ATTENDANCE

Recognizing that the attendance projections rest on a number of variables which may change over the next five years, the HR&A analysis presented high and low case attendance estimates in order to frame a reasonable range. The low case estimate assumed that the FY 1996 paid attendance volume at the Museum is a "spike" that will not be sustained over time. Therefore the projections are based on FY 1995 paid attendance (estimated for the Museum plus Planetarium at 1.76 million) and assume a baseline growth rate of 5 percent per year to 2001. The increase in attendance attributable to the project would include growth in the numbers of people who will purchase Sky Show tickets only plus a greater capture of Museum-goers who also attend the Sky Show. This would yield paid attendance at the Planetarium of 673,090, a solid increase over FY 1995 levels of 290,728.

The high case estimate assumes that the annual rate of paid attendance growth at the Museum will be higher than current levels and that the paid attendance levels of FY 1996 will be maintained. This more optimistic scenario would be achieved in anticipation of the project (the Museum would budget more funds for marketing to help defray project expenses) and in recognition of other project components, which include new amenities such as a new entrance from Columbus Avenue, galleria, terrace, restaurant, and enclosed parking. The analysis thus "grew" overall attendance from FY 1996 to 2001 at the rate of 8 percent per year. This analysis yields an estimated Planetarium attendance of 847,563.

CHOOSING ATTENDANCE ESTIMATES FOR USE IN THE EIS

The economic benefits analysis, when it is complete, will address both the low and high case estimates of attendance at the Planetarium. However, in all other EIS analyses, the high case estimate is used. The low case estimate shows strong attendance at the Planetarium, but this relies on a greater capture of people who are already coming to the Museum. In the low case estimate, the net increase in all attendance at the Museum (Museum plus Planetarium) would be approximately 186,800 over No Build conditions. Adding 10 percent for potential increases in employees and other non-revenue visitors, the EIS quantified analyses (e.g., open space, traffic, infrastructure) would be assessing the impacts of an attendance increment of 205,500.

With the high case, the net increment that is key to EIS quantified analyses would be considerably higher. This case would yield an overall increase in paid attendance at the Museum and Planetarium of 612,616. Adding 10 percent for potential increases in employees and other non-revenue visitors would bring this number to 673,900. Thus, in order to be conservative and not "underpredict" impacts of the project, the quantified analyses assume the high case estimate, as discussed below.

EXISTING CONDITIONS

The estimated paid attendance for FY 1996 is 2.33 million. This number includes some attendance surge for the new dinosaur halls, opened last fall. Recent surveys of Museum attendees, however, showed that although a decreasing proportion were coming primarily to see the new dinosaur halls, the total attendance numbers for the Museum were not declining. Also, the transportation analyses are based on field surveys undertaken during this time. Therefore, 2.33 million was considered to be a reasonable estimate of existing attendance to use as a base in the analysis. Of this number, approximately 21.4 percent purchased combination tickets (for general admission to the Museum plus a particular show or special event), and 40 percent (188,811) of those with combination tickets paid for the Sky Show. In addition, approximately 126,000 bought tickets for the Sky Show only, without seeking general admission to the Museum, bringing the total attendance at the Planetarium to 314,811. This represents a decrease of about 13 percent from FY 1994.

THE FUTURE WITHOUT THE PROJECT

The Museum administration projects attendance each year based on past trends, anticipated and planned new facilities and services. Based on these factors, the Museum anticipates that, without the proposed project, paid attendance will increase at about 5 percent a year to 2001. This estimate assumes completion of the program for the dinosaur halls and various improvements and special events, supported by increased effort in marketing already begun in FY 1996. However, with no improvements at the Planetarium, Sky Show only revenues would at best remain steady. As shown in Table 4-1, paid attendance without the project in 2001 would rise to 2.94 million. The Planetarium's attendance would also rise as a result of Museum increases, assuming the existing rate of combination ticket purchases is maintained. Museum attendees also going to the Sky Show would increase to 240,976; with Sky Show only remaining at 126,000, the 2001 paid attendance at the Planetarium would be 366,976, a level similar to that of FY 1994.

Table 4-1
Paid Attendance at the Museum and Planetarium FY 1996 and FY 2001 No Build

	1996	2001 No Build	Increment
Museum Attendance	2,205,735	2,815,139	609,404
Sky Show Only	126,000	126,000	0
Total Museum and Planetarium	2,331,735	2,941,139	609,404
Sky Show and Museum	188,811	240,976	52,165
Sky Show Only	126,000	126,000	0
Total Planetarium	314,811	366,976	52,165
Sources: 1996 data from American Museum of Natural History; analysis Hamilton, Rabinovitz & Alschuler, Inc. and Allee King Rosen & Fleming, Inc.			

The net increment in paid attendance at the Museum, above existing conditions, would be 609,404. In undertaking the open space, transportation, and infrastructure analyses in the EIS, this number was increased by 10 percent to account for some related increases in non-paid attendance, primarily employment, bringing the total increment to 670,344.

PROBABLE IMPACTS OF THE PROPOSED PROJECT

The analysis found that, with the proposed project, overall paid attendance would increase by 2001 both at the Museum and at the Planetarium at a higher rate than under No Build conditions. In anticipation of the project, the Museum would budget more funds for marketing to help defray expenses of the project. Also, besides the new Planetarium, the project would include other new amenities, such as a new entrance from Columbus Avenue, galleria, terrace, restaurant, and enclosed parking. This would result in 2001 attendance equivalent to a growth rate of approximately 8 percent per year, increasing the resulting paid attendance for general admission and combination tickets to the Museum by 425,809 over the No Build condition, as shown in Table 4-2.

Table 4-2
Paid Attendance at the Museum and Planetarium FY 2001 No Build and Build Conditions

	2001 No Build	2001 Build	Increment
Museum Attendance	2,815,139	3,240,948	425,809
Sky Show Only	126,000	312,807	186,807
Total Museum and Planetarium	2,941,139	3,553,755	612,616
Sky Show and Museum	240,976	534,756	293,780
Sky Show Only	126,000	312,807	186,807
Total Planetarium	366,976	847,563	480,587
Source: Hamilton, Rabinovitz & Alschuler, Inc. for Build condition.			

Beyond the overall increase in Museum attendance, the Planetarium's attendance would increase dramatically. Based on the analysis of market penetration, strong survey response, and experience at comparable facilities, the sale of Sky Show only tickets is expected to increase from today's 126,000 to 312,807. Moreover, it is estimated that, with the striking new facilities and state-of-the-art exhibits, combination tickets at the Museum would increase from 21.4 to 33.0 percent of ticket sales, and that the Planetarium's share would increase from 40 to 50 percent.

Thus, combination tickets for Museum and Sky Show would increase from 240,976 in the future without the project, to 534,756 in the future if the proposed project is built. Total paid attendance at the Planetarium would rise to 847,563, compared with 366,976 without the proposed project. Paid attendance at the Museum and Planetarium together would reach 3.55 million, with an increment to No Build conditions of 612,616. As with the No Build condition, this increment has been adjusted by 10 percent, to 673,878, for use in the EIS quantified impact analyses.

C. ECONOMIC IMPACTS

This section reviews the existing Museum and Planetarium as an economic entity, and assesses the types of economic effects that result from its operation. The general type of economic effects from the operation of the proposed project—including from the additional attendance projected to occur with the project—is then reviewed. The overall economic consequences from the Museum result from those expenditures associated with the operation of the Museum itself, plus those expenditures from visitors from out of the region who come or extend their stay because of the Museum, and from those suburbanites who come to the City primarily to visit the Museum. These expenditures result in an increase in economic activity, which in turn generates tax revenues to the City and State. These financial benefits would be positive, even considering that public money may be used to partially fund the project.

EXISTING CONDITIONS

PROJECT SITE

The Museum operates in a complex of interconnected buildings and structures on the large block that extends from West 77th Street to West 81st Street between Central Park West and Columbus Avenue. The Museum as an economic entity employs approximately 800 people. Its actual expenditures in FY 1994 were $60.7 million. In FY 1996, approximately 2.33 million people are expected to pay to attend the exhibitions at the Museum, and substantial numbers of *schoolchildren* will attend free of charge.

The economic consequences from the operation of the Museum can be summarized in the following seven principal effects:

1. Employment associated with the activity of the Museum itself.
2. Spending for other goods and services associated with the activities at the Museum itself, and resulting indirect and generated economic activity it creates.
3. Sales tax revenues associated with the Museum shops and eating facilities, and the parking tax associated with the parking facility.
4. Personal income tax and other City and State tax revenues associated with the direct and indirect economic activity from the operation of the Museum itself.
5. Spending by visitors who are attracted to the City by the Museum or who extend their stay because of the Museum, including spending from suburbanites, visitors from outside the region in the U.S., and visitors from outside the country.
6. Employment, wages, and salaries associated with spending by visitors, and the indirect and generated employment, wages and salaries, and economic output that the spending creates.

7. City and State tax revenues derived from the direct and indirect economic activity from the spending by visitors, including sales tax, personal income tax, hotel occupancy tax, corporate and business taxes, and numerous additional taxes.

MUSEUM AND ART GALLERY EMPLOYMENT

Museum and nonprofit art gallery employment has been one of the fastest growing employment categories in New York City. Table 4-3 summarizes employment in museums and art galleries in New York City from 1980 to the present. The figures are from the New York State Department of Labor (separate figures for museums are not available). Although the absolute amount of employment is not large compared with many of New York's other sectors, the increase in employment is significant. Average annual employment increased by more than two-thirds (69 percent) between 1980 and the latest available figures for 1995. This increase was a result both of increases in the number of museums and nonprofit art galleries operating in the City and increases in employment at the existing facilities.

Table 4-3
Employment in Museums and Art Galleries in New York City: 1980 to 1995 (Sector 8411)

Year	Average Annual Employment
1980	3,825
1981	3,980
1982	4,203
1983	4,422
1984	4,661
1985	4,969
1986	5,230
1987	5,349
1988	5,604
1989	5,893
1990	6,161
1991	6,151
1992	5,840
1993	6,111
1994	6,310
1995*	6,461

Notes: The figures are average annual employment covered by unemployment insurance.
* Through first half of 1995 (the latest available data).
Source: New York State Department of Labor.

THE MUSEUM AS PART OF THE ARTS INDUSTRY

The economic operation of the Museum occurs within the arts industry in New York, the broadest category of industry that includes museums. The Port Authority analyzed this industry in 1993 in its major report *The Arts as an Industry*,* updating its report of a decade earlier.** According to the Port Authority, the arts portion of the regional economy has grown even as the region itself has suffered through difficult times. The report concludes that the economic activity in the region's arts complex has grown some 14 percent in real terms over the 10-year period (1982-1992). As it has flourished, the arts industry has increased its previously significant impact on the region's economy.

As defined in the Port Authority report, the arts industry is composed of five segments: nonprofit cultural institutions (including museums), commercial theaters, art galleries and auction houses, television and film, and the businesses that serve the visitors to the region's cultural attractions.

Overall, the impact of the arts industry is substantial. In 1992, the total economic impact of the arts in the entire New York-New Jersey region was $9.8 billion (about $10 billion in 1996, correcting only for inflation), the vast portion of which occurred in New York City. More than $3.0 billion in wages and salaries were generated by the arts in New York City in 1992, which represents a 10 percent increase in real terms over a decade ago. Employment, both direct and indirect, totaled more than 107,000 in the region in 1992. In New York City, employment from this economic sector totaled nearly 100,000 (98,800).

THE MUSEUM AS PART OF NONPROFIT CULTURAL INSTITUTIONS

According to the Port Authority report, the New York-New Jersey region is home to the largest concentration of nonprofit cultural institutions in the nation and the world. These include, in addition to the American Museum of Natural History and Hayden Planetarium, many other of the world's most celebrated museums as well as nonprofit theater companies, orchestras, and arts organizations. The contribution of these institutions not only enriches the creative and cultural life of those who attend them, but the economy of the region as well. Within the region, the nonprofit cultural institutions located in New York City account for 92 percent of all expenditures associated with these institutions. Including only the effect of the institutions themselves (and not the visitors to them), these institutions in New York City had a total economic impact of $2.5 billion in 1992, based on direct expenditures of more than $1.2 billion, an increase in real dollars of more than one-third (38 percent) between 1982 and 1992. Most of this growth occurred in large nonprofit institutions, those with budgets of more than $1.5 million. During the same period, smaller organizations downsized and decreased in number. Museums, in particular, were singled out for their growth in spending, registering a 61 percent increase over a decade ago. Employment resulting from the nonprofit cultural institutions, including both direct and indirect, equaled nearly 33,600 jobs in the region in 1992, of which 26,900 jobs were in New York City.

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* *The Arts as an Industry: Their Economic Importance to the New York-New Jersey Metropolitan Region* (New York, October 1993); Part I of *Tourism and the Arts in the New York-New Jersey Region*.

** *The Arts as an Industry: Their Economic Importance to the New York-New Jersey Metropolitan Region* (New York, May 1983).

CHARACTERISTICS OF VISITORS TO THE MUSEUM

The economic importance of the Museum, to a large extent, is influenced by the residence patterns and expenditure patterns, as discussed below, of visitors to the Museum.

Residence Patterns

As shown in Table 4-4, in 1992 a little more than one-third (36 percent) of visitors to the Museum were from New York City. An additional 33 percent were from New Jersey, Connecticut, and New York State outside of the City, for a total in the tri-state area of 69 percent. Visitors from other states and countries represented the remaining, nearly one-third (31 percent) of attendees. This pattern of attendance relies more on local and regional visitors than is the norm in the City's museums.

Table 4-4

Residences of Visitors to the American Museum of Natural History and Hayden Planetarium: 1992

Location	Percent
New York City	36
New York State Outside of the City	17
Total New York State	53
New Jersey and Connecticut	16
Total Tri-State Region	69
Other U.S. States and Outside the U.S.	31
TOTAL	100
Source: The Port Authority of New York and New Jersey and the Roper Organization.	

As shown in Table 4-5, only one-quarter of the visitors to all cultural attractions in New York were City residents. Slightly more than an additional quarter (26 percent) were from New Jersey, Connecticut, and New York State outside of the City, for a total in the tri-state area of 51 percent. Visitors from other states and other countries represented the remaining nearly one-half (49 percent) of attendees.

Table 4-5

Residences of Visitors to All NYC Cultural Attractions: 1992

Location	Percent
New York City	25
New York State Outside of the City	11
Total New York State	36
New Jersey and Connecticut	15
Total Tri-State Region	51
Other U.S. States and Outside the U.S.	49
TOTAL	100
Source: The Port Authority of New York and New Jersey and the Roper Organization.	

Expenditure Patterns

The Port Authority data on trip purpose and expenditure patterns for visitors to the City's museums also reveal the importance of museums in the City's economy. Nearly half of the out-of-region visitors at the City's arts institutions visit specifically to attend arts and cultural activities. This group is referred to as the "arts-motivated visitor," and the Port Authority estimates that they represented some 2.26 million visitors in 1992. On the average, the arts-motivated visitor attended two cultural institutions during his or her stay. In 1992, the per-person expenditure of arts-motivated visitors per trip was $320, or about $110 per day, beyond the cost of their admission to cultural institutions or events. As shown in Table 4-6, these visitors spent most of this money at the City's hotels, restaurants, and stores. In addition to the arts-motivated visitor, nearly 20 percent of out-of-region visitors who are in the City for other purposes (business, seeing relatives, shopping, etc.) extended their trips for the arts. These visitors spent an average of about $240 per trips, and spent this money in a proportion similar to that of the arts-motivated visitor (see Table 4-7).

Table 4-6

Expenditure Patterns of Arts-Motivated Visitors to New York City

Expenditure Category	Percent Distribution
Food and Beverage	36
Lodging	36
Shopping	14
Local Transportation	6
Miscellaneous	8
TOTAL	100

Notes: Data are averages; figures for lodging reflect both individuals staying in hotels and individuals not requiring additional lodging (i.e., staying with friends or relatives). The above figures exclude the value for air fare included in the Port Authority figures.

Source: Data adapted from The Arts as an Industry, the Port Authority of New York and New Jersey, October 1993.

Table 4-7

Expenditure Patterns of Visitors Who Extended Their Trip for the Arts

Expenditure Category	Percent Distribution
Food and Beverage	38
Lodging	37
Shopping	13
Local Transportation	9
Miscellaneous	3
TOTAL	100

Notes: Data are averages; figures for lodging reflect both individuals staying in hotels and individuals staying with friends or relatives.

Sources: The Port Authority of New York and New Jersey, *The Arts as an Industry*, October 1993.

Approximately one-third of the attendees at all surveyed institutions in 1992 were categorized as arts-motivated suburbanites, who spent, on average, $37 above the cost of admission to museums and cultural events. This expenditure is heavily oriented to food and beverage, as shown in Table 4-8.

Table 4-8
Expenditure Patterns of Arts-Motivated Suburbanites Attending New York City Art Events

Expenditure Category	Percent Distribution
Food and Beverage	56
Lodging	13
Parking	10
Shopping	8
Local Transportation	9
Miscellaneous	4
TOTAL	100

Sources: The Port Authority of New York and New Jersey, *The Arts as an Industry*, October 1993.

THE FUTURE WITHOUT THE PROJECT

In the future without the project, changes in the economic effects from the Museum would result from changes in the expected attendance and spending at the Museum. As discussed above, the net increment in paid attendance in 2001, above existing conditions, is estimated at about 609,400. This estimate assumes completion of the program for the dinosaur halls and various improvements and special events, supported by increased effort in marketing. The future economic changes from the operation of the Museum can be summarized in terms of the same seven principal effects from the Museum discussed in existing conditions.

1. The employment associated with the activity of the Museum itself, currently 800 people, would marginally increase, but at a rate of growth probably less than that of attendance.
2. The spending for other goods and services associated with the activities at the Museum itself would also marginally increase, as would the resulting indirect and generated economic activity it creates.
3. Sales tax revenue associated with the Museum shops and eating facilities would also be expected to marginally increase; due to the limitations of the existing capacity of the parking facility, there would be only a very slight increase in the parking tax revenue associated with it.
4. Personal income tax and other City and State tax revenues associated with the direct and induced economic activity from the operation of the Museum itself would also be expected to marginally increase.
5. Assuming that the existing patterns of the visitor residences and expenditures would continue, the spending by visitors to the City would increase proportionally with attendance.
6. The employment, wages, and salaries associated with the spending by visitors, and the indirect and generated economic activity from the spending, would be expected to similarly increase at a rate approximately proportionate with attendance.

7. Similarly, and corresponding with this increase in economic activity from visitors spending, the City and State tax revenues derived from this spending would be expected to increase at a rate approximately proportionately with the increase in attendance in the future without the project. These taxes would include sales tax, personal tax, hotel occupancy tax, corporate and business taxes, and numerous additional taxes.

PROBABLE IMPACTS OF THE PROPOSED PROJECT

The principal economic effects of the proposed project would include the one-time effects derived from spending on construction activity, and recovering effects from the annual operation of the Museum and Planetarium after construction of the project is completed. The general type of economic effects from the construction and operation of the proposed project are discussed below.

CONSTRUCTION PERIOD IMPACTS

During the construction period, economic effects would be derived from direct and generated construction employment, wages and salaries, and demand for local industries, as well as City and State tax revenues resulting from this economic activity. The construction cost of the proposed project is preliminarily estimated at approximately $130 million (in 1996 dollars). This amount includes hard costs for the buildings (actual renovation and construction), the construction of exhibits, and design, legal, and related costs.

Direct employment from these construction expenditures would occur during the approximately 32-month construction period. In addition to direct employment, total employment from construction expenditures would include jobs in business establishments providing goods and services to the contractors, and the resulting induced or generated employment. Similarly, wages and salaries would be expected to include direct wages and salaries for the construction of the project and indirect and generated wages and salaries occurring in the broader economy. Tax revenues would also be derived from the direct and indirect economic activity. The project would be expected to be exempt from sales tax on construction materials. Tax revenues from the project's direct and indirect economic activity would include personal income taxes, sales tax on indirect and generated activity; corporate, business and related taxes; and numerous miscellaneous taxes.

ANNUALLY RECURRING IMPACTS FROM OPERATION

The probable impacts from the annual operation of the Museum and Planetarium after construction is completed would result from the incremental increases in the expected attendance and spending at the facility. As discussed above, paid attendance at the Museum and Planetarium is projected to reach about 3.55 million with the project, an increment of about 612,600 above the levels of the future without the project. This attendance would represent an increase of about 21 percent above future No Build conditions and an increase of about 52 percent above existing conditions. The future economic changes from the operation of the Museum can be summarized in terms of the same seven principal effects from the Museum discussed in existing conditions and the future without the project.

1. The employment associated with the activity of the Museum itself, currently 800 people, would marginally increase over No Build conditions, but probably at a rate of growth less than that of attendance.

2. The spending for the goods and services associated with the activities of the Museum itself would also marginally increase over No Build conditions, as would the resulting indirect and generated economic activity it creates.

3. The sales tax revenue associated with the Museum shops and eating facilities would increase both from the new restaurant and retail facilities and from increased attendance. Similarly, the parking tax associated with the parking facility would increase both from the new enclosed parking and the increased *visitation*.

4. Personal income tax and other City and tax revenues associated with the direct and indirect economic activity from the operation of the Museum itself would also be expected to marginally increase over No Build conditions.

5. If the existing patterns of visitor residences and expenditures continue with the project, the spending by visitors to the City would increase proportionately with attendance. This spending would represent about a 21 percent increase to No Build conditions and about a 52 percent increase to existing conditions. It is anticipated that the project would generate a proportionally greater percentage increase of out-of-region and foreign visitors, so that the Museum's attendance mix would more closely approximate the average for museums in the City. Thus, with a greater proportion of out-of-region and foreign visitors than the current mix, the increase would be greater than these percents.

6. The employment, wages, and other salaries associated with the spending by visitors, and the indirect and generated economic activity from the spending would be expected to similarly increase at a rate approximately proportional to that of the increasing spending.

7. Similarly, and corresponding with this increased economic activity from visitor spending, the City and State tax revenues derived from this spending would be expected to increase at a rate approximately proportional to that of the increased spending. These increased taxes would include sales, personal income, hotel occupancy, corporate and business, and numerous additional taxes. To the extent that public money is used to fund the project, that amount annualized over the projected life of the project would be deducted from the annual project benefits to determine the net increase in revenue accruing to the City and State from the project. ❖

A. INTRODUCTION

This chapter describes the existing community facilities and services available in the area surrounding the American Museum of Natural History, including police and fire service, and the Museum itself. Changes that can be reasonably expected to occur in these facilities if the proposed project is not built are estimated for 2001, the future analysis year for the EIS. The effects of the proposed project on the capacity and performance of these community facilities are also assessed.

B. EXISTING CONDITIONS

POLICE DEPARTMENT

The project site and surrounding area are in the 20th Precinct of the New York City Police Department, with precinct headquarters at 120 West 82nd Street between Columbus and Amsterdam Avenues (see Figure 5-1). According to Lieutenant James Martin of the Police Department, the precinct, west of Central Park and east of the Hudson River from West 59th Street to West 86th Street, is not considered a high-crime area (source: telephone conversation of March 5, 1996).

Over the last 3 years, crime within the precinct has decreased by 50 percent, contributing to the overall decline in crime citywide. Only two homicides were reported in the area in 1995, and no homicides have been reported this year to date. Robberies within the precinct are as few as one per day, on average. There are 199 uniformed staff members at the 20th Precinct police station.

Lieutenant Martin said that the Museum itself does not attract any specific crime within the area. The biggest problem in the area surrounding the Museum is automobile break-ins, which can be attributed to the large number of parked cars along the streets belonging to both neighborhood residents and Museum visitors. It is important to note that this type of crime typically occurs all over the city and is not unique to the project area.

Supplementing the protection provided by the police department, the Museum also has its own security force. The entire Museum is patrolled by this private security force, with additional protection provided by closed circuit television surveillance. In addition, outside areas of the Museum are lit at night for safety reasons.

FIRE DEPARTMENT

The New York City Fire Department has four companies in three firehouses that provide fire and rescue services to the area around the Museum (see Figure 5-1). Engine 74 Company ("Engine" refers to a truck with several firefighting hoses that is used for the application of water in a fire) is located at 120 West 83rd Street between Columbus and Amsterdam Avenues. Ladder Company 25 ("Ladder" refers to a search-and-rescue unit that works hand-in-hand with the engine companies fighting fires and with other emergencies) is housed at 205 West 77th Street between

Broadway and Amsterdam Avenue. Engine Company 40 and Ladder Company 35 is located at 101 Amsterdam Avenue, between 64th Street and 65th Street. These three firehouses are the closest to the Museum and are the most likely to respond to an emergency in the project area. A fourth firehouse that could serve the Museum, Engine 76/Ladder 22/Thaw App 61 ("Thaw App," or "Thawing Apparatus," refers to devices used to thaw out frozen fire hydrants, etc.), is located at 145 West 100th Street between Amsterdam Avenue and Columbus Avenue. There are approximately 25 to 30 firefighters per firehouse, who typically work in shifts of five people. Equipment at each of the engine companies includes a 1,000 gallon-per-minute pumper, while the ladder companies each utilize a 75-foot tower ladder.

In addition to these engine and ladder companies, the Fire Department can call on units from more distant parts of the city as needed. Therefore, according to the Fire Department, fire and rescue protection in the study area is considered adequate.

The Museum has an extensive fire detection system throughout its complex. This system consists of smoke and heat detectors connected to a central system. If this system is activated, the Fire Department is notified immediately. The Museum's security force is also alert for any potential problems, and contacts the Fire Department when any are detected.

AMERICAN MUSEUM OF NATURAL HISTORY

The American Museum of Natural History is a cultural institution of major importance for the Upper West Side community and for the city, the region, and the world. It provides both education and entertainment through its permanent and special exhibits, its lectures, courses, and its Sky Show and IMAX theaters.

Despite an overall increase in attendance at the Museum over the past two decades, annual attendance at the Planetarium has fallen steadily, from a high of about 700,000 in 1976 to approximately 300,000 today. Although the Planetarium's Sky Show is still popular with schoolchildren on class trips, weekend attendance is much lower and the exhibits at the Planetarium attract much less interest than other areas of the Museum.

C. THE FUTURE WITHOUT THE PROJECT

POLICE DEPARTMENT

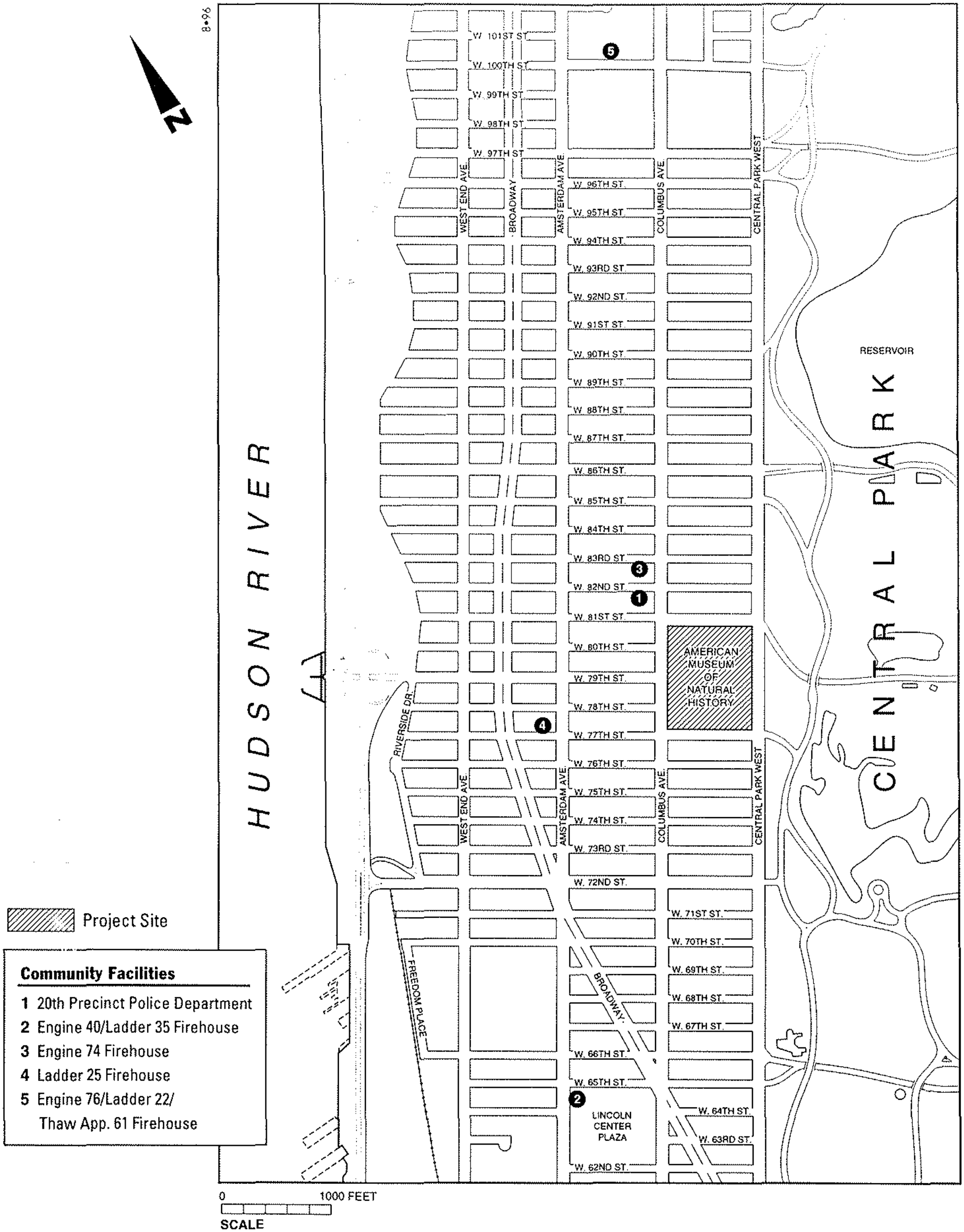
According to Lieutenant Martin, the Police Department expects that the 20th Precinct will continue to experience a declining crime rate in the future.

FIRE DEPARTMENT

Fire protection is expected to remain adequate in the project area in the future without the proposed action. The Fire Department allocates personnel in response to demonstrated needs. If a need arose for greater fire protection in the study area, the Fire Department would respond accordingly. The Fire Department is not currently planning changes to the stations or equipment that serve the area.

AMERICAN MUSEUM OF NATURAL HISTORY

If the proposed Planetarium and North Side project does not go forward, the Museum will continue operating as it does today. Some increase in overall attendance at the Museum is expected (see Chapter 4, "Economic Conditions"); however, the Planetarium's Sky Show and exhibits



American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

Community Facilities

Figure 5-1

will remain in their current condition, and attendance at this portion of the Museum will remain low.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

POLICE DEPARTMENT

The Planetarium and North Side project is expected to add approximately 673,900 new visitors and employees to the Museum annually above the No Build condition (see Chapter 4, "Economic Conditions"). According to Lieutenant Martin, the proposed project would not be expected to interfere with precinct headquarters' current ability to provide effective, efficient police protection.

Like the existing Museum complex, the new Museum elements proposed as part of the project would also be patrolled by a private on-site security force, and monitored by closed circuit televisions. The new terrace and other outdoor locations at the perimeter of the project would be lit for security purposes. When the Museum is not open, the terrace would be closed to the public and the stairs leading to the terrace from the park would be gated off and secured, to avoid any potential safety problems in these areas.

FIRE DEPARTMENT

The Fire Department has indicated that it could provide adequate fire protection services to the proposed project.* All elements of the proposed project would be equipped with fire safety devices, to protect visitors, employees, and Museum collections.

AMERICAN MUSEUM OF NATURAL HISTORY

As described in more detail in Chapter 16, "Construction Impacts," construction of the project would result in unavoidable disruptions to the Museum during the 3½-year construction period. The Planetarium would be closed during that period, as would the Biology of Birds exhibit on the first floor of the Whitney Wing. No public parking would be available at the Museum during that period. During the first year of construction, when site preparation and foundation work would occur, intermittent noise and vibration related to construction could disrupt operations in the northern portions of the Museum, such as at the IMAX theater.

Once completed, the proposed project's new exhibit and educational facilities on the north side of the Museum would update and greatly improve the Planetarium and exhibits related to earth and planetary sciences. At the same time, the project would also improve circulation and visitor services in this part of the Museum, creating important additional amenities, such as an indoor area for students to unload from school buses, a new community entrance to the Museum from Columbus Avenue, the new publicly accessible terrace, and, within the Museum, new restrooms and other visitor services. Overall, the project would represent a significant improvement to the American Museum of Natural History, enhancing the public's ability to use this community resource. ❖

* Donald J. Burns, Chief of Operations. Letter dated April 1, 1996.

A. INTRODUCTION AND METHODOLOGY

This chapter describes the open space resources in proximity to the proposed project and evaluates any potential impacts to open space resources that may result from the project. Because of the project's location within a mapped New York City park (Theodore Roosevelt Park), and because the project would bring new visitors to the area, open space issues are of particular concern in the environmental review.

ASSESSMENT OF IMPACTS ON PUBLICLY ACCESSIBLE OPEN SPACE

The methodology for open space impacts follows that recommended in the city's *CEQR Technical Manual.* The proposed action would generate additional visitors to the Museum and Planetarium, who might also use Theodore Roosevelt Park, Central Park, and other recreational open spaces within walking distance of the Museum, defined more specifically as a ¼-mile radius from the project site, as shown in Figure 6-1. Within this study area, the analysis takes an inventory of all publicly accessible recreational facilities. For each of these, general features, including the facilities available for active and passive recreation, are noted. Active facilities are planned open spaces that encourage vigorous activities, such as jogging, baseball, football, soccer, basketball, handball, tennis, and children's active play (such as on playground equipment). Passive facilities encourage such activities as strolling, picnicking, sunbathing, reading, people watching, etc. Certain unprogrammed spaces, such as lawns, can be used for both active and passive recreation. The inventory of open spaces also describes any changes planned for these facilities in the future that could affect their utility, and whether any new spaces will be added to the inventory.

Once the inventory of available facilities is completed, the quantity and characteristics of potential users of those facilities can be determined, based on census data. Within the study area are three distinct user groups: residents, workers, and Museum and Planetarium visitors. To determine the number of residents in the study area, census data are compiled for census tracts with at least 50 percent of their area inside the study area boundary. For the residential population, age distribution is also determined (younger children and elderly residents are typically more dependent on local resources). Because the study area is characterized by a workforce that may also use open spaces, employees in the study area are also calculated. This number is also derived from the census (based on journey-to-work data). Finally, the known number of Museum and Planetarium visitors and employees is taken into consideration.

With an inventory of available resources and potential users, the adequacy of open space in the study area can be assessed both quantitatively and qualitatively. The quantitative approach computes the ratio of open space acreage to the population in the study area and compares this open space ratio (OSR) with certain guidelines. For the residential population, there are generally two guidelines by which to evaluate residential OSRs. The New York City Department of City Planning (DCP) typically recommends a comparison to the median OSR for community districts in New York City, which is 1.5 acres per 1,000 residents. Alternately, DCP has established an optimal level, or planning goal, of 2.5 acres per 1,000 residents. To determine the adequacy of open space resources for the working, or daytime, population of a given area, DCP has established the ratio of 0.15 acres of passive open space per 1,000 workers as an optimal planning goal. Impacts are assessed based on how the proposed action changes OSRs in the study area.

The qualitative analysis takes into account other factors that may reflect on the adequacy of open space resources, but are not revealed through quantitative assessment. Such factors can include other nearby resources not within the study area, and the demographic composition of study area residents.

IMPACTS OF THEODORE ROOSEVELT PARK IMPROVEMENTS

The northern and western sections of Theodore Roosevelt Park north and west of the project site are undergoing planning for redesign and improvement, independent of the project. The renovated park is expected to retain the types of facilities now available, but would benefit from improved drainage, repair and maintenance of existing vegetation, new landscaping, benches, and walks, and better lighting and security. Park renovation planning and design is being overseen by a working group consisting of the Borough President and local Councilmember, New York City Department of Parks and Recreation (DPR), the American Museum of Natural History, Community Board 7, Friends of Museum Park, the West 81st Street Block Association, and civic groups. Although the park renovations are independent of the proposed action and will be subject to their own environmental review once these aspects are actually formulated and proposed, this chapter examines the likely impacts associated with the park improvements in the section, "The Future Without the Project," subsection "Project Site."

B. EXISTING CONDITIONS

INVENTORY OF OPEN SPACE RESOURCES

Five publicly accessible open space and recreational resources, totaling about 93 acres, lie within the ¼-mile study area (see Figure 6-2 and Table 6-1). Of the 93 acres, about 52 percent (or 48 acres) is largely devoted to active recreation, such as jogging, ball playing, and playground activities. The remaining 48 percent (or 45 acres) is dedicated to passive pursuits, such as sunbathing, sitting, and strolling. However, much of the open space land area can be used for either active or passive activities. The information used for this analysis was gathered through field surveys conducted in January 1996.

PROJECT SITE

The American Museum of Natural History and Hayden Planetarium are located on a large four-block parcel bounded to the north by West 81st Street, to the south by West 77th Street, and to the east and west by Central Park West and Columbus Avenue, respectively. The Museum itself is set within, and bounded by, the 17½-acre Theodore Roosevelt Park, sometimes referred to as Museum Park. About 8 acres of the park can be considered open space, with the remainder occupied by Museum facilities.

The most accessible and frequently used parts of Theodore Roosevelt Park are the north and west portions along West 81st Street and Columbus Avenue, respectively. The northern part of the park, which slopes downhill to the south, features a network of bench-lined pathways that wind through the park. The sloping terrain, coupled with poor drainage, can create significant puddling in certain areas, such as the Belgian block-paved semicircular drive on West 81st Street that serves as the main vehicular entrance and exit for the Museum's public parking lot. West of

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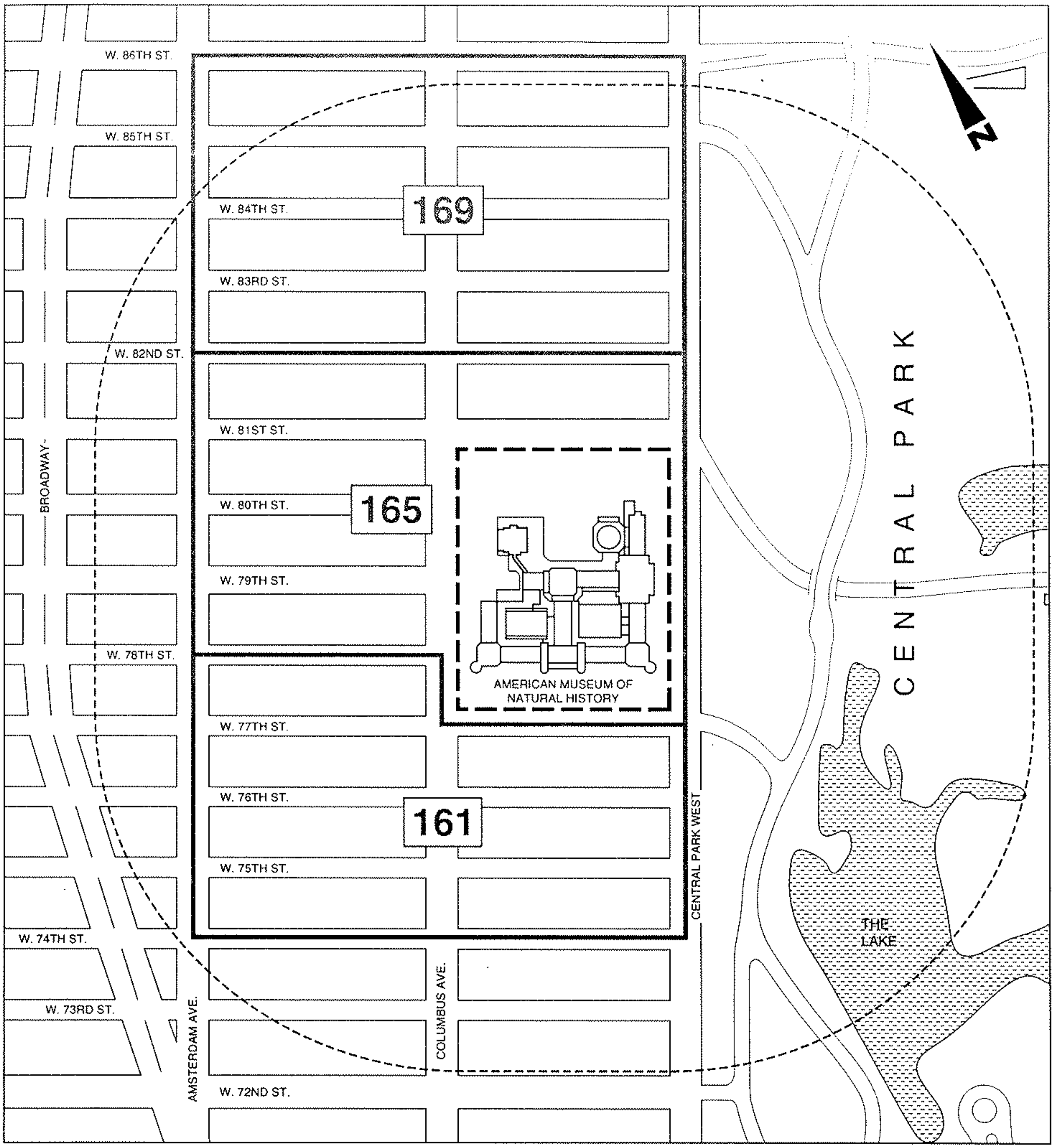


Project Site Boundary

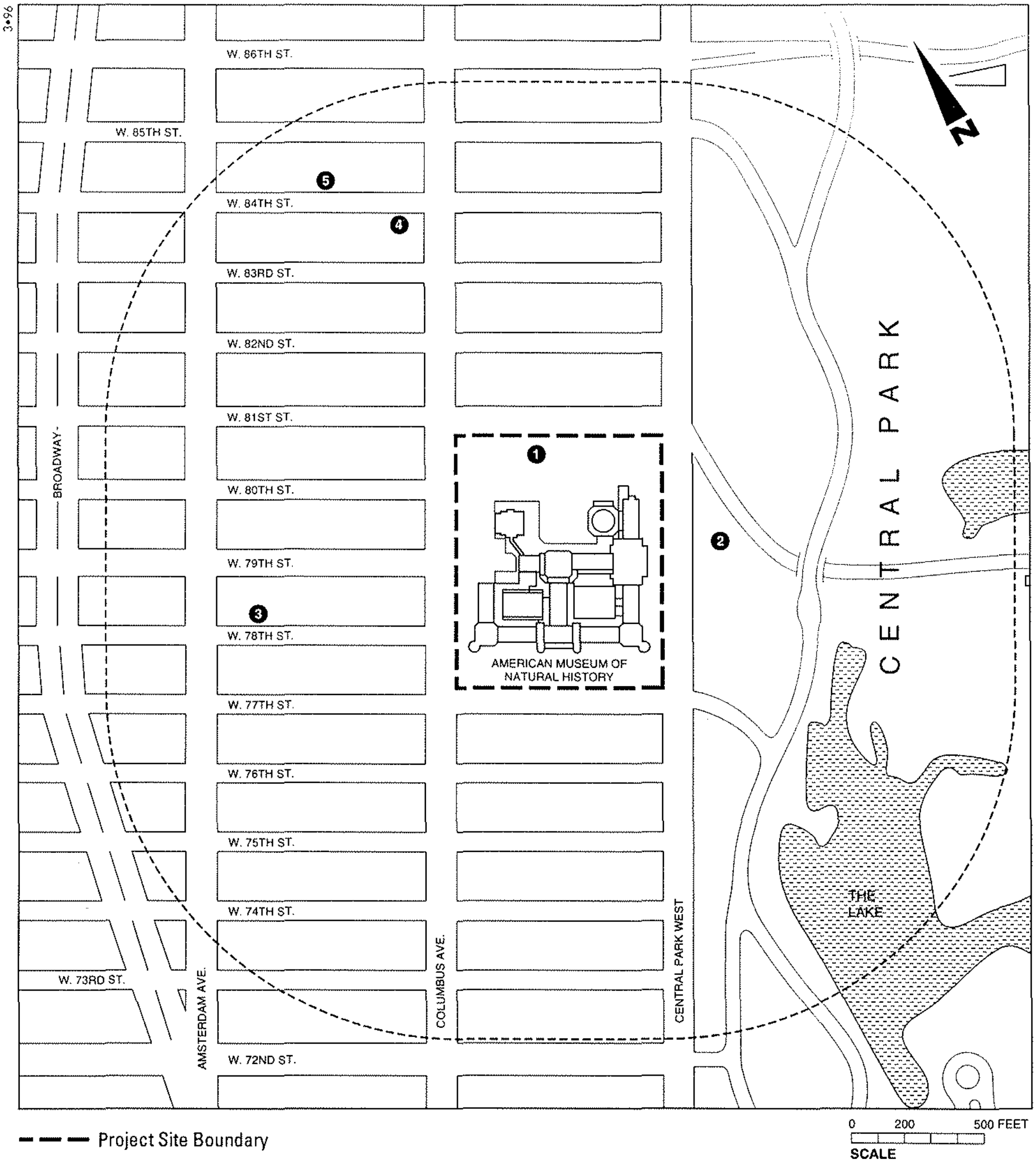
Open Space Study Area Boundary (1/4-Mile Perimeter)

Study Area Census Tract Boundary

161 Census Tract Number

Open Space Study Area

Figure 6-1



Project Site Boundary

Open Space Study Area Boundary (1/4-Mile Perimeter)

❶ Open Space & Recreational Facility

Note: See Table 6-1 for reference

Open Space and Recreational Facilities

Figure 6-2

American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

this driveway, on a piece of land defined by meandering footpaths, is a dog run. The dog run, which is surrounded by a low wire fence, is gravel-covered and provides seating. Connecting the northern and western sides of the park is a single pathway that permits pedestrian access from Columbus Avenue at West 79th and 81st Streets and provides a quiet area for sitting or strolling among the park's many mature trees. South of the West 79th Street entrance, alongside Columbus Avenue, is a small lawn- and shrub-covered area enclosed by a fence, and beyond that a winding driveway leads from Columbus Avenue under the Museum, providing a vehicular service entrance. Overall, this part of the park is in poor condition, with cracked and uneven paving, sparse vegetation, dim lighting, compacted and eroded soil, and inadequate drainage systems.

Table 6-1

Inventory of Open Space and Recreational Facilities

Map Ref. No.	Name	Owner/ Agency	Features	Total Acres	Active		Passive		Condition	Usage
					Acres	Percent	Acres	Percent		
1	Theodore Roosevelt Park (Not including museum buildings)	NYCDPR	Benches, dog run, lawn areas, paths.	8.00	0.80	10	7.20	90	Poor/Fair	Light to Moderate
2	Central Park (Portion in study area)	NYCDPR	Playgrounds, jogging and bicycle paths, seating, gardens, lawns, bridle paths.	83.57	45.96	55	37.61	45	Good	Heavy
3	P.S. 87 (Tecumseh Playground)	NYCDPR/BOE	Seating, game tables, basketball, jungle gym, wooden climbing apparatus, slides.	0.74	0.66	90	0.07	10	Good	Moderate
4	P.S. 9 Playground	NYCDPR/BOE	Benches, climbing tower, slides.	0.75	0.60	80	0.15	20	Excellent	Moderate
5	Brandeis H.S. Play Area	BOE	Paved multi-use lot.	0.64	0.64	100	0.00	0	Fair	Light to Moderate
	TOTAL			93.70	48.67		45.03			

Notes:
NYCDPR = New York City Department of Parks and Recreation.
BOE = New York City Board of Education.

In contrast to the northern and western areas, the southern and eastern parts of Theodore Roosevelt Park are essentially landscaped yards that establish the setting for the Museum's imposing south and east facades, providing formal entrances to the Museum. The well-maintained lawns, trees, and shrubs are enclosed by an iron fence, and no pedestrian or seating amenities are provided.

Theodore Roosevelt Park is surrounded on all four sides by a wide sidewalk lined with mature trees and, on the north and west sides, with park benches.

STUDY AREA

About 10 percent of the 843-acre Central Park lies within the study area, making it the largest open space resource available to residents and workers in the area. Located directly east of the project site, across Central Park West, the park is also a regional resource that draws users from throughout Manhattan and the city's other boroughs. The portion of the park in the study area, totaling 83.5 acres, contains numerous features serving both passive and active recreational needs, including three children's playgrounds at the western periphery of the park; Delacorte

Theater, home of summer performances of the New York Shakespeare Festival since 1957; and Belvedere Castle. Other features include jogging and bicycle paths, statues, gardens, seating, lawns, bridle paths, and lakes and ponds.

The study area also includes three publicly accessible play areas adjacent to schools. (The play area closest to the Museum, a paved yard at I.S. 44 on Columbus Avenue and West 77th Street, is for use by students only except on Sundays, when it is used for a flea market and greenmarket.) The P.S. 87 playground, at West 78th Street between Columbus and Amsterdam Avenues, is jointly operated by the New York City Department of Parks and Recreation and the New York City Board of Education. The playground features a paved ballfield with basketball backboards, game tables, seating, and wooden and metal climbing equipment. Six blocks north, on West 83rd Street between Columbus and Amsterdam Avenues, is the P.S. 9 playground. Like the P.S. 87 playground, it is a small, jointly operated facility that serves both the school's students and the children from the surrounding neighborhood. The P.S. 9 playground is located on the south side of the school and features a play area, jungle gym equipment, and seating. Finally, one block farther north, just west of Louis D. Brandeis High School and running almost to Amsterdam Avenue, is a paved open play field, which can be used for ball games and similar outdoor activities.

OPEN SPACE USER POPULATION

RESIDENTIAL

According to 1990 Census data, the residential population of the study area is 22,950 (see Table 6-2). The three tracts analyzed have lower percentages of children and seniors than Manhattan and New York City as a whole (see Table 6-3). Almost 80 percent of the residents are between 20 and 64 years old, compared with roughly 68 and 61 percent for Manhattan and New York City, respectively. This demographic composition indicates a greater than average overall demand for adult recreational space and facilities, and less demand for activities and features geared toward children and seniors. In addition, the high percentage of residents in the 20 to 64 age group indicates greater potential for mobility and therefore less dependence on nearby facilities.

Table 6-2
Study Area Population

Tracts	Residential	Workers	Museum Visitors and Workers (Daily Average in Maximum Month)
161	6,870	2,004	—
165	7,278	2,385	—
169	8,802	2,813	—
Total	22,950	7,202	10,609

Sources: U.S. Department of Commerce, Bureau of the Census, *Census of Population and Housing, 1990*; American Museum of Natural History for attendance figures.

Table 6-3

Age Distribution of Study Area Residential Population

Age Group	Study Area		Manhattan		New York City	
	Number	Percent	Number	Percent	Number	Percent
Under 5	863	3.76	78,590	5.28	509,740	6.96
5-9	568	2.47	66,340	4.46	457,477	6.25
10-14	470	2.05	63,563	4.27	450,072	6.14
15-19	532	2.32	72,557	4.88	470,786	6.43
20-64	18,326	79.85	1,009,102	67.84	4,481,172	61.20
65+	2,191	9.55	197,384	13.27	953,317	13.02
TOTAL	22,950	100.00	1,487,536	100.00	7,322,564	100.00

Source: U.S. Department of Commerce, Bureau of the Census, *Census of Population and Housing, 1990.*

NONRESIDENTIAL

Based on data from the 1990 Census, the daytime population (which indicates the number of people employed in the area) of the three study tracts is 7,202. To the extent that some people both live and work within the study area, there may be minimal double counting.

In addition to the workers in the area, the Museum and Planetarium attract an average in the maximum attendance month (July) of about 10,609 visitors and workers per day, bringing the total worker and visitor population to 17,811.

QUANTITATIVE ANALYSIS OF THE ADEQUACY OF OPEN SPACE RESOURCES

RESIDENTIAL

There are generally two guidelines by which to evaluate residential OSRs for a given area, one of which reflects actual conditions throughout the city, and one that sets ideal levels of open space. The first, used for comparative purposes, is an existing citywide median of 1.5 acres of parkland per 1,000 residents. The second criterion is DCP's optimal planning goal of 2.5 acres per 1,000 residents, of which 80 percent, or 2.0 acres, is recommended for active open space and 20 percent, or 0.5 acres, for passive recreational space.

In the study area, there are a total of 93.7 acres of open space, including 45.03 acres of passive open space and 48.67 acres of active open space. Based on a residential population of 22,950, the overall OSR for the study area is 4.08 acres per 1,000. The active OSR is 2.12 per 1,000 residents, while the passive ratio is 1.96 per 1,000. These ratios are above both the city median and the DCP planning goal, indicating that the area is well-served by both passive and active recreational and open spaces.

NONRESIDENTIAL

Within the study area, the nonresidential population generally consists of those working in the area and the visitors who attend the Museum and Planetarium. To determine the adequacy of open space resources for the working population of a given area, DCP has established 0.15 acres of passive open space per 1,000 workers as an optimal planning goal, *to be considered after considering the residential need for passive open space (with an optimal planning goal of 0.5* *acres per 1,000 residents, as discussed above). Thus, the combined residential and nonresidential passive space planning goal is* 0.65 acres per 1,000 residents and workers. As noted above, a total of 17,811 visitors and workers could be in the area on a given day, *in addition to the area's residents.* Based on this figure, the nonresidential OSR, including Museum visitors, is *1.11* acres per 1,000. This existing OSR far exceeds those recommended by DCP, indicating ample passive recreational space for the nonresidential population within the study area.

QUALITATIVE ANALYSIS OF THE ADEQUACY OF OPEN SPACE RESOURCES

Several factors contribute to the open space and recreational conditions in the study area that are not reflected in the quantitative assessment. Although the inventory indicates five open space resources within the ¼-mile study area, more than one-third of the study area covers Central Park. Extending beyond the study area are more than 750 acres of the park, which is not a single facility but an amalgam of natural and built features that present a variety of outdoor recreational opportunities for a mix of users. It is a major regional resource attracting users from not only adjacent and nearby neighborhoods but all of Manhattan and New York City.

C. THE FUTURE WITHOUT THE PROJECT

OPEN SPACE RESOURCES

PROJECT SITE

As noted above, because of their poor condition, the northern and western sections of Theodore Roosevelt Park bounding the project site are undergoing planning for redesign and improvement. It is expected that the renovated park would retain the types of facilities now available but would benefit from improved drainage, repair and maintenance of existing vegetation, new landscaping, benches, walks, and better lighting and security. Park renovation planning and design is being overseen by a working group consisting of the Borough President, local Councilmember, DPR, the American Museum of Natural History, Community Board 7, Friends of Museum Park, the West 81st Street Block Association and civic groups. Planning for the park renovation, which will be undertaken using funding from the Museum and the City, is proceeding on a different schedule from that of the Planetarium project. As such, the details of the proposal are not yet developed. However, given the basic mandate of the working group to improve but not substantially change the park, the proposed renovation would not likely generate substantial adverse environmental impacts. Issues to be considered include the following.

Open Space and Recreational Facilities

The park renovation is expected to create a beneficial impact on open space. The improvement to drainage and plantings, and the installation of new lighting and other park fixtures will make the park more attractive as a neighborhood resource.

Historic Resources

The park is a contributing element to the Upper West Side/Central Park West Historic District. As such, the changes made to paths, plantings, lighting, benches, and other facilities should not conflict with the basic historic qualities of the park, including pedestrian flow, mature plantings, use of materials, and fixture design. The design of the improvements is subject to review by the New York City Landmarks Preservation Commission (LPC).

Archaeological Resources

As noted in Chapter 7, the park site consists of fill set over a marsh, stream, and pond. It is not yet known where and how deep excavation associated with the improvements will be. Once the excavation locations are determined, it will be possible to identify areas, if any, that might contain potential archaeological resources. Should any such resources be identified, a program for investigation, recovery (if appropriate), and protection will be developed in coordination with the LPC.

Urban Design and Visual Resources

The improvements contemplated in Theodore Roosevelt Park would not alter the basic plan, materials, and use of the park. To the extent that the improvements better the physical and thus visual conditions in the park, they would beneficially affect visual resources in the area.

Hazardous Materials

It is unlikely that the soils of the park contain hazardous materials. However, before construction, a site history will be performed to confirm this assessment. Should some possibility for such materials be discovered, a Health and Safety Plan would be instituted during construction and other remediation implemented, as appropriate, to protect workers and residents.

Noise

Nearby residents have complained about noise at night from the dog run in Theodore Roosevelt Park. Plans for the park include potential relocation of the dog run. If the proposed new location is closer to surrounding residential uses, noise levels may increase.

Construction Impacts

Work to renovate the park should take approximately 12 months. During that time various portions of the park would be closed to the public, as necessary. Construction activities would include regrading, excavation and replacement of catch basins, drain pipes, etc., installation of light poles, benches, etc., and landscaping. The work would conform to city requirements for construction, and no blasting or pile driving would be required. The soils exposed during excavation would be dampened, as necessary, to avoid fugitive dust. Some temporary increases in daytime noise can be anticipated from trucks and heavy equipment at the site.

STUDY AREA

A number of improvements to Central Park are scheduled for completion before 2001. As detailed below, these projects will enhance the natural and man-made resources of the park, a significant open space resource within the study area.

- A new pedestrian entrance to Naturalist's Walk at Central Park West near West 79th Street is scheduled for completion in 1997. The new entrance, which will be directly across from the Museum, will provide pedestrian access into and out of the park and will link up with the existing system of pathways;
- Reconstruction of the Great Lawn is currently under way and is scheduled to be completed in 1997. The reconstruction entails drainage, pathway, and lighting improvements, as well as replanting the lawn;
- Summit Rock, a high outcrop north of 82nd Street at Central Park West, will be refurbished to a more naturalistic landscape by removing existing asphalt areas and replanting;

- The perimeter landscape between 72nd and 75th Streets is scheduled for general improvements, including pathway reconstruction, reseeding, and landscape refurbishing;
- The Ramble, a large wooded area near the center of the park, is the subject of long-term management and restoration plans. Improvements will be incrementally implemented in phases extending from 1996 to 2016, and will include drainage and walkway repair, and landscape work geared toward improving ecological habitats; and
- Beginning in 1997, the 79th Street Yard, a service area used for maintenance and equipment storage, will undergo general restoration to the existing buildings and structures, and a new maintenance building may be constructed.

In addition to these plans for Central Park, the P.S. 87 Playground will be resurfaced before 2001.

QUANTITATIVE ANALYSIS OF THE ADEQUACY OF OPEN SPACE RESOURCES

Residential population and local employment are not expected to increase substantially by 2001 in the open space study area. As noted in Chapter 3, no new residential or commercial development is expected. Based on projections prepared for the New York City Department of Environmental Protection, population is expected to increase overall in the North River Water Pollution Control Plant service area (which contains the study area) from 1990 to 2001 by 1.5 percent. This would increase study area population in 2001 to 23,330. A comparable source for employment growth in the study area is not available; in its absence, employment is assumed to grow at the rate of population to yield 7,320 workers in the study area by 2001. As noted in Chapter 4, without the project, attendance at the Museum is expected to increase by about 670,344 annual visitors in 2001; this would increase average daily attendance in the maximum month to 12,220 and the total non-resident populations to 20,540.

These slight increases would reduce the overall OSR to 4.01 acres per 1,000 residents, including 2.08 acres per 1,000 residents for active space and 1.93 acres per 1,000 residents for passive space. For nonresidential users, the OSR would be reduced to *1.03* acres per 1,000 workers, Museum visitors, *and residents*. All of these OSRs would still exceed those recommended by DCP.

QUALITATIVE ANALYSIS OF OPEN SPACE RESOURCES

In the future without the project, the quality of open space resources is slated to improve. The improvements planned in Theodore Roosevelt Park, as discussed above, plus the extensive improvements and new pedestrian entrance to Central Park will provide better quality open space, and access to Central Park will be enhanced.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

The Planetarium and North Side project can be expected to affect open space resources in two ways: by physical alteration to Theodore Roosevelt Park and by increasing the number of visitors to the Museum and Planetarium complex, which may also add to the number of people using the study area's parks. In general, the effects of the project on open spaces in the study area are beneficial, as described below.

OPEN SPACE RESOURCES

The amount of publicly accessible open space in the area would increase slightly with the proposed project (about 0.81 acres). Although a 2,620-square-foot strip of parkland between the Museum and Columbus Avenue would be converted to a new entrance plaza and pavilion, this loss of parkland would be offset by the new landscaped terrace *with approximately 33,850 square feet accessible to the public,* built on top of the proposed garage, and the addition of a 2,800-square-foot area of the subsurface service yard that is to be covered and made accessible as part of the construction of the Columbus Avenue entrance. *The new terrace* would be publicly accessible outdoor space, maintained by the Museum, and linked to the park by a wide stairway at its northwest corner. As described in Chapter 2, "Project Description," *although* the terrace *design is not yet finalized, it is expected to include such features as a lawn, benches, tables and chairs,* and would extend to the Power House, which would be renovated to contain a restaurant at the terrace level. The terrace would be open free of charge when the Museum is open. It may also remain open later during the summer or close because of inclement weather. *The terrace may be closed occasionally to allow its use for special events or Museum-related activities. Approximately 20 to 30 such evening events may be scheduled during good weather (June through September). The number of events with most intrusive noise levels would be limited. During warm weather, the westernmost portion of the terrace (approximately 1,150 square feet) would be reserved for outdoor dining by patrons at the restaurant. More information about programming on the terrace is provided in Chapter 2.*

In addition, the introduction of a new Museum entrance near Columbus Avenue in the form of a well-lighted pavilion and well-maintained plaza, would likely encourage greater use of this section of Theodore Roosevelt Park. Overall, the project would bring new life to Theodore Roosevelt Park by introducing new and exciting open space and architectural elements that create a sense of continuity between the park and Museum. With new and enhanced open spaces, the park would become livelier and give users a sense of safety and security.

QUANTITATIVE ANALYSIS OF THE ADEQUACY OF OPEN SPACE RESOURCES

With the project the total residential OSR would *remain the same as in* No Build conditions, *4.01* acres per 1,000 residents, and the passive OSR would *remain at 1.93* acres per 1,000 residents. *These calculations do not include the additional open space provided by the project's new terrace, since the terrace would occasionally be closed to the public. These ratios would continue to exceed the recommended levels of 2.5 total acres and 0.50 passive acres per 1,000 residents, indicating sufficient open space resources.*

As discussed in Chapter 4, "stabilized" attendance at the Planetarium and Museum is expected to add approximately 673,900 visitors by 2001 over those anticipated in the future without the project. This would increase daily attendance in the maximum month (July) at the Museum and Planetarium to 15,840. Total worker and visitor population would increase to 23,160 and the *nonresidential passive* OSR would decrease to *0.97* acres per 1,000 workers, visitors, *and residents. These* ratios still exceed the recommended level of *0.65* acres per 1,000 workers, visitors, *and residents.* Thus, the proposed project would have no significant adverse impact on open space usage in the study area.

QUALITATIVE ANALYSIS OF OPEN SPACE RESOURCES

Since the proposed project would slightly increase the inventory of publicly accessible open space, with maintenance of the terrace undertaken by the Museum, and the quantitative ratio of users to open space area would still be high, the project would have no adverse effect on the quality of open space in the study area. ❖

A. INTRODUCTION

HISTORIC ISSUES

The Museum complex and its immediate surroundings are significant historic resources in the City, State, and nation. The Museum site and complex of buildings is a New York City Landmark and is individually listed on the State and National Registers of Historic Places. It is also located within both the City's Upper West Side/Central Park West Historic District and the State and National Registers' Central Park West Historic District. The Museum's main entrance faces Central Park, which is both a National Historic Landmark and a New York City Scenic Landmark. The proposed project would replace the existing Hayden Planetarium with an entirely new structure; the project would also construct a garage on the existing parking lot and build a pavilion and plaza entrance on Columbus Avenue near West 79th Street. The north and west sides of the complex would be substantially changed as viewed in the context of surrounding historic areas.

For these reasons, historic issues are reviewed carefully in this chapter. Project impacts are assessed as required by SEQR, using the guidance provided in the *CEQR Technical Manual*, a document formulated in coordination with the New York City Landmarks Preservation Commission (LPC). As noted there, in addition to its own criteria for designation (defined in NYCLL), LPC commonly applies National Register eligibility criteria (36 CFR Part 60) in identifying an historic or archaeological resource or in assessing impacts (36 CFR Part 800) on such resources. These criteria are also employed by the New York State Historic Preservation Officer (SHPO) for its assessment responsibilities under SEQR. The project has already been reviewed by LPC in an advisory role, and LPC's findings are reported below, in section E. Because the Planetarium Authority is exempt from the State Historic Preservation Act, SHPO has no formal role in reviewing the proposed project.

ARCHAEOLOGICAL ISSUES*

The disturbance or destruction of archaeological resources is not an issue for the project. Before being developed, the site contained a pond, a stream, and hills, a topography that would have been attractive to prehistoric peoples. However, previous historic and archaeological research has identified no Native American sites or trails in the vicinity of the Museum property. Historical remains that might have been of interest are cisterns or privies associated with the squatter shacks that stood on the site before construction of the Museum began, but these have been destroyed by subsequent construction, as shown by the example of construction activities in Figure 7-1. The area that would be disturbed by the proposed project was previously disturbed by construction of the Power House, Planetarium, parking lot, and Museum service drives. Therefore,

* This analysis is based on a report prepared by Historical Perspectives, Inc., 1996.

it is highly unlikely that there are any significant archaeological resources in the construction area, and this chapter addresses only impacts on historic resources.

B. DEVELOPMENT HISTORY

DEVELOPMENT OF THE UPPER WEST SIDE

The Upper West Side was first called "Bloemendaal," after a flower-growing region of Holland, and its main street was Bloomingdale Road (now Broadway), which followed the path of a Native American trail. By the early 18th century, working farms and rural estates were established, and hamlets began to develop along Bloomingdale Road. There were also shantytowns in this undeveloped area of Manhattan, including one on Columbus Avenue near West 81st Street.

When Manhattan's street grid was laid out by the Commissioners' Plan of 1811, several park squares were designated, including Tompkins Square, Madison Square, Union Square, and the site of the Museum, then known as Manhattan Square. The city acquired Manhattan Square through condemnation, and it opened in 1840. The surrounding area remained undeveloped until planning and construction of Central Park in the 1850's led to land speculation, particularly along Central Park West. A horsecar line ran up Central Park West to West 84th Street in 1864, and The New York Elevated Company extended the Ninth Avenue El north along what is now Columbus Avenue to West 104th Street in 1879 (see Figure 7-2). Row house construction began in the early 1870's, and by the 1880's, construction of the buildings that characterize the Upper West Side began and continued through the next 50 years.

Until 1910, development consisted largely of three-, four-, and five-story row houses, designed in harmonious groups. During the same period, five- and six-story neo-Grec and Romanesque Revival-style tenements and flats that incorporated street-level storefronts, interspersed with apartment hotels and small commercial buildings, were built on Columbus and Amsterdam Avenues. Apartment hotels and studio buildings of 8 to 12 stories were also constructed, including the Endicott at West 81st Street and Columbus Avenue, which still stands. Larger 12- to 17-story apartment buildings, which are particularly prevalent along Central Park West and the major cross streets (such as West 79th Street), were built before and particularly after World War I.

Two of the earliest buildings—neither row house nor tenement—were among the most influential in setting the style of future development: the luxury Dakota Apartments on Central Park West between West 72nd and 73rd Streets, completed in 1884; and the American Museum of Natural History, the first building of which was completed 7 years earlier, in 1877. By the 1890's, as the Museum grew, its presence in the neighborhood was well established. It had become a "popular establishment, the center of fashionable and constantly augmenting interest."

Changes in zoning allowed commercial development along West 79th Street in the block west of Manhattan Square to occur in the 1930's and 1940's. Redevelopment generally took the form of one- and two-story alterations and additions to row houses. Demolition of the Ninth Avenue El in 1940 spurred further alterations along what is now known as Columbus Avenue, and the 1960's boom plus construction of Lincoln Center led to a revival of commercial uses along Columbus Avenue. Since then, the area has seen little new development, with the most notable exception being construction of a tall new apartment building on West 79th Street at Columbus Avenue in the 1980's.

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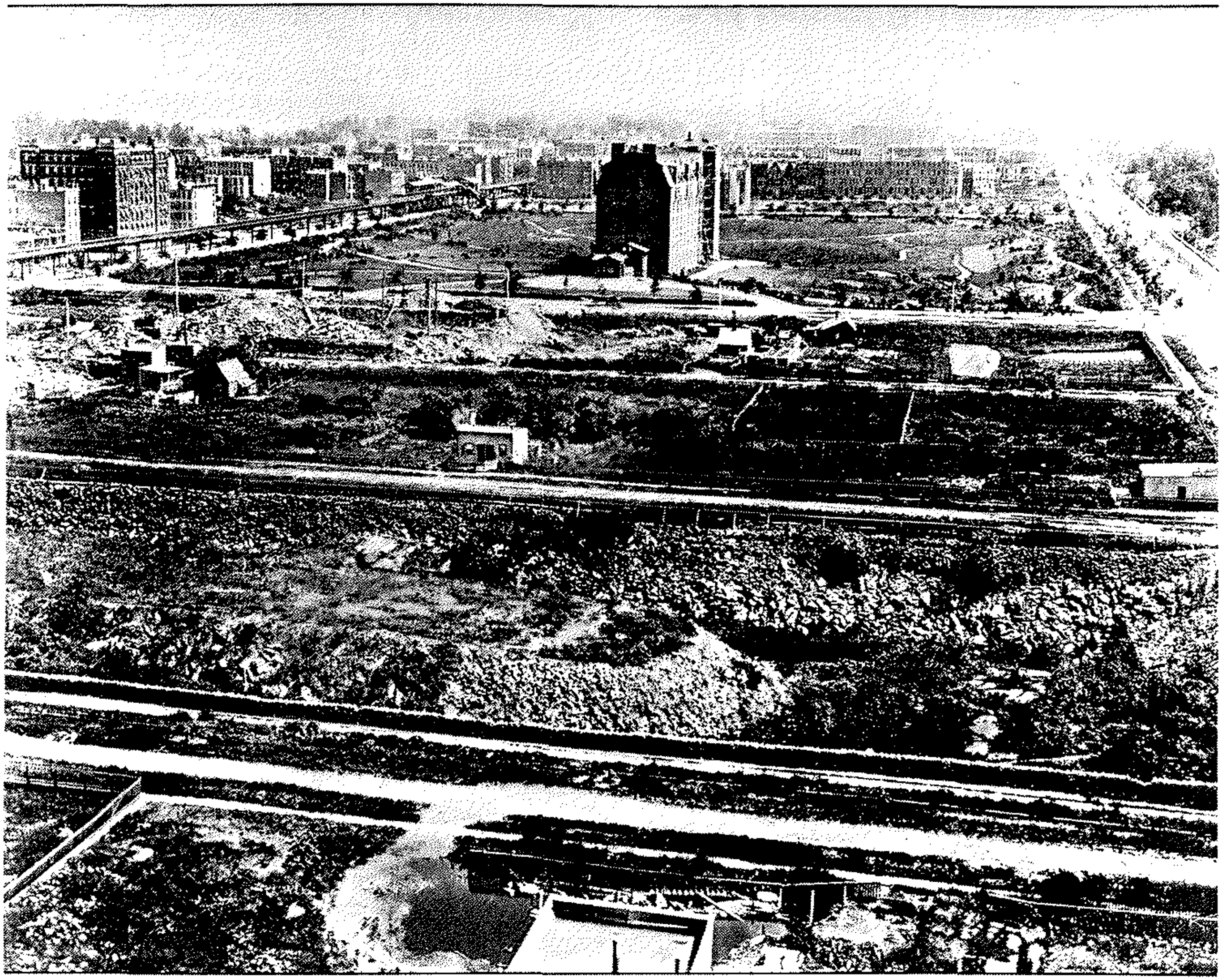
American Museum of Natural History Site Preparation – 1880

Figure 7-1



American Museum of Natural History, Ninth Avenue Elevated Tracks, and Upper West Side Development – 1887

Figure 7-2

DEVELOPMENT OF THE AMERICAN MUSEUM OF NATURAL HISTORY

In 1869, the Museum was chartered by an act of the New York State legislature, through the initiative of the naturalist Albert S. Bickmore and a group of distinguished New Yorkers. In contrast to other museums of zoology and paleontology founded at universities during the 19th century, the Museum was envisioned as an institution for public education with the mission of "encouraging and developing the study of Natural Science; of advancing the general knowledge of kindred subjects, and, to that end, of furnishing popular instruction and recreation."

The development of the Museum's physical plant took place over many decades and was subject to the vicissitudes of city financing and the architectural decisions of numerous groups. The cornerstone for the first Museum building was laid in 1874 by President Ulysses S. Grant at the Manhattan Square site provided by the Board of Park Commissioners. In the 1870's, Central Park architects Calvert Vaux and Jacob Wrey Mould designed the Museum's first building as well as a "master plan" for development of the entire site. The plan laid out a large square complex, subdivided internally by four "transepts" with a large tower at the center, thereby creating four open interior courtyards. In the early 1880's, the Museum was able to initiate an expansion plan overseen by the architectural firm of Cady, Berg & See. Adhering to the Vaux/Mould master plan, although changing the style from Victorian Gothic to Romanesque Revival, six sections of the Museum were constructed in the 1890's, completing the entire southern facade. In addition, the firm designed and constructed the Lecture Hall, which occupied the center of the site, and prepared a modified version of the Vaux plan for the remainder of the project that retained the concept of a rectangular shape, with perimeter buildings on four sides, crossed in the center to create four inner courtyards.

Construction in the early years of the 20th century followed this basic plan. Charles Volz designed the south wing along Columbus Avenue as a continuation of the West 77th Street facade. A power house, which is now the Ichthyology Building, was built along the inner cross. Although the Trustees of the Museum set an interim goal of completing the buildings surrounding the two southern courtyards in time for the Museum's 50th anniversary, subsequent construction took place not only surrounding, but within the courtyards. The Asiatic wing was constructed on Central Park West in the early 1920's, but the Oceanic and Education Halls were built at about the same time within the southeast and southwest courts, respectively. The new architects were Trowbridge & Livingston. During this period, the park on site was renamed Theodore Roosevelt Park.

The next wave of Museum expansion took place in the 1930's, with development along the site's Central Park West side to approximately 80th Street. Five buildings were constructed, all designed by Trowbridge & Livingston. Three continue the basic rectangle and cross of the original plan: Roosevelt Memorial Hall, which now serves as the Museum's main entrance (John Russell Pope designed this building with the Museum's architects); the East Transept (African Wing); and the Whitney Wing (north wing on Central Park West). Two were constructed in the remaining courtyard spaces: the Power House in the northwest court and Hayden Planetarium in the northeast court. Both of these buildings were built to be enclosed by continuation of the basic plan at a later time.

By 1935, when the Hayden Planetarium opened, the Museum complex looked largely as it does today. The southern and eastern facades and related inner crosses are essentially completed; the western facade is only partially built; all four inner courts contain buildings; and the complex along West 81st Street and on Columbus Avenue presents an unfinished edge toward the community. Since then, individual infill projects have been completed, but no major building sections have been added. Master plans have been prepared for remodeling and completing the Museum—most of which have proposed maintaining the arrangement of the original plan by completing the northern and western perimeter building sections—but none have been undertaken.

THE HAYDEN PLANETARIUM

Increasing attention to astronomy at the Museum in the first decade of this century, coupled with the success of early exhibits, identified the need for a permanent astronomical exhibit hall. Early plans for the hall placed it at the site of the central pavilion, with a projection planetarium located in a domed room extending from the uppermost floor. Use of the northeast court was proposed initially as a temporary location for the Planetarium, but became a more permanent choice through subsequent design development and private funding initiatives. With a $170,000 donation from Charles Hayden for purchase of the Zeiss projection equipment and a $600,000 loan from the Reconstruction Finance Corporation (a New Deal relief agency), construction of the new Planetarium began in May 1934. The Hayden Planetarium opened just 4 months later. Its building was designated "temporary" in a 1928 prospectus, yet it still stands 60 years later.

Unlike other Museum buildings, the Planetarium was built for exhibits only and does not include a research area. It and the land beneath it are owned by the Planetarium Authority, a State authority and public benefit corporation established by statute in 1933 to raise the funds, through bonds, to repay the Reconstruction Finance Corporation loan.

C. EXISTING CONDITIONS

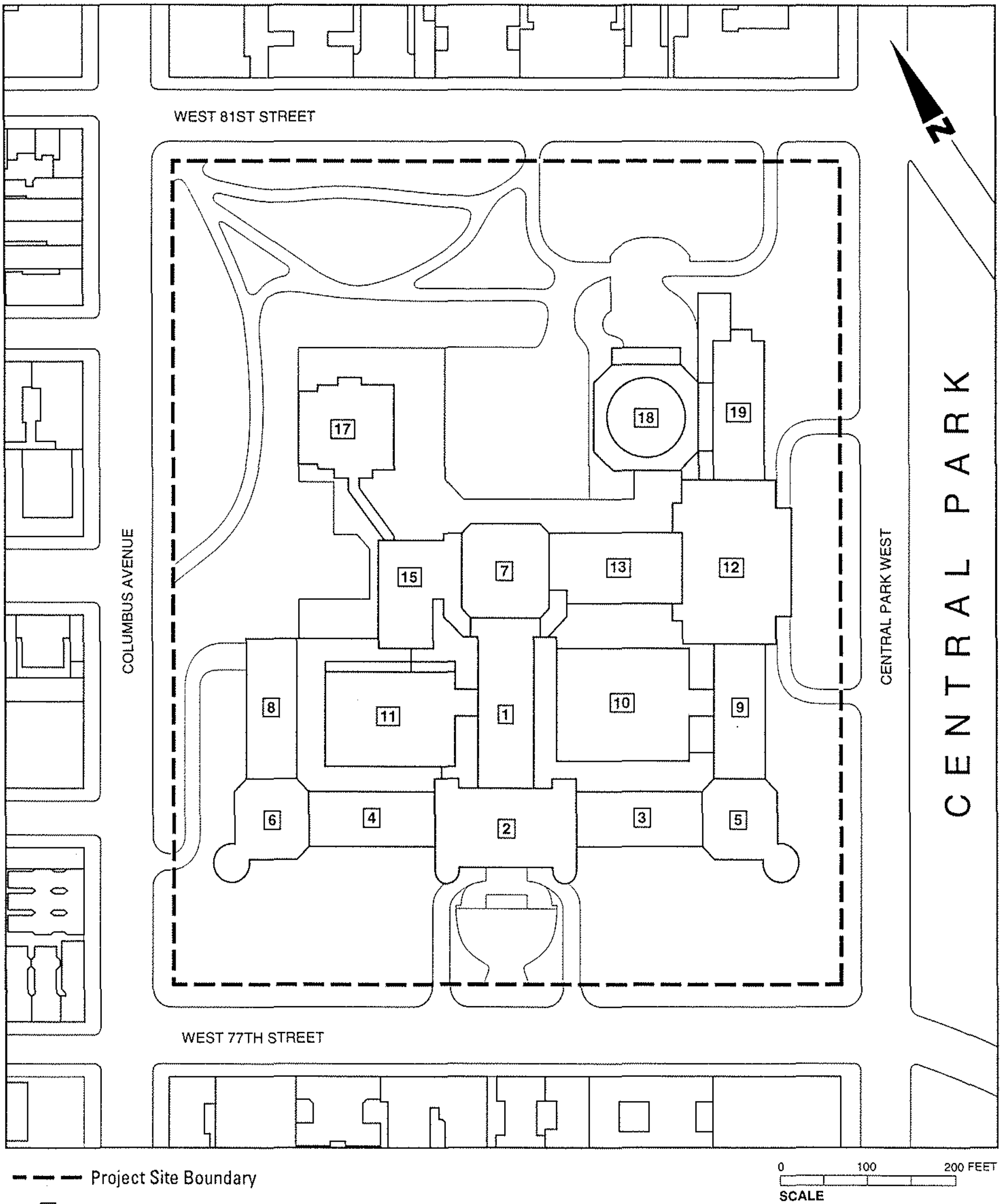
PROJECT SITE

The Museum complex and site constitute a significant historic resource based on its scientific and educational purpose, and its architecture. The National Register Nomination Form Statement of Significance emphasizes people (the founders, the curators, and the curatorial staff), educational philosophy, collections, and research.

As described above, the Museum's physical complex evolved over about a 60-year period from the 1870's to the 1930's. Today, it comprises numerous interconnected buildings in a variety of architectural styles and materials (see Table 7-1 and Figure 7-3). The master plan that called for the development of the entire site has never been fully realized, and the four facades are in varying stages of completion. The south (77th Street) facade was completed by 1900. The National Register Nomination Form calls it one of the outstanding examples of Romanesque Revival in the City (see Figure 7-4). A massive yet graceful staircase marks the ground-floor carriageway, one of the Museum's entryways.

The east (Central Park West) facade was completed, except for its north corner pavilion, by the mid-1930's. Its wings are rather plain structures that continue elements of the 77th Street facade in a more restrained Classical style. The central building, Pope's Roosevelt Memorial Hall, is entered by climbing a long staircase and passing through a Roman triumphal arch. Four multistory Ionic columns carry an entablature embellished with statues of Daniel Boone, John James Audubon, James Rogers Clark, and Meriwether Lewis.

In contrast, only the southern wing of the west (Columbus Avenue) facade has been built. It was constructed in the first decade of this century to match the Romanesque Revival style of the south facade. Its blank north wall is still waiting for the middle building, which would have provided the Columbus Avenue entrance (see Figure 7-5). None of the north perimeter buildings were realized, leaving exposed buildings that were intended to be internal. The north edge and



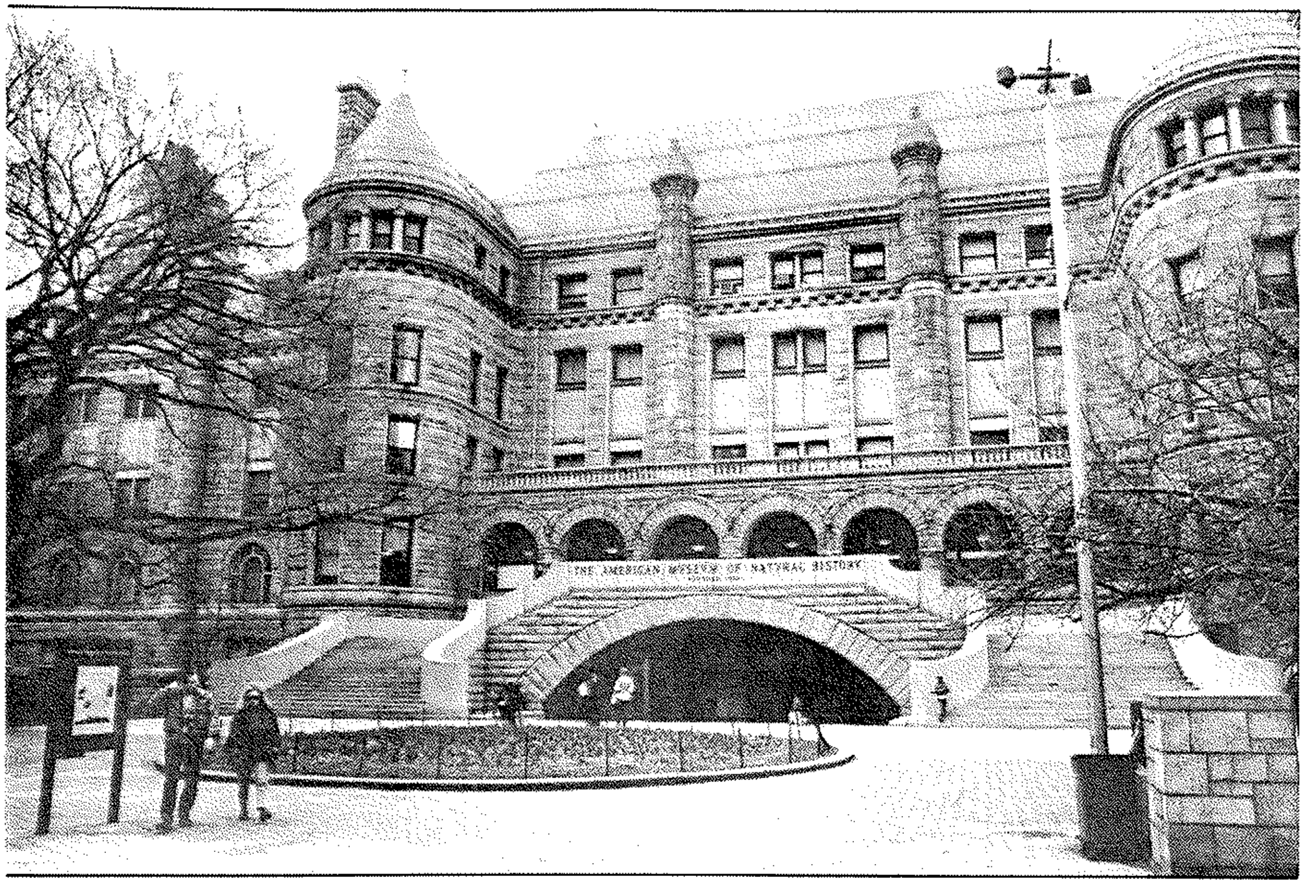
Project Site Boundary

1 Building Reference Number
(See Table 7-1 for reference)

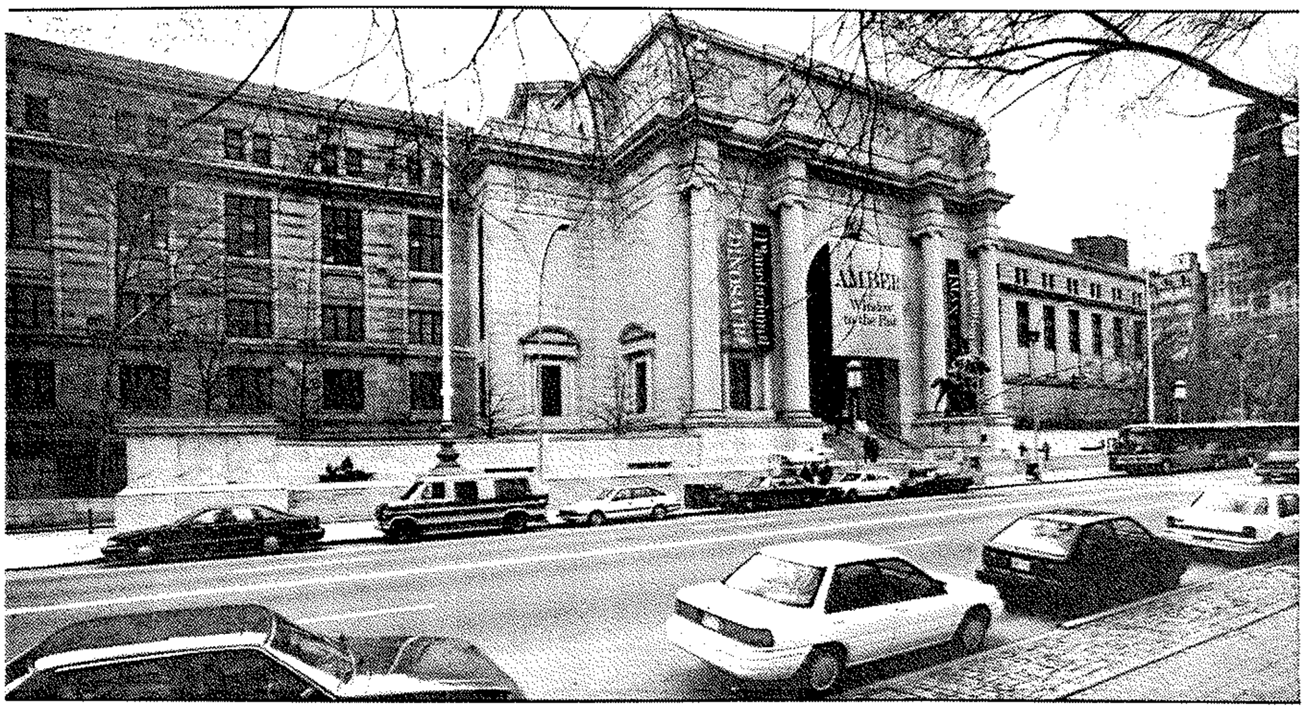
American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Building Construction Sequence Plan

Figure 7-3

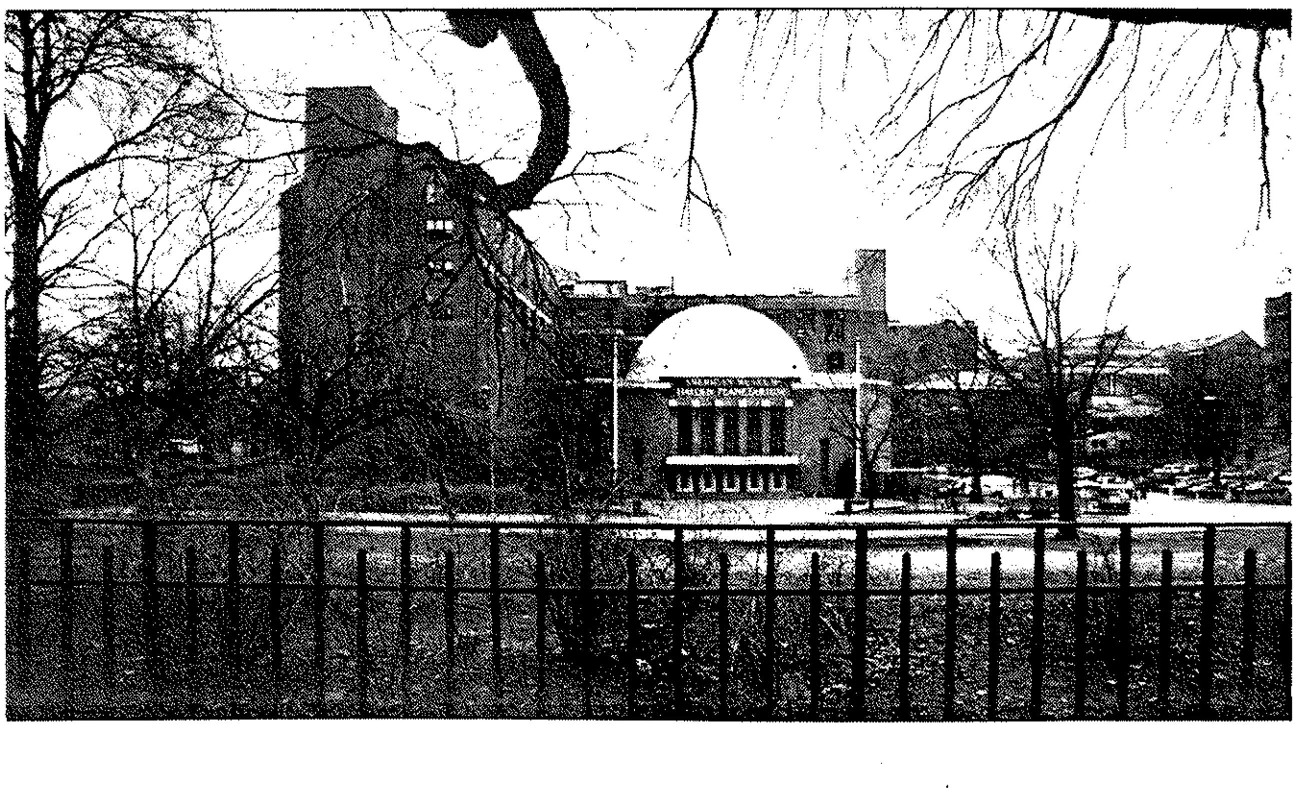


South (West 77th Street) facade



East (Central Park West) facade

South and East Facades of the Museum



Views of the Museum
from Columbus Avenue and West 81st Street

Figure 7-5

Table 7-1
American Museum of Natural History Buildings

Year	Map Number*/Name	Style	Height (stories)	Facade Material	Architect
1874-1877	1: Bickmore Wing	Victorian Gothic	5	Red brick and stone	Vaux & Mould
1890-1891	2: Memorial (77th Street Entrance)	Romanesque Revival	6	Vermont pink granite	Cady, Berg & See
1894-1895	3: North American (East Wing on 77th Street)	Romanesque Revival	5	Granite	Cady, Berg & See
1895-1897	4: South American (West Wing on 77th Street)	Romanesque Revival	5	Granite	Cady, Berg & See
1897-1899	5: North Asiatic (Southeast Corner Pavilion)	Romanesque Revival	6	Granite	Cady, Berg & See
1897-1899	6: Polynesian (Southwest Corner Pavilion)	Romanesque Revival	6	Granite	Cady, Berg & See
1897-1899	7: Lecture Hall (Central Pavilion)	Functional/Utilitarian	2	Granite and brick	Cady, Berg & See
1903-1904	15: First Power House and Boiler House (Western Central Extension, now the Ichthyology Building)	Romanesque Revival	3	Brick and stone	Charles Volz
1906-1908	8: European (South Wing on Columbus Avenue)	Romanesque Revival	6	Granite	Charles Volz
1922-1924	9: Asiatic (South Wing on Central Park West)	Academic Classical	5	Jonesboro (gray) granite	Trowbridge & Livingston
1922-1924	10: Oceanic (Southeast Court)	Functional/Utilitarian	1	Brick	Trowbridge & Livingston
1924-1928	11: Education (Southwest Court)	Functional/Utilitarian	2, 4, and 5	Brick	Trowbridge & Livingston
1930-1934	12: Roosevelt Memorial (East Entrance)	Academic Classical	7	Milford pink granite (weathers to gray)	John Russell Pope; Trowbridge & Livingston
1930-1931	13: African (East Transept)	Functional/Utilitarian	6	Brick	Trowbridge & Livingston
1930-1931	17: Power and Service (Northwest Court, now the Power House)	Functional/Utilitarian	5, 2 (connector)	Brick	Trowbridge & Livingston
1934-1935	18: Hayden Planetarium (Northeast Court)	Moderne	2	Brick and metalwork	Trowbridge & Livingston
1931-1933	19: South Oceanic (North Wing of Central Park West Facade, now the Whitney Wing)	Academic Classical	6	Gray granite	Trowbridge & Livingston

Note:
* See Figure 7-3.

the northern portion of the west edge of Manhattan Square (now Theodore Roosevelt Park) are in park use.

The most visible of the internal structures on the current north end of the complex is the Hayden Planetarium. Not intended as part of the north perimeter, it is utilitarian in a simple Moderne style of architectural design. In its report on this project, LPC noted that documents dating from the time the Planetarium was designed and constructed describe it as a building to be erected in an inner court, with no facade and plain brick finish. LPC also noted that the inclusion of the Planetarium in the individual landmark designation was related to its institutional association and the appreciation of the popular experience of visiting its exhibits, rather than to its architectural importance.

As noted earlier, the Museum is set within the landscaped surroundings of Theodore Roosevelt Park, once known as Manhattan Square. This city park is considered part of the landmark Museum site. As described in more detail in Chapter 6, "Open Space and Recreational Resources," the wider northern and western portions of this park are divided by a paved path system lined by benches; the southern and eastern portions are not publicly accessible. Museum driveways paved in Belgian block enter all four sides of the park. The park is surrounded by a wrought iron fence marked by stone piers at the corners and at entrances and driveways into the park, and by a wide sidewalk of hexagonal pavers lined with tall trees and, on the north and west sides, park benches.

UPPER WEST SIDE/CENTRAL PARK WEST HISTORIC DISTRICT

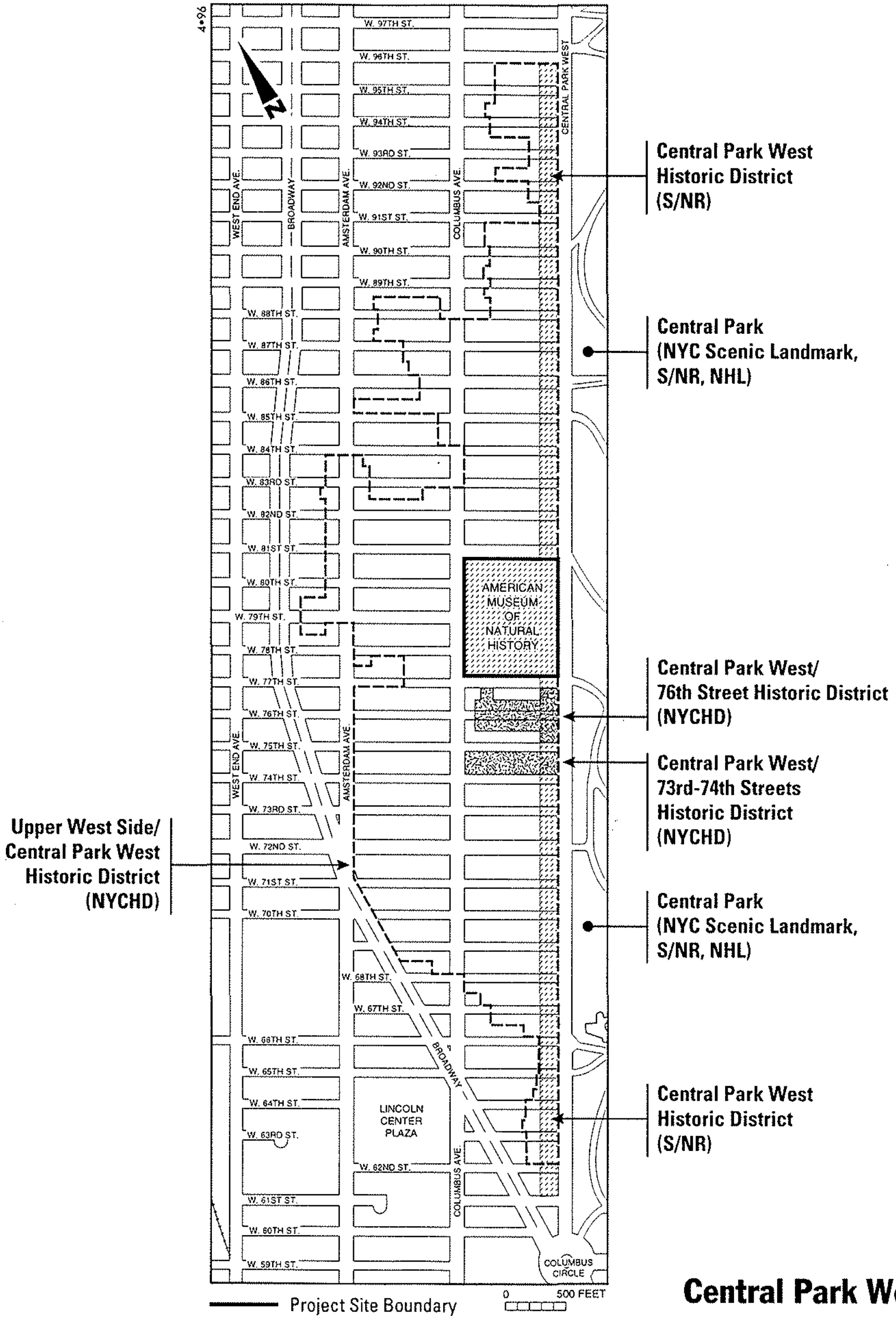
As described above, the Upper West Side/Central Park West Historic District was primarily developed with row houses, apartment hotels, flats, and apartment buildings in the period between 1880 and 1930. The Museum, also described above, is located at the heart of this district.

This New York City Historic District is a vast area encompassing some 2,000 buildings (see Figure 7-6). Within it, several smaller districts were also delineated, including the Central Park West/West 76th Street Historic District just south of the Museum block. There is also a Central Park West Historic District listed on the S/NR, which includes all of the buildings fronting on Central Park West from the north side of West 61st Street to the north side of West 96th Street.

Blockfronts facing the Museum property are all within the larger Upper West Side/Central Park West Historic District: West 81st Street between Central Park West and Columbus Avenue, Columbus Avenue between West 77th and 81st Streets, and West 77th Street between Central Park West and Columbus Avenue.

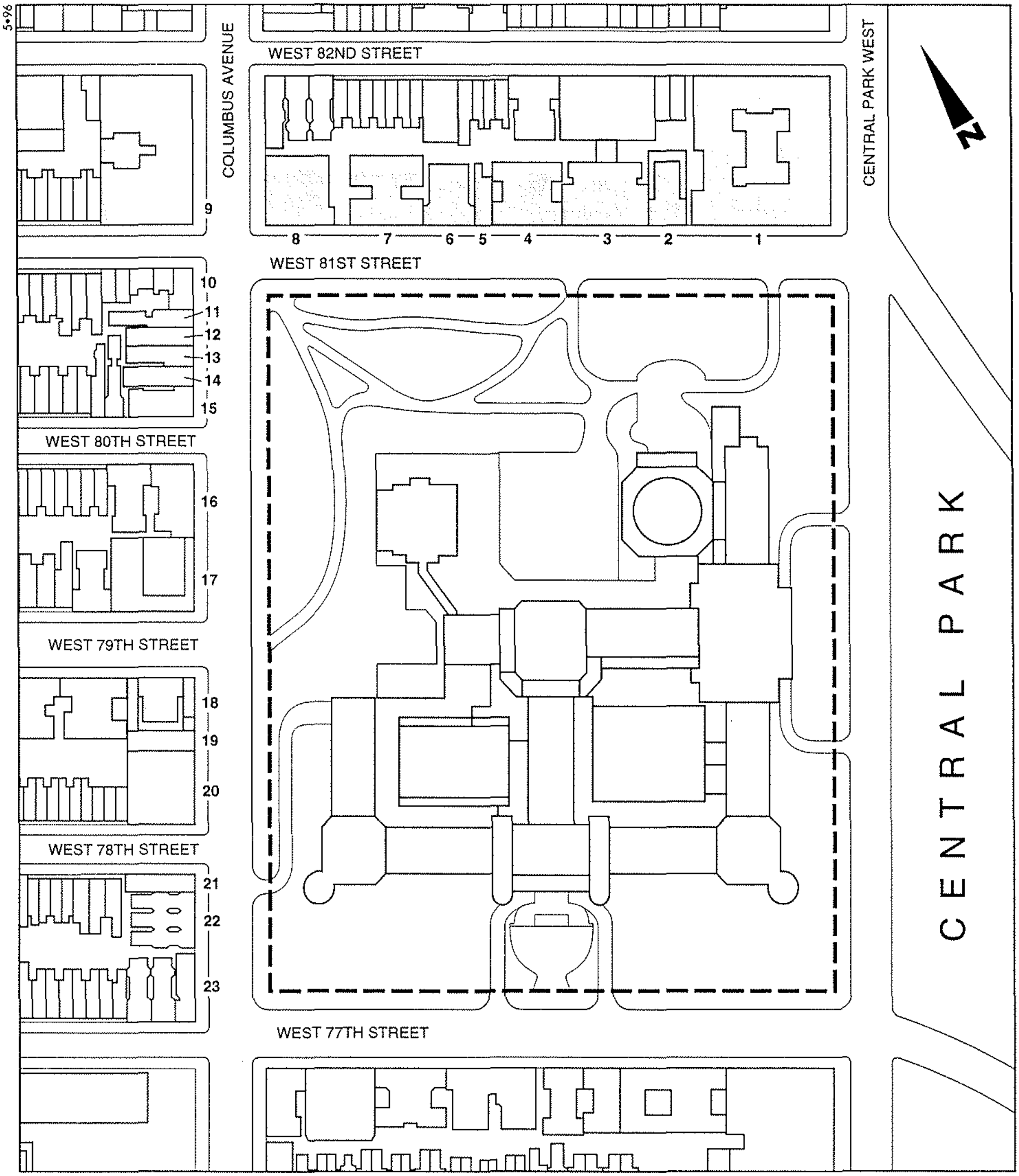
The buildings along West 81st Street are similar in many ways, and form a rather uniform, harmonious streetwall (see Figure 7-7). With one small exception (an altered row house at mid-block), they are tall (11 to 20 stories) and broad (frontages of 50 to 200 feet), and rise to their full height (or nearly so) with no setbacks. The facades are beige and light brown tones of brick, terra-cotta, and stone (see Figure 7-8). Four of these seven large buildings, including the Beresford, are Neo-Renaissance in style. Four—including, again, the Beresford, as well as two other Neo-Renaissance buildings—date from the last era of the major construction in the district, between World War I and 1930. (See Appendix A for a building list.)

The buildings facing the Museum across Columbus Avenue are not uniform, and some of the older ones have been altered in unsympathetic ways (see Figure 7-9). The older building fabric is broken by three easily identifiable, more recent buildings occupying corner locations. At the south corner of West 81st Street is a 6-story apartment building; at the north corner of West 79th Street is a 28-story apartment building, the Park Belvedere; and in the midblock between West



Central Park West Historic Districts

Figure 7-6



Project Site Boundary

4 Building Reference Number (See Table 7-2 for reference)

Buildings on 81st Street and Columbus Avenue

Figure 7-7

American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

View east from Columbus Avenue

View east from mid-block

Views of West 81st Street

Figure 7-8

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View north near West 78th Street

View north near West 80th Street

Views of Columbus Avenue

Figure 7-9

78th and 79th Streets is a narrow 18-story apartment building. These were constructed after the Ninth Avenue El was demolished (1940), and reflect different periods and styles. The older buildings, which date from 1882 to 1900, are 2 to 10 stories tall and in Renaissance Revival, Queen Anne, Beaux-Arts, or early 20th century commercial styles. One group of three 1887 flats was combined behind a modern facade devoid of detail. The building at the corner of West 77th Street—the Kenmar, an 1891-1892 Renaissance Revival flats building—now has a sidewalk cafe projecting toward Columbus Avenue.

On the south side of the Museum, the buildings along West 77th Street also vary, from the New-York Historical Society's Classical Revival-style building on Central Park West and a 6-story Neo-Tudor apartment building in the midblock, to large, full streetwall 12- to 16-story apartment buildings in Neo-Renaissance and Neo-Gothic styles.

CENTRAL PARK

Central Park, which faces the project site across Central Park West, is a New York City Scenic Landmark and listed on the State and National Registers. It is also designated as a National Historic Landmark.

The concept of reserving land for open space in Manhattan took hold in the 1840's. In the 1850 mayoral campaign, both candidates promised a great park, and the winner kept his word. By 1856, the City had acquired the land and began to clear it. The Board of Park Commissioners held a competition for the park's design, which was won by Frederick Law Olmsted and his partner, the architect Calvert Vaux, in 1857. Over the next 20 years, the undeveloped tract of land between Fifth and Eighth Avenues from 59th Street to 110th Street was transformed into a picturesque landscape composition of meadows, glades, rock outcroppings, foot paths, bridle paths, and carriage drives. Central Park was the first large-scale park in the nation, and it embodies 19th century attitudes toward nature and the ideals of a democratic society; it is a place where people from all walks of life can find respite from the pressures of an urban and industrial society.

Olmsted and Vaux had strong ideas about the form of the park's borders. They designed a low stone wall in keeping with the park's naturalistic design. They also planned broad sidewalks lined by a row of elm trees outside, as well as a planting of understory trees and shrubs inside the stone wall. This scheme was intended to create a substantial visual barrier between the emerging city and the park.

Over the years, many changes have taken place in and around Central Park. The city has grown up around all sides of the park. In the years after the park's construction, Olmsted and Vaux's predictions about the growth of Manhattan have come true; tall buildings, including those on Central Park West, can be seen from locations in the park's interior. The effect of this development has been to add to the sense of Central Park as a rustic retreat in an urban context. The Museum complex and Theodore Roosevelt Park are notable exceptions to the walls of tall buildings overlooking Central Park.

D. THE FUTURE WITHOUT THE PROJECT

INTRODUCTION

This section describes the changes that may affect archaeological and historic resources in the future without the proposed project. It also considers other projects that will be independently developed by the year 2001.

PROJECT SITE

As described in Chapter 6, in the future without the project, improvements are being planned for Theodore Roosevelt Park, which bounds the Museum. While a specific design has not been finalized, the improvements will affect the north side and northwest corner of the open space, where the Museum buildings are distant from the street and the park is widest. As stated above, these alterations must be submitted to LPC for review and advice.

UPPER WEST SIDE/CENTRAL PARK WEST HISTORIC DISTRICT

No development projects are planned or proposed in the area surrounding the Museum. The nearest known development project, a 65,000-square-foot community center, is proposed for the west side of Amsterdam Avenue at West 77th Street. This site is not visible from the Museum complex and thus will not affect the Museum or its setting in the historic district.

E. PROBABLE IMPACTS OF THE PROPOSED PROJECT

PROJECT SITE

As mandated by the Museum's landmark status, the proposed Planetarium and North Side project has been reviewed in detail with LPC in public hearings and meetings on October 5, October 31, November 14, and November 21, 1995. LPC has issued a report pursuant to section 25-318 of the Administrative Code of the City of New York. This section requires such a report on plans for the construction, reconstruction, alteration, or demolition of any improvement or proposed improvement that is owned by the city or is to be constructed on property owned by the city and is located or is to be located on a landmark site or in an historic district or that contains an interior landmark.

The proposed project would generally meet the first of the criteria of adverse effect (destruction or alteration) that LPC uses in identifying impacts on historic resources. However, LPC found both the demolition and alteration to be appropriate to proceed with the proposed project, as discussed below.

With regard to the Hayden Planetarium, LPC found the following (quoted from LPC's report, dated November 21, 1995):

- That the Hayden Planetarium is one component of a complex of buildings forming an individually designated landmark, and that it has a minimal role in establishing the distinctive architectural character of this landmark;
- That although the building was included as part of the individually designated Museum complex, its inclusion in that designation relates primarily to its cultural associations as the Museum's Planetarium and to the public's experience of its programming and exhibits rather than to its architectural importance;
- That despite the presence of certain architecturally interesting features that are typical of the Moderne style, such as the window and louver grilles, the building is not a distinguished example of the architecture of the early 1930's;
- That the Planetarium is a late work by the firm of Trowbridge & Livingston, executed after the death of Samuel Trowbridge, the firm's chief designer, and is not of the same quality as other individually designated buildings designed by the firm, such as the St. Regis Hotel and the former B. Altman Department Store;

- That the Planetarium's design has a weaker relationship to the complex as a whole than Trowbridge & Livingston's other work at the Museum;
- That the Hayden Planetarium, the fourth planetarium constructed in the United States, is less distinguished architecturally than its contemporaries, such as the Adler Planetarium and the Griffith Observatory;
- That the Planetarium is also less imposing than these contemporary planetaria that were created as freestanding structures rather than as accessories to larger institutions;
- That the Museum's records indicate that the Planetarium was sited in a courtyard, and that its facade was simply designed, so that the anticipated completion of the master plan could proceed at some point in the future; and that the building was never intended as a permanent component of the northern facade of the Museum complex;
- That the simple, inexpensive materials of the facade contrast with the rich granite and limestone of the Central Park West and West 77th Street facades, emphasizing the secondary nature of the Planetarium's architecture;
- That demolishing the Planetarium would have no impact on the remaining components of the complex;
- That demolishing the Planetarium would permit the construction of an architecturally distinguished structure that would impart a finished appearance to the northern side of the Museum complex; and
- Therefore, based on all of these factors, LPC concluded that demolition of the Hayden Planetarium component of the Museum complex to proceed with the proposed redevelopment of the complex is appropriate.

With regard to the proposed project's new construction and the proposed alterations to the Power House, LPC found the following (quoted from LPC's report, dated November 21, 1995):

- That the new construction on the north side of the complex will, for the first time, create a single facade for this portion of the complex, unifying it architecturally and concealing from view the many undeveloped facades and areaways which currently present an unfinished appearance for this portion of the Museum;
- That because of its site within the existing footprint of the Museum, the addition will present a finished appearance on the north side of the building for the foreseeable future without precluding the completion of the Museum master plan;
- That the height and massing of the addition will ensure that it relates harmoniously to the complex without overwhelming any of the significant historic buildings;
- That the arched entrance to the new Planetarium recalls the arch at the West 77th Street entrance, evoking the historic building element in a contemporary form;
- That the form of the proposed new Planetarium structure, a sphere within a glass cube, is a contemporary expression of the building's purpose which recalls the earlier Planetarium's similar expression of function through the use of a copper-clad dome and which would continue and enhance the scientific mission of the Planetarium;
- That the cultural associations of the Planetarium will be retained in both the location and architectural expression of the new Planetarium structure;

- That the design of the garage facade and terrace wall, with a series of planted setbacks and a monumental stair leading to the adjacent park, will make a graceful transition between the park and the Museum buildings;
- That relocating the parking function of the Museum from an open lot to a parking garage will enhance the appearance of the streetscape along West 81st Street within the Upper West Side/Central Park West Historic District, and that creating a finished facade on the north side will enhance the architectural relationship between the Museum complex and the buildings along the north side of West 81st Street within the Upper West Side/Central Park West Historic District;
- That the dark red brick which will form most of the facade cladding would blend well with the materials of this part of the complex;
- That the granite used for trim and the monumental entrance will help to relate this facade visually with the formal facades on Central Park West and West 77th Street;
- That rearranging window and door openings, creating new window openings, and restoring the skylights on the Power House building will have no effect on any significant architectural features of the complex;
- That the new western entrance pavilion will provide a contemporary focal point for that side of the complex; that the relatively small size of the pavilion will ensure that it does not diminish the appearance of the adjacent Romanesque Revival-style wing; and that the entrance pavilion will establish a visual connection between the Museum and the buildings along Columbus Avenue within the Upper West Side/Central Park West Historic District;
- That the copper and glass galleria element provides a strong horizontal element that will visually unite the entrance pavilion, Power House, garage, terrace, and the new Planetarium;
- That these elements will combine to create a unified, monumental composition that follows the Museum's long history of building wings as needed in styles that express their periods of construction; and
- That this proposed construction will enhance the special architectural, historic, and cultural significance of the American Museum of Natural History complex and of the Upper West Side/Central Park West Historic District.

UPPER WEST SIDE/CENTRAL PARK WEST HISTORIC DISTRICT

A number of the LPC findings listed above described the relationship of the proposed project to the Upper West Side/Central Park West Historic District. In particular, LPC found the following:

- That relocating the parking function of the Museum from an open lot to a parking garage will enhance the appearance of the streetscape along West 81st Street within the Upper West Side/Central Park West Historic District;
- That creating a finished facade on the north side will enhance the architectural relationship between the Museum complex and the buildings along the north side of West 81st Street within the Upper West Side/Central Park West Historic District;
- That the granite used for trim and for the monumental entrance will help to relate this facade visually with the formal facades on Central Park West and West 77th Street;

- That the entrance pavilion (on Columbus Avenue) will establish a visual connection between the Museum and the buildings along Columbus Avenue within the Upper West Side/ Central Park West Historic District; and
- That this proposed construction will enhance the special architectural, historic, and cultural significance of the American Museum of Natural History complex and of the Upper West Side/Central Park West Historic District. ❖

Chapter 8: Urban Design and Visual Resources

A. INTRODUCTION

The American Museum of Natural History's location in a city park, surrounded by the urban streetscape of the Upper West Side on three sides and by Central Park on the fourth, make its design and appearance key elements to the urban design and visual quality of the surrounding area. The proposed project would substantially change the appearance of the north side and part of the west side of the Museum. This chapter of the EIS considers the effects of those changes both on the Museum and on nearby locations from which the Museum is visible. In addition, since the Planetarium is currently lighted and set into a view with street and park lights in the foreground and Manhattan skyline beyond, and since the proposed project will also include special lighting, an analysis of the impact on nighttime views is included below.

B. EXISTING CONDITIONS

PROJECT SITE

The Museum complex is located on a superblock occupying the space of four regular blocks as well as the three unbuilt intervening streets. The Museum is set back within this landscaped setting from each of the surrounding streets—West 77th and West 81st Streets, Columbus Avenue, and Central Park West. Looking up or down Central Park West and from within Central Park, the Museum site is easily identifiable as a break in the wall of large apartment buildings built to overlook Central Park. As described below, Theodore Roosevelt Park's landscape of lawn and mature trees and its wide perimeter sidewalk lined with trees provide visual relief and separation between the Museum and the surrounding streets.

At the Museum, various episodes of construction and the several architectural styles in the complex of buildings are evident. Also evident are the different conditions of completion on the four sides of the Museum: from the south and east, the Museum presents finished facades, developed according to a Museum master plan (the master plan is described in detail in Chapter 7, "Historic and Archaeological Resources"). In contrast, the north and west sides of the Museum were never completed as originally envisioned in the master plan, and on these sides, the back and side walls of various Museum buildings are visible. About this collection of interior building facades that have been left exposed to the outside of the Museum, the National Register of Historic Places Nomination Form for the Museum goes so far as to say that "[f]rom the north and the west, where the insides of complex can be seen, it looks like nothing else on earth." Each side of the Museum complex is described in more detail below.

WEST 77TH STREET

The West 77th Street facade of the Museum is an imposing Romanesque Revival design that recalls the era in which it was built (see Figure 8-1). Recently cleaned, the pink granite is a warm color. The earlier of the two completed facades features rounded towers with peaked roofs and rusticated stone. In the center, a gracefully curved double staircase leads up to a portico of rounded arches marking the entry. The staircase itself is generally unused, as there is no entry on the upper level. Visitors entering from West 77th Street use the carriageway entry at ground level, which is visible through the shallow arch below the stair. A semicircular drive of Belgian block leads to this entrance from West 77th Street.

This facade is set back from the sidewalk about 150 feet behind a wrought iron fence marked by rusticated stone piers at the corners. Behind this fence, the lawn area of Theodore Roosevelt Park along West 77th Street is not accessible to the public. Large trees in the lawn as well as along the sidewalk obscure views of the wings of this facade from the street. In front of the Museum, the wide sidewalk of hexagonal pavers is lined by trees.

CENTRAL PARK WEST

The National Register Nomination Form describes the Museum as an important focal point when viewed from Central Park. Indeed, the Central Park West facade features the most ceremonial of entries to the Museum, the one that leads directly into the Theodore Roosevelt Memorial. The main building here is closer to the sidewalk than any of the other Museum buildings, making this more formal side of the Museum its most imposing (see Figure 8-2). A wide staircase takes the visitor up to a Roman Triumphal arch. The very wide stairs also open up views—both direct and oblique—of the facade. An equestrian statue of Roosevelt stands above the sidewalk level centered in front of the archway. Colorful banners hang above the main entrance, announcing the exhibits inside (see Figure 8-2).

Although there is also a ground-level entry on this facade, it is less visible than the one on West 77th Street, the visual clue being the Belgian block paving of the sloping, semicircular carriageway leading beneath the arch. There is also an entry from the Eighth Avenue subway here, one level below the street, allowing people to enter and leave the Museum without ever seeing its exterior.

On either side of the main Museum entrance on Central Park West, the wings are less distinctive in design. On the south, this allows a transition to the Romanesque Revival style of the corner building at West 77th Street, with its round tower. Due to the length of this facade, it is not readily apparent, especially in views from south of the entry, that the Central Park West facade is in fact unfinished. However, walking south from West 81st Street along the Central Park West sidewalk, the blank north wall of the north building (the Whitney Wing) suggests that the complex is not complete and that more (in fact, the whole north perimeter) was planned. The Hayden Planetarium is visible from Central Park West only north of this building.

Theodore Roosevelt Park provides a green border for this side of the Museum and contributes to the experience of walking along the sidewalk, although the open space on either side of the Central Park West entrance is not accessible to the public. As on the other sides of the Museum, the sidewalk here is wide and paved with hexagonal pavers.

COLUMBUS AVENUE

For pedestrians walking north along Columbus Avenue, the round corner tower of the Museum at Columbus Avenue and West 77th Street creates a strong visual impression, but the continuation of the wing is physically farther from the sidewalk and less striking by comparison (see Figure 8-3). Similar to the north wing on Central Park West, this south wing on Columbus Avenue has a blank, unfinished north end waiting for completion. Once past this wing, the open area expands into the site to expose a jumble of buildings of varying shapes, styles, and materials (see Figure 8-3). A single structure stands closer to sidewalk at the northwest corner of the complex,

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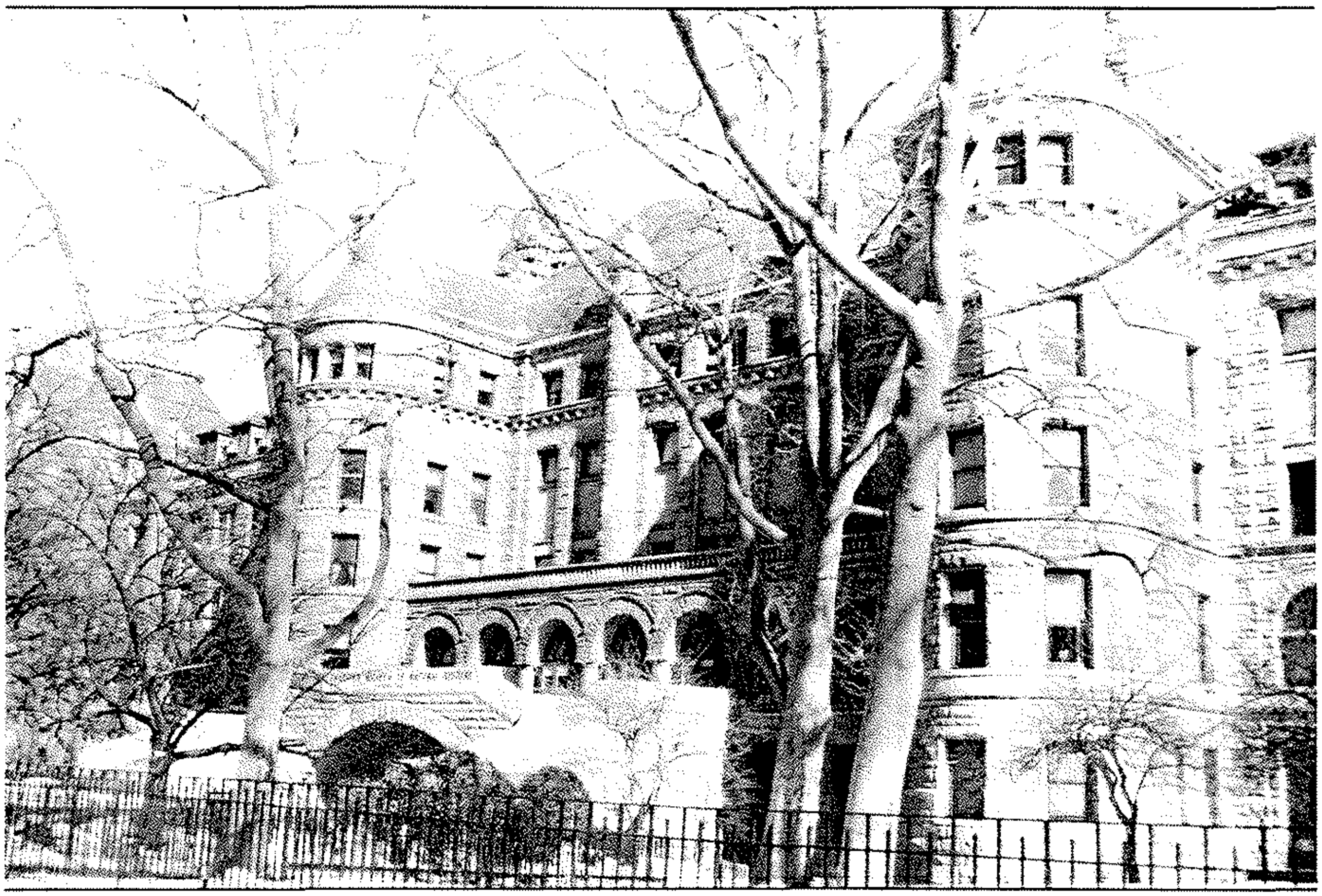
Corner at Central Park West



Entry with low arch to carriageway

West 77th Street Facade

Figure 8-1

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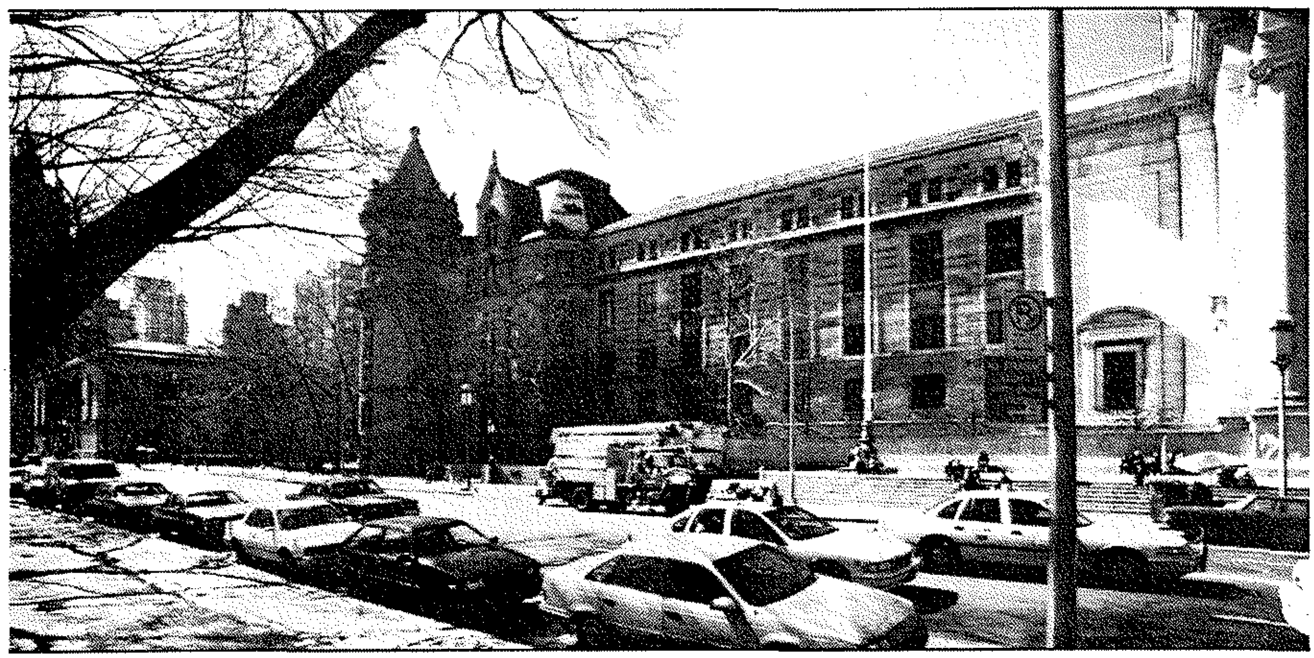
View of entrance and north to West 81st Street

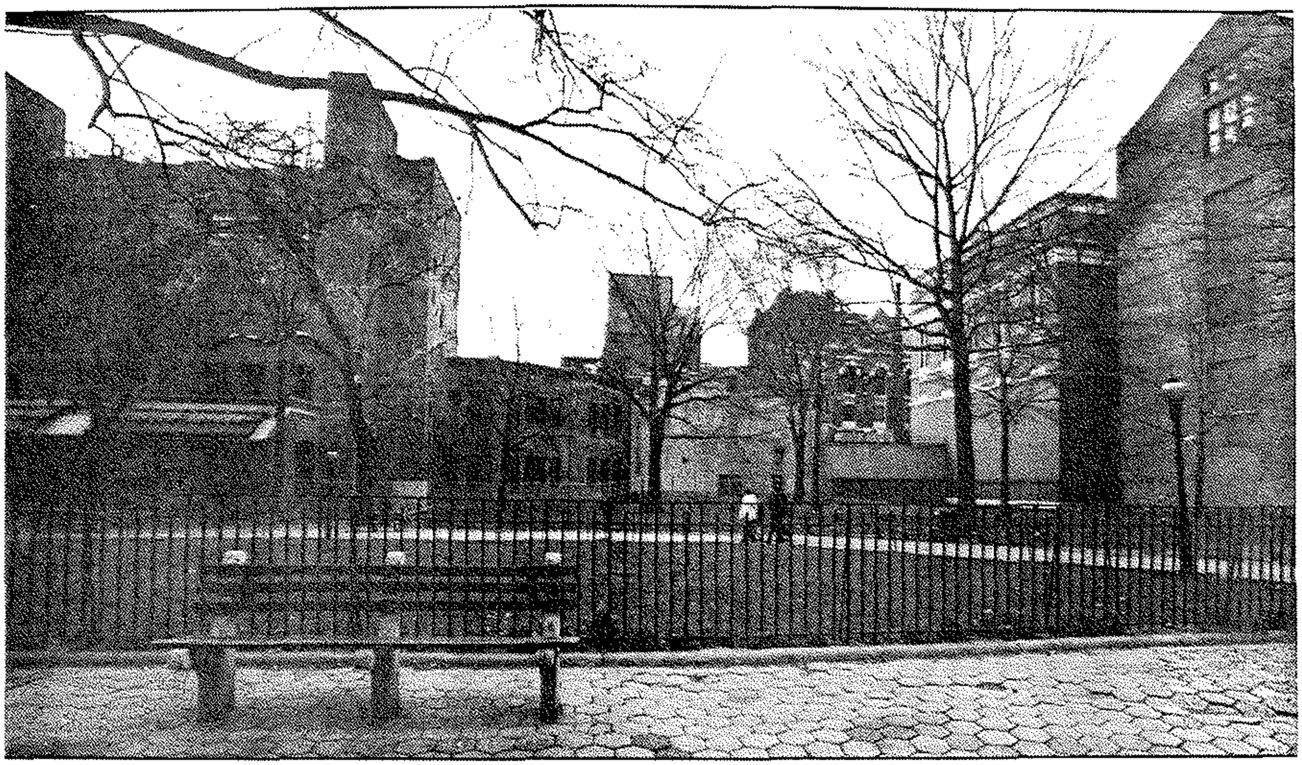


View south from entrance to West 77th Street

Central Park West Facade

Figure 8-2

View north from West 77th Street



View into museum complex near West 79th Street

Views of the Museum from Columbus Avenue

Figure 8-3

View east across Theodore Roosevelt Park

View of planetarium and museum

Views of Theodore Roosevelt Park and the Museum from West 81st Street

Figure 8-4

a utilitarian, five-story brick structure that was once the Power House for the Museum. The Museum buildings are separated from the adjacent park by tall chain link fencing protecting a below-grade service yard that surrounds the complex.

As on the West 77th Street and West 81st Street sides of the Museum, the park and the sidewalk along Columbus Avenue are under a canopy of tall trees. There are no entries to the Museum along Columbus Avenue, other than a below-grade service entrance that is largely hidden from view and not accessible to the public. The driveway leading to this entrance from Columbus Avenue begins just south of West 78th Street. Paved with Belgian block, this drive slopes quickly out of view behind a rusticated stone supporting wall that matches the facade of the Museum's southern buildings, but cannot be readily seen because of the drive's slope and sharp curve from Columbus Avenue. Only the end of the drive near Columbus Avenue is obvious to the viewer. Another opening in the perimeter fence at West 79th Street marks the beginning of a paved path into the park that continues north to West 81st Street. The wide sidewalk of hexagonal pavers bordering the park is lined with benches in the northern half of this block.

WEST 81ST STREET

Although the Hayden Planetarium has a designed north facade with readily identifiable entry doors, the predominant appearance of the north portion of the Museum complex is created by the jumble of buildings intended to be on the interior of the complex and not seen: undetailed and often windowless plain brick walls, a deep areaway surrounding many of the buildings, and, at the center of the unintended composition, a parking lot (see Figure 8-4). These buildings present a palette of different colors to the viewer, including the dark brick of plain side and rear facades, and glimpses of the brighter reds and pinks of finished brick and rusticated stone facades of the Museum's earliest buildings, built to be seen from all sides. In contrast to the other Museum structures visible from the sidewalk, the Planetarium appears to be a free-standing structure because its connections to the rest of the complex are out of view. Apart from the Planetarium doors, there is no visible entry to the complex on this side. East of the Planetarium is the blank north wall of the Whitney Wing, the north building on Central Park West. To the west of the parking lot is the utilitarian, five-story brick structure that was once the second Power House for the Museum. Visible along the north wall of much of the complex is a tall chain link fence that delineates the below-grade service yard beyond.

Along West 81st Street, Theodore Roosevelt Park is larger than on the opposite side of the Museum at West 77th Street, and the Museum buildings are set well back from the street. The park slopes down from West 81st Street about 200 feet to the Museum buildings, increasing this sense of distance. Views of the Museum from the north are partially obscured by this change in elevation and by trees and shrubbery in the park.

Although the park is widest north of the Museum, it is broken up by the driveway to the Museum's parking lot, paved with Belgian block, that curves downhill from West 81st Street in front of the Planetarium and back up to West 81st Street. Paved paths provide pedestrian access to the park and Planetarium. In this part of the park, the fenced dog run is an area of lively activity. However, because of an inadequate drainage system and a lack of maintenance and repair, the vegetation of the surrounding lawn area is unkempt and patchy, the paving is cracked, and there are puddles and soggy soil.

SURROUNDING AREA

WEST 81ST STREET

Facing the Museum and Planetarium across West 81st Street is an almost solid row of strikingly similar 12- to 15-story buildings (see Figure 8-4) clad in beige to light brown masonry. They are residential structures with decoration typical of early 20th century apartment buildings and hotels. Most notable among them is the Beresford on the corner of Central Park West. With its three highly visible octagonal towers, it is among the most prominent elements of Central Park West's distinctive skyline. Many of the other buildings in the block are of similar Renaissance-inspired design, although one has Moorish motifs. There is also an exception to the prevailing character: a comparatively tiny, but extensively altered row house recalls the original construction of the midblock here.

COLUMBUS AVENUE AND CROSS STREETS

The west side of Columbus Avenue in the blocks facing the Museum is heterogenous, with a wide variety of building heights, materials, and design styles (see Figure 8-5). Structures range from a 28-story modern pink brick apartment building that towers over all its neighbors, to bulky 7- to 10-story structures clad in brick with stone trim, to small-scale, but heavily altered, structures. Almost all are built on the sidewalk line—only one is somewhat set back—allowing a continuity in the street wall. Almost all have retail uses at ground level and one has two cafes built out on the sidewalk.

From the side streets that run to or from Columbus Avenue opposite the Museum property—West 78th, 79th, and 80th Streets—there are views toward the Museum, particularly from the high point in the grade between Columbus and Amsterdam Avenues. However, views of the Museum buildings themselves are largely obscured by trees. Even in winter without their leaves, sidewalk trees on the side streets and along Columbus Avenue as well as trees in the park surrounding the Museum limit views of the structures—particularly those north of the southern Museum building on Columbus Avenue—to glimpses among the limbs and branches (see Figure 8-6).

WEST 77TH STREET

This street wall begins at Central Park West with the low (approximately 6 apartment-house floors tall), but imposing, New-York Historical Society building. Its light-colored granite facade is designed in the Academic Classical style. Similar to other institutions along Central Park West, it is much shorter than the apartment houses that characterize Central Park West, such as the Beresford. West of the Historical Society on West 77th Street, the building wall goes up and down. The larger structures are 12 to 16 stories tall and the smaller ones in the mid-block and on the west end area 6 and 7 stories, respectively. Styles range from Neo-Gothic and Neo-Tudor to Neo-Renaissance. All buildings are built to the street wall and none are set back. Lower structures are found at both ends of the block.

CENTRAL PARK WEST AND CENTRAL PARK

Central Park West is a wide sometimes heavily trafficked boulevard, notable for the distinguished, large-scale apartment houses that line its west side as well as Central Park to its east (see Figure 8-7). With two lanes of traffic in each direction, it might be considered a barrier, but pedestrians cross it readily to enter Central Park near West 81st and 77th Streets. The wide

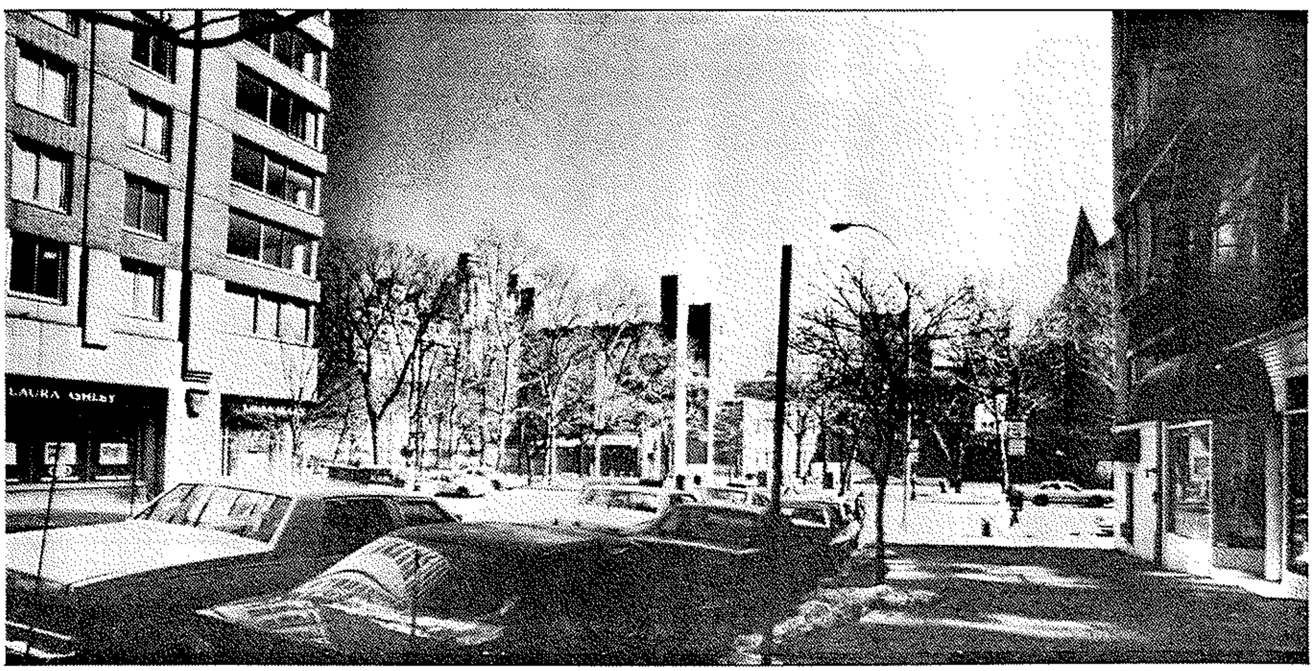
View north from West 79th Street

View north from West 77th Street

Views of Columbus Avenue

Figure 8-5

West 78th Street



West 79th Street

Views Toward the Museum

Figure 8-6

Central Park West

Central Park and 81st Street Transverse

Central Park and Central Park West

Figure 8-7

sidewalks on both sides of Central Park West are also suitable for an urban stroll in good weather. A rustic stone wall separates the park from the sidewalk and the street.

Central Park consists of more than 840 acres of open space in the heart of Manhattan. One of the great manmade monuments of the 19th century and the first large-scale public park in the United States, it functions as it was planned in the mid-19th century, as a naturalistic landscape in which urban dwellers can mingle and find respite from the pressures of life. The park remains a bucolic setting of meadows, lakes and forests, in spite of modern intrusions—including the numerous automobiles and buses on the 81st Street transverse.

NIGHTTIME LIGHTING

INTRODUCTION AND METHODOLOGY

At night, the Planetarium, which is lighted, is visible within a context of nighttime views from street level and from the apartments along West 81st Street. The lighted front of the building and dome is set back in Museum Park, which is also lighted and is itself set behind the street lights of West 81st Street. Behind the Planetarium, the lights of various Museum windows can be seen and, behind that, lights of the city's skyline. Other portions of the project site are also lighted, such as the parking lot adjacent to the Planetarium. Descriptions of floodlighting or other night time exterior lighting often use the terms "brightness" and "luminance." These words have different meanings and are not interchangeable, as discussed below:

- "Luminance" refers to the measured amount of luminous intensity as described in Footlamberts by the luminance meter. The meter sees a 1° field of view, which enables the operator to dissect a scene and assign values to various points. While the luminance of a surface can sometimes be represented by a reading from a particular point, a visual scene is a much more complicated situation, due to the fact that many objects consist of a variety of surfaces with different reflective characteristics. A meter's shortcomings are further compounded by the failure of luminance readings to account for the size of an object. This is illustrated by how a point source (i.e., streetlight) may have luminance values 600 times higher than that of a large luminous surface (i.e., Planetarium dome), but the difference between the two readings may not appear nearly as great when viewed by the naked eye.

- "Brightness," on the other hand, refers to the sensory experience resulting from light traveling from a luminous surface to the eye/brain. The eye/brain is at its best when comparing two objects that are located close together in its field of view. As precise as the eye/brain can be, however, these sensory perceptions are not always accurate due to the manner in which the human visual system receives and interprets light impulses. After light enters the eye, it travels to the retina, which consists of many light receptors. Larger luminous objects strike a larger portion of the retina, are detected by more light receptors, and thereby form a larger receptive field. Due to their greater number of receptors, larger receptive fields are more sensitive to light than smaller receptive fields, resulting in larger luminous objects being perceived as "brighter" than smaller objects with similar brightness.

  Another crucial variable in perceived brightness is the age of the observing eye. An older eye does not transmit as much light as a younger eye, nor does it compensate for large ranges in contrast the way a younger eye does.

To better describe these existing conditions, Fisher Marantz Renfro Stone, Inc., the architectural lighting designers for the project, performed a survey, including photographs and luminance readings, at four locations: 15 West 81st Street at street level; 15 West 81st Street at the sixth floor apartment level; Columbus Avenue at 79th Street, northwest corner street level; and 101 West 79th Street from the 15th floor apartment level. The discussions of nighttime views and lighting that follow in this section and below summarize Fisher Marantz Renfro Stone's report, *Environmental Impact Study, Exterior Lighting Study*, April 1996.

Luminance readings were made with a Minolta Luminance Meter/1°, which reads in Footlamberts. Readings were taken of 29 luminous objects in various locations on, around, or in view of the project site. Readings were made from both street and apartment levels. Generally, the same subjects were metered from each location, but this was not always possible. In choosing subject matter to meter, the goal was to capture any luminous surfaces unique to that corresponding view. A series of photographs, shown in Figures 8-8 through 8-12, were taken from each location to serve as means to document each of these objects.

As typical for the winter season, the trees surrounding the site were bare of leaves, but views from all four locations were obscured by tree trunks and branches to varying degrees, as shown in the photographs. However, due to the luminance meter's extremely narrow field of view (1°), these obstructions had a minimal effect on the readings. The Columbus Avenue apartment view had a balcony obstructing the view down, but the necessary readings were still possible.

EXISTING LIGHTING CONDITIONS

It was observed during this study that various lighting fixtures cycled on and off, suggesting a lack or need of maintenance. Conditions did not permit a thorough investigation of all fixtures to determine the following:

- Whether all fixtures were lighted;
- Age of lamps;
- Cleanliness of fixture;
- Cleanliness of lamps;
- Physical condition of fixture housing; and
- Physical condition of optical assembly.

These factors, when ignored, can dramatically reduce the output of a lighting system. While the maintained condition of the lighting system did not appear severe, it was impossible to judge the level of efficiency at which the current system is operating.

The 29 observed objects can be grouped into three categories according to their measured luminance levels. The first (highest readings) category contains objects with direct light sources, such as streetlights and area floodlights. The second category are direct sources that are partially obscured by an object or window opening. The last category is that of surfaces with reflected light, such as the Planetarium dome and facade.

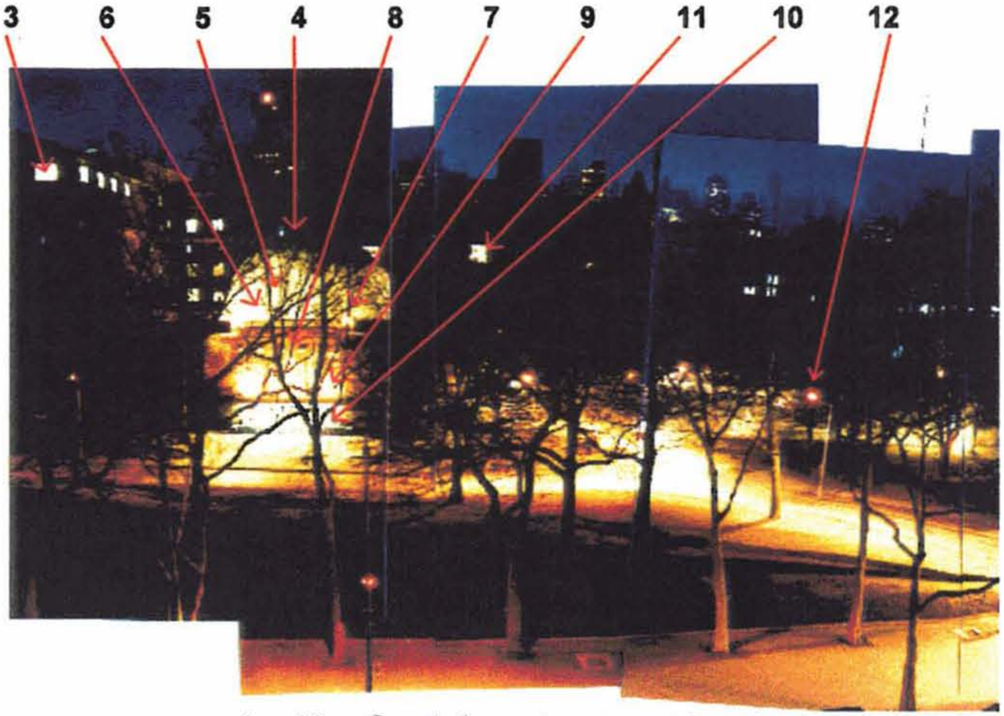
The exposed nature of many of the light sources produced a great deal of glare. As evidenced in the meter readings in Table 8-1, the readings of direct light sources varied a great deal between "Street Level" and "Apartment Level" positions. Typically, one of these positions allowed a view directly at the source, causing a very high reading (and a great deal of visual glare). These bright points of light also increased the already high contrast of this scene and thereby reduced overall visibility. It will be noticed that readings of all surfaces lighted by a particular fixture were fairly constant regardless of its meter reading position.

Looking Southeast from Apartment Level

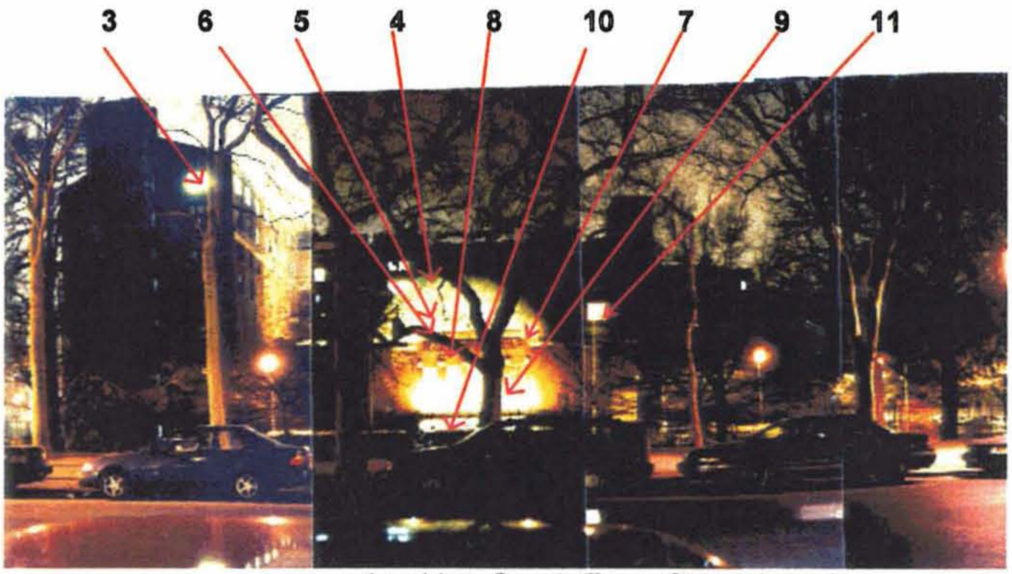
Looking Southeast from Street Level

Nighttime Lighting
West 81st Street—Southeast Views

Figure 8-8



Looking South from Apartment Level

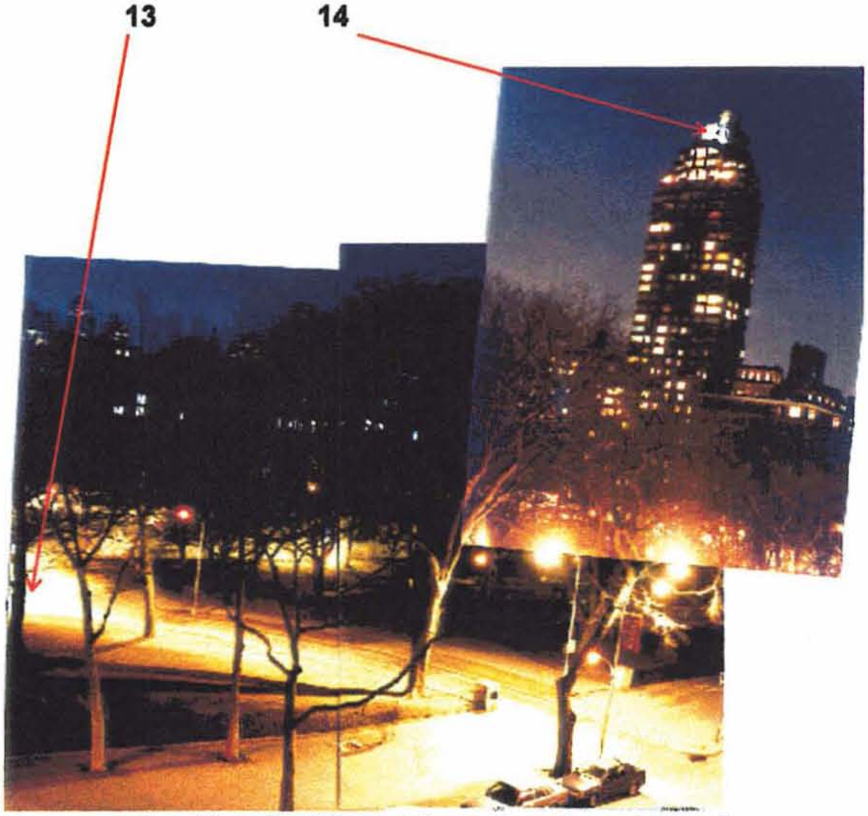


Looking South From Street Level

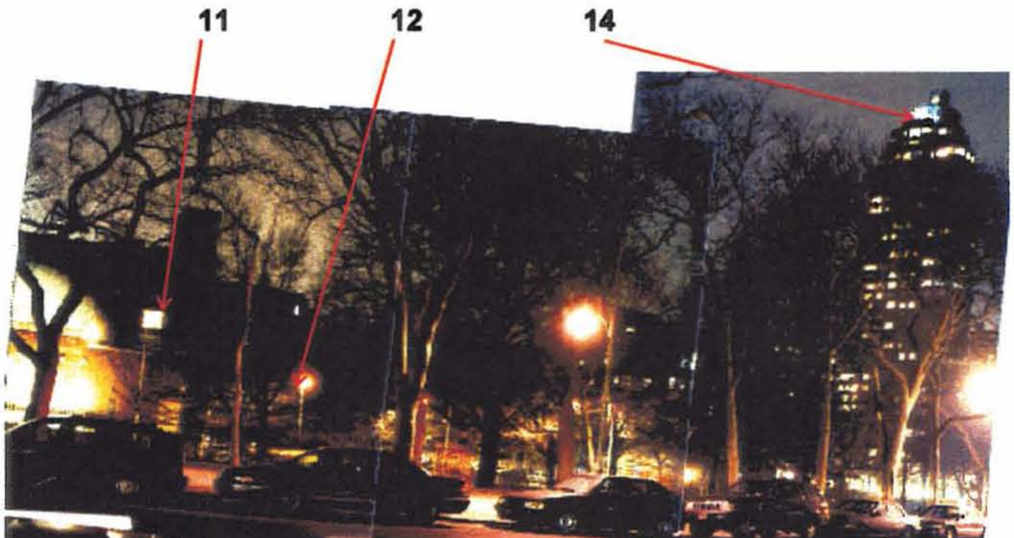
Nighttime Lighting

West 81st Street—South Views

Figure 8-9



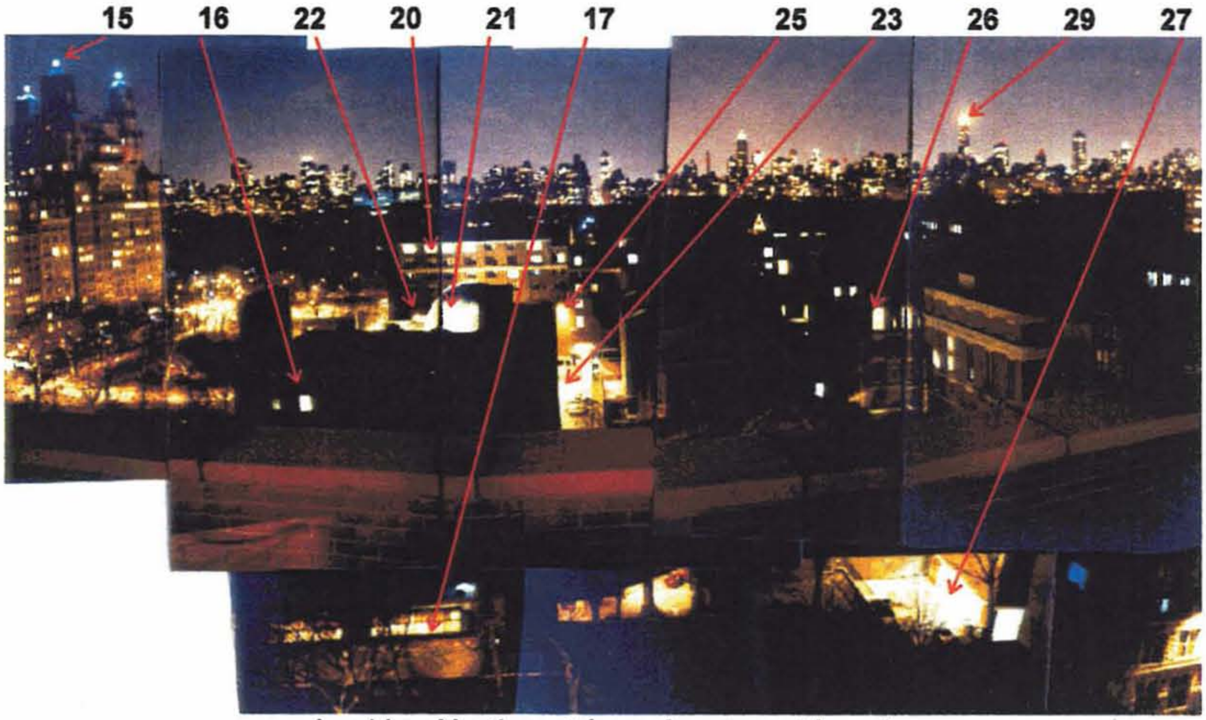
Looking Southwest from Apartment Level



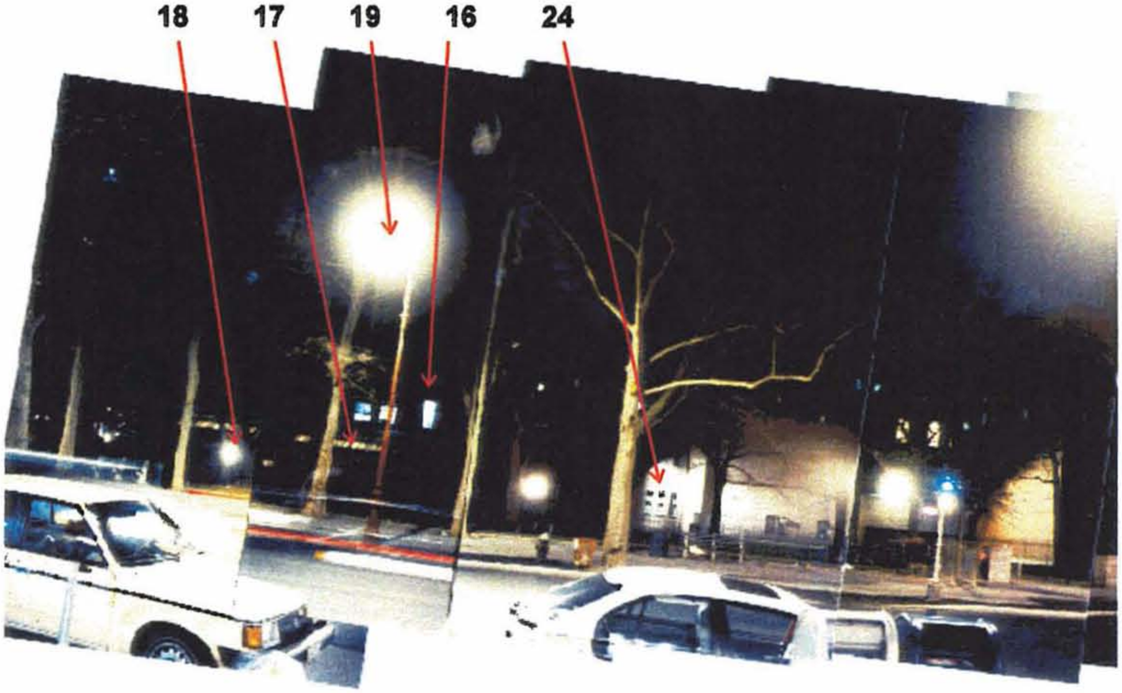
Looking Southwest from Street Level

Nighttime Lighting
West 81st Street—Southwest Views

Figure 8-10



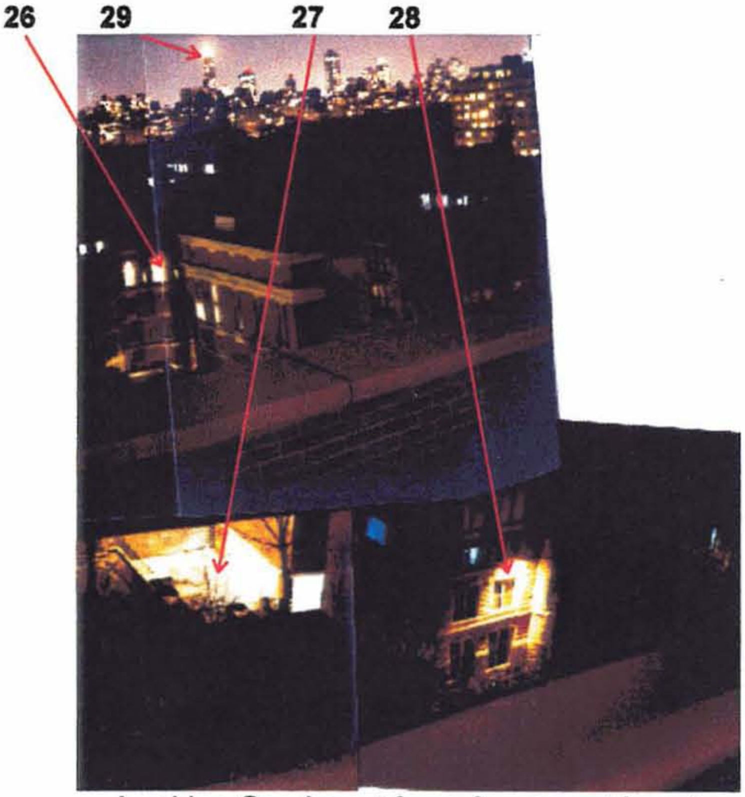
Looking Northeast from Apartment Level



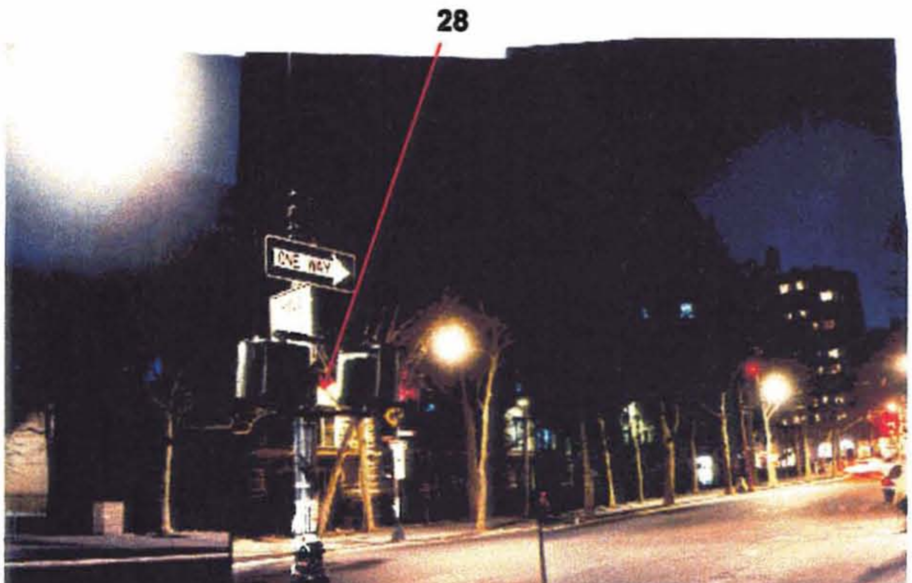
Looking Northeast from Street Level

Nighttime Lighting
Columbus Avenue—Northeast Views

Figure 8-11



Looking Southeast from Apartment Level



Looking Southeast from Street Level

Nighttime Lighting
Columbus Avenue—Southeast Views

Figure 8-12

Table 8-1
Project Area Luminance Measurements*

West 81st Street	Object #	Apt. Level	Street Level	Columbus Avenue	Object #	Apt. Level	Street Level
Bus shelter	**1**	3.0	5.0	Beresford building top	**15**	1.3	X
Street light	**2**	65	675	Museum window	**16**	4.0	10
Museum window	**3**	4.5	13	Skylight	**17**	0.7	0.3
Dome–top	**4**	0.1	0.1	Walkway light	**18**	X	250
Dome–middle	**5**	0.4	0.5	Streetlight	**19**	X	815
Dome–bottom	**6**	1.3	1.0	Window near dome	**20**	1.8	X
Dome floodlight	**7**	25	85	Dome	**21**	1.0	X
"Hayden" sign	**8**	0.3	0.4	Floodlight near dome	**22**	10	X
Facade brick piers	**9**	4.0	6.5	Parking lot pavement	**23**	1.0	X
Door level	**10**	1.3	2.0	Building mtd. floodlight	**24**	X	560
Planetarium window	**11**	0.6	3.8	Building mtd. floodlight	**25**	130	X
Parking lot streetlight	**12**	0.9	25	Museum window	**26**	0.8	X
Parking lot pavement	**13**	1.3	X	Underground parking	**27**	0.4	X
Columbus Ave building	**14**	0.3	0.2	Museum Wall	**28**	30	15
				East side building top	**29**	X	4.8

Notes:
* All measurements are in footlamberts; X = no reading.
See Figures 8-8 through 8-12 for object photographs.

Source: *Fisher Marantz Renfro Stone, EIS Exterior Lighting Study for Museum of Natural History North Side Project*, April 1996.

Although brightness cannot be quantified, it is clear from the photographs in Figures 8-8 through 8-12 and from observation at the site that, although the Planetarium and parking lot are lighted and clearly visible, and although the park and street also contain fixtures with high luminance readings, the scene is one of the city at night, and the lights on and near the project site do not obscure the lighted skyline that forms a backdrop to the view.

C. THE FUTURE WITHOUT THE PROJECT

This section describes the changes that may affect the visual and urban design character of the project area in the future without the proposed project. In particular, it considers any other projects that would be independently developed by 2001.

PROJECT SITE

Improvements to the northern and western portions of Theodore Roosevelt Park are planned in the future whether or not the proposed project is built. These improvements are intended to improve the drainage system, the lawn, and the paths. The dog run is to be replaced, although possibly not at exactly the same location. It is not expected that these changes would significantly alter the visual character of the open space other than to improve it.

SURROUNDING AREA

No other projects are expected to be completed by 2001 within the visual context of the proposed project. The nearest project being planned, a 65,000-square-foot community center, would be west of Amsterdam Avenue on West 77th Street. It would not be visible from the project site or even the sidewalk on West 77th Street in front of the Museum.

NIGHTTIME LIGHTING

Without the project, the lighting of the Planetarium, parking lot and other Museum elements would not change from existing conditions. The lighting in Theodore Roosevelt Park might be slightly different, however, after the improvements are completed. Although the lights themselves are not likely to be designed with more luminance than the current lighting, the fixtures will be new and therefore would probably function at their design standard. As noted above, existing lights appeared to be in somewhat poor condition, with fixtures cycling on and off. This would not change the overall appearance of the site at night, however, nor would it obscure the skyline beyond.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

PROJECT SITE

WEST 81ST STREET

The major changes associated with the proposed project would occur on the north side of the Museum complex. As described in Chapter 2, "Project Description," the existing Planetarium would be replaced by a new structure, designed to provide architectural unity and conceal from view the existing undeveloped facades and areaways that currently create an unfinished appearance on this side of the Museum. The height and massing of the proposed construction would be in scale with existing Museum buildings, so that it can relate well to the complex and not overwhelm any of the significant components. The arched entrance would recall the low arch of the carriageway entrance on West 77th Street.

The form of the new Planetarium structure would be a sphere visible within a glass cube, evoking the purpose of the building (see Figure 8-13). It would be an exciting new element overlooking the open space on the north side of the Museum block. The activity in the Planetarium (visible through the glass walls) and the activity on the terrace would enliven this area.

The design of the garage wall and the terrace parapet would create a series of planted setbacks. A monumental stair would lead down to the open space level at the northwest corner of the Power House structure. Both of these design elements would contribute to a graceful transition from building to open space. On the west side of the terrace, the Power House would appear shorter and less imposing than it does today, because the level of the terrace would be higher than the current parking lot level. A dining terrace would be created as part of the restaurant that would occupy this level of the former Power House, and the solid brick walls of the Power House would be opened up with doors and windows onto the terrace.

COLUMBUS AVENUE

The proposed new Columbus Avenue entrance would provide neighborhood access to the Museum, carrying out the access intentions of the Museum planners and satisfying the needs of many Museum visitors. The entry would be a glass cube similar to, but smaller than, the box enclosing the Planetarium (see Figure 8-14). Indeed, the design of the entrance with a small plaza allows a view to the larger cube. The new glass enclosure would allow park users and approaching visitors to see into the Museum.

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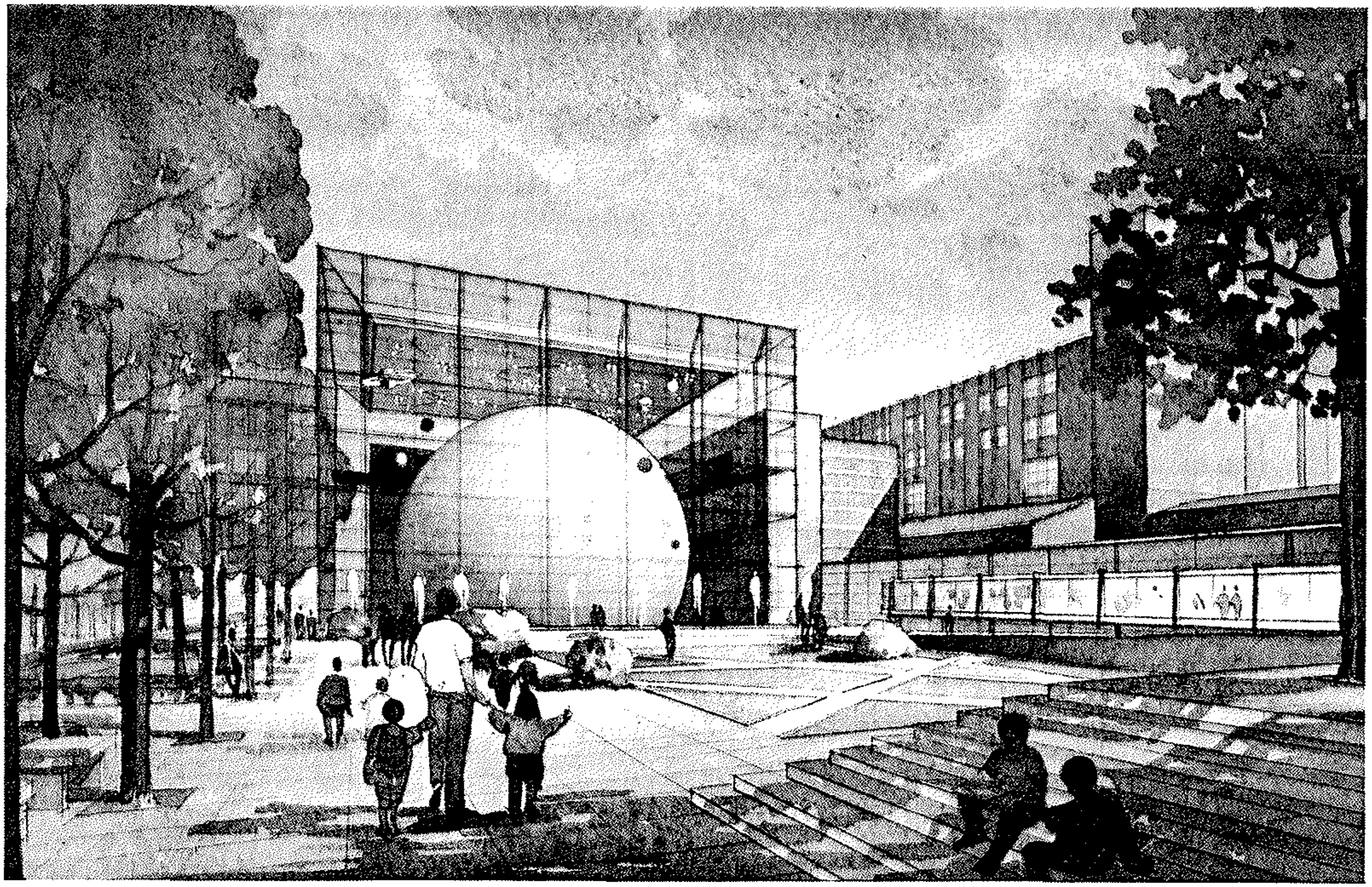

View of Planetarium Across Terrace

Figure 8-13

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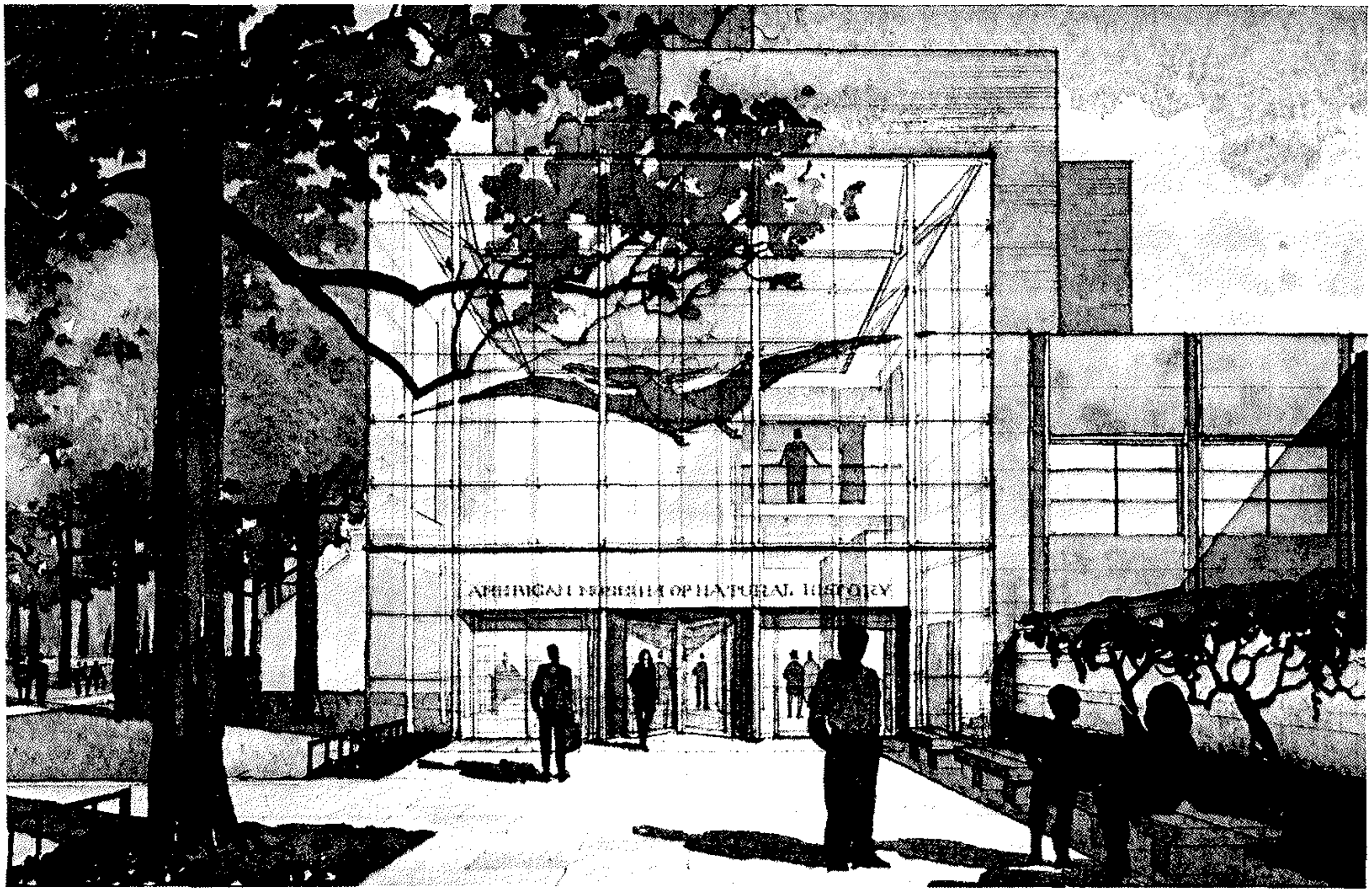


View of New Columbus Avenue Entrance

Figure 8-14

A new restaurant in the Power House at the first-floor level would overlook the park space on this side of the building, providing visible activity on this facade for the first time. Altogether these changes would connect the Museum to its Columbus Avenue community context much more closely than ever before.

WEST 77TH STREET

The new structures on the north side of the complex would not be visible on the West 77th Street facade or from the West 77th Street sidewalks. As it would be set back behind the building line of the south wing on the Columbus Avenue facade, the new Columbus Avenue entry would also not be visible from 77th Street and would not compete with the West 77th Street facade.

CENTRAL PARK WEST AND CENTRAL PARK

The new Planetarium building would be shorter than the existing Whitney Wing on Central Park West, and would be visible from Central Park West only north of the existing northernmost Museum structure (the Whitney Wing); south of that building, the project would not be seen. Since the proposed project would be distant from both Central Park West and Central Park, it would not have a significant visual effect on either.

THEODORE ROOSEVELT PARK

The proposed project would affect Theodore Roosevelt Park, primarily by bringing new visitors and associated activity through the park. The terrace that would be the roof of the parking garage (to occupy roughly the same site as the current parking lot) would be publicly accessible. The terrace would bring visitors through the park and add a sense of activity and added security to this part of the park. The new Museum entrance from Columbus Avenue would also occupy a portion of the now-vacant area south of the Power House. This entrance would require a new walkway and bring many visitors, who now use one of the entries on the other sides of the building, across this part of the park.

SURROUNDING AREA

WEST 81ST STREET

While the proposed project would occur and be most visible on the north end of the complex, this is also the side of the complex with the deepest open space between the Museum buildings and the sidewalk. The new structures would be somewhat closer to the street than the existing structures. For example, the stairs down from the terrace to the open space would be on the north side of the former Power House. On the other hand, the project would change the character of this side of the Museum from being an employee and service entrance with a surface parking lot and a number of blank facades to being attractive means for public access. The new Planetarium would include a new major entrance for the Museum. First-time visitors exiting the subway at West 81st Street and seeing the north side of the Museum would no longer have to ask where the Museum is. The low archway would be an inviting entry, but would not be obtrusive or dominate the landscape. Above it, the glass-enclosed cube with the sphere inside would be visually exciting. The structure would at the same time be in scale with existing Museum buildings.

The parking would remain but be covered with a terrace. Landscaping on the stepped-back wall of the garage/terrace would blend the building and the open space. While the terrace would be higher than the level of the existing parking lot and surrounding open space, it would still present a low, flat (but much improved) surface to the viewer. It would not be obtrusive, but rather it would be a major visual improvement. Since it would be open to the public (generally during the hours that the Museum is open), it would be a new passive recreational resource for the surrounding area as well as Museum visitors.

Overall, there would be more activity on this end of the Museum complex. Although some of the existing activity—people walking from their parked vehicles into the Museum—would no longer be visible, new activity inside the cube and on the terrace would be visible. Views of the activity as well as the structures would continue to be screened by the trees in Theodore Roosevelt Park.

COLUMBUS AVENUE AND CROSS STREETS

The new Museum entrance from Columbus Avenue would be opposite West 79th Street. Just to the north of the entry, the Power House would have new windows for the park-level restaurant. Except the walkway to the new entrance, all the alterations that would accompany the proposed project would be set back farther from the street than the Power House. The new entrance would be visible from the sidewalk on the east side of Columbus Avenue north of West 78th Street, and it would noticeably increase the number of pedestrians on the sidewalk headed to and from the Museum. From the north on Columbus Avenue, the trees in Theodore Roosevelt Park would partially obscure views of the new construction.

The new stairs leading to the terrace would be the elements of the project nearest to the corner of Columbus Avenue and West 81st Street. Since they would be landscaped and basically a low structure, would be clearly visible, but would not dominate the context of the wide open space at this corner of the site.

From West 79th Street, the new Columbus Avenue entrance would be visible through the break in the trees. Along West 78th Street, the new entrance would not be visible except near the corner of Columbus Avenue, where the oblique view would include more trees than the direct view from West 79th Street. From West 80th Street, the new construction would again not be visible except near the corner of Columbus Avenue, where a pedestrian would have a view of the stairs leading up to the terrace and a glimpse of the cube of the new planetarium farther east and the new Columbus Avenue entry to the south.

WEST 77TH STREET

No portion of the proposed project would be visible from the sidewalks of West 77th Street between Central Park West and Columbus Avenue. There would be no change in the relationship of the imposing Romanesque Revival facade of the Museum on the north side to the streetwall composed of the New-York Historical Society and apartment buildings on the south side.

CENTRAL PARK WEST AND CENTRAL PARK

The proposed Planetarium and North Side project would not extend farther north than the existing northern building of the Museum on Central Park West. As the project site is not currently visible from many locations on Central Park West and in Central Park because of the Museum buildings on Central Park West, so would the proposed project be blocked from view. Even from near West 81st Street, the new structure would be set back approximately 200 feet across a park with trees and a difference in elevation partially obscuring the view. The new structures, the Planetarium, and the terrace over the garage would not dominate the context of the Central Park West and Central Park.

NIGHTTIME LIGHTING

The lighting design scheme for the proposed project is similar to the existing scheme in that the lighting focus is on the Planetarium building while maintaining the pastoral setting of the surrounding landscape. To better execute this scheme, most sources would be either concealed or partially concealed to reduce the perceived glare that is a problem with the existing lighting system. This decrease in glare would increase visibility and address security issues for the area.

Since the approach from Columbus Avenue is new, there would be a number of lighted elements in an area that is now lit sporadically with unshielded pathway lights and some random unshielded floodlights. The major new elements would be a series of lighted banners along the path, and illuminated walls in the entry plaza and entry pavilion. Overall, the lighted new entrance would improve security and visibility in this part of the park.

The lighting of the sphere is to include a series of soft, partially shielded light sources that would be dimmable and could be programmed for different effects during the course of each month. The Planetarium entrance would include an uplighted archway (and unlighted sign), which would be significantly less bright than the floodlighted facade of the existing building. The existing parking lot area lighting would be replaced by the tree uplights of the site. Both the 81st Street and Columbus Avenue pathway entrances would be accented by a combination of lighted vertical surfaces from fully concealed sources and glowing decorative lanterns. The parking garage entrance and exterior wall would also be accented by concealed light sources.

In conclusion, the perceived brightness of most elements of the proposed lighting scheme would be comparable to the existing scheme. While most of the Planetarium sphere surface typically may not be lighted at any given time, and most interior light sources would be shielded from exterior views, the final visual appearance of the Planetarium may vary depending on how the lighting fixtures are programmed. On Columbus Avenue, the view would be most affected by the new post-mounted lighted banners that would be added along one side of the entry walkway. These banners would not have a significant effect on the overall visual scene. The proposed lighting scheme and new project elements would still be seen in the broader context, as shown in Figures 8-8 through 8-12, framed by the darkness of Central Park or the other Museum buildings, with the Manhattan skyline beyond.

SHADOW ANALYSIS

In response to a comment on the DEIS, additional studies were performed to determine the effect that incremental shadows from the proposed project would have on the surrounding area. Incremental shadows are those that would result from the project and exceed the existing and no build shadow conditions (existing and no build conditions are identical for this analysis). As shown in the shadow diagrams prepared for this analysis comparing existing and proposed conditions (included in Appendix B), the area of potential effect is limited to portions of Theodore Roosevelt Park immediately north of the structures proposed for the north side of the Museum complex. Therefore, this analysis considers the incremental increase in shadows on Theodore Roosevelt Park that are expected to result from the proposed project.

Although shadows would vary at different times of the year and at different times of the day, incremental shadows would generally result from three elements of the proposed project; the Planetarium, the Columbus Avenue entrance pavilion, and the parking garage. As described *below, these shadow increments would not result in adverse impacts to Theodore Roosevelt Park.*

INCREMENTAL SHADOWS

Potential shadow impacts were assessed for four representative days of the year: March 21st, the spring equinox (approximately the same as September 21st, the fall equinox); May 6th represents the midpoint between the solstice and equinox (and is equivalent to August 6th) —this time represents a typical day during the growing season and when parks are well used; June 21st, the summer solstice and longest day of the year; and December 21st, the winter solstice and shortest day of the year—these are the longest shadows of the year and represent winter time, when use of the park is more limited, but the sun's warmth, particularly for those who may use benches, is more important. To represent the movement of the sun across the southern sky, the assessment considers conditions at 10 AM, 12 Noon, and 2PM (eastern standard time) for each analysis day. This analysis is based on the procedures set forth in the CEQR Technical Manual.

March 21st and September 21st

On the equinoxes at 10 AM, the Whitney Wing casts a shadow on the entryway in front of the Hayden Planetarium and the Hayden's shadows fall on the parking lot within the project site. The proposed Planetarium would cast an incremental shadow on a small area north of the parking garage, including the garage entryway and a small adjacent area to its west. The shadow cast by the garage itself would be negligible. The Columbus Avenue entrance pavilion would cast a small shadow to the northwest. By 12 Noon, existing building shadows would extend a bit further into the park, barely crossing the entrance driveway to the grassy slope beyond. The proposed Planetarium would create a slightly larger shadow than that of the Hayden Planetarium, but this, too would be limited to the driveway. The garage and the Columbus Avenue entrance pavilion would create shadows. At 2 PM, existing buildings cast shadows northward into the park, with the Hayden Planetarium shadow confined to the driveway apron. The proposed Planetarium's shadow would cover a greater part of the driveway and a small part of the adjacent lawn. The garage's shadow would also extend northward, but would continue to fall in a narrow band adjacent to the structure. The shadow cast by the Columbus Avenue entrance pavilion would be very small and would fall on a recessed area between the Columbus Avenue entrance pavilion and the Power House.

May 6th and August 6th

On a typical spring or summer day, at 10 AM the Planetarium and garage would have no noticeable increment over existing conditions. The Columbus Avenue entrance pavilion would cast a small shadow to its west. At 12 Noon, the increment from the Planetarium would cover a very small area to the east of the garage entrance, and the shadow of the garage would be almost imperceptible. The shadow cast by the Columbus Avenue entrance pavilion would be very small and located to the south side of the Power House. By 2 PM shadows from the Hayden Planetarium are limited to the area south of the driveway. Shadows from the proposed Planetarium would fall in the same area and be slightly larger. The garage's shadow would be negligible. The Columbus Avenue entrance pavilion would result in a very small shadow to its north, limited to the area between the entrance pavilion and the Power House.

June 21st

At 10 AM on the longest day of the year, shadows from either the Hayden Planetarium or the proposed Planetarium would be limited to the project site. The Columbus Avenue entrance pavilion would cast a small shadow to the west, adjacent to the building. Conditions at 12 Noon would be similar to those at 10 AM, with minimal incremental shadows cast by the Planetarium, garage, and Columbus Avenue entrance pavilion. By 2 PM, shadows would not lengthen significantly, and increments from project components would remain small and located within the building apron.

December 21st

Because of differences in the sun's height throughout the year, shadows are longer during the winter months, but move more quickly. On the shortest day of the year, the incremental shadows cast by the project would be most noticeable but of relatively short duration. At 10 AM, the proposed Planetarium would add a shadow in the area west of the driveway, extending just beyond the footpath that begins near the garage entrance. The garage's slim shadow would be limited to its northwestern corner and would occupy a small area at the foot of the garage. The Columbus Avenue entrance pavilion would cast a shadow near the southwest corner of the Power House. At 12 Noon, the incremental shadow of the proposed Planetarium would fall on the garage entryway, a portion of the 81st Street driveway, and a small lawn area to the north of the driveway. The area of shadow cast by the garage onto the park would remain close to the building's base and would be minimal. The shadow of the Columbus Avenue entrance pavilion would be very small, falling on an area just south of the Power House. At 2 PM, the incremental shadow of the Planetarium would reach as far north as the park boundary on 81st Street, covering a portion of the lawn area within the semi-circular driveway. The garage would cast a shadow on the area to its north, including the garage entryway and the area immediately to its west, but would not reach the footpath. Incremental shadows from the Columbus Avenue entrance pavilion would be very small, falling on a recessed area between the Columbus Avenue entrance pavilion and the Power House.

IMPACT ASSESSMENT

None of the areas that would be affected by the project's incremental shadows contain active recreational amenities or seating; they are not well suited to such activities as sunbathing, and they do not contain sun-sensitive vegetation. The area directly in front of the Planetarium serves, and would continue to serve, as an entry plaza for the building and the primary vehicular driveway for the Museum complex. The steep slope of the lawn area within the semi-circular driveway limits its recreational use. Shadows created by the proposed garage and Columbus Avenue entrance pavilion would fall largely on limited areas adjacent to the Museum complex that are not used for sun-dependent recreational pursuits. Because the extent of such shadows is limited to the area within the building apron, uses in those parts of the park would not be adversely affected. In the parts of the park affected by incremental shadows of the proposed project, sunlight-dependent vegetation or activities would not be affected. Therefore, the incremental increase in shadows associated with the proposed project would have no significant adverse effect on Theodore Roosevelt Park. ❖

A. INTRODUCTION

Neighborhood character is an amalgam of the many factors that combine to give an area its distinctive personality. These components include land use; street layout; scale, type, and style of development; historic features; patterns and volumes of traffic; noise levels; and any other physical or social characteristic that helps distinguish the community in question from another. Not all of these elements affect neighborhood character in all cases; a neighborhood usually draws its character from a few determining elements.

Because the American Museum of Natural History plays a key part in determining the character of the surrounding area, any changes to the Museum have the potential to affect the neighborhood. This chapter of the EIS examines neighborhood character in the area surrounding the Museum and the project's effects on that character, drawing from the range of assessments presented in the other chapters of this EIS.

B. EXISTING CONDITIONS

The Museum and its setting within the "superblock" site of Theodore Roosevelt Park are key components in the character of the surrounding area. In fact, as one of the first developments in the area, the Museum has helped to set the tone for development of the rest of the neighborhood. The land uses on the project site and in the immediate area have been largely unchanged for the past 70 years.

The Museum is a complex of 19 interconnected structures developed over 5 decades in disparate architectural styles, each reflecting the period in which they were built. On West 77th Street and on Central Park West, the Museum presents monumental stone facades with major public entrances to the institution. The West 77th Street side is Romanesque Revival in style, while the Central Park West side is Classical. In contrast, the Columbus Avenue and West 81st Street sides of the complex are less finished in appearance. South of West 79th Street, the west facade continues the Romanesque Revival style from West 77th Street, but to the north, plain and utilitarian Museum structures present largely blank brick facades to viewers. Similarly, on the north side of the Museum, an uncoordinated mix of internal Museum buildings in different materials and styles is visible. Museum elements on the north side of the complex include the north end of the institution's Whitney Wing, which fronts onto Central Park West; the Hayden Planetarium, of dark brick with a green dome; the Museum's surface parking lot; the utilitarian Power House; and the back sides of other Museum structures visible behind the parking lot. At night, the Museum's north and west sides appear dark and somewhat forbidding, except for the areas lit by sodium vapor lights for safety.

Along West 77th Street and Central Park West, Theodore Roosevelt Park is well-maintained, providing a landscaped border for the Museum's entrances. These portions of the park are not accessible to the public. In contrast, west and north of the Museum, where the institution's buildings are farther from the street, the wide park areas are open to the public. This part of the park, which slopes down to the south from West 81st Street, is crossed by a network of paths and, north of the Museum's parking lot, includes a fenced dog run. Because of inadequate drainage, frequent use, and lack of maintenance and repair, the west and north areas of the park have unkempt and patchy vegetation and frequent puddles.

The neighborhood surrounding the Museum is predominantly residential, with a uniform streetwall of taller apartment buildings on West 77th and 81st Streets, a mix of residential buildings of differing heights on Columbus Avenue, and smaller row houses set back from the street by stoops on the side streets extending from Columbus Avenue. The buildings along Columbus Avenue have upscale retail uses in the ground floor. East of the Museum, the neighborhood is bounded by the green edge formed by Central Park.

Most of the neighborhood was developed from the 1880's through the 1920's, following development of the Ninth Avenue elevated train and the first Museum buildings in the 1870's. Because of the architectural quality of these older buildings, and because few changes have occurred to the area since they were built, the entire area has been designated by the city and state as part of a larger historic district.

Streets in the area are laid out as part of Manhattan's grid system, terminating at Central Park on the east. The grid is also broken by the Museum block, which stops West 78th, 79th, and 80th Streets at Columbus Avenue. Both Central Park West and Columbus Avenue are wide, heavily trafficked avenues carrying more than1,500 vehicles per hour (vph) during peak periods; Central Park West is a two-way street carrying cars and buses, while Columbus Avenue is a major southbound route for cars and buses as well as a designated truck route. Although it is a wide two-way street alongside the Museum, West 77th Street is a regular, narrow one-way side street west of Columbus Avenue that dead-ends at Central Park West. It is relatively lightly trafficked.

West 81st Street is also a wide two-way street in the block bordering the Museum and a narrow one-way (eastbound) street west of Columbus Avenue. Because West 81st Street connects to the 79th Street transverse through Central Park, it is busy east of Columbus Avenue, with more than 300 vph in each direction during peak periods. West 81st Street carries traffic heading to and from the transverse, including the M79 bus. On the north side of the street, a stop for the westbound bus is just west of Central Park West; on the south side, the eastbound bus stops close to Columbus Avenue and again before Central Park West. Entrance and exit drives for the Museum's parking lot connect to West 81st Street as well. Traffic flow on this street is complicated by the intersection at Columbus Avenue, where the eastbound portion of West 81st Street west of Columbus Avenue meets the two-way portion of the street. In addition, on weekends from before 12 Noon to after 3 PM when the Museum parking lot is full, traffic bound for the lot backs up on 81st Street, causing congestion. During the week, this and the other three sides of the Museum block are often lined by school buses parked or double-parked as they await the schoolchildren inside the Museum.

West of Columbus Avenue, West 78th and 80th Streets are little-trafficked. West 79th Street is a major east-west corridor that begins at the exit from the Henry Hudson Parkway at Riverside Drive and ends on the west side at Columbus Avenue. This broad thoroughfare carries crosstown traffic, the westbound movement of which turns onto 79th Street from Columbus Avenue after flowing from the park onto West 81st Street.

Similar to much of the rest of the Upper West Side and Manhattan, the area around the Museum is relatively noisy. This noise is largely caused by the traffic on the area's streets. During the week, this traffic includes school buses, which make a substantial contribution to the noise levels.

C. THE FUTURE WITHOUT THE PROJECT

If the proposed project is not built, the character of the area will remain largely unchanged. Improvements planned for Theodore Roosevelt Park will introduce new landscaping and drainage, making the park more attractive. Attendance at the Museum is expected to grow with completion of the new dinosaur halls and other improvements, bringing additional traffic to the area's streets. In particular, on weekends, the Museum parking lot will reach capacity sooner, causing backups and congestion on West 81st Street from approximately 11 AM to 4 PM, 2 hours longer than occurs today.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

The Planetarium and North Side project would change the appearance of the north and west sides of the Museum, by giving them architectural unity and a sense of completion. The somewhat ragged edge of interior buildings now visible would be hidden behind the new Planetarium, parking garage, galleria, and Columbus Avenue entrance. These new elements of the Museum would bring more activity to the north and west portions of Theodore Roosevelt Park. Overall, these changes would connect the north and west sides of the Museum to the surrounding streetscape, making the Museum relate more to the character of the area. This in turn would strengthen the ambience of the historic district. At night, the north and west sides of the Museum would be lit with softer lighting, making the site more evenly lit and visually appealing.

The project would bring some 673,900 new visitors to the Museum each year, with many of these visitors entering on the north and west sides of the complex, where few (on the north side) or no (on the west side) people enter today. These new visitors would add to the pedestrian activity on those sides of the Museum.

The new parking garage would represent a more intense parking use on the site than is there today. With the new garage in place to serve the Museum's visitors, the congestion and backups on West 81st Street would be reduced, because the parking facility would be full for fewer hours during the weekend days. The queuing and related congestion is expected to occur between 1 and 3 PM on weekend days only. *With transportation management, this queue could be prevented.* The traffic associated with the project would not perceptibly increase noise levels in the area. *Noise mitigation for terrace events would mitigate nearly all of their intrusive effects.*

Overall, these changes from the proposed project would *alter* the character of the north and west sides of the Museum, but they would not change the character of the surrounding neighborhood, which has developed around the presence of the Museum. ❖

A. INTRODUCTION AND METHODOLOGY

For any project involving alterations to existing structures, particularly older buildings, or excavation of soils, an assessment of hazardous materials is appropriate. If hazardous materials are present in the buildings or soils to be affected, workers, visitors, and nearby residents could be exposed to them during construction. For this reason, this chapter of the EIS addresses the potential for construction of the Planetarium and North Side project to create a hazardous materials impact.

For the Museum, three areas were examined for hazardous materials:

- Museum activities. Some past and present activities at the Museum involve the use, storage, and disposal of chemicals and other potentially hazardous substances. If any of these materials have been spilled in the buildings to be affected by construction, residue may remain in those buildings that would need special treatment before construction, to protect workers. If improperly handled in the vicinity of the project site during the project's construction or operation, these substances could pose a hazard to construction workers or to visitors to the completed project. In addition, the Museum's Power House and Ichthyology Buildings were both coal-fired power plants at one time, and potential contaminants would pose a hazard if they remain in the buildings. Any such materials in buildings to be affected would have to be specially handled to protect construction workers and the environment.
- Buildings. All of the buildings to be affected by the construction were built more than 60 years ago, when the use of lead-based paint and asbestos (an insulating material) were common. These materials are now known to be hazardous, and would have to be specially handled before or during construction to protect construction workers and the environment.
- Soils and groundwater. If any hazardous materials were spilled on the site in the past, contaminants could remain from those spills in the soils or groundwater to be affected by construction. Grading activities using soils containing contaminants could also have introduced hazardous materials to the soils or groundwater. Disturbing soil or groundwater that contains such contaminants could pose a risk to construction workers and the environment.

To assess whether hazardous materials at the Museum could pose a problem, an investigation was conducted in March 1996 of the area to be affected by project construction (shown in Figure 10-1). This investigation considered past and present uses on the project site, reported spills, waste storage and disposal activity, and the presence of fuel oil tanks. The work included an on-site investigation on March 1, 1996, and research using government agency records, historic maps, and Museum archival material. Logs from borings made on the site in March and April 1996 were also examined. In addition, a detailed evaluation of lead-based paint surfaces and asbestos in the buildings to be affected was conducted by GCI Environmental Advisory, Inc. for the Museum. A full description of the investigation and its findings is provided in Appendix C.

B. EXISTING CONDITIONS

MUSEUM ACTIVITIES

CHEMICALS USED AT THE MUSEUM

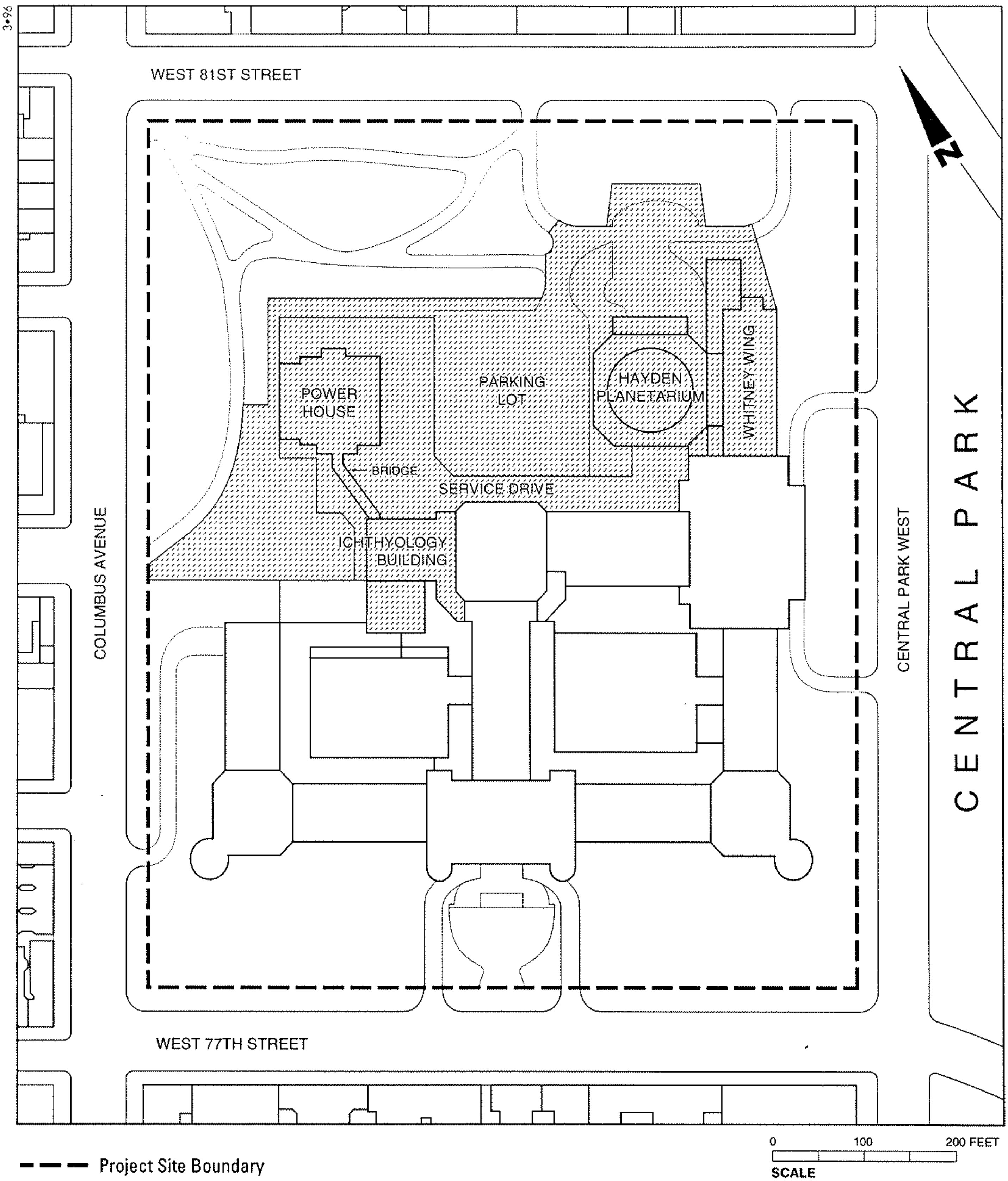
Chemicals are used and stored throughout the Museum for exhibit preparation, specimen preservation, and research activities. These include the formaldehyde and other chemicals used for preservation of ornithology specimens on the first and sixth floor of the Whitney Wing; the dyes, metals, and paints used by the Exhibition Department, on the fifth floor of the Power House, to construct major Museum displays and signs; the fiberglass resin used in the Museum's Reproduction Department, on the ground floor of the Ichthyology Building, to construct fiberglass replicas of Museum specimens; the ethyl alcohol used by the Ichthyology Department, on the remaining floors of the Ichthyology Building, for storage of ichthyology specimens in glass jars; and fuel stored on the ground level of the Ichthyology Building for use in the Museum's gasoline- and diesel-powered equipment. Other chemicals are stored in the basement of the Power House, both in the hallway and in a storeroom that is no longer in active use.

The Museum complies with all applicable regulations regarding its use, storage, and disposal of these potentially hazardous materials. This includes the Federal Resource Conservation and Recovery Act (RCRA) and the New York State hazardous waste regulations (6NYCRR Parts 370-374), which require generators of hazardous waste, such as the Museum, to register with and be licensed by the New York State Department of Environmental Conservation (DEC). The Museum is considered a "small quantity generator" of hazardous materials, and, as required, files forms with DEC each time hazardous wastes are picked up from the site, and files quarterly and annual reports with DEC as well. As required by New York City regulations, all storage areas for both combustible and noncombustible chemicals at the Museum, including all of the specimen storage areas where samples are stored and preserved in jars of ethyl alcohol, are registered with the New York City Fire Department. In areas where fumes may be a problem, such as the Exhibition Department, exhaust hoods vent the fumes from the rooms to protect workers there and prevent the fumes from traveling to other areas in the Museum. As required, these are registered with the New York City Department of Environmental Protection (DEP). Any chemicals intended for disposal are collected by a licensed waste hauler and treated off-site. The Museum also has a 24-hour spill response program in the event that a major spill occurs.

During the site inspection, investigators noted that cardboard debris on the floor of the now-unused storeroom in the basement of the Power House had disintegrated substantially, indicating past leaks or spills. To prevent any potential hazard from such leaks or spills, the Museum will have these areas cleaned up properly before construction activities for the project begin.

COAL IN THE POWER HOUSE

The small building that now serves as the Ichthyology Building was originally the Museum's first power house. It continued in this use for nearly 30 years, when it was replaced by the larger building still referred to as the Power House just to its north. That building was used as a coal-fired electric power plant for some 30 years as well, until the Museum converted to alternating current in the 1960's. The current boiler room in the basement of the Power House was also the location of the original coal-fired boilers; the exhaust stacks for these boiler units were on the north and south ends of the building. The flues in these stacks are still visible from the second floor. Directly above the boilers were coal storage bins, and ash and cinder basins were in the



Project Site Boundary

Area Subject to Construction

Land and Buildings Subject to Construction

Figure 10-1

subbasement, directly below the boilers. The ash basins are still covered with ash residue, and a pile of ash was also observed in this room at the time of inspection.

Coal ash can contain hazardous levels of metals and polycyclic aromatic hydrocarbons (PAHs). Metals, such as lead, arsenic, chromium, cadmium, and mercury, most commonly occur in the urban environment in paint but are also present in coal ash and residue. Heavy metals can be toxic to humans when ingested and the effects accumulate in the body. PAHs, a common constituent of fossil fuels, are carcinogenic.

BUILDINGS

ASBESTOS

Asbestos was once commonly used for many building products, such as insulation, roofing, and flooring, because of its resistance to chemicals, incombustibility, and thermal conductivity. However, the use of asbestos in most building materials was banned in the 1970's when its health hazards became known. When asbestos fibers become airborne and are inhaled by an individual, the respiratory tract may become damaged. Asbestos is most hazardous when it is friable and in deteriorating condition, because it has the potential to become airborne in this condition. Friable asbestos, such as pipe insulation, is that which can be crumbled, pulverized, or reduced to powder by hand or mechanical pressure. Asbestos in non-friable forms, such as roofing materials and vinyl flooring, does not constitute a threat to health and may remain in place unless it is will be disturbed by renovation activities.

Asbestos-containing materials were identified in all of the Museum buildings to be affected by the proposed construction. The Hayden Planetarium includes asbestos in the form of acoustical ceiling plaster, duct insulation, pipe insulation/connections, and floor tile. In the bridge between the Ichthyology Building and Power House, which is to be removed, the pipe insulation contains asbestos. Asbestos-containing material is also present in the Power House in floor tiles, pipe insulation, and in the south boiler stack chase. Suspect asbestos-containing materials were also observed in the air handling room in the basements of the Whitney Wing and Ichthyology Building.

The Museum is undertaking an abatement plan for the asbestos identified throughout the areas to be affected by construction, as well as the asbestos in the basements of the Whitney Wing and Ichthyology Building. This plan must be approved by the New York City Department of Environmental Protection (DEP), and the U.S. Department of Labor must be notified.

LEAD-BASED PAINT

Lead was a major constituent of household paints until the 1950's. Its use in the city was banned in the 1960's, because of lead's potentially toxic effects to humans when ingested. Lead-based paint was identified on the original painted ceilings in the bridge and in the Power House. Lead-based paint was also discovered on the painted metal doors in the Power House and in the Planetarium.

SOILS AND GROUNDWATER

A review of the site boring logs (March and April 1996) found similar fill material throughout the site. There was no evidence of ash or any potentially hazardous materials. Groundwater was encountered between 20 and 30 feet below the surface.

C. THE FUTURE WITHOUT THE PROJECT

If the proposed project is not built, no significant change will take place in the daily operation of the American Museum of Natural History and no new potential for exposure to hazardous materials will be created. Since the discovery of the coal ash residue at the Power House, the Museum is developing plans for its cleanup. Once the residue has been removed, the affected surfaces will be covered with a sealant to prevent the future release of the ash residue.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

As described above under "Existing Conditions," potentially hazardous chemicals are used and stored throughout the Museum buildings to be affected by the proposed Planetarium and North Side project. In portions of the buildings to be used for project elements, these chemicals and all other materials used by Museum staff will be carefully relocated to other areas in the Museum or properly disposed of and thus would not pose a hazard during construction.

As also noted earlier, asbestos and lead-based paint are present in the buildings to be affected by construction of the proposed project. The presence of lead and asbestos, if unabated, could lead to hazardous materials impacts during construction. Therefore, the project proposes the following avoidance and mitigation measures (also detailed in Chapter 17, "Mitigation"):

- The areas to be disturbed by the Planetarium and North Side project are scheduled to have all of the asbestos abated prior to construction in those areas. An asbestos abatement plan is being developed that will detail the specifications for minimizing the environmental impact of this abatement project. This plan will include containment of the work area; containment involves sealing off an area where airborne asbestos fibers are present so that the fibers will not migrate and contaminate other areas. Air monitoring, a process of measuring the fiber content of a specific quantity of air over a given amount of time, will also be included in the asbestos abatement plan. These measures will minimize the risk posed to the environment and the neighboring residents during the abatement project.
- Lead paint does not pose a hazard to the environment when it is well fixed to a wall or other structural element and as such can be disposed of as construction and demolition debris. However, lead could become airborne during the demolition. Although these particles are heavy and would settle rapidly, procedures will be established to protect workers during demolition of this material. Any construction activities involving lead-based paint must be performed in accordance with the applicable Occupational Safety and Health Administration (OSHA) regulations, OSHA 29 CFR 1926.62, "Lead Exposure in Construction."
- Groundwater. During construction, dewatering would be necessary. The project would comply with DEP regulations by ensuring that the groundwater meets DEP's pretreatment requirements before discharging it to the municipal sewer system.
- In addition, to avoid potential hazards from leaks or spills in the now-unused storeroom in the basement of the Power House, the Museum will have these areas cleaned up properly before construction activities for the project begin.

During construction and after completion of the proposed project, the continued use and storage of chemicals at the Museum would not pose a threat to workers or visitors at the Museum. The Museum will continue to follow all applicable rules and regulations relating to the use, storage, and disposal of hazardous materials. ❖

A. INTRODUCTION

This section describes the existing utilities and services available at the American Museum of Natural History, including water supply, sewage treatment, solid waste collection and disposal, and energy. Changes that can be reasonably expected to occur in water usage, sewage flows, solid waste generation, and energy consumption without the proposed project are estimated for the year 2001. The potential impacts of the proposed project are then assessed by estimating the new demand caused by the project, and its effects on the capacity and performance of these utility and service systems.

B. EXISTING CONDITIONS

WATER SUPPLY

DELIVERY SYSTEM AND WATER DEMAND

New York City water is collected in three watersheds: the Delaware, Catskill, and Croton. From these watersheds, water is carried to the city via a conveyance system composed of reservoirs, aqueducts, and tunnels extending from as far as 125 miles north of the city. Within the city, a grid of main pipes distributes water to consumers.

The Delaware and Catskill systems collect water from the Catskill Mountain region and deliver it to the Hillview Reservoir in Yonkers. From there, it flows to the city through one of two tunnels: City Tunnel No. 1, which runs beneath the Bronx and Manhattan to Brooklyn; and City Tunnel No. 2, which runs beneath the Bronx, Queens, and Brooklyn (and from there beneath New York Harbor to Staten Island via the Richmond Tunnel). A third tunnel, City Tunnel No. 3, is under construction.

The Croton system collects water from Westchester and Putnam Counties and delivers it to the Jerome Park Reservoir in the Bronx. From there, it is distributed to the Bronx and Manhattan through the New Croton Aqueduct, which travels beneath the Bronx and Manhattan.

Water consumption in the city averages approximately 1.4 billion gallons per day. In Manhattan, average consumption is estimated at 420 million gallons per day (mgd); peak consumption is approximately 500 mgd. The Croton system has a lower pressure than the Delaware and Catskill systems and supplies primarily domestic uses. The higher-pressure Delaware and Catskill systems serve the fire hydrants in areas where both systems occur, as well as domestic uses. Approximately 110 mgd of the Manhattan consumption is supplied by the Croton system.

Two trunk mains, 48-inches in diameter, run under Central Park West in front of the Museum. Also under Central Park West is a 12-inch diameter distribution main. One of these 48-inch diameter trunk mains turns west under West 77th Street. Shafts from Water Tunnel No. 3 rise into Central Park across from the Museum. The shafts and Water Tunnel No. 3 are not yet in use. Under Columbus Avenue and West 81st Street are 20-inch diameter secondary trunk mains. The project site is serviced by 4-inch and 6-inch diameter service lines from the 12-inch distribution main under Central Park West.

WATER USAGE AT THE PROJECT SITE

The number of visitors to the Museum varies both seasonally and daily. The highest visitor attendance is on the weekend during the summer. The number of employees varies slightly with attendance. However, scientific and office employees make up the greatest percentage of workers, and they work full-time year-round. The Museum includes about 63,000 square feet of laboratories that use water. For analysis purposes, an average day's attendance during the busiest month added to all employees working at the Museum will be used. Under existing conditions, about 75 percent of the visitors and employees use the cafeteria, and about 5 percent use the more formal cafe. The existing water consumption is shown in Table 11-1.

Table 11-1

Existing Water Usage at the Museum

Use	Number	Rate (gallons per unit)	Total (gallons per day)
Visitors	10,609 people	5/person	53,045
Employees	800 people	25/person	20,000
Laboratory	63,000 square feet	0.12/square foot	7,560
Cafe	550 meals	10/meal	5,500
Cafeteria	8,330 meals	2/meal	16,660
Total	NA	NA	102,765

SANITARY SEWAGE

NORTH RIVER WPCP

Sewage from the west side of Manhattan, including the project area, is treated in the North River Water Pollution Control Plant (WPCP). Located on the Hudson River between 137th and 145th Streets, this plant serves the area between Bank Street and the northern tip of Manhattan (Spuyten Duyvil) and provides secondary treatment, which removes organic materials through biological activity.

Effluent from the North River WPCP is discharged into the Hudson River. Discharges to waters are regulated by the New York State Department of Environmental Conservation (DEC) under the State Pollutant Discharge Elimination System (SPDES) permit program. For the North River plant, the permit sets a dry weather inflow of 170 mgd. As shown in Table 11-2, for the 12-month period ending *June* 1996, the North River WPCP had an average dry weather flow of *148.8* mgd, which is below the SPDES permit limit. All months were also below the SPDES permit limit.

PROJECT SITE

The existing flows from the Museum are assumed to be the same as water usage—102,765 gpd—which accounts for 0.064 percent of the dry weather flow to the North River WPCP.

SOLID WASTE

In New York City, solid waste from commercial and business uses is collected by private carters, and residential waste is handled by the Department of Sanitation (DOS). Commercial and business refuse ("commercial" refers to retail or restaurant uses and "business" refers to office uses) is transported either to Fresh Kills Landfill (where private carters pay a tipping fee for disposal) or to private landfills in upstate New York or out-of-state. All residential refuse is disposed of at Fresh Kills.

Table 11-2
Dry Weather Flows at North River WPCP

Month	Flow (mgd)
July *1995*	153
August	159
September	154
October	153
November	149
December	143
January 1996	*148*
February	*160*
March	*152*
April	*142*
May	*136*
June	*137*
12 Month Average	*148.8*

Source: New York City Department of Environmental Protection.

Fresh Kills takes in about 13,000 to 14,000 tons of solid waste daily (84,000 tons per week, 6 days per week) from DOS as well as from private carters. DOS also collects solid waste from city agencies, street trash cans, lot cleaning, and street sweepers—all of which goes to Fresh Kills.

The Museum is not a residential or government use; a private carter collects and disposes of its solid waste. As shown in Table 11-3, it is estimated that the Museum currently generates about 78 tons per week of solid waste. The Museum has a recycling program to reduce the amount of its solid waste sent to landfills. Offices and research areas source separate white paper, magazines, newspaper, and cardboard. Public areas, such as the lunchrooms, have bins for separation of glass, metal, and plastic. This tonnage (without accounting for recycled materials) amounts to about 0.09 percent of the solid waste disposed of at Fresh Kills Landfill.

ENERGY

New York City and most of Westchester County is supplied with electricity by Con Edison. In 1994, the utility sold 47.7 billion kilowatt hours (kwh) of electricity to its Manhattan customers. The Museum uses about 19.4 million kilowatt hours per year.

Table 11-3
Existing Solid Waste Generation at the Museum

Use	Number	Rate (pounds per day)	Total (pounds per week)
Visitors	10,609 people	1/person	74,263
Employees	800 people	2/person	11,200
Dining Room	550 meals	3/meal	11,550
Cafeteria	8,330 meals	1/meal	58,310
Total	NA	NA	154,163

C. THE FUTURE WITHOUT THE PROJECT

This section of the analysis considers the expected changes in infrastructure service conditions through 2001, the future analysis year for the EIS. In the future without the proposed action, land use on the project site is expected to remain unchanged from existing conditions. Within the Museum itself, however, an air ventilation system will be added. Currently, the Museum is equipped mostly with room (window) units only. A project to improve the air-conditioning (on the first floor) is being planned, which will affect the water and energy usage at the Museum without the proposed project.

WATER SUPPLY

DELIVERY SYSTEM AND WATER DEMAND

The New York City Department of Environmental Protection (DEP) is planning no major changes in the water distribution system in the project area by 2001. However, the shafts for the City's third water tunnel, across Central Park West from the Museum, will be in operation.

Because its water supply is finite, the City has initiated a comprehensive water conservation program that seeks to reduce water use principally by (1) implementing a metering program and (2) requiring that all new water fixtures in the City, including those in new structures and replaced fixtures in existing structures, be of a low-flow design (Local Law No. 29, of 1989). Installation of water meters within the North River service area is under way and will be essentially completed by 1997. Retrofitting of plumbing fixtures within the service area is estimated to occur over a 30-year period as the existing high-flow fixtures wear and are replaced by new required low-flow fixtures. DEP projects that the savings from these conservation measures will, over the next decade, exceed any increase in water demand from added consumers—i.e., population and employment growth. Future water use for the entire Borough of Manhattan is conservatively projected to remain at or below the current average use of 420 mgd, with peak use of 500 mgd.

WATER USAGE AT THE PROJECT SITE

In the future without the project, attendance is anticipated to increase to 13,219 visitors per day. The new air-conditioning system will also increase the water usage. The expected water usage in the future without the project is shown in Table 11-4. The projected increase is 44,956 gallons per day.

Table 11-4
Museum Water Usage
2001 Future Without the Project

Use	Number	Rate (gallons per unit)	Total (gallons per day)
Visitors	13,219 people	5/person	66,095
Employees	800 people	25/person	20,000
Laboratory	63,000 square feet	0.12/square foot	7,560
Cafe	700 meals	10/meal	7,000
Cafeteria	10,515 meals	2/meal	21,030
Air Conditioning	153,155 square feet	0.17/square foot	26,036
Total	NA	NA	147,721

SANITARY SEWAGE

NORTH RIVER WPCP

On July 1, 1992, the City of New York signed an Order on Consent for the North River WPCP. In this order, the city agreed to implement a specific program of flow reduction measures within the North River WPCP drainage basin. These measures are primarily related to the water conservation measures discussed above. DEP has estimated that, as a result of the accelerated schedule for the water conservation program and the program to remove extraneous flows from the system principally by replacement of defective tide gates, a savings of 11.25 mgd will be achieved by the year 1997.

All new construction and substantial renovation are required to incorporate low-flow fixtures for water conservation purposes. In addition, the city is under an active program to meter water usage of all buildings that will ultimately serve to reduce flow to all sewage facilities. The New York City Water Board estimates at least a 5 percent reduction in flow as a result of the city's metering program alone, which is to be completed citywide by 1997. Taking into account savings from the water conservation measures and increases from new building, DEP estimates that the flows to the North River WPCP will be about 165 mgd in 2001.

PROJECT SITE

The *nonevaporative* water usage at the Museum will be part of flows to the North River WPCP. *Nonevaporative* uses include all of the classification shown in Table 11-4 except air conditioning, which is evaporative. The Museum will send about 0.1 mgd to the North River WPCP, or about 0.06 percent of the total expected flow.

SOLID WASTE

Fresh Kills Landfill, the sole disposal site in the City, may reach capacity sometime after 2020. At that time, the City will have to secure new disposal sites for its solid waste. Until the closure of Fresh Kills, however, sufficient capacity remains in the City's solid waste disposal system to accommodate anticipated growth.

In April 1989, the City passed a local law requiring residents and businesses to separate recyclable material from wastes, and for 25 percent of the City's waste to be recycled. This has begun to reduce the volume of waste that is disposed of at the City's landfills. As noted earlier, the Museum complies with this law.

The additional visitors will increase the solid waste generation as shown in Table 11-5. This represents an increase of about 36,715 pounds per week.

Table 11-5
Museum Solid Waste Generation
2001 Future Without the Project

Use	Number	Rate (pounds per day)	Total (pounds per week)
Visitors	13,219 people	1/person	92,533
Employees	800 people	13/person	10,040
Cafe	700 meals	3/meal	14,700
Cafeteria	10,515 meals	1/meal	73,605
Total	NA	NA	190,878

ENERGY

The Museum's new air conditioning system on the first floor is expected to use an additional 3,800,000 kilowatt hours of energy per year by 2001.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

INTRODUCTION

The proposed project would increase infrastructure demands at the Museum by drawing higher attendance, adding new restaurant space, and increasing the amount of Museum space that is air conditioned. Events on the terrace would also result in additional infrastructure demands.

The new Museum restaurant would be able to seat about 450 people. It would be open for lunch and for late dinners, unlike the dining room in the Museum. Three seatings of meals could be served in the new restaurant, especially during warm weather. The terrace would *also* be used for special evening events during the warm weather.

The analysis of infrastructure considers conditions at the Museum on the average day of the busiest month in terms of attendance. It also accounts for a special event for *1,000* people on the terrace. *Consistent with the assumptions set forth in Chapter 4, it was assumed that employment* at the Museum would increase by 10 percent with the project.

WATER SUPPLY

The expected water demand for the project is shown in Table 11-6. *On days with an event on the terrace,* the proposed project would increase water consumption by *66,700* gallons per day over the future without the proposed project. *This water consumption would be imperceptible* in terms of the added demands that it would place on the City's water sources. The additional demands of the project would not have an adverse significant impact on the City's water system. This demand could be met through the existing supply lines and would not overburden the local distribution system. In addition, this new demand would not noticeably lower the local water pressure. Pursuant to public law, the project's plumbing fixtures would be low-flow in design.

Table 11-6
Water Usage with the Proposed Project

Use	Number	Rate (gallons per unit)	Total (gallons per day)
Visitors	15,843 people	5/person	79,215
Employees	880 people	25/person	22,000
Laboratory	63,000 square feet	0.12/square foot	7,560
Cafe	830 meals	10/meal	8,300
Cafeteria	12,485 meals	2/meal	24,970
Terrace	*1,000 people*	7/person	*7,000*
Restaurant	1,350 meals	10/meal	13,500
Air Conditioning	305,155 square feet	0.17/square feet	51,876
Total	NA	NA	*214,421*

SANITARY SEWAGE

Assuming that the water used for air conditioning is not disposed of as sewage and that for the remaining uses sewage generation at the project is to equal water usage, the proposed project would generate an estimated *40,860* gallons per day of sewage above No Build flows. This increment would not cause the North River WPCP to exceed its permit flow limit. Further, these small increases to the plant are not expected to have any measurable impact on the plant's ability to remove biological oxygen demand (BOD) or total suspended solids (TSS), nor would it be expected that mass loadings (currently well below the allowable standards) would be affected. Consequently, the sewage generated by the proposed project would not have a significant adverse impact.

SOLID WASTE

As is shown in Table 11-7, the solid waste generated by the proposed project *on days when an event is held on the terrace* is expected to be 260,000 pounds, or 130 tons per week. Because solid waste impacts are analyzed on a weekly basis, the analysis assumes two receptions during a week on the terrace, although during much of the year this would not occur. The solid waste would be collected by private carter and could be disposed of at Fresh Kills, upstate, or out-of-state landfills. If the waste were disposed of at Fresh Kills Landfill, the incremental solid waste from the proposed project would represent an increase of 0.15 percent at the Fresh Kills Landfill. This is not a significant change over current disposal levels. The Museum would continue to comply with the City's recycling mandate. Solid waste would be separated so that recyclable materials could be recovered.

ENERGY

The proposed project would comply with the New York State Conservation Construction Code. This code governs performance requirements for heating, ventilation, and air-conditioning systems, as well as the exterior building envelope. The code, promulgated on January 1, 1979, pursuant to Article Eleven of the Energy Law of the State of New York, requires that new and recycled buildings (both public and private) be designed to ensure adequate thermal resistance to heat loss and infiltration. In addition, it provides requirements for the design and selection of

Table 11-7
Solid Waste Generation with the Proposed Project

Use	Number	Rate (pounds per day)	Total (pounds per week)
Visitors	15,843 people	1/person	110,901
Employees	880 people	2/person	12,320
Cafe	835 meals	3/meal	17,535
Cafeteria	12,485 meals	1/meal	87,395
Terrace	*1,000* people	2/person	*2,000*
Restaurant	1,350 meals	3/meal	28,350
Total	NA	NA	*258,501*

mechanical, electrical, and illumination systems. In compliance with the code, the basic design would incorporate all required energy conservation measures, including meeting the code's requirements relating to energy efficiency and combined thermal transmittance. Consequently, the renovated and new buildings would be substantially more energy-efficient than the existing conventional buildings.

Energy demand for the buildings consists of loads for heating, ventilation, air conditioning, lighting, and auxiliary equipment, such as elevators and pumps. The annual energy consumption was estimated using the factors from *Energy Consumption in New Building Design: An Impact Assessment* of ASHRAE Standard 90-75 by Arthur D. Little, Inc., Washington, D.C., for the Federal Energy Administration, March 1976. The annual energy usage generated by the proposed project is estimated at 10,800,000 kilowatt hours per year without discounting for the current energy usage in the Hayden Planetarium. Consumption at this level would not result in any significant additional load for Con Edison. ❖

A. INTRODUCTION

The American Museum of Natural History and Hayden Planetarium already play a major role in affecting traffic and transportation service conditions in the area. In addition to generating a sizable number of trips that place demands on various transportation services accessing the site, particularly on weekends, the Museum's driveway activity along West 81st Street and heavy school bus traffic on weekdays create particular service issues. Development of the project's components (a full description of the project is provided in Chapter 2, "Project Description") would place additional service demands on the surrounding transportation network and will increase the supply of on-site parking in a new garage. This chapter of the EIS considers these issues and addresses the effects of the proposed project on traffic and parking. (Subway and bus services, as well as pedestrian conditions, are discussed in Chapter 13, "Transit and Pedestrians.") The discussion below contains the following sections:

- Methodology, which describes the study area and time periods studied and explains the process for assessment of intersection capacity, which is the basis for measuring traffic impacts and developing mitigation.
- Existing Conditions, which presents conditions in 1996 in the study area. Traffic conditions are discussed for study area intersections; in addition, a specific discussion of West 81st Street is included, which addresses traffic friction and other issues arising from queuing of cars waiting to get into the parking lot on weekends and bus loading and parking activities on weekdays. Parking conditions on- and off-site are also assessed.
- The Future Without the Project, also referred to as the "No Build" condition, which assesses conditions in the future (2001) if the project is not built. This analysis considers increases in traffic and parking demand in the study area generally ("background growth"), from proposed new development (excluding the proposed project) in the area, and from projected growth in attendance at the Museum. Each of the areas presented in Existing Conditions—intersection analysis, West 81st Street (traffic conditions and school/tour buses), and parking—is considered in the future without the project.
- Probable Impacts of the Proposed Project, which considers, for each area presented (intersection analysis, West 81st Street, and parking), the effect of the proposed project. These effects are associated with anticipated increases in attendance, as described in Chapter 4, and certain proposed program elements—e.g., new garage, new Columbus Avenue entrance, events on the terrace, and restaurant patronage.

B. METHODOLOGY

The first steps in the traffic analysis involve choosing the area in which the project's traffic could result in significant adverse impacts, referred to as the study area, and the hours to be considered for analysis. Existing traffic conditions are then observed and analyzed. Next, using the assessment of existing conditions as a baseline, traffic conditions are predicted for the future analysis year, assuming that the project is not built. For this project, the future analysis year is 2001, the first year in which stabilized attendance is expected at the project. This "No Build" condition accounts for traffic associated with future growth in the area but does not include any traffic from the project. Finally, traffic generated by proposed project is predicted, and the traffic conditions in the study area are assessed with those predicted vehicles added to study area roadways. These "Build" conditions are compared to the No Build conditions to allow an understanding of the project's incremental effect on the study area.

Information on the study area and analysis hours for this project, as well as the intersection capacity analysis, is provided below. Details on predicting the No Build traffic conditions are provided later in this chapter in "The Future Without the Project," and information on predicting the Build traffic conditions is provided in "Probable Impacts of the Proposed Project."

STUDY AREA

To assess the traffic impacts associated with the proposed project, an overall study area was defined that considered the location of the project, primary access routes to and from the site area, and key intersections likely to be affected by project-generated trips. As shown in Figure 12-1, the study area consists of a network containing 19 intersections along Central Park West, Columbus Avenue, and Amsterdam Avenue. The project's impact would diminish outside this area, as project-generated vehicles were distributed throughout the broader street network.

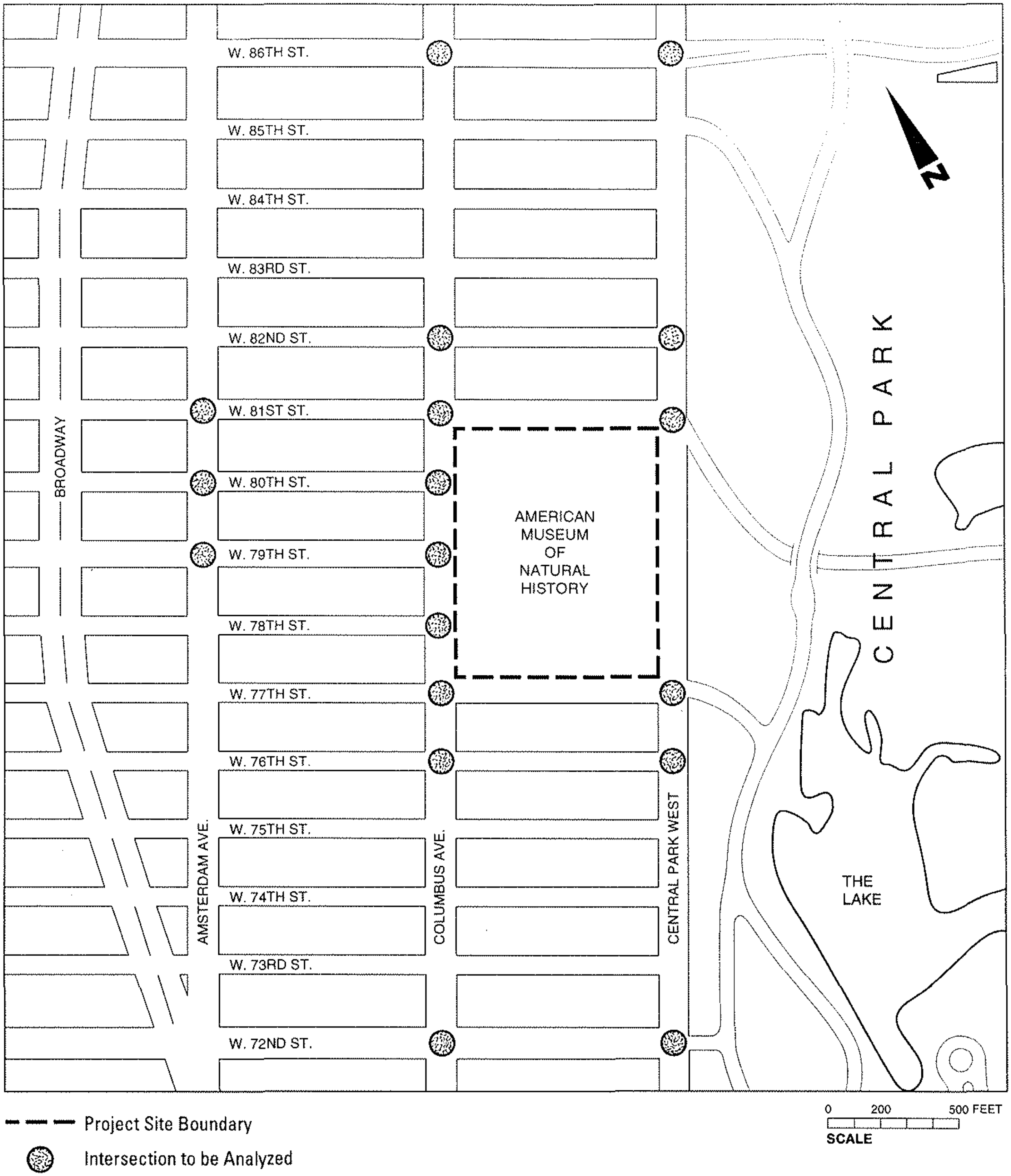
Within this larger study area, the portion of West 81st Street between Columbus Avenue and Central Park West was also considered in particular detail. Because this block is the site of the entrance and exit drives for the Museum's existing parking lot and proposed parking garage, traffic conditions there are of particular importance for this analysis.

ANALYSIS HOURS

Traffic conditions are assessed over a period of time, such as an hour, a group of hours, a day, or year. For an EIS, the most appropriate period is an hour, which permits analysis of a short-term, often more acute condition, rather than an average over a longer period. To be conservative, the EIS also picks the worst-case hour(s), depending on the project proposed and prevailing conditions in the study area. A review of the Museum's attendance patterns found that the peak hour for this project's traffic would be on a weekend afternoon, specifically Saturday, when average attendance is about 28 percent greater than on Sunday. Existing street traffic, however, is often highest during the work week, at the times when workers are traveling—i.e., morning, midday, and evening. Since the Museum opens at 10 AM, after the morning rush hour, the analysis in this EIS studies an hour in both the midday (12 to 2 PM) and evening peak (4 to 6 PM) periods. The specific times chosen depended on the flow of trips to the Museum and the volumes of traffic encountered throughout the study area. With these considerations, the following analysis hours were chosen for study: weekday 1 to 2 PM; weekday 4 to 5 PM for Museum trips coupled with 5 to 6 PM for base traffic; and Saturday 2 to 3 PM. These are referred to as peak hours.

INTERSECTION CAPACITY ANALYSIS

The operation of signalized intersections in the study area was analyzed applying the methodologies presented in the 1995 *Highway Capacity Manual* (*HCM*) (Special Report 209, Transportation Research Board, 1995). This procedure considers the average delay that a vehicle would encounter as it approached, stopped, and then moved through an intersection to determine a "level of service" for each of the various movements of vehicles through an intersection (which are



American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Traffic Study Area

Figure 12-1

called "lane group movements") and for the intersection as a whole. Variables affecting delay include cycle length, progression of traffic, green time, and the relationship of traffic volume to roadway capacity (volume-to-capacity, or "v/c" ratio). Levels of service (LOS) are identified as ranging from A through F. LOS A and B indicate good operating conditions with minimal delay; LOS C indicates greater delay, but little congestion; LOS D describes a condition where congestion levels are more noticeable and backups can occur; and LOS E and F reflect poor conditions, with longer stopped delays of vehicles, and frequent backups. The methodology has defined LOS in terms of stopped vehicle delay, as follows:

LOS	Average Delay
A	< 5.0 seconds
B	5.1-15.0 seconds
C	15.1-25.0 seconds
D	25.1-40.0 seconds
E	40.1-60.0 seconds
F	> 60.0 seconds

The analysis methodology does calculate a v/c ratio for each lane group movement and intersection, but there is no strict relationship that permits LOS to be defined by v/c ratio. A high v/c ratio can be combined with low average delay, and this is in fact the best case for traffic engineering standards: an approach or a whole intersection processes traffic near its theoretical maximum with a minimum of delay. However, very high v/c ratios—especially those greater than 1.0—are often correlated with a deteriorated LOS. The LOS, delay, and v/c ratio are computed for each lane group movement. To determine overall LOS conditions at a signalized intersection, the analysis computes a weighted average of the delay on the two critical movements in each direction from each roadway (the worst-case conditions from each roadway)

Although all the intersections in the study area are controlled by signals, the entrance and exit driveways to the Museum parking lot on West 81st Street actually function as unsignalized intersections. These have been assessed according to the 1985 *HCM* methodology for such intersections. This approach assesses the ability of motorists to make difficult movements—namely, left turns from the major street and all movements from the minor street or driveway. For these movements, the analysis evaluates motorists' opportunity to find a suitable gap between opposing vehicles to safely execute the movement. These are identified as the "critical movements" and, as congestion increases, delay also increases, while safety decreases as vehicles risk moving through shorter gaps in opposing traffic flow. The LOS measure is a "reserve capacity," which is a theoretical capacity less the movement volumes. Reserve capacities are calculated for these critical movements or, in the cases where there is one lane carrying more than one movement, a shared lane reserve capacity. The reserve capacity and volumes are expressed in passenger cars per hour (pcph). This is an adjustment to the vehicles-per-hour volume to account for trucks in the traffic flow.

The reserve capacity for the range of service levels is as follows:

LOS	Reserve Capacity (pcph)
A	> 400
B	300–399
C	200–299
D	100–199
E	0–99
F	0

C. EXISTING CONDITIONS

INTERSECTION AND ROADWAY CHARACTERISTICS

The traffic study area is a portion of the Upper West Side grid, with major north-south one-way flows on Columbus and Amsterdam Avenues, major two-way north-south flows on Central Park West, major two-way crosstown movements on West 72nd and 86th Streets, and local east-west circulation on the narrower one-way streets. A distinctive feature of West 77th and 81st Streets is that they are wide two-way streets for the one block between Central Park West and Columbus Avenue, but are narrower and one-way west of Columbus Avenue. In addition, West 81st Street's circulation and role in the network are worth noting. Because 79th Street terminates at Columbus Avenue, West 81st Street serves as a bypass route for crosstown traffic. This role results in a street direction system in which West 81st Street, after emerging from the park, operates as a two-way street between Central Park West and Columbus Avenue, a one-way eastbound street between Amsterdam and Columbus Avenues, and a one-way westbound street west of Amsterdam Avenue. *This results in a study area circulation pattern in which 79th Street does not operate as a typical major crosstown street. After reaching a crown midblock between Columbus and Amsterdam Avenue, 79th Street slopes down toward Columbus Avenue, where it forms a "T" intersection at the Museum superblock. Consequently, it does not offer an east-west through route; eastbound traffic is diverted up to 81st Street at Amsterdam Avenue or southbound onto Columbus Avenue, and westbound traffic turns right from southbound Columbus Avenue.*

Network traffic is carried to the East Side through Central Park by transverse roadways at West 81st and 86th Streets. Access to the East Side and other areas in Manhattan is also provided at West 72nd and 77th Streets, which provide access to the Central Park West Drive roadway. In the study area, avenues range in width between approximately 59 and 63 feet; the two-way crosstown streets are generally between 58 and 60 feet wide, and the local east-west streets are generally between 29 and 35 feet wide. The one-way avenues generally operate with three to five moving lanes. Central Park West and the major crosstown streets generally operate with two moving lanes in each direction. The local streets typically function with one to two moving lanes. However, trucking and delivery activity; double-parking buses, autos, and service vehicles; and illegal use of the curbside limit the number of moving lanes available on the various streets and avenues in the study area during the course of the day.

All the intersections in the study area are controlled on a 90-second signal cycle. In general, green time priority is given to the avenues and other north-south roadways.

TRAFFIC CONDITIONS

INTERSECTION ANALYSIS

Existing traffic conditions in the study area were established based on observations and field surveys conducted in June 1995 and February 1996 during the analysis hours. These surveys were taken under "typical" circumstances, i.e., without rain or snow and avoiding special conditions or events that would affect traffic flow. Information collected included one week of 24-hour traffic volume counts from automatic traffic recorders (ATRs) at several locations throughout the network; weekday and Saturday manual turning movement and vehicle classification counts; and vehicle speed measurements. Information was collected pertaining to the ability of a given intersection to process traffic, or intersection "capacity." Such items included number of moving lanes of traffic, roadway widths, traffic signal cycle length, signal progressions, and the presence of bus stops and other features that might affect capacity.

Segments of Columbus Avenue and West 86th Street were under construction during some of the 1995 and 1996 traffic counts. Therefore, the traffic data collected on these roadways during this time period was adjusted to reflect normal operating conditions (non-construction activity). ATR data collected during non-construction periods by Allee King Rosen & Fleming, Inc. and the New York City Department of Transportation (NYCDOT) at several locations throughout the study area were examined and used to adjust and validate the network volumes. Specifically, pre- and post-construction ATR counts were collected at key network locations, including West 81st Street between Central Park West and Columbus Avenue, West 77th Street at Central Park West, Columbus Avenue at West 79th Street, and Central Park West at West 77th and West 81st Streets. These counts were then used as network control volumes that were employed to adjust and balance other volumes collected while construction was under way.

Based on the data collected, network volumes were estimated for the weekday midday, weekday PM, and Saturday peak hours, as shown in Figures 12-2, 12-3, and 12-4, respectively. On the streets bordering the Museum, weekday volumes on West 81st Street range from approximately 600 to 680 vehicles per hour (vph) in both directions, and Saturday traffic volumes reach approximately 700 vph. Central Park West (in both directions) and Columbus Avenue carry approximately 1,500 to 1,850 vph during the weekday peak hours, and on Saturday between 1,600 and 2,000 vph during the midday peak hour. West 77th Street carries light to moderate volumes near the project site, approximately 315 to 365 vph in both directions during the weekday peak hours, and on Saturday, approximately 345 vph in both directions during the midday peak hour. In the larger area, Central Park West carries between 1,490 and 1,650 vph in both directions during the weekday and Saturday peak hours; Columbus Avenue carries between 1,600 and 1,930 vph during the weekday and Saturday peak hours; and Amsterdam Avenue carries between 1,230 and 1,780 vph during the weekday and Saturday peak hours. The major crosstown streets (i.e., West 72nd and 86th Streets) carry between 570 and 1,535 vph in both directions during the weekday and Saturday peak hours. *Traffic is lighter on 79th Street. Because of its truncated role in the network, with crosstown traffic diverting up to 81st Street, activity is not as heavy with two-way peak hour volumes ranging from 495 to 620 vph.* Traffic volumes are generally the highest during the weekday PM and Saturday peak hours.

As shown in Table 12-1, during both the weekday and Saturday analysis hours, many study area intersection approaches operate at LOS C or better. Some, however, operate at LOS D or worse. At the streets bordering the Museum, the westbound 81st Street left-turn movement at Central Park West operates at LOS F during all peak periods; the eastbound 81st Street approach at Columbus Avenue operates at LOS D to F during the weekday and Saturday peak periods; the northbound Central Park West approach at 77th Street operates at LOS D during the weekday PM peak hour; and the north- and southbound 81st Street approaches at Central Park West operate at LOS E and F, respectively, during the Saturday peak hour. In the larger study area, the eastbound 72nd Street left-turn movement at Central Park West operates at LOS D to F during the weekday peak hours; the westbound 86th Street approach at Central Park West operates at LOS D to E during the weekday peak hours; the northbound Central Park West approach at 72nd Street operates at LOS D during the weekday PM peak hour; and the westbound 86th Street approach at Columbus Avenue operates at LOS F during the weekday PM peak hour.

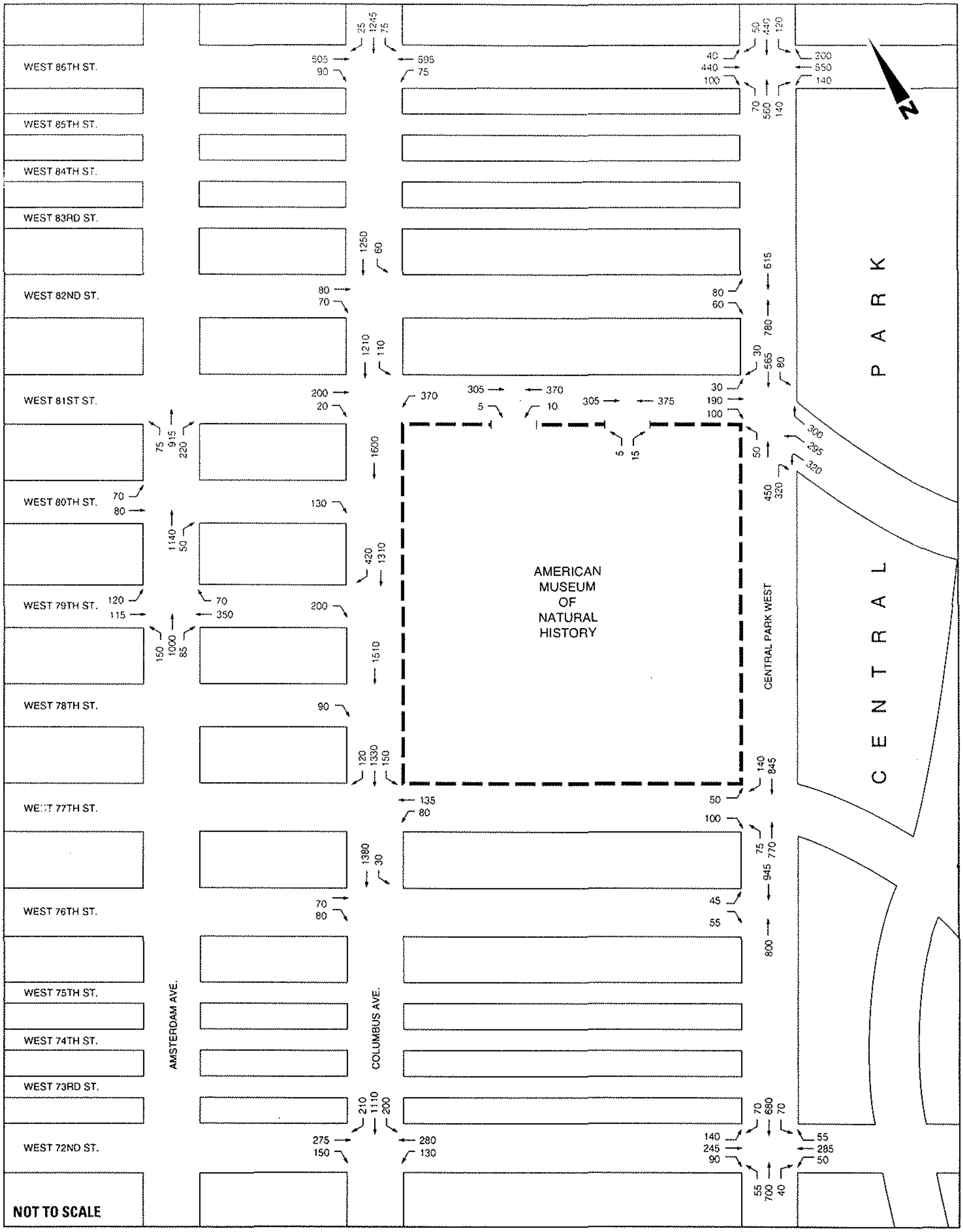
WEST 81st STREET

While the calculated service conditions in the study area generally indicate acceptable service conditions that have been confirmed by field observations, there are a number of particular problems at the streets bordering the Museum. These issues relate to service conditions along West 81st Street and heavy weekday school bus activity in the area.

Traffic Conditions

The Museum has a surface parking lot at the project site with a current capacity of 180 cars, assuming valet parking. There is a one-way driveway entrance to the lot approximately midblock on West 81st Street, and a one-way exit driveway approximately 100 feet from the intersection with Central Park West. During weekdays, when auto activity at the Museum is relatively light, the lot is rarely filled and its primary users are school buses. On a heavy weekday, there are roughly 100 to 125 entering autos during the daytime hours and 20 to 30 entering buses. During the weekday peak hours, there are generally not more than 25 to 40 entering vehicles. Overall on weekdays, except for problems related to school buses (discussed below), the capacity of the lot is adequate, and vehicles enter and exit the lot's drives without adverse effects on traffic conditions on West 81st Street.

However, on weekends, traffic to the site is far heavier, resulting in greater demand at the lot. Typically, on weekends, the parking lot fills up sometime between 11 AM and noon. Before the lot fills, vehicles are able to find sufficient gaps in the traffic stream on West 81st Street for maneuvering into the lot and cause only minimal disruption to traffic flow on 81st Street. This is consistent with the general service condition at the lot: as long as sufficient storage space remains at the project driveway and in the lot, the driveway intersections at West 81st Street operate reasonably well and traffic is able to enter and exit the lot smoothly. This condition is documented by the lack of delay faced by turning vehicles entering the lot. Based on field observation and videotape review of traffic operations at the site, eastbound vehicles have an uncontested right turn into the lot and typically face no delay in making their maneuver. Although westbound vehicles need to wait for a gap in the opposing traffic stream before executing their maneuver, approximately 95 percent of these entering vehicles are able to execute their turn with fewer than 10 seconds of stopped delay.



American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

1996 Existing Traffic Volumes • MD Peak Hour

Figure 12-2

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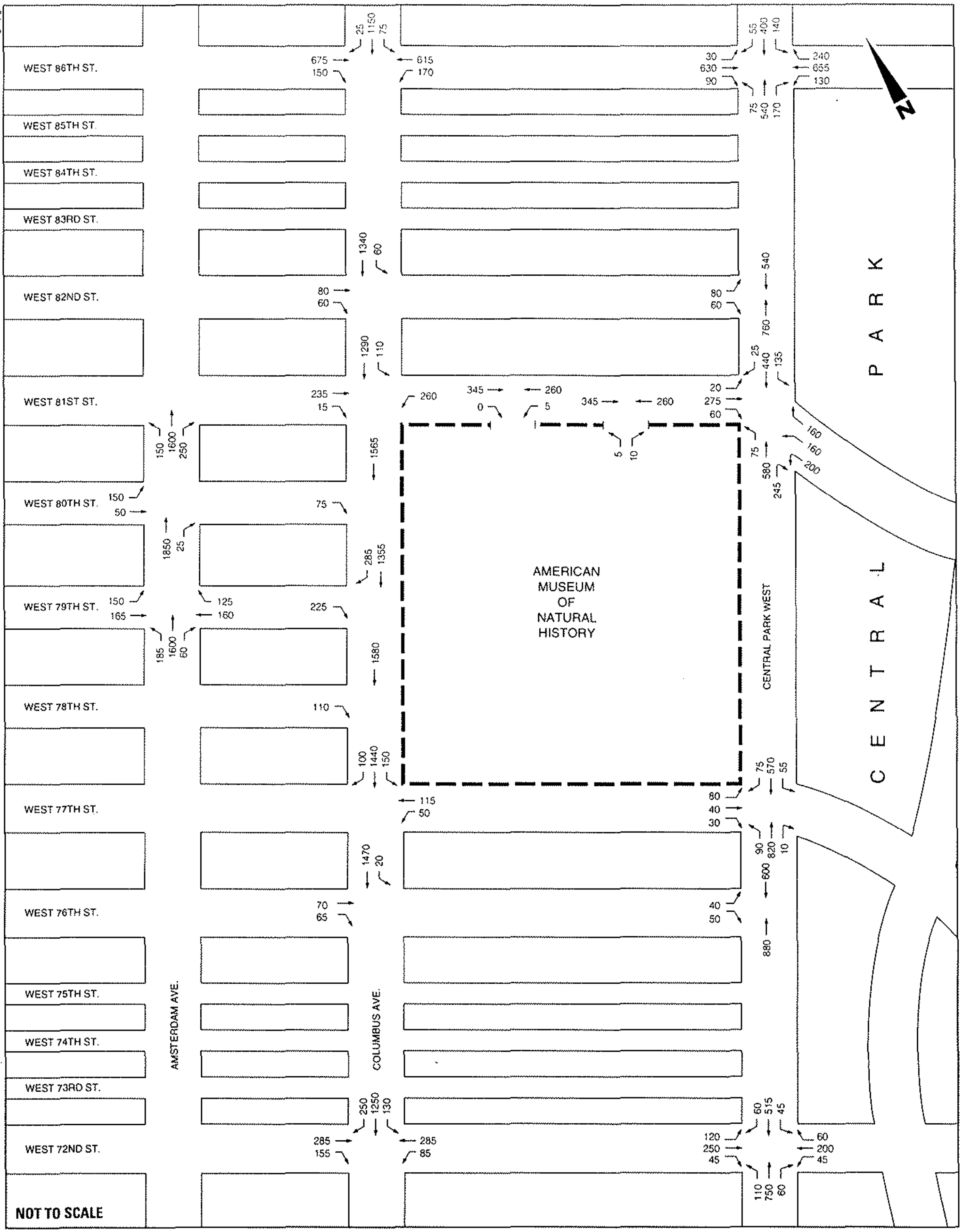
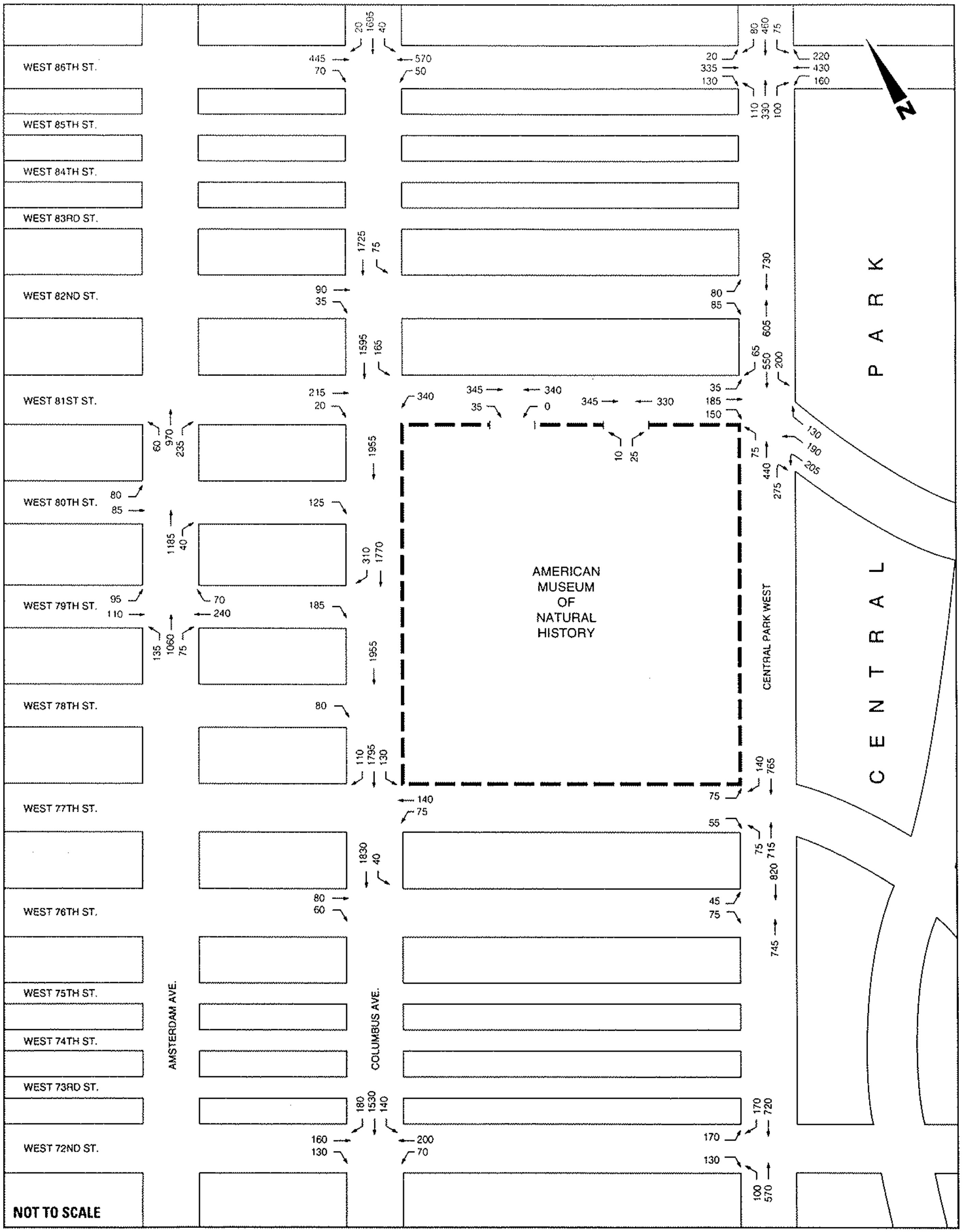


1996 Existing Traffic Volumes • PM Peak Hour

Figure 12-3

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT



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American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

1996 Existing Traffic Volumes • Saturday Peak Hour

Figure 12-4

Table 12-1
Signalized Intersections:
1996 Existing Conditions Level of Service Analysis

	Midday Existing							
					Approach		Intersection	
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Delay	LOS	Delay	LOS
Central Park West & West 72nd Street								
Eastbound	DfL	1.04	85.1	F	34.7	D	20.4	C
	TR	0.44	14.7	B				
Westbound	LTR	0.61	16.6	C	16.6	C		
Northbound	*LTR*	*0.84*	*13.6*	*B*	*13.6*	*B*		
Southbound	LTR	0.91	18.2	C	18.2	C		
Central Park West & West 76th Street								
Eastbound	LTR	0.15	14.5	B	14.5	B	7.3	B
Northbound	T	0.55	6.3	B	6.3	B		
Southbound	T	0.66	7.2	B	7.2	B		
Central Park West & West 77th Street								
Eastbound	LTR	0.28	14.9	B	14.9	B	14.2	B
Northbound	LT	0.95	20.9	C	20.9	C		
Southbound	TR	0.70	8.2	B	8.2	B		
Central Park West & West 81st Street								
Eastbound	LTR	0.30	15.5	C	15.5	C	19.8	C
Westbound	DfL	1.05	75.1	F	38.2	D		
	TR	0.66	19.2	C				
Northbound	LTR	0.80	9.8	B	9.8	B		
Southbound	LTR	0.78	9.6	B	9.6	B		
Central Park West & West 82nd Street								
Eastbound	LTR	0.46	17.3	C	17.3	C	6.9	B
Northbound	T	0.53	6.1	B	6.1	B		
Southbound	T	0.43	5.6	B	5.6	B		
Central Park West & West 86th Street								
Eastbound	LTR	0.78	26.5	D	26.5	D	18.0	C
Westbound	LTR	0.70	17.6	C	17.6	C		
Northbound	LTR	0.87	15.1	C	15.1	C		
Southbound	LTR	0.83	14.1	B	14.1	B		
Columbus Avenue & West 72nd Street								
Eastbound	TR	0.47	15.0	B	15.0	B	11.2	B
Westbound	DfL	0.64	20.3	C	15.4	C		
	T	0.26	13.3	B				
Southbound	LTR	0.67	9.1	B	9.1	B		
Columbus Avenue & West 76th Street								
Eastbound	TR	0.53	18.7	C	18.7	C	8.7	B
Southbound	LT	0.76	7.6	B	7.6	B		
Columbus Avenue & West 77th Street								
Westbound	LT	0.29	15.9	C	15.9	C	9.0	B
Southbound	LTR	0.79	8.1	B	8.1	B		
Columbus Avenue & West 78th Street								
Eastbound	R	0.21	15.4	C	15.4	C	6.2	B
Southbound	T	0.54	5.7	B	5.7	B		
Columbus Avenue & West 79th Street								
Eastbound	*R*	*0.23*	*17.5*	*C*	*17.5*	*C*	*7.4*	*B*
Southbound	TR	0.80	6.2	B	6.2	B		
Columbus Avenue & West 80th Street								
Eastbound	R	0.28	15.9	C	15.9	C	5.8	B
Southbound	T	0.42	5.1	B	5.1	B		
Columbus Avenue & West 81st Street								
Eastbound	TR	0.78	32.2	D	32.2	D	18.2	C
Westbound	L	0.52	22.9	C	22.9	C		
Southbound	LT	0.67	14.9	B	14.9	B		
Columbus Avenue & West 82nd Street								
Eastbound	TR	0.46	17.6	C	17.6	C	6.6	B
Southbound	LT	0.46	5.3	B	5.3	B		
Columbus Avenue & West 86th Street								
Eastbound	*TR*	*0.37*	*14.1*	*B*	*14.1*	*B*	*12.4*	*B*
Westbound	LT	0.58	16.0	C	16.0	C		
Southbound	LTR	0.69	9.5	B	9.5	B		
Amsterdam Avenue & West 79th Street								
Eastbound	DfL	0.61	19.0	C	16.2	C	10.3	B
	T	0.26	13.3	B				
Westbound	TR	0.30	13.5	B	13.5	B		
Northbound	LTR	0.51	7.9	B	7.9	B		
Amsterdam Avenue & West 80th Street								
Eastbound	LT	0.42	17.0	C	17.0	C	6.7	B
Northbound	TR	0.43	5.1	B	5.1	B		
Amsterdam Avenue & West 81st Street								
Northbound	LTR	0.49	5.4	B	5.4	B	5.4	B

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; TR=Through & right turn movements; LTR=Left turn, through, & right turn movements; and DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersectons, determined by delay in seconds).

Table 12-1 (Continued)
Signalized Intersections:
1996 Existing Conditions Level of Service Analysis

Intersection	PM Existing							
	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Central Park West & West 72nd Street								
Eastbound	DfL	0.86	40.0	D	23.0	C	23.0	C
	TR	0.42	16.4	C				
Westbound	LTR	0.52	17.5	C	17.5	C		
Northbound	LTR	1.03	34.6	D	34.6	D		
Southbound	LTR	0.69	8.0	B	8.0	B		
Central Park West & West 76th Street								
Eastbound	LTR	0.13	14.4	B	14.4	B	6.8	B
Northbound	T	0.63	6.9	B	6.9	B		
Southbound	T	0.43	5.6	B	5.6	B		
Central Park West & West 77th Street								
Eastbound	LTR	0.26	14.7	B	14.7	B	21.6	C
Northbound	LTR	1.04	30.1	D	30.1	D		
Southbound	LTR	0.83	11.9	B	11.9	B		
Central Park West & West 81st Street								
Eastbound	LTR	0.37	16.0	C	16.0	C	20.4	C
Westbound	DfL	1.05	85.0	F	41.8	E		
	TR	0.38	16.1	C				
Northbound	LTR	0.90	14.2	B	14.2	B		
Southbound	LTR	0.88	14.3	B	14.3	B		
Central Park West & West 82nd Street								
Eastbound	LTR	0.51	18.1	C	18.1	C	7.0	B
Northbound	T	0.51	6.1	B	6.1	B		
Southbound	T	0.36	5.3	B	5.3	B		
Central Park West & West 86th Street								
Eastbound	LTR	1.00	47.0	E	47.0	E	27.6	D
Westbound	LTR	0.61	16.3	C	16.3	C		
Northbound	LTR	1.00	30.9	D	30.9	D		
Southbound	LTR	0.88	17.1	C	17.1	C		
Columbus Avenue & West 72nd Street								
Eastbound	TR	0.60	16.5	C	16.5	C	12.2	B
Westbound	DfL	0.51	17.2	C	14.1	B		
	T	0.25	13.2	B				
Southbound	LTR	0.79	10.6	B	10.6	B		
Columbus Avenue & West 76th Street								
Eastbound	TR	0.43	17.3	C	17.3	C	8.2	B
Southbound	LT	0.75	7.5	B	7.5	B		
Columbus Avenue & West 77th Street								
Westbound	LT	0.23	15.5	C	15.5	C	9.0	B
Southbound	LTR	0.81	8.4	B	8.4	B		
Columbus Avenue & West 78th Street								
Eastbound	R	0.30	16.0	C	16.0	C	6.4	B
Southbound	T	0.55	5.7	B	5.7	B		
Columbus Avenue & West 79th Street								
Eastbound	R	0.28	17.8	C	17.8	C	7.1	B
Southbound	TR	0.74	5.3	B	5.3	B		
Columbus Avenue & West 80th Street								
Eastbound	R	0.18	15.2	C	15.2	C	5.6	B
Southbound	T	0.44	5.1	B	5.1	B		
Columbus Avenue & West 81st Street								
Eastbound	TR	1.04	76.8	F	76.8	F	24.8	C
Westbound	L	0.39	21.8	C	21.8	C		
Southbound	LT	0.72	15.4	C	15.4	C		
Columbus Avenue & West 82nd Street								
Eastbound	TR	0.39	16.9	C	16.9	C	6.5	B
Southbound	LT	0.52	5.5	B	5.5	B		
Columbus Avenue & West 86th Street								
Eastbound	TR	0.64	16.6	C	16.6	C	16.7	C
Westbound	DfL	1.02	74.3	F	28.2	D		
	T	0.59	16.1	C				
Southbound	LTR	0.70	9.6	B	9.6	B		
Amsterdam Avenue & West 79th Street								
Eastbound	DfL	0.51	16.1	C	15.0	B	9.8	B
	T	0.35	14.0	B				
Westbound	TR	0.20	13.0	B	13.0	B		
Northbound	LTR	0.60	8.4	B	8.4	B		
Amsterdam Avenue & West 80th Street								
Eastbound	LT	0.55	18.9	C	18.9	C	6.7	B
Northbound	TR	0.51	5.5	B	5.5	B		
Amsterdam Avenue & West 81st Street								
Northbound	LTR	0.60	6.0	B	6.0	B	6.0	B

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; TR=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersectons, determined by delay in seconds).

Table 12-1 (Continued)
Signalized Intersections:
1996 Existing Conditions Level of Service Analysis

Intersection	Saturday Existing Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Central Park West & West 72nd Street								
Eastbound	LTR	0.27	13.4	B	13.4	B	13.8	B
Northbound	LT	0.91	18.8	C	18.8	C		
Southbound	TR	0.74	10.5	B	10.5	B		
Central Park West & West 76th Street								
Eastbound	LTR	0.18	14.7	B	14.7	B	6.8	B
Northbound	T	0.49	5.9	B	5.9	B		
Southbound	T	0.56	6.4	B	6.4	B		
Central Park West & West 77th Street								
Eastbound	LTR	0.21	14.4	B	14.4	B	12.2	B
Northbound	LT	0.91	16.6	C	16.6	C		
Southbound	TR	0.67	7.9	B	7.9	B		
Central Park West & West 81st Street								
Eastbound	LTR	0.49	17.0	C	17.0	C	34.6	D
Westbound	DfL	1.02	71.1	F	36.7	D		
	TR	0.34	15.7	C				
Northbound	LTR	1.05	43.2	E	43.2	E		
Southbound	DfL	1.03	66.5	F	35.3	D		
	TR	0.98	25.2	D				
Central Park West & West 82nd Street								
Eastbound	LTR	0.49	17.5	C	17.5	C	6.8	B
Northbound	T	0.27	4.9	A	4.9	A		
Southbound	T	0.50	6.0	B	6.0	B		
Central Park West & West 86th Street								
Eastbound	LTR	0.64	23.2	C	23.2	C	15.4	C
Westbound	LTR	0.58	16	C	16.0	C		
Northbound	LTR	0.81	13.2	B	13.2	B		
Southbound	LTR	0.71	10.3	B	10.3	B		
Columbus Avenue & West 72nd Street								
Eastbound	TR	0.41	14.4	B	14.4	B	13.3	B
Westbound	DfL	0.28	13.6	B	13.0	B		
	T	0.18	12.8	B				
Southbound	LTR	0.90	13.1	B	13.1	B		
Columbus Avenue & West 76th Street								
Eastbound	TR	0.48	17.9	C	17.9	C	20.9	C
Southbound	LT	1.00	21.1	C	21.1	C		
Columbus Avenue & West 77th Street								
Westbound	LT	0.28	15.9	C	15.9	C	15.1	C
Southbound	LTR	0.96	15.0	B	15.0	B		
Columbus Avenue & West 78th Street								
Eastbound	R	0.22	15.4	C	15.4	C	8.0	B
Southbound	T	0.79	7.8	B	7.8	B		
Columbus Avenue & West 79th Street								
Eastbound	R	0.24	17.6	C	17.6	C	10.5	B
Southbound	TR	0.93	9.7	B	9.7	B		
Columbus Avenue & West 80th Street								
Eastbound	R	0.29	15.9	C	15.9	C	6.1	B
Southbound	T	0.51	5.5	B	5.5	B		
Columbus Avenue & West 81st Street								
Eastbound	TR	0.99	62.9	F	62.9	F	26.7	D
Westbound	L	0.53	23.0	C	23.0	C		
Southbound	LT	0.94	22.4	C	22.4	C		
Columbus Avenue & West 82nd Street								
Eastbound	TR	0.35	16.4	C	16.4	C	7.2	B
Southbound	LT	0.67	6.5	B	6.5	B		
Columbus Avenue & West 86th Street								
Eastbound	TR	0.39	14.2	B	14.2	B	17.8	C
Westbound	LT	0.52	15.4	C	15.4	C		
Southbound	LTR	0.97	19.9	C	19.9	C		
Amsterdam Avenue & West 79th Street								
Eastbound	DfL	0.36	14.3	B	13.7	B	9.6	B
	T	0.24	13.2	B				
Westbound	TR	0.22	13.1	B	13.1	B		
Northbound	LTR	0.53	8.0	B	8.0	B		
Amsterdam Avenue & West 80th Street								
Eastbound	LT	0.59	19.7	C	19.7	C	7.2	B
Northbound	TR	0.45	5.2	B	5.2	B		
Amsterdam Avenue & West 81st Street								
Northbound	LTR	0.51	5.5	B	5.5	B	5.5	B

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; TR=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersectons, determined by delay in seconds).

However, once the lot fills, several problems occur. First, faced with a full lot and a closed-off driveway, vehicles queue on the south side of 81st Street in the eastbound travel lane (the parking lane is already full), waiting for an opportunity to enter the lot. Based on observations throughout the year and a videotape survey on March 22, 23, and 24, 1996, this queue—stretching as many as 150 to 175 feet toward Columbus Avenue—generally ranges from 5 to 10 vehicles, and cars may wait for up to 10 minutes before entering the lot. (As vehicles exit during the day, new cars are permitted to enter from the 81st Street driveway to enter the lot). The impact of this queue is to eliminate one of the two available eastbound travel lanes, as well as to cause the disruption associated with a line of idling vehicles.

The Museum has recently undertaken measures to improve the queuing and related congestion that occur when the parking lot is full. At those times, a parking lot attendant has begun to hand out a leaflet listing other off-street parking garages near the Museum. *When the attendant stands outside, most motorists move on to other garages. However, the attendant, who is employed by the lot operator, is not always on duty when the lot is full, and at these times the queue forms again.*

To fully characterize the traffic condition on West 81st Street, it is important to note that it is not only the parking lot queue that causes the loss of travel lanes near the Museum driveway. While a portion of the eastbound travel lane adjacent to the curb lane is lost for almost the full period the parking lot is full (an analysis of lane utilization for a typical Saturday showed a blockage for approximately 49 minutes per hour), there is a corresponding condition, not related to Museum traffic, that occurs on the westbound side of the street. Primarily due to service vehicles, drop-offs, and double parking at the residential buildings along the north side of West 81st Street, there is persistent blockage of the westbound right-hand travel lane (in this case, the analysis showed blockages in the vicinity of the driveway of approximately 25 minutes per hour during the 11:30 AM to 4 PM period).

The second problem when the lot is full is the friction caused by westbound vehicles attempting to get into the lot. These vehicles can no longer make a left turn into the lot, although at times vehicles try to cut into the front of the queue, causing conflicts with eastbound vehicles already waiting to enter the lot. Also, drivers sometimes wait in the westbound lane, blocking its use, while determining that the lot cannot be entered; in that case, the driver may head to another parking location or execute a U-turn on West 81st Street prior to reaching Columbus Avenue and take a place in the eastbound queue. Cumulatively, the queuing conflicts and various traffic maneuvers result in a serious disruption of traffic along West 81st Street during those weekend hours that the parking lot is full, approximately noon until after 3 PM. *In recognition of the chronic weekend problem at the parking lot, the Museum will assign its own staff to redirect vehicles, as discussed in section 12.D, "The Future Without the Project," below.*

Buses

The problem related to the school buses is a weekday issue and occurs almost exclusively from approximately 9 AM until early afternoon. During that period, a heavy volume (50 to 100) of school buses deliver *schoolchildren* to the Museum. These buses, which generally include yellow school buses and some chartered coaches, generally drop off *schoolchildren* on either West 81st Street, Central Park West, or West 77th Street. On West 81st Street, the buses often queue up in the parking lot driveway while waiting for a position to unload. If the buses fill up the full length of the entrance driveway, other arriving buses queue in an east- or westbound travel lane on West 81st Street as they wait for an opening in the driveway. This process repeats itself in the early afternoon, when buses line up for a spot to load their passengers.

A portion of the buses leave the area after dropping off their passengers. These include buses from companies that maintain lots at convenient locations or buses with drivers who know about free parking elsewhere (e.g., along 40th Street near the West Side Highway). Approximately 20 to 25 buses typically park in the Museum's lot. However, a portion of the buses also double-park or illegally park on streets bordering the Museum. During peak weekdays, there are often 5 to 10 buses lining each of the various blockfaces, with the greatest concentration along West 81st Street and Central Park West. Some of these vehicles, which typically park for 2 to 3 hours, occupy a travel lane, thereby constricting traffic flow. This is particularly common on West 81st Street; the double-parking is less prevalent on Central Park West and West 77th Street.

The Museum has recently undertaken an effort to encourage bus parking either within its lot or at other appropriate locations. At the Museum's request, the New York City Board of Education has instituted a program to encourage bus drivers to park in the lot: the Board of Education has begun to issue vouchers to the drivers for payment for parking in the lot. In addition, the Police Department has recently increased its enforcement measures, issuing tickets to bus drivers illegally parked around the Museum. However, to date, buses parking on the surrounding blocks continue to be a problem despite these measures. In recognition of the problems associated with buses, the Museum is developing a bus management plan, as discussed in section 12.D, "The Future Without the Project," below.

PARKING SUPPLY AND UTILIZATION

As mentioned above, the Museum has a surface parking lot on 81st Street with a valet park capacity of 180 autos. When self-park operations are in effect on weekdays, the capacity is less. The lot is open from 7 AM until 11:30 PM and primarily serves Museum *visitors*. During weekdays, the lot is used by *visitors* and buses and typically has fewer than 100 vehicles, as shown in Table 12-2. These include approximately 20 to 25 buses. On weekends, when the demand is almost exclusively from automobiles, the lot routinely fills by noon and operates at capacity until after 3 PM.

In general, Museum employees do not use the lot. The Museum supplies 75 spaces in its service area for employee parking.

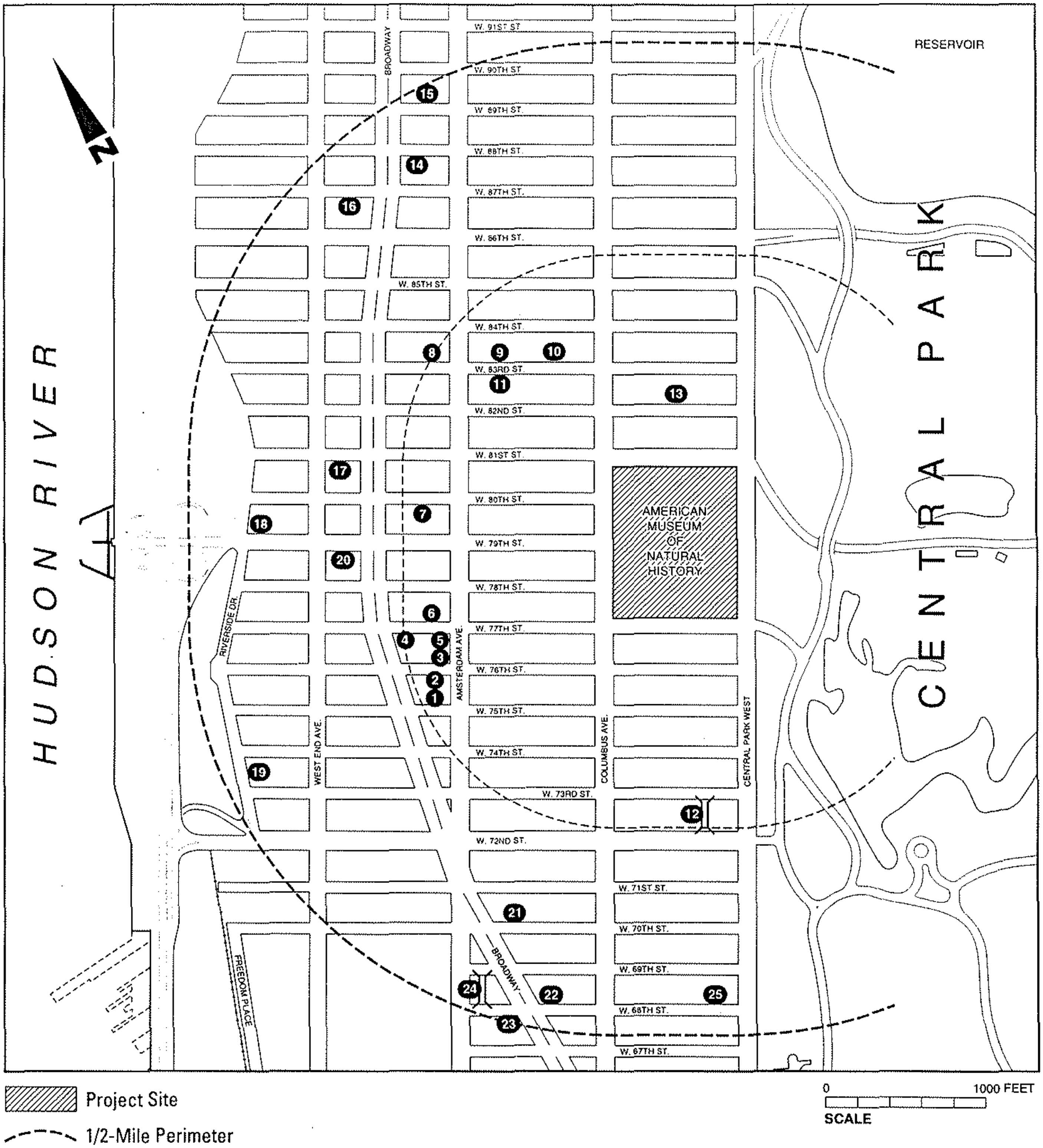
In addition to the surface lot at the Museum, the area contains a substantial number of off-street parking facilities. A survey of off-street parking within ¼- *and* ½-mile radii from the project site identified other off-street public parking facilities (see Figure 12-5). These garages and lots provide 2,807 parking spaces *within the ¼-mile radius and 4,222 parking spaces within the ½-mile radius* (see Table 12-3). Field surveys show an overall utilization of *58* and *73* percent during the weekday midday and PM peak hours, respectively, and *37* percent during the Saturday peak hour *for the garages within ¼ mile of the site, and an overall utilization of 63, 72, and 52 percent for the weekday midday, PM, and Saturday peak hours, respectively, for the garages within ½ mile of the site.*

There is also a supply of free on-street parking in the study area, located primarily on the cross streets, as well as metered parking along selected stretches of Columbus and Amsterdam Avenues. In the project area, alternate side of the street parking/street cleaning regulations are the predominant existing parking regulations on side streets. At the Museum block, parking regulations are alternate side of the street regulations on West 77th and 81st Streets and portions of Central Park West. "No Parking Anytime" regulations are posted along portions of both Columbus Avenue and Central Park West. City bus stops located on the streets bordering the project

Table 12-2
1996 Existing Conditions: 81st Street Museum Lot— Parking Demand and Accumulation

	Weekday						Saturday		
	In		Out		Accumulation		Auto		
Time	Auto	Bus	Auto	Bus	Auto	Bus	In	Out	Accum.
8-9 AM	2	0	0	0	2	0	0	0	0
9-10 AM	5	13	0	0	7	13	19	0	19
10-11 AM	12	13	2	0	17	26	110	2	127
11-12 PM	15	1	3	0	29	27	46	6	167
12-1 PM	18	3	5	20	42	10	25	22	170
1-2 PM	7	0	5	8	44	2	33	38	165
2-3 PM	3	0	7	2	40	0	41	39	167
3-4 PM	13	0	13	0	40	0	35	45	157
4-5 PM	2	1	10	0	32	1	12	61	108
5-6 PM	12	0	5	0	39	1	10	55	63
6-7 PM	11	0	3	0	47	1	21	43	41
7-8 PM	7	0	0	0	54	1	8	26	23
Total 8 AM-8 PM	**107**	**31**	**53**	**30**	**NA**	**NA**	**360**	**337**	**NA**

Source: Edison Parking Corporation surveys November 1995, January and February 1996, and Allee King Rosen & Fleming, Inc. surveys February 1992 and March 1996.



Project Site

1/2-Mile Perimeter

1/4-Mile Perimeter

Parking Facility

Through-Block Facility

Note: Figure Revised for FEIS

Off-Street Parking Locations

Figure 12-5

Table 12-3

Study Area Parking Supply and Utilization

Map Number	Name	Address	License Number	Capacity	Utilization Rates (%) Midday	PM	Saturday
¼-MILE RADIUS							
1	Carousel Parking Corp.	201 West 75th St.	920608	278	25	75	20
2	*Beacon Garage**	*201 West 76th St.*	907840	300	*60*	*75*	*25*
3	*Tristar Parking Corp.**	*201 West 76th St.*	906526	350	100	*90*	*40*
4	*The Hertz Corp.**	201 West 77th St.	427562	250	*30*	*50*	*20*
5	*Paramount Parking**	350 Amsterdam Ave.	906869	400	*40*	*50*	*20*
6	Barmax Parking Corp.*	203 West 77th St.	884128	75	*50*	*70*	*20*
7	Guardian Pearl St. Garage Corp.*	214 West 80th St.	427637	100	*85*	*85*	*75*
8	Reliant Parking Corp.*	225 West 83rd St.	819247	107	*60*	*60*	*30*
9	West Side Parking Garage Corp.	157 West 83rd St.	427587	300	80	100	25
10	West Side Parking Garage Corp.	147 West 83rd St.	427906	200	35	75	50
11	West Side Parking Garage Corp.	150 West 83rd St.	427255	225	85	95	70
12	15 W. 72nd St. Corp.*	15 West 72nd St.	905127	164	50	75	*40*
13	Click Parking Corp.**	5 West 82nd St.	766693	58	*50*	*50*	*50*
Average Utilization					*58*	*73*	*37*
Total Capacity				**2,807**			
½-MILE RADIUS							
14	Katz Parking System Inc.	214 West 88th St.	808321	131	70	70	70
15	Kinney Systems, Inc.	205 West 89th St.	N/A	85	50	35	90
16	Active Parking	2361-2379 Broadway	850402	124	75	80	50
17	Ultra Park, Inc.	424 West End Ave.	788455	83	90	90	95
18	Rapid Riverside Corp.	70 Riverside Drive	921454	80	75	75	75
19	11 Riverside Drive Garage Corp.	11 Riverside Drive	429467	200	N/A	N/A	N/A
20	BEW Parking, Inc.	254 West 79th St.	429522	100	N/A	N/A	N/A
21	Astro Parking Corp.	155 West 70th St.	855640	43	40	40	25
22	Copley Associates	2000 Broadway	833444	57	85	85	85
23	Diligent Parking Corp.	150-180 West 68th St.	817003	158	100	100	100
24	Omni Parking Corp.	143-159 West 68th St.	368822	271	95	95	95
25	Joe Heg Garage Corp.	80 Central Park West	369373	83	25	25	25
Average Utilization *for ¼- and ½-Mile Radii*					*63*	*72*	*52*
Total Capacity for ¼- and ½-Mile Radii				**4,222**			

Notes:

Data collected June 1995 and June 1996 by Allee King Rosen & Fleming.

All garages, with three exceptions, operate 24 hours per day.

The Hertz Corp. (No. 4) operates M-W: 6:30 AM-12 Midnight; Th-Sat: 6:30 AM to 1 AM.

West Side Parking Garage Corp. (Nos. 9 and 10) operates 7 AM to 2 AM daily.

N/A = Not Available.

* *Updated July 25, 1996 by Allee King Rosen & Fleming.*

** *Discussions with personnel at this facility did not produce reliable data. Therefore, utilization has been assumed based on field observations.*

site except West 77th Street further limit on-street parking supply. Within the ¼-mile radius of the project site that constitutes the on-street parking study area, there are approximately 2,296 legal on-street parking spaces during the weekday PM peak period and approximately 1,334 legal on-street parking spaces during the weekday midday and Saturday periods, as determined by a field survey conducted in November 1995. These surveys show an overall utilization rate of 93 percent during the weekday PM peak period and 91 percent during the weekday midday and Saturday peak periods.

D. THE FUTURE WITHOUT THE PROJECT

Traffic and parking conditions in the future without the proposed action were assessed to establish a baseline from which to evaluate the impacts of the proposed project. This baseline is also known as the "No Build" condition. The analysis focuses on 2001, the estimated year of full "normal" operation for the proposed project. An increase in traffic due to the projected increase in Museum attendance between 1996 and 2001 has been factored into the No Build analysis. An annual increase in Museum attendance and employee trips of approximately 670,300 was estimated, as discussed in Chapter 4, "Economic Conditions." For the purposes of the traffic and transportation study, these estimates were adjusted upward by 10 percent to conservatively reflect other non-paid trips to the Museum not reflected in the attendance estimates and then were translated in daily and peak hour travel estimates for a high activity period, as shown in Table 12-4. The approach to estimating vehicular trips and assigning them to the streets in the study area is explained in more detail in section 12.D, below.

Table 12-4
Museum Attendance Growth
Estimated 2001 No Build Incremental Travel Demand

	1996 vs. 2001 No Build Increment											
	Annual		2001 Average Day				2001 High Day					
	1996-2001		Weekday		Saturday		Weekday		Saturday			
	670,350		1,693		2,505		1,907		3,086			
	Person-Trips By Mode											
	Auto		Bus		Taxi		Subway		Walk		Total	
Time	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Modal Split	30.0%		8.0%		13.0%		25.0%		24.0%		100.0%	
Wk 1-2 PM	119	65	32	17	51	28	99	54	95	52	396	216
4-5 PM	37	117	10	31	16	51	31	97	29	93	123	389
Modal Split	50.0%		8.0%		14.0%		9.0%		19.0%		100.0%	
Sat 2-3 PM	289	270	46	43	81	76	52	49	110	103	578	541
	Vehicle-Trips By Mode											
	Auto			Taxi								
Time	In	Out	Total	In	Out	Total						
Wk 1-2 PM	34	19	53	21	11	32						
4-5 PM	11	33	44	6	20	26						
Sat 2-3 PM	83	77	160	32	30	62						

Notes:
* Vehicle occupancy rate to convert person-trips to vehicle trips for autos is 3.5 persons per vehicle.
** Vehicle occupancy rate to convert person-trips to vehicle trips for taxis is 2.5 persons per vehicle.

The Museum's level of school bus traffic is not expected to change substantially in the future. Based on the population projections for school age children and the already heavy level of *visitation*, the number of school groups and school buses is not expected to grow significantly from existing conditions. With the increased attendance expected at the Museum in the future, additional tour buses are expected. Beginning in 1996, the Museum expects to generate demand for 5 to 10 tour buses per day. By 2001 the number of tour buses could reach 10 to 15 per day. On peak days there might be as many as 25 tour buses. The tour bus activity would be primarily on weekdays, with only minimal weekend activity. Tour bus arrivals would be concentrated between 11 AM and noon, with departures generally between 2 and 3 PM. Therefore, the potential growth in tour bus activity would generally occur outside of the peak traffic periods. However, tour buses would overlap school buses, leading to more competition for limited parking and perhaps increasing double parking around the project site. In recognition of this current and continuing problem, the Museum is preparing a bus management plan, as discussed below.

In addition to traffic generated by the Planetarium and North Side project, the forecast of future conditions in 2001 included the trips generated by the Related Companies' proposed mixed-use residential (265 dwelling units) and retail (8,000 square feet) project on Amsterdam Avenue between West 89th and 90th Streets. Besides these specific increments, a background growth factor of 0.50 percent per year (as suggested in the *City Environmental Quality Review [CEQR] Technical Manual*), for a total of 2.5 percent by 2001, was applied to the baseline network.

TRAFFIC CONDITIONS

INTERSECTION ANALYSIS

Vehicular trips generated by the known background project were assigned to the avenues and streets of the study area based on their most likely travel paths to and from the site. The traffic generated by the increased Museum attendance was assigned to the network based on directional travel patterns at the Museum. Accounting for these various incremental changes and the overall yearly background growth rate, traffic volumes were estimated for the study area for the 2001 No Build analysis year.

The 2001 No Build traffic volumes are shown in Figures 12-6 through 12-8, and the delays, v/c ratios, and LOS for the signalized intersections are listed in Table 12-5.

By 2001, due to the increases in network traffic, conditions at some locations in the network are likely to deteriorate. The projected changes in traffic volumes will create the following notable changes in LOS during the weekday midday peak hour: at the intersections bordering the project site, the northbound Central Park West approach at West 77th Street will drop from LOS C to D; in the larger study area, the southbound Central Park West approach at West 72nd Street will also drop from LOS C to D.

During the weekday PM peak hour, at the intersections bordering the project site, the northbound Central Park West approach at West 77th Street will drop from LOS D to F, and the southbound Central Park West left-turn movement at West 81st Street will drop from LOS B to F. In the larger study area, the eastbound West 72nd Street left-turn movement at Central Park West will drop from LOS D to E, the northbound Central Park West approach at West 72nd Street will drop from LOS D to E, and the southbound Central Park West left-turn movement at West 86th Street will drop from LOS B to F.

Table 12-5
Signalized Intersections:
1996 Existing and 2001 No Build Conditions Level of Service Analyses

Intersection	Lane Group	Midday Existing V/C Ratio	Existing Delay (seconds)	Existing LOS	Existing Approach Delay	Existing Approach LOS	Existing Intersection Delay	Existing Intersection LOS	No Build V/C Ratio	No Build Delay (seconds)	No Build LOS	No Build Approach Delay	No Build Approach LOS	No Build Intersection Delay	No Build Intersection LOS
Central Park West & West 72nd Street															
Eastbound	DfL	1.04	85.1	F	34.7	D	20.4	C	1.11	113.8	F	43.0	E	25.9	D
	TR	0.44	14.7	B					0.45	14.8	B				
Westbound	LTR	0.61	16.6	C	16.6	C			0.63	16.9	C	16.9	C		
Northbound	LTR	0.84	13.6	B	13.6	B			0.90	16.9	C	16.9	C		
Southbound	LTR	0.91	18.2	C	18.2	C			0.98	27.2	D	27.2	D		
Central Park West & West 76th Street															
Eastbound	LTR	0.15	14.5	B	14.5	B	7.3	B	0.16	14.6	B	14.6	B	7.5	B
Northbound	T	0.55	6.3	B	6.3	B			0.57	6.5	B	6.5	B		
Southbound	T	0.66	7.2	B	7.2	B			0.69	7.5	B	7.5	B		
Central Park West & West 77th Street															
Eastbound	LTR	0.28	14.9	B	14.9	B	14.2	B	0.29	14.9	B	14.9	B	16.1	C
Northbound	LT	0.95	20.9	C	20.9	C			1.01	25.0	C	25.0	C		
Southbound	TR	0.70	8.2	B	8.2	B			0.72	8.5	B	8.5	B		
Central Park West & West 81st Street															
Eastbound	LTR	0.30	15.5	C	15.5	C	19.8	C	0.32	15.6	C	15.6	C	24.9	C
Westbound	DfL	1.05	75.1	F	38.2	D			1.12	107.5	F	50.3	E		
	TR	0.66	19.2	C					0.69	19.8	C				
Northbound	LTR	0.80	9.8	B	9.8	B			0.84	11.2	B	11.2	B		
Southbound	LTR	0.78	9.6	B	9.6	B			0.83	11.4	B	11.4	B		
Central Park West & West 82nd Street															
Eastbound	LTR	0.46	17.3	C	17.3	C	6.9	B	0.48	17.5	C	17.5	C	7.0	B
Northbound	T	0.53	6.1	B	6.1	B			0.55	6.3	B	6.3	B		
Southbound	T	0.43	5.6	B	5.6	B			0.44	5.7	B	5.7	B		
Central Park West & West 86th Street															
Eastbound	LTR	0.78	26.5	D	26.5	D	18.0	C	0.80	27.4	D	27.4	D	19.6	C
Westbound	LTR	0.70	17.6	C	17.6	C			0.72	18.0	C	18.0	C		
Northbound	LTR	0.87	15.1	C	15.1	C			0.92	18.6	C	18.6	C		
Southbound	LTR	0.83	14.1	B	14.1	B			0.87	16.2	C	16.2	C		
Columbus Avenue & West 72nd Street															
Eastbound	TR	0.47	15.0	B	15.0	B	11.2	B	0.48	15.1	C	15.1	C	11.4	B
Westbound	DfL	0.64	20.3	C	15.4	C			0.67	21.6	C	15.9	C		
	T	0.26	13.3	B					0.26	13.3	B				
Southbound	LTR	0.67	9.1	B	9.1	B			0.69	9.3	B	9.3	B		
Columbus Avenue & West 76th Street															
Eastbound	TR	0.53	18.7	C	18.7	C	8.7	B	0.55	18.9	C	18.9	C	9.0	B
Southbound	LT	0.76	7.6	B	7.6	B			0.79	7.9	B	7.9	B		
Columbus Avenue & West 77th Street															
Westbound	LT	0.29	15.9	C	15.9	C	9.0	B	0.29	15.9	C	15.9	C	9.4	B
Southbound	LTR	0.79	8.1	B	8.1	B			0.82	8.6	B	8.6	B		
Columbus Avenue & West 78th Street															
Eastbound	R	0.21	15.4	C	15.4	C	6.2	B	0.21	15.4	C	15.4	C	6.2	B
Southbound	T	0.54	5.7	B	5.7	B			0.56	5.7	B	5.7	B		
Columbus Avenue & West 79th Street															
Eastbound	R	0.23	17.5	C	17.5	C	7.4	B	0.24	17.5	C	17.5	C	7.8	B
Southbound	TR	0.80	6.2	B	6.2	B			0.83	6.6	B	6.6	B		
Columbus Avenue & West 80th Street															
Eastbound	R	0.28	15.9	C	15.9	C	5.8	B	0.29	15.9	C	15.9	C	5.9	B
Southbound	T	0.42	5.1	B	5.1	B			0.43	5.1	B	5.1	B		
Columbus Avenue & West 81st Street															
Eastbound	TR	0.78	32.2	D	32.2	D	18.2	C	0.81	34.6	D	34.6	D	18.7	C
Westbound	L	0.52	22.9	C	22.9	C			0.54	23.1	C	23.1	C		
Southbound	LT	0.67	14.9	B	14.9	B			0.69	15.1	C	15.1	C		
Columbus Avenue & West 82nd Street															
Eastbound	TR	0.46	17.6	C	17.6	C	6.6	B	0.48	17.8	C	17.8	C	6.7	B
Southbound	LT	0.46	5.3	B	5.3	B			0.47	5.3	B	5.3	B		
Columbus Avenue & West 86th Street															
Eastbound	TR	0.37	14.1	B	14.1	B	12.4	B	0.38	14.1	B	14.1	B	12.6	B
Westbound	LT	0.58	16.0	C	16.0	C			0.61	16.3	C	16.3	C		
Southbound	LTR	0.69	9.5	B	9.5	B			0.72	9.7	B	9.7	B		
Amsterdam Avenue & West 79th Street															
Eastbound	DfL	0.61	19.0	C	16.2	C	10.3	B	0.66	21.1	C	17.4	C	10.5	B
	T	0.26	13.3	B					0.27	13.4	B				
Westbound	TR	0.30	13.5	B	13.5	B			0.31	13.6	B	13.6	B		
Northbound	LTR	0.51	7.9	B	7.9	B			0.53	8.0	B	8.0	B		
Amsterdam Avenue & West 80th Street															
Eastbound	LT	0.42	17.0	C	17.0	C	6.7	B	0.43	17.1	C	17.1	C	6.7	B
Northbound	TR	0.43	5.1	B	5.1	B			0.45	5.2	B	5.2	B		
Amsterdam Avenue & West 81st Street															
Northbound	LTR	0.49	5.4	B	5.4	B	5.4	B	0.50	5.5	B	5.5	B	5.5	B

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; TR=Through & right turn movements; LTR=Left turn, through, & right turn movements; and DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersectons, determined by delay in seconds).

Table 12-5 (Continued)

Signalized Intersections: 1996 Existing and 2001 No Build Conditions Level of Service Analyses

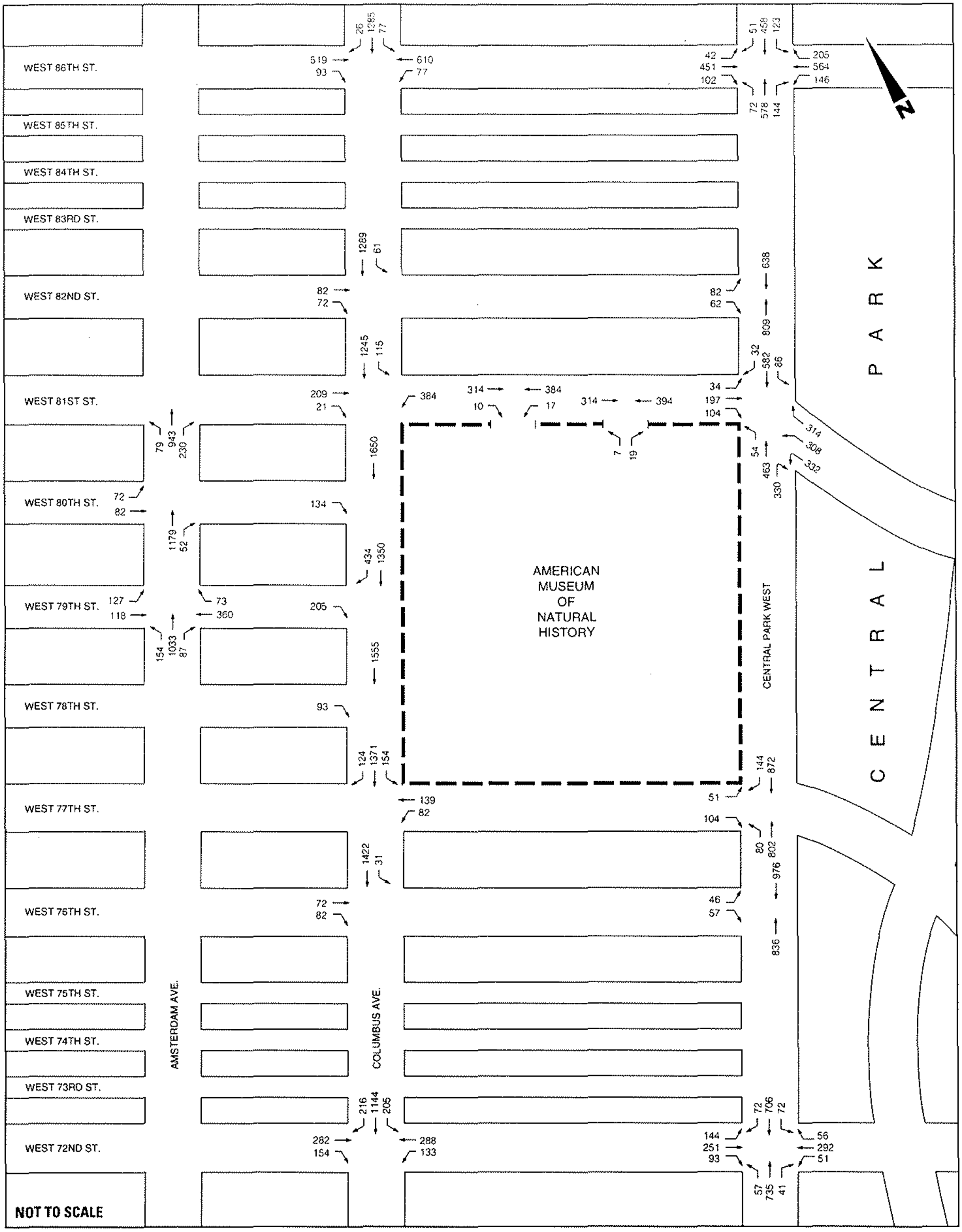
	PM															
	Existing								No Build							
					Approach		Intersection						Approach		Intersection	
Intersection	Lane Group	V/C Ratio	Delay *(seconds)*	LOS	Delay	LOS	Delay	LOS	Lane Group	V/C Ratio	Delay *(seconds)*	LOS	Delay	LOS	Delay	LOS
Central Park West & West 72nd Street																
Eastbound	DfL	0.86	40.0	D	23.0	C	23.0	C	DfL	0.90	47.6	E	25.1	D	31.0	D
	TR	0.42	16.4	C					TR	0.43	16.5	C				
Westbound	LTR	0.52	17.5	C	17.5	C			LTR	0.54	17.7	C	17.7	C		
Northbound	LTR	1.03	34.6	D	34.6	D			LTR	1.08	53.6	E	53.6	E		
Southbound	LTR	0.69	8.0	B	8.0	B			LTR	0.73	8.6	B	8.6	B		
Central Park West & West 76th Street																
Eastbound	LTR	0.13	14.4	B	14.4	B	6.8	B	LTR	0.14	14.4	B	14.4	B	7.0	B
Northbound	T	0.63	6.9	B	6.9	B			T	0.65	7.1	B	7.1	B		
Southbound	T	0.43	5.6	B	5.6	B			T	0.45	5.7	B	5.7	B		
Central Park West & West 77th Street																
Eastbound	LTR	0.26	14.7	B	14.7	B	21.6	C	LTR	0.28	14.8	B	14.8	B	34.0	D
Northbound	LTR	1.04	30.1	D	30.1	D			LTR	1.12	52.7	E	52.7	E		
Southbound	LTR	0.83	11.9	B	11.9	B			LTR	0.87	13.8	B	13.8	B		
Central Park West & West 81st Street																
Eastbound	LTR	0.37	16.0	C	16.0	C	20.4	C	LTR	0.40	16.2	C	16.2	C	44.1	E
Westbound	DfL	1.05	85.0	F	41.8	E			DfL	1.13	124.4	F	57.3	E		
	TR	0.38	16.1	C					TR	0.40	16.2	C				
Northbound	LTR	0.90	14.2	B	14.2	B			LTR	0.94	17.8	C	17.8	C		
Southbound	LTR	0.88	14.3	B	14.3	B			DfL	1.54	349.5	F	88.7	F		
									TR	0.76	9.7	B				
Central Park West & West 82nd Street																
Eastbound	LTR	0.51	18.1	C	18.1	C	7.0	B	LTR	0.52	18.3	C	18.3	C	7.1	B
Northbound	T	0.51	6.1	B	6.1	B			T	0.53	6.2	B	6.2	B		
Southbound	T	0.36	5.3	B	5.3	B			T	0.38	5.4	B	5.4	B		
Central Park West & West 86th Street																
Eastbound	LTR	1.00	47.0	E	47.0	E	27.6	D	LTR	1.03	56.4	E	56.4	E	83.1	F
Westbound	LTR	0.61	16.3	C	16.3	C			LTR	0.63	16.5	C	16.5	C		
Northbound	LTR	1.00	30.9	D	30.9	D			LTR	1.08	54.6	E	54.6	E		
Southbound	LTR	0.88	17.1	C	17.1	C			DfL	1.88	1103.6	F	267.6	F		
									TR	0.77	12.6	B				
Columbus Avenue & West 72nd Street																
Eastbound	TR	0.60	16.5	C	16.5	C	12.2	B	TR	0.61	16.7	C	16.7	C	12.5	B
Westbound	DfL	0.51	17.2	C	14.1	B			DfL	0.54	18.1	C	14.4	B		
	T	0.25	13.2	B					T	0.26	13.3	B				
Southbound	LTR	0.79	10.6	B	10.6	B			LTR	0.82	11.0	B	11.0	B		
Columbus Avenue & West 76th Street																
Eastbound	TR	0.43	17.3	C	17.3	C	8.2	B	TR	0.45	17.5	C	17.5	C	8.6	B
Southbound	LT	0.75	7.5	B	7.5	B			LT	0.78	7.8	B	7.8	B		
Columbus Avenue & West 77th Street																
Westbound	LT	0.23	15.5	C	15.5	C	9.0	B	LT	0.24	15.5	C	15.5	C	9.5	B
Southbound	LTR	0.81	8.4	B	8.4	B			LTR	0.84	8.9	B	8.9	B		
Columbus Avenue & West 78th Street																
Eastbound	R	0.30	16.0	C	16.0	C	6.4	B	R	0.31	16.1	C	16.1	C	6.6	B
Southbound	T	0.55	5.7	B	5.7	B			T	0.57	5.8	B	5.8	B		
Columbus Avenue & West 79th Street																
Eastbound	R	0.28	17.8	C	17.8	C	7.1	B	R	0.29	17.8	C	17.8	C	7.3	B
Southbound	TR	0.74	5.3	B	5.3	B			TR	0.77	5.6	B	5.6	B		
Columbus Avenue & West 80th Street																
Eastbound	R	0.18	15.2	C	15.2	C	5.6	B	R	0.19	15.3	C	15.3	C	5.7	B
Southbound	T	0.44	5.1	B	5.1	B			T	0.45	5.2	B	5.2	B		
Columbus Avenue & West 81st Street																
Eastbound	TR	1.04	76.8	F	76.8	F	24.8	C	TR	1.07	88.8	F	88.8	F	26.7	D
Westbound	L	0.39	21.8	C	21.8	C			L	0.41	21.9	C	21.9	C		
Southbound	LT	0.72	15.4	C	15.4	C			LT	0.74	15.7	C	15.7	C		
Columbus Avenue & West 82nd Street																
Eastbound	TR	0.39	16.9	C	16.9	C	6.5	B	TR	0.40	16.9	C	16.9	C	6.6	B
Southbound	LT	0.52	5.5	B	5.5	B			LT	0.53	5.6	B	5.6	B		
Columbus Avenue & West 86th Street																
Eastbound	TR	0.64	16.6	C	16.6	C	16.7	C	TR	0.65	16.8	C	16.8	C	17.4	C
Westbound	DfL	1.02	74.3	F	28.2	D			DfL	1.04	82.9	F	30.2	D		
	T	0.59	16.1	C					T	0.60	16.3	C				
Southbound	LTR	0.70	9.6	B	9.6	B			LTR	0.72	9.8	B	9.8	B		
Amsterdam Avenue & West 79th Street																
Eastbound	DfL	0.51	16.1	C	15.0	B	9.8	B	DfL	0.55	16.9	C	15.4	C	9.9	B
	T	0.35	14.0	B					T	0.36	14.1	B				
Westbound	TR	0.20	13.0	B	13.0	B			TR	0.21	13.0	B	13.0	B		
Northbound	LTR	0.60	8.4	B	8.4	B			LTR	0.62	8.6	B	8.6	B		
Amsterdam Avenue & West 80th Street																
Eastbound	LT	0.55	18.9	C	18.9	C	6.7	B	LT	0.56	19.2	C	19.2	C	6.8	B
Northbound	TR	0.51	5.5	B	5.5	B			TR	0.53	5.6	B	5.6	B		
Amsterdam Avenue & West 81st Street																
Northbound	LTR	0.60	6.0	B	6.0	B	6.0	B	LTR	0.62	6.1	B	6.1	B	6.1	B

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; TR=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersecton, determined by delay in seconds).

Table 12-5 (Continued)
Signalized Intersections:
1996 Existing and 2001 No Build Conditions Level of Service Analyses

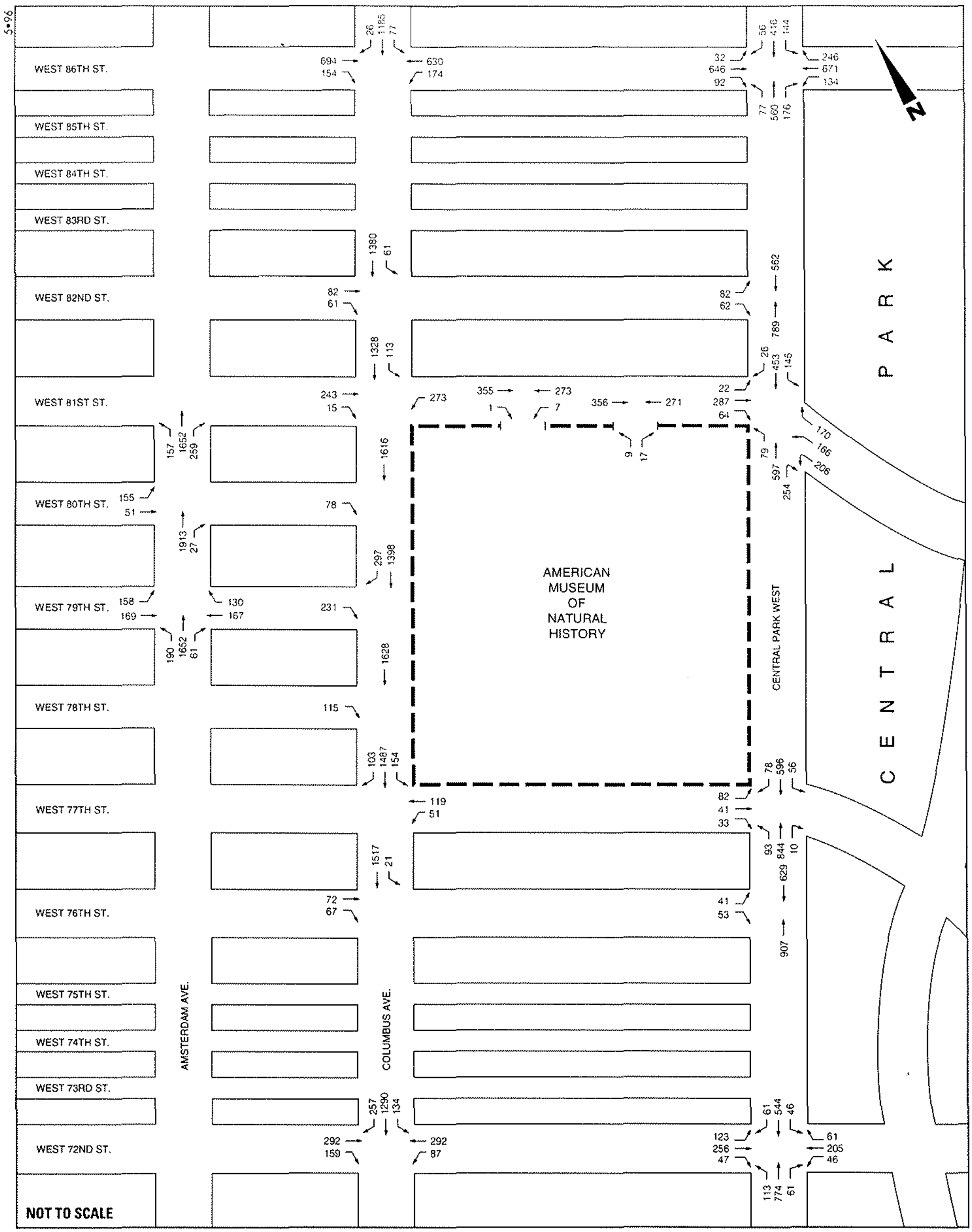
		Saturday														
		Existing							No Build						
	Lane	V/C	Delay		Approach		Intersection		V/C	Delay		Approach		Intersection	
Intersection	Group	Ratio	(seconds)	LOS	Delay	LOS	Delay	LOS	Ratio	(seconds)	LOS	Delay	LOS	Delay	LOS
Central Park West & West 72nd Street															
Eastbound	LTR	0.27	13.4	B	13.4	B	13.8	B	0.28	13.4	B	13.4	B	17.3	C
Northbound	LT	0.91	18.8	C	18.8	C			1.00	26.8	D	26.8	D		
Southbound	TR	0.74	10.5	B	10.5	B			0.78	11.3	B	11.3	B		
Central Park West & West 76th Street															
Eastbound	LTR	0.18	14.7	B	14.7	B	6.8	B	0.19	14.7	B	14.7	B	7.0	B
Northbound	T	0.49	5.9	B	5.9	B			0.51	6.1	B	6.1	B		
Southbound	T	0.56	6.4	B	6.4	B			0.59	6.6	B	6.6	B		
Central Park West & West 77th Street															
Eastbound	LTR	0.21	14.4	B	14.4	B	12.2	B	0.23	14.5	B	14.5	B	14.5	B
Northbound	LT	0.91	16.6	C	16.6	C			0.99	21.6	C	21.6	C		
Southbound	TR	0.67	7.9	B	7.9	B			0.70	8.2	B	8.2	B		
Central Park West & West 81st Street															
Eastbound	LTR	0.49	17.0	C	17.0	C	34.6	D	0.53	17.4	C	17.4	C	56.0	E
Westbound	DfL	1.02	71.1	F	36.7	D			1.08	97.9	F	47.1	E		
	TR	0.34	15.7	C					0.37	16.0	C				
Northbound	LTR	1.05	43.2	E	43.2	E			1.14	83.2	F	83.2	F		
Southbound	DfL	1.03	66.5	F	35.3	D			1.13	108.0	F	53.5	E		
	TR	0.98	25.2	D					1.02	34.9	D				
Central Park West & West 82nd Street															
Eastbound	LTR	0.49	17.5	C	17.5	C	6.8	B	0.50	17.6	C	17.6	C	6.9	B
Northbound	T	0.27	4.9	A	4.9	A			0.28	5.0	A	5.0	A		
Southbound	T	0.50	6.0	B	6.0	B			0.53	6.1	B	6.1	B		
Central Park West & West 86th Street															
Eastbound	LTR	0.64	23.2	C	23.2	C	15.4	C	0.69	24.1	C	24.1	C	16.7	C
Westbound	LTR	0.58	16.0	C	16.0	C			0.60	16.2	C	16.2	C		
Northbound	LTR	0.81	13.2	B	13.2	B			0.87	16.3	C	16.3	C		
Southbound	LTR	0.71	10.3	B	10.3	B			0.76	11.4	B	11.4	B		
Columbus Avenue & West 72nd Street															
Eastbound	TR	0.41	14.4	B	14.4	B	13.3	B	0.42	14.5	B	14.5	B	14.5	B
Westbound	DfL	0.28	13.6	B	13.0	B			0.29	13.7	B	13.0	B		
	T	0.18	12.8	B					0.18	12.8	B				
Southbound	LTR	0.90	13.1	B	13.1	B			0.93	14.6	B	14.6	B		
Columbus Avenue & West 76th Street															
Eastbound	TR	0.48	17.9	C	17.9	C	20.9	C	0.49	18.0	C	18.0	C	29.9	D
Southbound	LT	1.00	21.1	C	21.1	C			1.04	30.7	D	30.7	D		
Columbus Avenue & West 77th Street															
Westbound	LT	0.28	15.9	C	15.9	C	15.1	C	0.30	15.9	C	15.9	C	21.3	C
Southbound	LTR	0.96	15.0	B	15.0	B			1.00	21.8	C	21.8	C		
Columbus Avenue & West 78th Street															
Eastbound	R	0.22	15.4	C	15.4	C	8.0	B	0.25	15.6	C	15.6	C	8.5	B
Southbound	T	0.79	7.8	B	7.8	B			0.82	8.2	B	8.2	B		
Columbus Avenue & West 79th Street															
Eastbound	R	0.24	17.6	C	17.6	C	10.5	B	0.25	17.6	C	17.6	C	13.8	B
Southbound	TR	0.93	9.7	B	9.7	B			0.97	13.4	B	13.4	B		
Columbus Avenue & West 80th Street															
Eastbound	R	0.29	15.9	C	15.9	C	6.1	B	0.30	16.0	C	16.0	C	6.2	B
Southbound	T	0.51	5.5	B	5.5	B			0.53	5.6	B	5.6	B		
Columbus Avenue & West 81st Street															
Eastbound	TR	0.99	62.9	F	62.9	F	26.7	D	1.07	88.7	F	88.7	F	32.4	D
Westbound	L	0.53	23.0	C	23.0	C			0.61	23.9	C	23.9	C		
Southbound	LT	0.94	22.4	C	22.4	C			0.98	26.0	D	26.0	D		
Columbus Avenue & West 82nd Street															
Eastbound	TR	0.35	16.4	C	16.4	C	7.2	B	0.36	16.5	C	16.5	C	7.3	B
Southbound	LT	0.67	6.5	B	6.5	B			0.69	6.7	B	6.7	B		
Columbus Avenue & West 86th Street															
Eastbound	TR	0.39	14.2	B	14.2	B	17.8	C	0.41	14.4	B	14.4	B	21.3	C
Westbound	LT	0.52	15.4	C	15.4	C			0.54	15.5	C	15.5	C		
Southbound	LTR	0.97	19.9	C	19.9	C			1.01	25.8	D	25.8	D		
Amsterdam Avenue & West 79th Street															
Eastbound	DfL	0.36	14.3	B	13.7	B	9.6	B	0.42	15.0	B	14.1	B	9.8	B
	T	0.24	13.2	B					0.25	13.3	B				
Westbound	TR	0.22	13.1	B	13.1	B			0.24	13.2	B	13.2	B		
Northbound	LTR	0.53	8.0	B	8.0	B			0.54	8.1	B	8.1	B		
Amsterdam Avenue & West 80th Street															
Eastbound	LT	0.59	19.7	C	19.7	C	7.2	B	0.62	20.2	C	20.2	C	7.4	B
Northbound	TR	0.45	5.2	B	5.2	B			0.48	5.3	B	5.3	B		
Amsterdam Avenue & West 81st Street															
Northbound	LTR	0.51	5.5	B	5.5	B	5.5	B	0.54	5.6	B	5.6	B	5.6	B

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; TR=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersectons, determined by delay in seconds).



2001 No Build Traffic Volumes • MD Peak Hour

Figure 12-6



2001 No Build Traffic Volumes • PM Peak Hour

Figure 12-7

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

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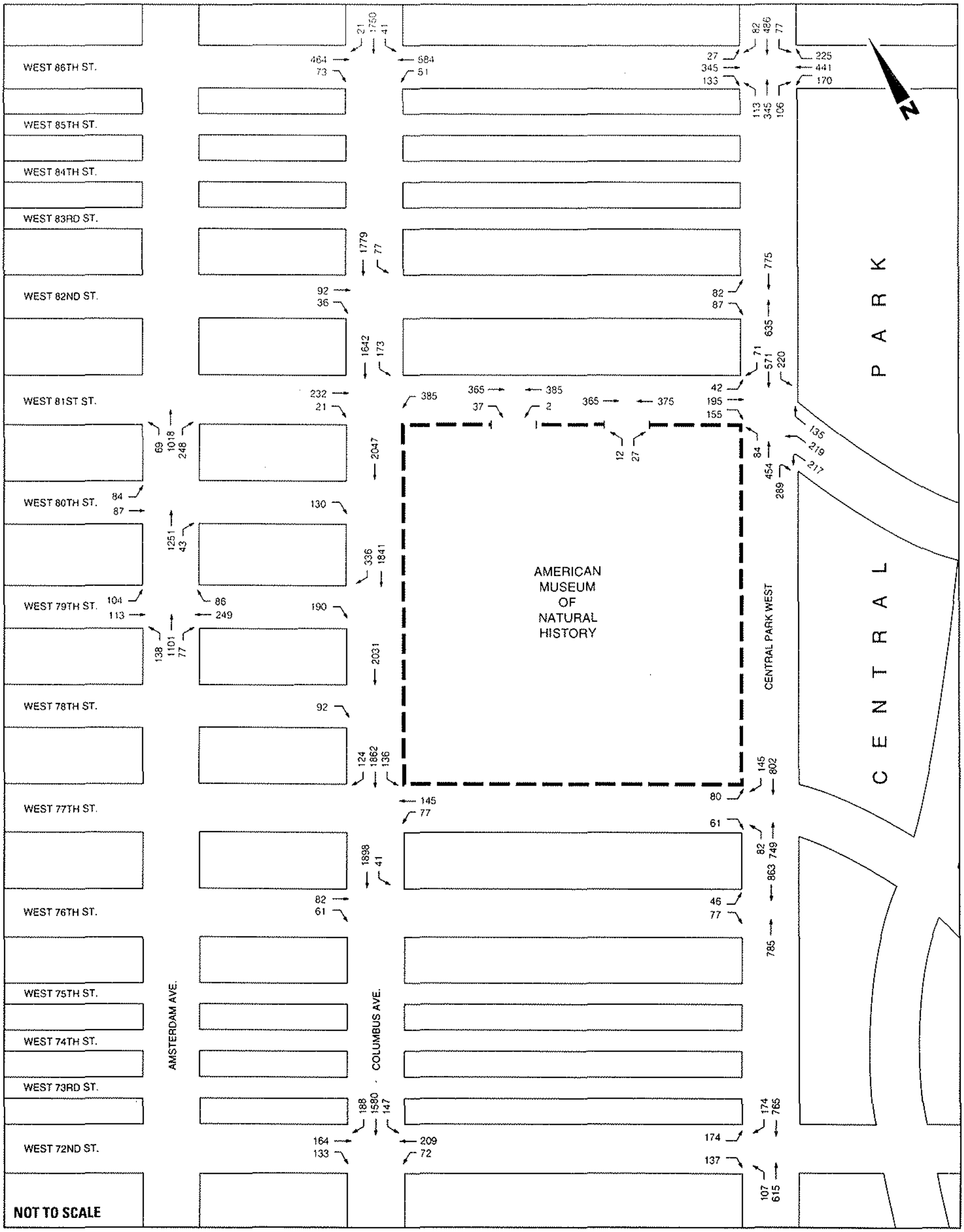

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

2001 No Build Traffic Volumes • Saturday Peak Hour

Figure 12-8

During the Saturday peak hour, at the intersections bordering the project site, the northbound Central Park West approach at West 77th Street will drop from LOS C to D, the northbound Central Park West approach at West 81st Street will drop from LOS E to F, the southbound Central Park West shared through-right movement will drop from LOS C to D, and the southbound Columbus Avenue approach at 81st Street will drop from LOS C to D. In the larger study area, the northbound Central Park West approach at West 72nd Street will drop from LOS C to D, the westbound West 86th Street approach at Central Park West will drop from LOS C to D, and the southbound Columbus Avenue approach at West 86th Street will drop from LOS C to D.

WEST 81st STREET

Traffic Conditions

In the future, additional cars from increases in attendance at the Museum will add to traffic friction on West 81st Street, unless steps are taken to resolve these problems (see discussion under "Transportation Management Plan," below). As a worst case, without traffic and parking management, the increased demand for Museum parking will adversely affect traffic conditions on weekends during the midday hours. This will occur because the period in which the lot is full will lengthen as will the time vehicles line up and wait to enter the West 81st Street driveway. These, in turn, will extend the period of weekend congestion associated with conflicts and friction at the driveway. With the projected increases in Museum traffic without the project, the lot is expected to fill before noon, and the conditions associated with driveway backup will continue until nearly 4 PM. More information on parking supply is provided *under "Parking Supply and Utilization,"* below.

Buses

Because the Museum currently draws groups from the full range of City and suburban schools, school bus activity is not expected to grow significantly in the future. Therefore, the issues caused by school bus backups and on-street parking/standing would likely continue without the project. With the increased attendance expected at the Museum in the future, additional tour buses are expected. An estimated 10 to 15 additional buses would travel to the Museum on a weekday.

TRANSPORTATION MANAGEMENT PLAN

During the environmental review of the proposed Planetarium and North Side project, the Museum committed to initiating an ongoing transportation planning effort covering all aspects of Museum-related transportation services. This will include visitors' trips by all modes (e.g., auto, taxi, subway, bus, bicycle and walking), employee trips, planning for special events, and management of parking and service and delivery vehicles. The Museum will hire a full-time employee to serve as the transportation coordinator and will provide managerial and support staff from appropriate departments to design, implement, and maintain the plan. Departments expected to participate include Operations, Communications, Visitor Services, Security, and Governmental Relations. Without successful transportation management, traffic friction currently associated with some Museum operations will continue.

The transportation management plan will include the following components:

- *Define specific objectives and responsibilities for the Transportation Management Plan to establish a clear management mandate and establish parameters for plan evaluation.*

- *Monitor travel demand and service characteristics at the Museum and Planetarium.*
- *Deploy staff at all appropriate times to monitor and coordinate activities affecting traffic surrounding the site with particular emphasis on preventing a queue from forming when the parking lot is full, overseeing service vehicles, and controlling conditions at drop-off points.*
- *Implement and ensure proper operation of a bus management plan (see below).*
- *See that on-site parking operations are managed to meet the transportation plan requirements.*
- *Coordinate with off-site parking providers.*
- *Manage on-site loading and service operations.*
- *Design and implement a transportation communications system, including clear signage, for all transportation services.*
- *Coordinate with public transportation providers to design, implement, and maintain an effective program to promote visitors' and employees' use of public transportation.*
- *Provide bicycle racks and promote bicycle use and safety.*
- *Plan transportation services for special events and assure effective implementation.*

Each component will have an implementation plan identifying service objectives, operations, implementation, staffing requirement, and responsible personnel. As part of the plan, the Museum will maintain regular communications regarding transportation-related concerns with the Community Board, local block associations, New York City Transit, the New York City Police Department, New York City Department of Parks and Recreation's (DPR) Parks Enforcement Patrol, NYCDOT, and elected officials.

In response to concerns raised in planning for the proposed project, preparation of the bus management portion of the plan was accelerated and a draft of the plan was presented during public review of the DEIS. The plan includes a summary of existing bus demand characteristics and a description of bus operations in terms of unloading, loading, and parking, followed by presentation of two related bus management plans, The first, called the Immediate Plan, addresses problems today and plans for the future. The second accommodates the Planetarium and North Side project, making use of the proposed garage in the optimum way for the management of buses at the Museum. The bus management plan is summarized below and is included as Appendix E of the FEIS.

Existing Bus Operations

Two types of buses deliver school and camp groups to the Museum: the majority are yellow school buses, and some are larger coach-type buses (longer and higher than yellow school buses). The total number of buses coming to the Museum can vary from fewer than 25 to more than 100 in a day. During the past 12 months, on approximately half of the non-holiday weekdays, fewer than 26 buses came to the Museum; 18 percent of the days were heavy, with more than 65 buses.

Buses unload and groups enter the Museum at three locations:

- *West 81st, usually in the parking lot or on the driveway in front of the Planetarium, but occasionally on West 81st Street itself;*
- *Central Park West southbound; and*
- *West 77th Street westbound.*

The largest proportion, approximately 60 to 80 percent, arrive on West 81st Street. The loading of buses is more dispersed, and includes additional nearby curbside locations. Some buses leave the area between drop-off and pick-up, but most stay and park, either in the Museum lot, where 20 to 25 spaces are made available, or on streets around the site, often double-parking.

Immediate Bus Management Plan

Current problems will be addressed by focusing on four areas: 1) instituting stronger control of bus operations through a reservation system; 2) engaging a transportation coordinator with the authority and support to control bus operations, 3) reorganizing loading operations in the lot, on the driveway, and on the street, and 4) implementing a bus parking plan. The reservation and scheduling system would be required for all buses serving school and camp groups.

All groups would be scheduled, and would receive advance travel information including an assigned arrival and departure time and drop-off location. On arrival, each would also be assigned a parking location. The transportation coordinator would be responsible for managing the bus plan and his or her duties would include advance scheduling for orderly arrival, parking, and departure of buses; and on-site and curbside management to see that the plan is implemented. The reorganization of loading operations calls for providing more loading spaces at the lot, on West 81st Street, and possibly on Central Park West and West 77th Street. The parking plan, which is intended to eliminate double-parking and idling buses on streets surrounding the Museum, calls for optimizing use of both the on-site lot and a satellite location for bus parking. The Museum is currently in negotiation with DPR for use of one of three lots at Yankee Stadium as a bus parking facility.

If the Museum is not able to design and implement a successful bus management plan, the adverse conditions associated with bus loading and parking will persist in the future and will continue to contribute to weekday parking and traffic congestion problems in the area surrounding the site.

PARKING SUPPLY AND UTILIZATION

The increase in attendance at the Museum will affect accumulation patterns at the parking lot on West 81st Street (see Table 12-6). If the project is not built, the site is expected to retain its 180-space surface lot. On weekdays, the lot will generally continue to accommodate the project demand, but on weekends, given the increase in attendance, the lot will fill up at an earlier hour and will stay at capacity for a longer period of time. (For the parking demand analysis in this chapter, the temporal distribution of auto trips generated by Museum *visitors* has been adjusted to account for the fact that approximately 50 percent of the visitors on a Saturday and 30 percent on a weekday stay in the area after exiting the Museum during the analysis hour(s). Therefore, the traffic analysis in this document conservatively accounts for the peak hour volume of people entering and exiting the Museum, while the parking accumulation conservatively reflects the probability that departure from the area would be spread out because some *visitors* stay in the area for other activities.) Currently, the excess demand for the lot—i.e., *visitors* attempt to park at the lot, but are unable to when it is full—is estimated to reach approximately 30 to 60 vehicles per hour during the Saturday midday. Under the No Build condition, the excess demand will increase to up to approximately 60 to 80 vehicles in an hour. In addition, the period in which the lot is at capacity will begin earlier and last somewhat longer. The increased parking demand under No Build conditions will utilize spaces at other curbside and off-street locations. The survey of parking facilities in the area (see Table 12-3, above), indicates that there is enough available capacity *in off-street garages* to absorb the demand. *However, on-street parking spaces are in short supply.* As parking near the site becomes scarcer, some *visitors* will need to park at locations farther from the Museum than they might otherwise choose.

Table 12-6

2001 No Build Conditions: 81st Street Museum Lot—Parking Demand and Accumulation

	Weekday						Saturday					
	On-Site Parking Demand				Accumulation		On-Site Parking Demand		Parking Lot Trips Accom on Site		Accumu-lation	Hrly Excess Demand
	Auto		Bus									
Time	In	Out	In	Out	Auto	Bus	In	Out	In	Out		
8-9 AM	2	0	0	0	2	0	0	0	0	0	0	0
9-10 AM	5	0	13	0	7	13	19	0	19	0	19	0
10-11 AM	19	3	13	0	23	26	137	4	137	4	152	0
11-12 PM	22	5	1	0	40	27	84	13	41	13	180	44
12-1 PM	23	9	3	20	54	10	99	36	36	36	180	63
1-2 PM	16	10	0	8	61	2	125	63	63	63	180	62
2-3 PM	10	13	0	2	57	0	150	78	78	78	180	73
3-4 PM	19	21	0	0	55	0	73	96	52	52	180	21
4-5 PM	5	19	1	0	41	1	33	154	33	91	122	0
5-6 PM	13	11	0	0	43	1	23	156	23	93	52	0
6-7 PM	11	3	0	0	51	1	21	102	21	30	43	0
7-8 PM	7	0	0	0	58	1	8	26	8	5	46	0
Total 8 AM-8 PM	**152**	**95**	**31**	**30**	**NA**	**NA**	**772**	**726**	**510**	**464**	**NA**	**NA**

Source: Edison Parking Corporation surveys November 1995, January and February 1996, and Allee King Rosen & Fleming, Inc. surveys February 1992 and March 1996.

E. PROBABLE IMPACTS OF THE PROPOSED PROJECT

The proposed Planetarium and North Side project would attract new visitors to the Museum when it opens. These would include new visitors to the Museum and new Planetarium as well as visitors to the restaurant and patrons at special events held on the terrace. To meet current needs and those anticipated in the future without the project, as well as the needs of new visitors who drive to the Museum, a three-level garage is proposed, as described in Chapter 2, "Project Description." The upper parking level of the garage would be used on weekdays for unloading and loading of school buses and for some school bus parking, while the middle and lower levels would be used for automobile parking. On weekends, the garage *would be used entirely for automobile parking. Floor plans for each level of the garage are provided in Figures 12-9 through 12-12. An analysis of the impacts on traffic conditions, pedestrian conditions, and transit caused by the proposed project follows.*

PROJECT TRAVEL DEMAND CHARACTERISTICS

To evaluate project impacts, the increase in attendance expected from the proposed project was estimated. These estimates were developed in conjunction with market and demand studies conducted by the Museum in planning for the project. Overall, the project is expected to generate approximately 673,900 new annual visitors the Planetarium and Museum in addition to the attendance increase anticipated in the future without the project (see Chapter 4, "Economic Conditions"). Approximately 187,000 of these visitors would attend only the Sky Show, while the balance would attend the Planetarium and/or the Museum. For the purpose of evaluating project impacts, these trips were then translated into daily and hourly travel demand estimates. Utilizing monthly, weekly, and daily attendance data, conservatively high demand estimates were created to reflect attendance during high activity periods at the Museum. These estimates would result in increases in daily attendance of approximately 1,700 to 1,900 on a weekday, and 2,500 to 3,100 on Saturday. The project is estimated to generate 616, 515, and 1,123 daily person trips during the weekday midday, weekday PM, and Saturday peak hours, respectively. (As discussed in section 12.B, above, the traffic study overlays the project's 4-5 PM increment, representing the highest hourly vehicle total, onto a peak base traffic hour of 5-6 PM). Person-trips by mode and vehicle trips were estimated based on a survey of Museum *visitors*. Overall, during weekdays, approximately 30 percent of the *visitors* come by auto, 13 percent by taxi, 25 percent by subway, 8 percent by public bus, and 24 percent by walking. On Saturday, the corresponding numbers are 50 percent by auto, 14 percent by taxi, 9 percent by subway, 8 percent by public bus, and 19 percent by walking. Table 12-7 presents a summary of the project's Museum and Planetarium-related incremental trip generation characteristics.

Trip estimates were also prepared for the other major project components—the new restaurant space and the terrace. The project would include approximately 10,350 square feet dedicated to the new restaurant. To estimate trips to the restaurant, detailed attendance and modal split data were obtained from another restaurant in the area. To account for linkage—i.e., people eating at the restaurant whose primary trip purpose was attendance at the Museum—information was obtained from another major New York City museum with a high-quality restaurant. Based on this information, trip estimates were prepared for the Museum and are presented in Table 12-8.

The other element adding new trips to the area is the project's terrace. *Occasionally,* private events would be held on the terrace. *The number and type of such events will be determined with a view to avoiding or minimizing excessive noise, as described in Chapter 15, "Noise," and Chapter 17, "Mitigation."* These events, which would be held during warm weather months, could accommodate up to approximately *1,000* people for a cocktail party and 500 people for a dinner party. In most cases, the attendance would be substantially less. Because of scheduling controls placed by the Museum, attendance at these events would occur during the evening and nighttime hours, when the Museum is closed, and thus would not overlap with the network's peak analysis hours. Detailed estimates were prepared for this project component and are accounted for in the parking and noise studies that follow. Table 12-9 shows the estimated peak attendance, including the hourly distribution, by mode, for *a 1,000*-person cocktail party.

Table 12-7
Museum Attendance Growth
Estimated 2001 Build Incremental Travel Demand

	2001 No Build vs Build Increment				
	Annual	2001 Average Day		2001 High Day	
	No Bld v Bld	Weekday	Saturday	Weekday	Saturday
	673,900	1,702	2,518	1,917	3,102

	Person-Trips By Mode											
	Auto		Bus		Taxi		Subway		Walk		Total	
Time	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Modal Split	30.0%		8.0%		13.0%		25.0%		24.0%		100.0%	
Wk 1-2 PM	119	65	32	17	51	28	100	55	96	52	399	218
4-5 PM	37	117	10	31	16	51	31	98	30	94	124	391
Modal Split	50.0%		8.0%		14.0%		9.0%		19.0%		100.0%	
Sat 2-3 PM	291	271	47	43	81	76	52	49	110	103	581	542

	Vehicle-Trips By Mode					
	Auto			Taxi		
Time	In	Out	Total	In	Out	Total
Wk 1-2 PM	34	19	53	21	11	32
4-5 PM	11	34	45	6	20	26
Sat 2-3 PM	83	77	160	33	30	63

Notes:
* Vehicle occupancy rate to convert person-trips to vehicle trips for autos is 3.5 persons per vehicle.
** Vehicle occupancy rate to convert person-trips to vehicle trips for taxis is 2.5 persons per vehicle.

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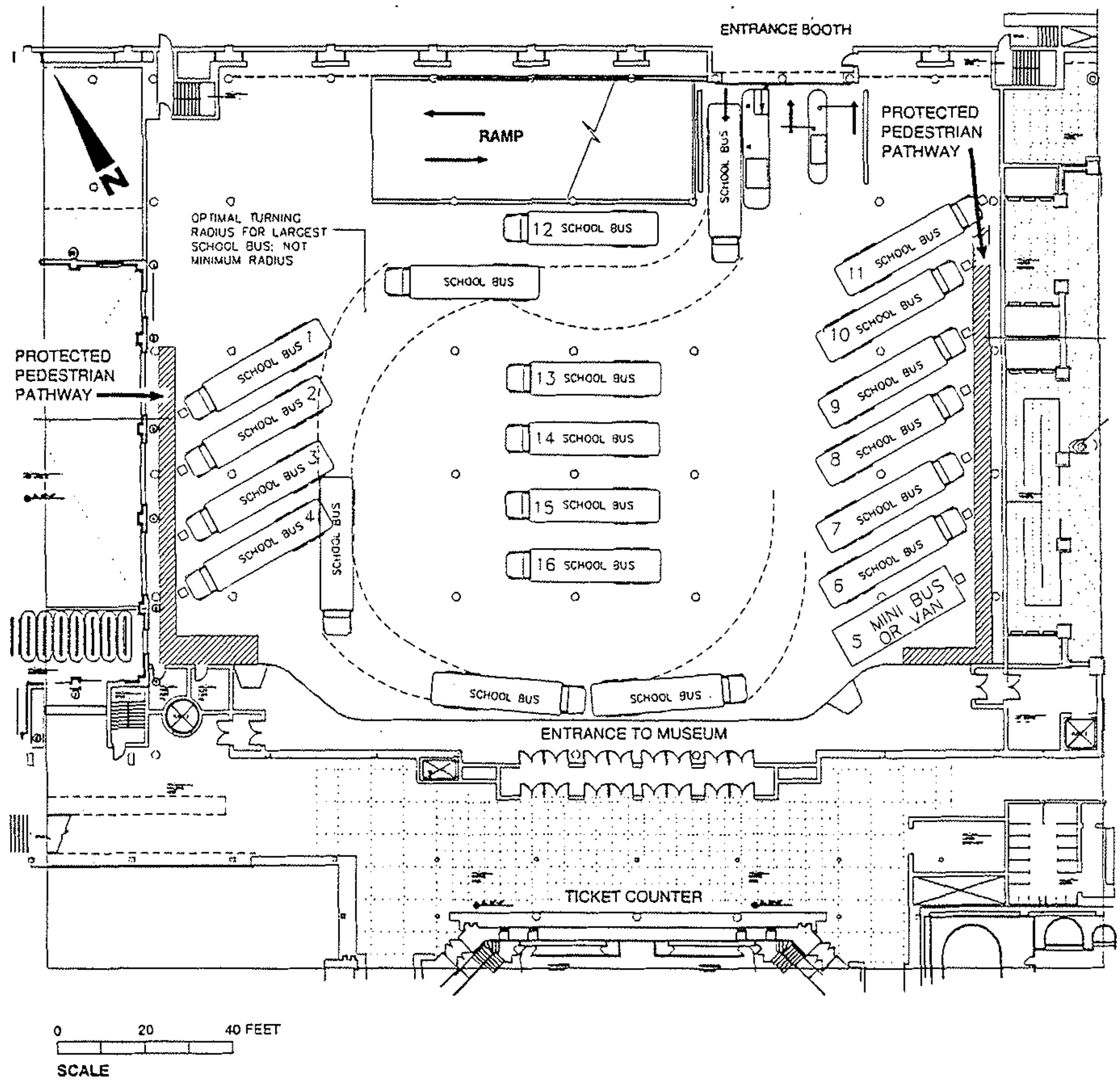

Proposed Garage Plan, Top Parking Level
Layout for Buses

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Figure 12-9

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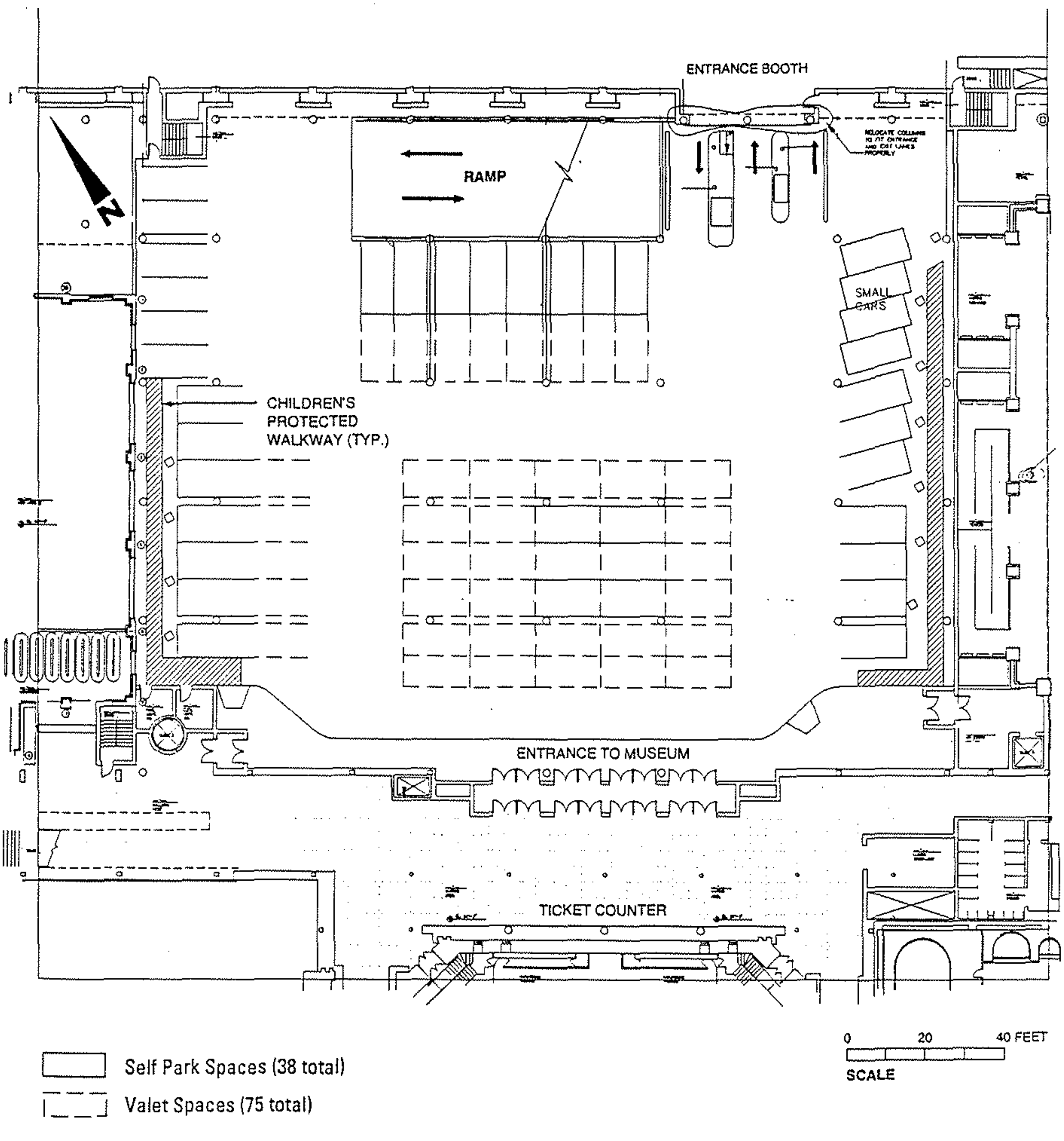
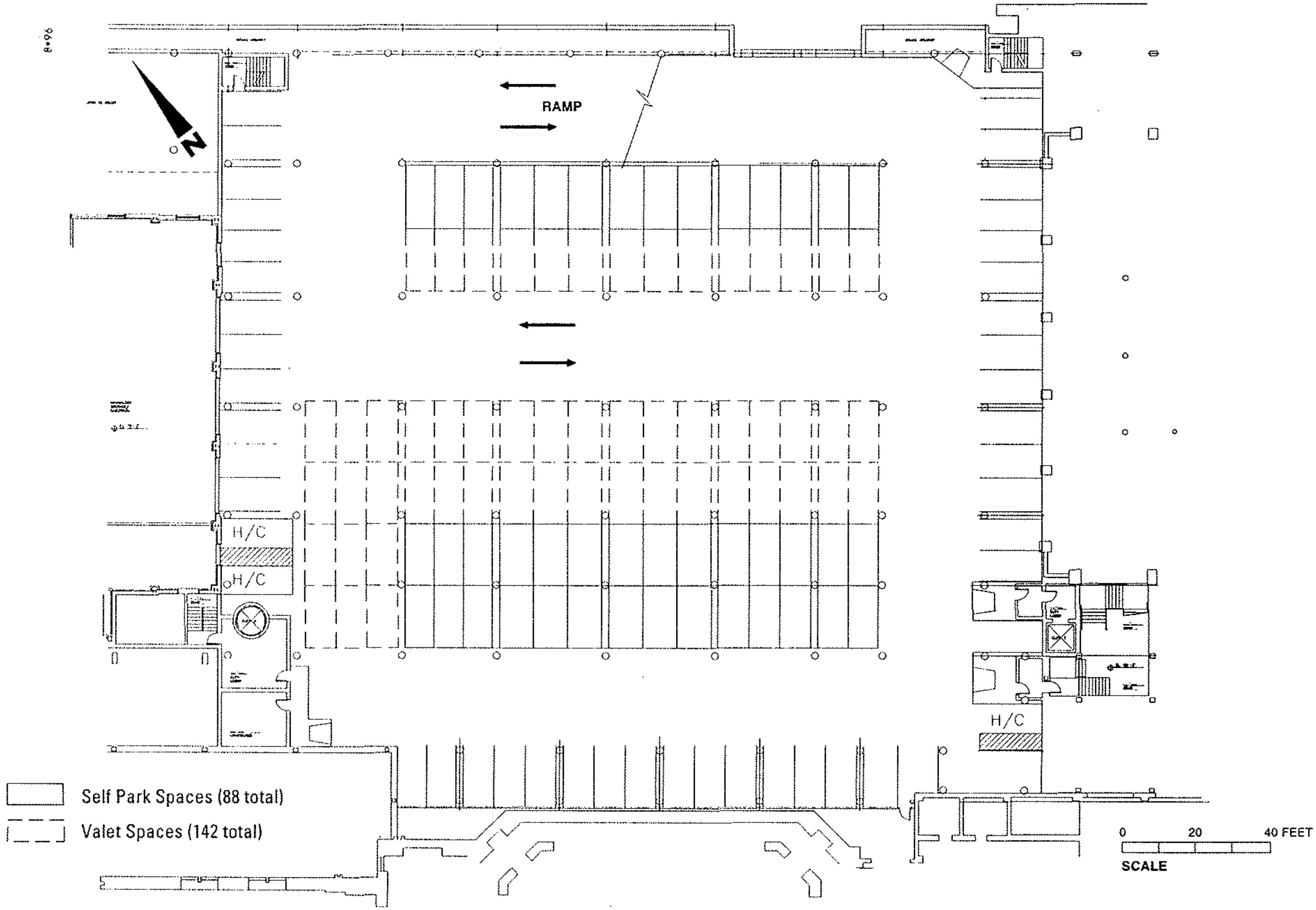


Proposed Garage Plan, Top Parking Level
Layout for Cars

Figure 12-10

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

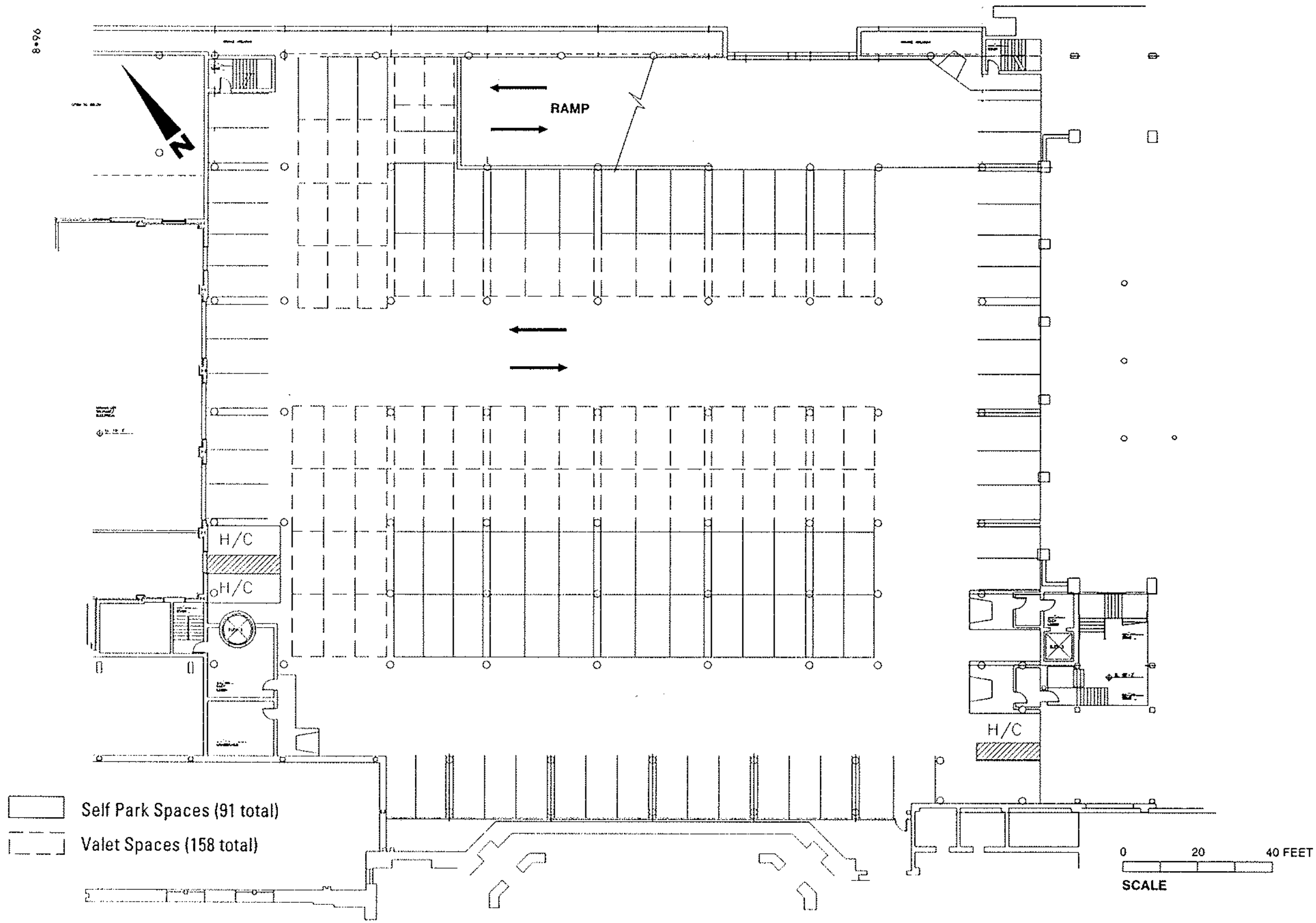


American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

Proposed Garage Plan, Middle Parking Level

Figure 12-11



American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

Proposed Garage Plan, Lower Parking Level

Figure 12-12

Table 12-8

2001 Build Conditions: Restaurant Hourly Trip Estimates

Time	Person-Trips By Mode									
	Auto		Taxi		Walk		Other		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out
Midday Hours										
Modal Split	5.0%		40.0%		50.0%		5.0%		100.0%	
11AM-12 PM	1	0	7	0	9	0	1	0	17	0
12-1PM	3	1	28	7	35	9	3	1	69	17
1-2PM	2	3	14	28	17	35	2	3	35	69
2-3 PM	1	2	7	14	9	17	1	2	17	35
3-4 PM	1	1	7	7	9	9	1	1	17	17
Evening Hours										
Modal Split	20.0%		40.0%		30.0%		10.0%		100.0%	
4-5 PM	10	0	21	0	16	0	5	0	52	0
5-6 PM	10	5	21	10	16	8	5	3	52	26
6-7 PM	21	10	41	21	31	16	10	5	104	52
7-8 PM	41	16	83	31	62	23	21	8	207	78
8-9 PM	21	31	41	62	31	47	10	16	104	155
9-10 PM	10	31	21	62	16	47	5	16	52	155
10-11 PM	10	16	21	31	16	23	5	8	52	78
Weekday Total										
3 PM - 12 AM	132	116	311	273	264	232	70	61	776	681
Saturday										
Modal Split	25.0%		30.0%		30.0%		15.0%		100.0%	
11AM-12 PM	9	0	10	0	10	0	5	0	35	0
12-1PM	17	17	21	21	21	21	10	10	69	69
1-2PM	17	17	21	21	21	21	10	10	69	69
2-3 PM	17	17	21	21	21	21	10	10	69	69
3-4 PM	9	17	10	21	10	21	5	10	35	69
11 AM - 4 PM	69	69	83	83	83	83	41	41	276	276

Time	Vehicle-Trips By Mode					
	Auto		Taxi		Total	
	In	Out	In	Out	In	Out
Weekday						
11AM-12 PM	0	0	3	0	3	0
12-1PM	2	0	12	3	14	3
1-2PM	1	2	6	12	7	14
2-3 PM	0	1	3	6	3	7
3-4 PM	0	0	3	3	3	3
4-5 PM	5	0	9	0	14	0
5-6 PM	5	2	9	5	14	7
6-7 PM	9	5	18	9	27	14
7-8 PM	19	7	36	14	55	21
8-9 PM	9	14	18	27	27	41
9-10 PM	5	14	9	27	14	41
10-11 PM	5	7	9	14	14	21
Total	60	53	135	119	195	172
Saturday						
11AM-12 PM	4	0	5	0	8	0
12-1PM	8	8	9	9	17	17
1-2PM	8	8	9	9	17	17
2-3 PM	8	8	9	9	17	17
3-4 PM	4	8	5	9	8	17
Total	32	32	37	36	67	68

Notes:
The information in this table is based on trip generation data for Isabella's (Columbus Avenue at 77th Street) and Sette MoMA (Museum of Modern Art). The trip estimates reported represent the net restaurant trips generated by *visitors* not already visiting the Museum. Restaurant patrons are estimated to be linked with the Museum as follows: 70% weekday midday; 10% weekday evening; and 90% Saturday midday hours.

Table 12-9
2001 Build Condition
Terrace Event Hourly Trip Estimates

Hour	Person-Trips (By Mode)															
	Auto		Taxi/Car Service		Limousine		Charter Bus		Walk		Subway		Bus		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Modal Splits:																
Event Staff:	0.0%		10.0%		0.0%		0.0%		10.0%		70.0%		10.0%		100.0%	
Guests:	20.0%		40.0%		10.0%		15.0%		5.0%		5.0%		5.0%		100.0%	
3-4 PM	0	0	1	0	0	0	0	0	1	0	10	0	1	0	13	0
4-5 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-6 PM	0	0	1	0	0	0	0	0	1	0	10	0	1	0	13	0
6-7 PM	70	0	140	0	35	0	52	0	18	0	18	0	18	0	351	0
7-8 PM	100	0	200	0	50	0	75	0	25	0	25	0	25	0	500	0
8-9 PM	30	20	60	40	15	10	23	15	8	5	8	5	8	5	152	100
9-10 PM	0	80	0	160	0	40	0	60	0	20	0	20	0	20	0	400
10-11 PM	0	90	0	181	0	45	0	67	0	24	0	33	0	24	0	464
11PM-12AM	0	10	0	21	0	5	0	8	0	4	0	13	0	4	0	65
Total: (3PM-12AM)	200	200	402	402	100	100	150	150	53	53	71	71	53	53	1029	1029

Hour	Vehicle-Trips* (By Mode)											
	Auto		Taxi/Car Service		Limousine		Charter Bus		Delivery Vehicles		Total Vehicles	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
3-4 PM	0	0	1	0	0	0	0	0	0	0	1	0
4-5 PM	0	0	0	0	0	0	0	0	2	2	2	2
5-6 PM	0	0	1	0	0	0	0	0	0	0	1	0
6-7 PM	39	0	61	0	15	0	2	0	0	0	117	0
7-8 PM	55	0	87	0	21	0	3	0	0	0	166	0
8-9 PM	17	11	26	17	6	4	1	1	0	0	50	33
9-10 PM	0	44	0	70	0	17	0	2	0	0	0	133
10-11 PM	0	50	0	79	0	19	0	2	0	0	0	150
11PM-12AM	0	6	0	10	0	2	0	1	0	0	0	19
Total: (3PM-12AM)	111	111	176	176	42	42	6	6	2	2	337	337

Note:
* = The Vehicle Occupancy Rates used to convert Guest Person-Trips to Vehicle-Trips are: Autos, 1.8 persons per vehicle (ppv); Taxi/Car Service, 2.3 ppv; Limousine, 2.4 ppv; and Charter Bus, 30 ppv. The Vehicle Occupancy Rate for Event Staff using Taxis/Car Services is 1.0 ppv.

The next step in the evaluation process is the assignment of incremental trips to the various transportation services in the area. Utilizing the estimated trips by mode and logical travel patterns, project trips for each project element were distributed to area roadways, sidewalks, subway service, and public buses. To evaluate the auto increment, vehicle trips were assigned to the new project garage and other off-site facilities. For the weekday analysis, which utilized current travel patterns, this was fairly straightforward, because the choice of parking locations is not constrained by the capacity of the lot. On weekends, however, a different situation occurs. Since the lot typically fills up for a portion of each Saturday and Sunday, the number of drivers using the lot is less than the total that actually attempts to enter. A survey of visitors on Saturdays indicates that, even though only 25 percent of the arriving autos park at the project site, the actual percentage that attempts to park there is 61 percent. Consequently, given the increased capacity provided by the new parking garage, 61 percent of the project autos were assigned to the on-site garage. The balance was distributed to curbside locations in the network and other area garages. This approach reflects a portion of the incremental traffic change associated with the new project trips and the increase in parking, but conservatively tends to understate the full effect of the increased parking. The issue here is that peak hour weekend network volumes reflect a condition in which some drivers—approximately 60 to 80 during an hour in the No Build condition—initially attempt to park at the site, and then, after traversing 81st Street, circulate into the surrounding street network to find a substitute parking location. With the project, more of these vehicles would be able to enter into the parking garage, thereby lessening their overall impact on the network. In fact, with the new garage, it estimated that the garage would operate at capacity only from 1 to 3 PM, as opposed to the approximately 11 AM to 4 PM period under No Build conditions.

TRAFFIC CONDITIONS

INTERSECTION ANALYSIS

The incremental traffic associated with the proposed project would increase traffic throughout the study area, as shown in Table 12-10.

Looking at intersection service conditions at the project site and in the larger study area, according to guidelines presented in the *CEQR Technical Manual*, impacts are considered significant (and require examination of mitigation) if they result in an increase in delay of 5 or more seconds in a lane group when the No Build LOS is D. For No Build LOS E, 4 seconds of delay are considered significant. For No Build LOS F, 3 seconds of delay are considered significant. However, if the No Build LOS F condition already has delays in excess of 120 seconds, more than 1 second of delay is considered significant, unless the proposed project generates fewer than five peak hour vehicle trips through that intersection. Impacts are also considered significant if levels of service deteriorate from acceptable LOS A, B, or C in the future No Build condition to unacceptable LOS D, E, or F in the Build condition.

Additionally, if the traffic analysis indicates that future No Build v/c ratios below 0.95 are projected to increase to more than 0.95—or where future No Build v/c ratios greater than 0.95 are expected to increase by 0.020 or more at locations where acceptable LOS is projected to occur in future Build conditions—additional analyses should be conducted to determine how close the project's increment is to creating a significant impact. These analyses should consist of determining how much additional traffic at that analysis location would cause LOS to deteriorate from its projected acceptable LOS to unacceptable LOS D. This incremental volume represents the "buffer" available to NYCDOT before it may need to consider capacity improvements.

Table 12-10
Signalized Intersections:
2001 No Build and Build Conditions Level of Service Analyses

Intersection	Midday														
	No Build								Build						
	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Central Park West & West 72nd Street															
Eastbound	DfL	1.11	113.8	F	43.0	E	25.9	D	1.11	113.8	F	43.0	E	27.9	D
	TR	0.45	14.8	B					0.45	14.8	B				
Westbound	LTR	0.63	16.9	C	16.9	C			0.64	17.1	C	17.1	C		
Northbound	LTR	0.90	16.9	C	16.9	C			0.93	19.2	C	19.2	C		
Southbound	LTR	0.98	27.2	D	27.2	D			1.00	31.9	D	31.9	D		
Central Park West & West 76th Street															
Eastbound	LTR	0.16	14.6	B	14.6	B	7.5	B	0.16	14.6	B	14.6	B	7.5	B
Northbound	T	0.57	6.5	B	6.5	B			0.58	6.5	B	6.5	B		
Southbound	T	0.69	7.5	B	7.5	B			0.69	7.5	B	7.5	B		
Central Park West & West 77th Street															
Eastbound	LTR	0.29	14.9	B	14.9	B	16.1	C	0.29	14.9	B	14.9	B	19.3	C
Northbound	LT	1.01	25.0	C	25.0	C			1.05	32.3	D *	32.3	D		
Southbound	TR	0.72	8.5	B	8.5	B			0.73	8.6	B	8.6	B		
Central Park West & West 81st Street															
Eastbound	LTR	0.32	15.6	C	15.6	C	24.9	C	0.34	15.7	C	15.7	C	29.6	D
Westbound	DfL	1.12	107.5	F	50.3	E			1.18	140.8	F *	61.7	F		
	TR	0.69	19.8	C					0.71	20.1	C				
Northbound	LTR	0.84	11.2	B	11.2	B			0.89	13.4	B	13.4	B		
Southbound	LTR	0.83	11.4	B	11.4	B			0.85	12.3	B	12.3	B		
Central Park West & West 82nd Street															
Eastbound	LTR	0.48	17.5	C	17.5	C	7.0	B	0.48	17.5	C	17.5	C	7.0	B
Northbound	T	0.55	6.3	B	6.3	B			0.55	6.3	B	6.3	B		
Southbound	T	0.44	5.7	B	5.7	B			0.45	5.7	B	5.7	B		
Central Park West & West 86th Street															
Eastbound	LTR	0.80	27.4	D	27.4	D	19.6	C	0.81	27.6	D	27.6	D	20.1	C
Westbound	LTR	0.72	18.0	C	18.0	C			0.73	18.0	C	18.0	C		
Northbound	LTR	0.92	18.6	C	18.6	C			0.93	19.6	C	19.6	C		
Southbound	LTR	0.87	16.2	C	16.2	C			0.88	16.8	C	16.8	C		
Columbus Avenue & West 72nd Street															
Eastbound	TR	0.48	15.1	C	15.1	C	11.4	B	0.48	15.1	C	15.1	C	11.4	B
Westbound	DfL	0.67	21.6	C	15.9	C			0.67	21.6	C	15.9	C		
	T	0.26	13.3	B					0.27	13.3	B				
Southbound	LTR	0.69	9.3	B	9.3	B			0.69	9.4	B	9.4	B		
Columbus Avenue & West 76th Street															
Eastbound	TR	0.55	18.9	C	18.9	C	9.0	B	0.55	18.9	C	18.9	C	9.1	B
Southbound	LT	0.79	7.9	B	7.9	B			0.80	8.1	B	8.1	B		
Columbus Avenue & West 77th Street															
Westbound	LT	0.29	15.9	C	15.9	C	9.4	B	0.30	16.0	C	16.0	C	9.6	B
Southbound	LTR	0.82	8.6	B	8.6	B			0.83	8.8	B	8.8	B		
Columbus Avenue & West 78th Street															
Eastbound	R	0.21	15.4	C	15.4	C	6.2	B	0.22	15.4	C	15.4	C	6.3	B
Southbound	T	0.56	5.7	B	5.7	B			0.56	5.8	B	5.8	B		
Columbus Avenue & West 79th Street															
Eastbound	R	0.24	17.5	C	17.5	C	7.8	B	0.24	17.6	C	17.6	C	8.1	B
Southbound	TR	0.83	6.6	B	6.6	B			0.84	6.8	B	6.8	B		
Columbus Avenue & West 80th Street															
Eastbound	R	0.29	15.9	C	15.9	C	5.9	B	0.29	15.9	C	15.9	C	5.9	B
Southbound	T	0.43	5.1	B	5.1	B			0.44	5.1	B	5.1	B		
Columbus Avenue & West 81st Street															
Eastbound	TR	0.81	34.6	D	34.6	D	18.7	C	0.85	38.6	D	38.6	D	19.4	C
Westbound	L	0.54	23.1	C	23.1	C			0.56	23.4	C	23.4	C		
Southbound	LT	0.69	15.1	C	15.1	C			0.69	15.1	C	15.1	C		
Columbus Avenue & West 82nd Street															
Eastbound	TR	0.48	17.8	C	17.8	C	6.7	B	0.48	17.8	C	17.8	C	6.7	B
Southbound	LT	0.47	5.3	B	5.3	B			0.47	5.3	B	5.3	B		
Columbus Avenue & West 86th Street															
Eastbound	TR	0.38	14.1	B	14.1	B	12.6	B	0.38	14.1	B	14.1	B	12.6	B
Westbound	LT	0.61	16.3	C	16.3	C			0.61	16.3	C	16.3	C		
Southbound	LTR	0.72	9.7	B	9.7	B			0.72	9.8	B	9.8	B		
Amsterdam Avenue & West 79th Street															
Eastbound	DfL	0.66	21.1	C	17.4	C	10.5	B	0.68	22.3	C	18.0	C	10.6	B
	T	0.27	13.4	B					0.27	13.4	B				
Westbound	TR	0.31	13.6	B	13.6	B			0.31	13.6	B	13.6	B		
Northbound	LTR	0.53	8.0	B	8.0	B			0.53	8.0	B	8.0	B		
Amsterdam Avenue & West 80th Street															
Eastbound	LT	0.43	17.1	C	17.1	C	6.7	B	0.44	17.2	C	17.2	C	6.8	B
Northbound	TR	0.45	5.2	B	5.2	B			0.45	5.2	B	5.2	B		
Amsterdam Avenue & West 81st Street															
Northbound	LTR	0.50	5.5	B	5.5	B	5.5	B	0.51	5.5	B	5.5	B	5.5	B

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; TR=Through & right turn movements; LTR=Left turn, through, & right turn movements; and DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersectons, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.

Table 12-10 (Continued)
Signalized Intersections:
2001 No Build and Build Conditions Level of Service Analyses

		PM													
		No Build							Build						
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Central Park West & West 72nd Street															
Eastbound	DfL	0.90	47.6	E	25.1	D	31.0	D	0.90	47.6	E	25.1	D	34.7	D
	TR	0.43	16.5	C					0.43	16.5	C				
Westbound	LTR	0.54	17.7	C	17.7	C			0.54	17.7	C	17.7	C		
Northbound	LTR	1.08	53.6	E	53.6	E			1.10	62.7	F *	62.7	F		
Southbound	LTR	0.73	8.6	B	8.6	B			0.74	8.8	B	8.8	B		
Central Park West & West 76th Street															
Eastbound	LTR	0.14	14.4	B	14.4	B	7.0	B	0.14	14.5	B	14.5	B	7.0	B
Northbound	T	0.65	7.1	B	7.1	B			0.66	7.2	B	7.2	B		
Southbound	T	0.45	5.7	B	5.7	B			0.46	5.7	B	5.7	B		
Central Park West & West 77th Street															
Eastbound	LTR	0.28	14.8	B	14.8	B	34.0	D	0.28	14.8	B	14.8	B	42.0	E
Northbound	LTR	1.12	52.7	E	52.7	E			1.16	67.6	F *	67.6	F		
Southbound	LTR	0.87	13.8	B	13.8	B			0.88	14.5	B	14.5	B		
Central Park West & West 81st Street															
Eastbound	LTR	0.40	16.2	C	16.2	C	44.1	E	0.42	16.3	C	16.3	C	60.5	F
Westbound	DfL	1.13	124.4	F	57.3	E			1.21	171.9	F *	75.1	F		
	TR	0.40	16.2	C					0.41	16.3	C				
Northbound	LTR	0.94	17.8	C	17.8	C			0.99	25.9	D *	25.9	D		
Southbound	DfL	1.54	349.5	F	88.7	F			1.66	505.5	F *	126.6	F		
	TR	0.76	9.7	B					0.76	10.0	B				
Central Park West & West 82nd Street															
Eastbound	LTR	0.52	18.3	C	18.3	C	7.1	B	0.53	18.3	C	18.3	C	7.1	B
Northbound	T	0.53	6.2	B	6.2	B			0.54	6.2	B	6.2	B		
Southbound	T	0.38	5.4	B	5.4	B			0.39	5.4	B	5.4	B		
Central Park West & West 86th Street															
Eastbound	LTR	1.03	56.4	E	56.4	E	83.1	F	1.05	61.5	F *	61.5	F	85.4	F
Westbound	LTR	0.63	16.5	C	16.5	C			0.63	16.5	C	16.5	C		
Northbound	LTR	1.08	54.6	E	54.6	E			1.09	59.6	E *	59.6	E		
Southbound	DfL	1.88	1103.6	F	267.6	F			1.88	1103.6	F	266.1	F		
	TR	0.77	12.6	B					0.78	12.8	B				
Columbus Avenue & West 72nd Street															
Eastbound	TR	0.61	16.7	C	16.7	C	12.5	B	0.61	16.7	C	16.7	C	12.6	B
Westbound	DfL	0.54	18.1	C	14.4	B			0.54	18.1	C	14.4	B		
	T	0.26	13.3	B					0.26	13.3	B				
Southbound	LTR	0.82	11.0	B	11.0	B			0.82	11.2	B	11.2	B		
Columbus Avenue & West 76th Street															
Eastbound	TR	0.45	17.5	C	17.5	C	8.6	B	0.45	17.5	C	17.5	C	8.7	B
Southbound	LT	0.78	7.8	B	7.8	B			0.78	7.9	B	7.9	B		
Columbus Avenue & West 77th Street															
Westbound	LT	0.24	15.5	C	15.5	C	9.5	B	0.25	15.6	C	15.6	C	9.7	B
Southbound	LTR	0.84	8.9	B	8.9	B			0.84	9.1	B	9.1	B		
Columbus Avenue & West 78th Street															
Eastbound	R	0.31	16.1	C	16.1	C	6.6	B	0.31	16.1	C	16.1	C	6.6	B
Southbound	T	0.57	5.8	B	5.8	B			0.58	5.9	B	5.9	B		
Columbus Avenue & West 79th Street															
Eastbound	R	0.29	17.8	C	17.8	C	7.3	B	0.29	17.9	C	17.9	C	7.4	B
Southbound	TR	0.77	5.6	B	5.6	B			0.78	5.8	B	5.8	B		
Columbus Avenue & West 80th Street															
Eastbound	R	0.19	15.3	C	15.3	C	5.7	B	0.19	15.3	C	15.3	C	5.7	B
Southbound	T	0.45	5.2	B	5.2	B			0.46	5.2	B	5.2	B		
Columbus Avenue & West 81st Street															
Eastbound	TR	1.07	88.8	F	88.8	F	26.7	D	1.12	109.0	F *	109.0	F	29.9	D
Westbound	L	0.41	21.9	C	21.9	C			0.44	22.1	C	22.1	C		
Southbound	LT	0.74	15.7	C	15.7	C			0.74	15.8	C	15.8	C		
Columbus Avenue & West 82nd Street															
Eastbound	TR	0.40	16.9	C	16.9	C	6.6	B	0.40	16.9	C	16.9	C	6.6	B
Southbound	LT	0.53	5.6	B	5.6	B			0.53	5.6	B	5.6	B		
Columbus Avenue & West 86th Street															
Eastbound	TR	0.65	16.8	C	16.8	C	17.4	C	0.66	16.9	C	16.9	C	17.4	C
Westbound	DfL	1.04	82.9	F	30.2	D			1.04	82.9	F	30.2	D		
	T	0.60	16.3	C					0.60	16.3	C				
Southbound	LTR	0.72	9.8	B	9.8	B			0.73	9.9	B	9.9	B		
Amsterdam Avenue & West 79th Street															
Eastbound	DfL	0.55	16.9	C	15.4	C	9.9	B	0.57	17.3	C	15.7	C	10.0	B
	T	0.36	14.1	B					0.36	14.1	B				
Westbound	TR	0.21	13.0	B	13.0	B			0.22	13.0	B	13.0	B		
Northbound	LTR	0.62	8.6	B	8.6	B			0.62	8.6	B	8.6	B		
Amsterdam Avenue & West 80th Street															
Eastbound	LT	0.56	19.2	C	19.2	C	6.8	B	0.57	19.4	C	19.4	C	6.8	B
Northbound	TR	0.53	5.6	B	5.6	B			0.54	5.6	B	5.6	B		
Amsterdam Avenue & West 81st Street															
Northbound	LTR	0.62	6.1	B	6.1	B	6.1	B	0.63	6.2	B	6.2	B	6.2	B

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; TR=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersectons, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.

Table 12-10 (Continued)
Signalized Intersections:
2001 No Build and Build Conditions Level of Service Analyses

Intersection	Saturday: No Build Lane Group	No Build V/C Ratio	No Build Delay (seconds)	No Build LOS	No Build Approach Delay	No Build Approach LOS	No Build Intersection Delay	No Build Intersection LOS	Build V/C Ratio	Build Delay (seconds)	Build LOS	Build Approach Delay	Build Approach LOS	Build Intersection Delay	Build Intersection LOS
Central Park West & West 72nd Street															
Eastbound	LTR	0.28	13.4	B	13.4	B	17.3	C	0.28	13.4	B	13.4	B	22.1	C
Northbound	LT	1.00	26.8	D	26.8	D			1.05	39.0	D *	39.0	D		
Southbound	TR	0.78	11.3	B	11.3	B			0.80	11.6	B	11.6	B		
Central Park West & West 76th Street															
Eastbound	LTR	0.19	14.7	B	14.7	B	7.0	B	0.19	14.7	B	14.7	B	7.1	B
Northbound	T	0.51	6.1	B	6.1	B			0.54	6.2	B	6.2	B		
Southbound	T	0.59	6.6	B	6.6	B			0.61	6.7	B	6.7	B		
Central Park West & West 77th Street															
Eastbound	LTR	0.23	14.5	B	14.5	B	14.5	B	0.23	14.5	B	14.5	B	19.5	C
Northbound	LT	0.99	21.6	C	21.6	C			1.05	32.7	D *	32.7	D		
Southbound	TR	0.70	8.2	B	8.2	B			0.72	8.5	B	8.5	B		
Central Park West & West 81st Street															
Eastbound	LTR	0.53	17.4	C	17.4	C	56.0	E	0.63	18.5	C	18.5	C	67.9	F
Westbound	DfL	1.08	97.9	F	47.1	E			1.10	109.2	F *	50.2	E		
	TR	0.37	16.0	C					0.40	16.2	C				
Northbound	LTR	1.14	83.2	F	83.2	F			1.26	110.1	F *	110.1	F		
Southbound	DfL	1.13	108.0	F	53.5	E			1.16	124.5	F *	64.2	F		
	TR	1.02	34.9	D					1.05	43.5	E *				
Central Park West & West 82nd Street															
Eastbound	LTR	0.50	17.6	C	17.6	C	6.9	B	0.50	17.7	C	17.7	C	7.0	B
Northbound	T	0.28	5.0	A	5.0	A			0.29	5.0	A	5.0	A		
Southbound	T	0.53	6.1	B	6.1	B			0.54	6.2	B	6.2	B		
Central Park West & West 86th Street															
Eastbound	LTR	0.69	24.1	C	24.1	C	16.7	C	0.70	24.3	C	24.3	C	17.3	C
Westbound	LTR	0.60	16.2	C	16.2	C			0.61	16.3	C	16.3	C		
Northbound	LTR	0.87	16.3	C	16.3	C			0.90	18.2	C	18.2	C		
Southbound	LTR	0.76	11.4	B	11.4	B			0.78	12.0	B	12.0	B		
Columbus Avenue & West 72nd Street															
Eastbound	TR	0.42	14.5	B	14.5	B	14.5	B	0.42	14.5	B	14.5	B	15.1	C
Westbound	DfL	0.29	13.7	B	13.0	B			0.29	13.7	B	13.0	B		
	T	0.18	12.8	B					0.19	12.8	B				
Southbound	LTR	0.93	14.6	B	14.6	B			0.94	15.4	C	15.4	C		
Columbus Avenue & West 76th Street															
Eastbound	TR	0.49	18.0	C	18.0	C	29.9	D	0.49	18.0	C	18.0	C	34.4	D
Southbound	LT	1.04	30.7	D	30.7	D			1.05	35.6	D	35.6	D		
Columbus Avenue & West 77th Street															
Westbound	LT	0.30	15.9	C	15.9	C	21.3	C	0.31	16.0	C	16.0	C	24.1	C
Southbound	LTR	1.00	21.8	C	21.8	C			1.02	24.9	C	24.9	C		
Columbus Avenue & West 78th Street															
Eastbound	R	0.25	15.6	C	15.6	C	8.5	B	0.25	15.7	C	15.7	C	8.7	B
Southbound	T	0.82	8.2	B	8.2	B			0.83	8.4	B	8.4	B		
Columbus Avenue & West 79th Street															
Eastbound	R	0.25	17.6	C	17.6	C	13.8	B	0.25	17.6	C	17.6	C	16.5	C
Southbound	TR	0.97	13.4	B	13.4	B			0.99	16.3	C	16.3	C		
Columbus Avenue & West 80th Street															
Eastbound	R	0.30	16.0	C	16.0	C	6.2	B	0.30	16.0	C	16.0	C	6.2	B
Southbound	T	0.53	5.6	B	5.6	B			0.54	5.6	B	5.6	B		
Columbus Avenue & West 81st Street															
Eastbound	TR	1.07	88.7	F	88.7	F	32.4	D	1.17	139.2	F *	139.2	F	39.4	D
Westbound	L	0.61	23.9	C	23.9	C			0.66	24.7	C	24.7	C		
Southbound	LT	0.98	26.0	D	26.0	D			0.98	27.0	D	27.0	D		
Columbus Avenue & West 82nd Street															
Eastbound	TR	0.36	16.5	C	16.5	C	7.3	B	0.36	16.5	C	16.5	C	7.4	B
Southbound	LT	0.69	6.7	B	6.7	B			0.70	6.7	B	6.7	B		
Columbus Avenue & West 86th Street															
Eastbound	TR	0.41	14.4	B	14.4	B	21.3	C	0.42	14.4	B	14.4	B	22.3	C
Westbound	LT	0.54	15.5	C	15.5	C			0.54	15.5	C	15.5	C		
Southbound	LTR	1.01	25.8	D	25.8	D			1.01	27.4	D	27.4	D		
Amsterdam Avenue & West 79th Street															
Eastbound	DfL	0.42	15.0	B	14.1	B	9.8	B	0.49	16.0	C	14.6	B	9.9	B
	T	0.25	13.3	B					0.26	13.3	B				
Westbound	TR	0.24	13.2	B	13.2	B			0.26	13.3	B	13.3	B		
Northbound	LTR	0.54	8.1	B	8.1	B			0.55	8.2	B	8.2	B		
Amsterdam Avenue & West 80th Street															
Eastbound	LT	0.62	20.2	C	20.2	C	7.4	B	0.63	20.6	C	20.6	C	7.5	B
Northbound	TR	0.48	5.3	B	5.3	B			0.49	5.4	B	5.4	B		
Amsterdam Avenue & West 81st Street															
Northbound	LTR	0.54	5.6	B	5.6	B	5.6	B	0.55	5.7	B	5.7	B	5.7	B

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; TR=Through & right turn movements; *LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of* the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersectons, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.

With the proposed project, there would be increases in traffic volumes at all of the study area intersections (see Figures 12-*13*, 12-*14*, and 12-*15*). On West 81st Street, the traffic volumes would increase by approximately 35 to 41 vehicles during the weekday peak hours, and by approximately 110 vehicles during the Saturday peak hour. The 2001 Build traffic volumes are shown in Figures 12-*16*, 12-*17*, and 12-*18* for the weekday midday, weekday PM, and Saturday peak hours, respectively. Street capacities for the most part would be sufficient to accommodate these increases. However, the increases in traffic would cause significant impacts at some intersections, discussed below. All of these impacts could be mitigated. The potential mitigation for these impacts is described in Chapter 17, "Mitigation."

Intersections Bordering the Project Site

Weekday Midday Peak Hour.

- The northbound Central Park West approach at West 77th Street, which would drop from LOS *C* to *D* (delay increasing from *25.0* to *32.3* seconds); and
- The westbound West 81st Street left-turn movement at Central Park West, which would continue to operate at LOS F (delay increasing from 107.5 to more than 120 seconds).

Weekday PM Peak Hour.

- The northbound Central Park West approach at West 77th Street, which would *drop from LOS E to* F (delay increasing from *52.7* to *67.6* seconds);
- The westbound West 81st Street left-turn movement at Central Park West, which would continue to operate at LOS F (delay of more than 120 seconds);
- The northbound Central Park West approach at West 81st Street, which would drop from LOS C to D (delay increasing from 17.8 to 25.9 seconds);
- The southbound Central Park West left-turn movement at West 81st Street, which would continue to operate at LOS F (delay of more than 120 seconds); and
- The eastbound West 81st Street approach at Columbus Avenue, which would continue to operate at LOS F (delay increasing from 88.8 to 109.0 seconds).

Saturday Midday Peak Hour.

- The northbound Central Park West approach at West 77th Street, which would drop from LOS *C* to *D* (delay increasing from *21.6* to *32.7* seconds);
- The westbound West 81st Street left-turn movement at Central Park West, which would continue to operate at LOS F (delay increasing from 97.9 to 109.2 seconds);
- The northbound Central Park West approach at West 81st Street, which would continue to operate at LOS F (delay increasing from 83.2 to more than 120 seconds);
- The southbound Central Park West left-turn movement at West 81st Street, which would continue to operate at LOS F (delay increasing from 108.0 to more than 120 seconds);
- The southbound Central Park West shared through-right movement at West 81st Street, which would drop from LOS D to E (delay increasing from 34.9 to 43.3 seconds); and
- The eastbound West 81st Street approach at Columbus Avenue, which would continue to operate at LOS F (delay increasing from 88.7 to more than 120 seconds).

Other Study Area Intersections

As the project-generated vehicles are distributed throughout the broader street network, the potential for traffic impacts diminishes. Significant adverse traffic impacts would occur at the following additional intersections in the traffic study area. All of these impacts could be mitigated (see Chapter 17, "Mitigation").

Weekday Midday Peak Hour.

- No other impacts were identified at any of the other study area intersections during this time period.

Weekday PM Peak Hour.

- The northbound Central Park West approach at West 72nd Street, which would drop from LOS E to F (delay increasing from 53.6 to 62.7 seconds);
- *The eastbound West 86th Street approach at Central Park West, which would drop from LOS E to F (delay increasing from 56.4 to 61.5 seconds); and*
- *The northbound Central Park West approach at West 86th Street, which would continue to operate at LOS E (delay increasing from 54.6 to 59.6 seconds).*

Saturday Midday Peak Hour.

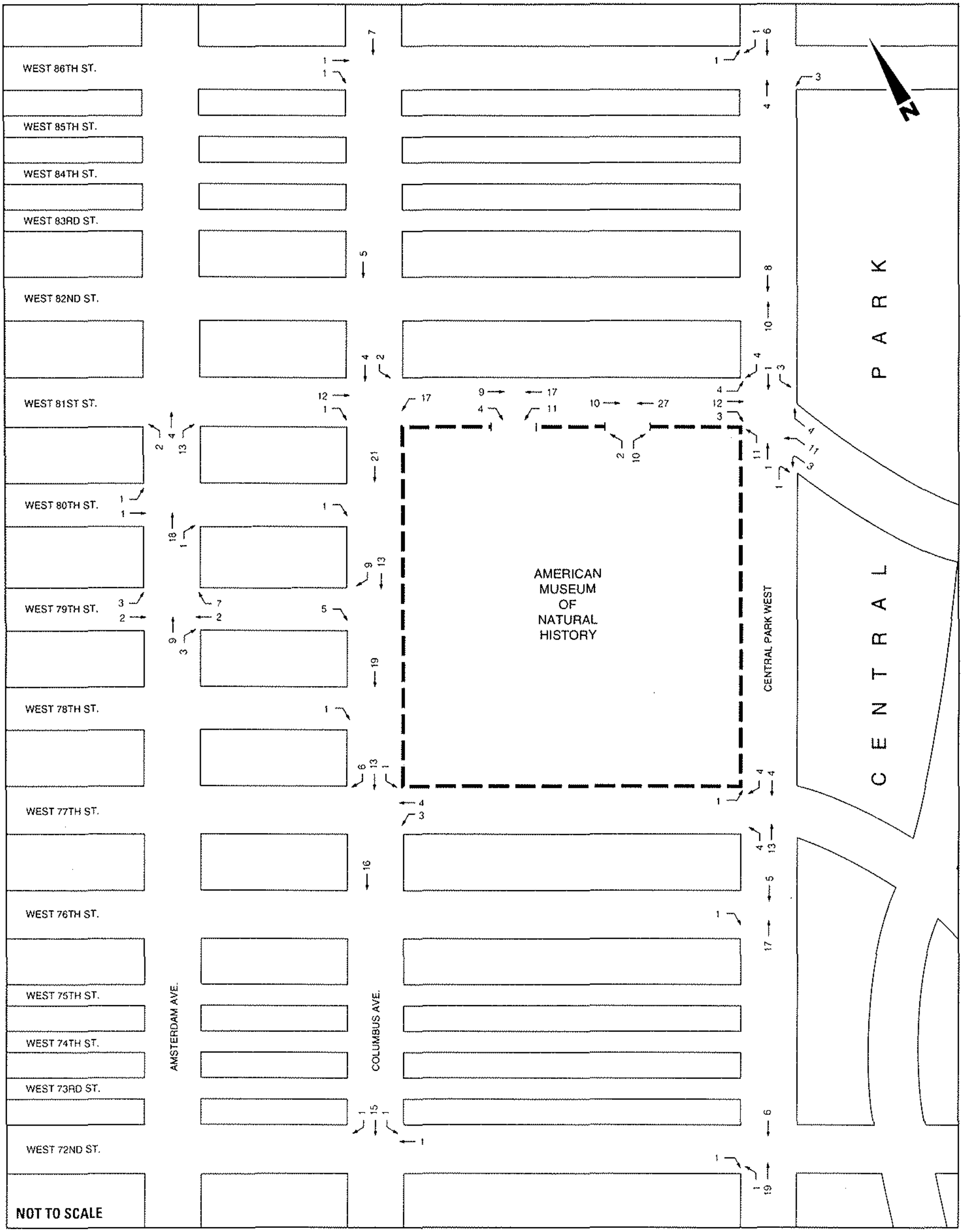
- The northbound Central Park West approach at West 72nd Street, which would *continue to operate at* LOS D (delay increasing from *26.8* to *39.0* seconds).

WEST 81st STREET

Traffic Conditions

With the proposed project, parking demand would increase as would the number of vehicles traveling to the site. With the proposed garage, parking capacity would also increase, so that the site could accommodate all of the No Build demand and most of the demand from the project. (See "Parking Supply and Utilization," below.) This would have the effect of reducing the hours during which the garage would be full (from 1 to 3 PM, compared with the No Build condition's 11 AM to 4 PM) and thus shortening the duration of queuing and its associated traffic friction on West 81st Street. With effective transportation management in place (see page 12-19), this queuing can be prevented. Without such management, a queue would persist, albeit for a shorter time compared with conditions without the project.

As noted in Chapter 2, "Project Description," and Chapter 17, "Mitigation," additional mitigation is proposed for peak conditions (primarily weekends and holidays): the service driveway on Columbus Avenue near West 78th Street would be connected to the garage in order to function as a second garage entrance. This would have the effect of rerouting a portion of traffic away from West 81st Street, further alleviating conditions there. As noted in Chapter 17, the service driveway can be used as a garage entrance without significantly adversely affecting traffic and pedestrian conditions on West 79th Street or on Columbus Avenue, assuming mitigation.

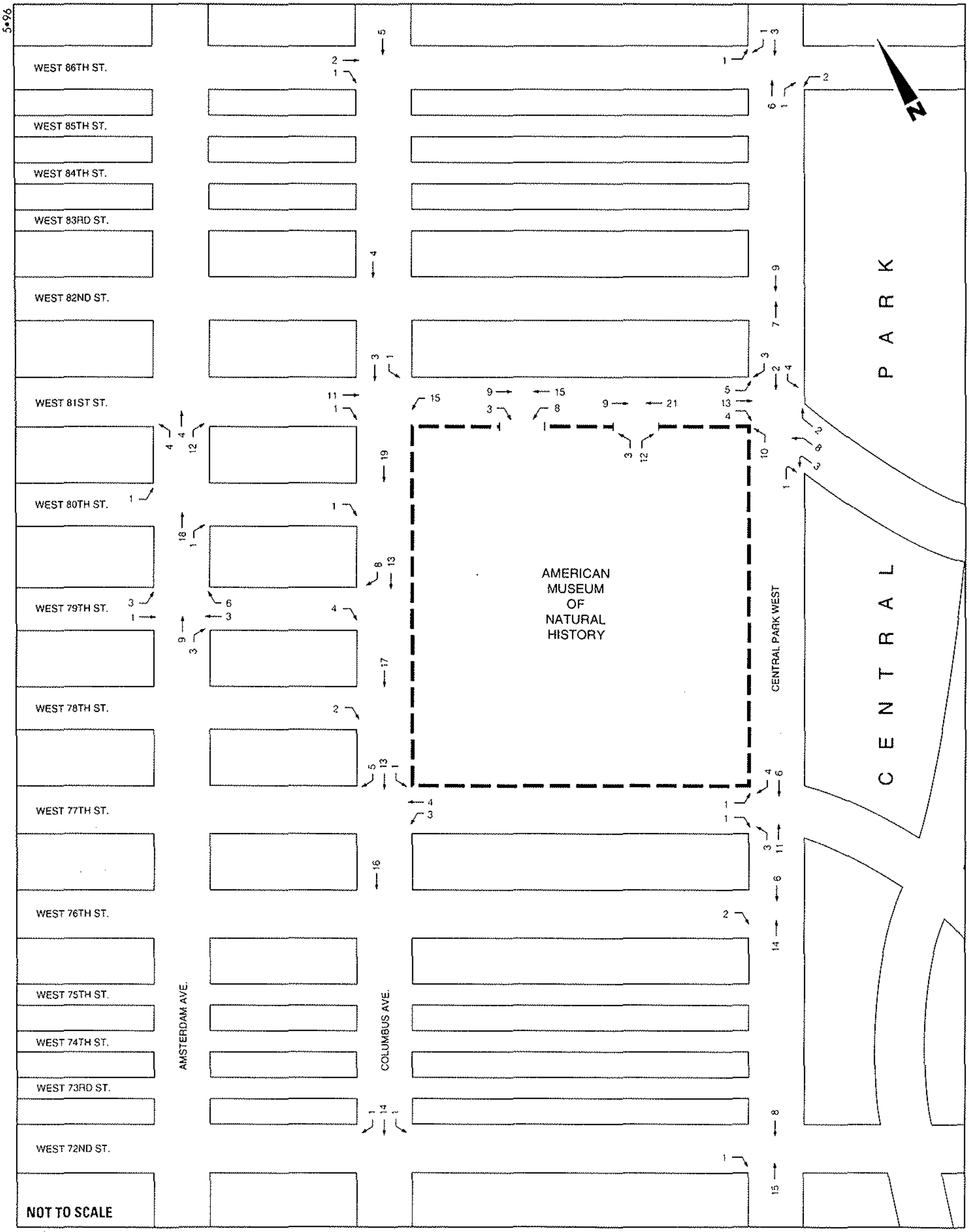


American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

2001 Project-Generated Traffic • MD Peak Hour

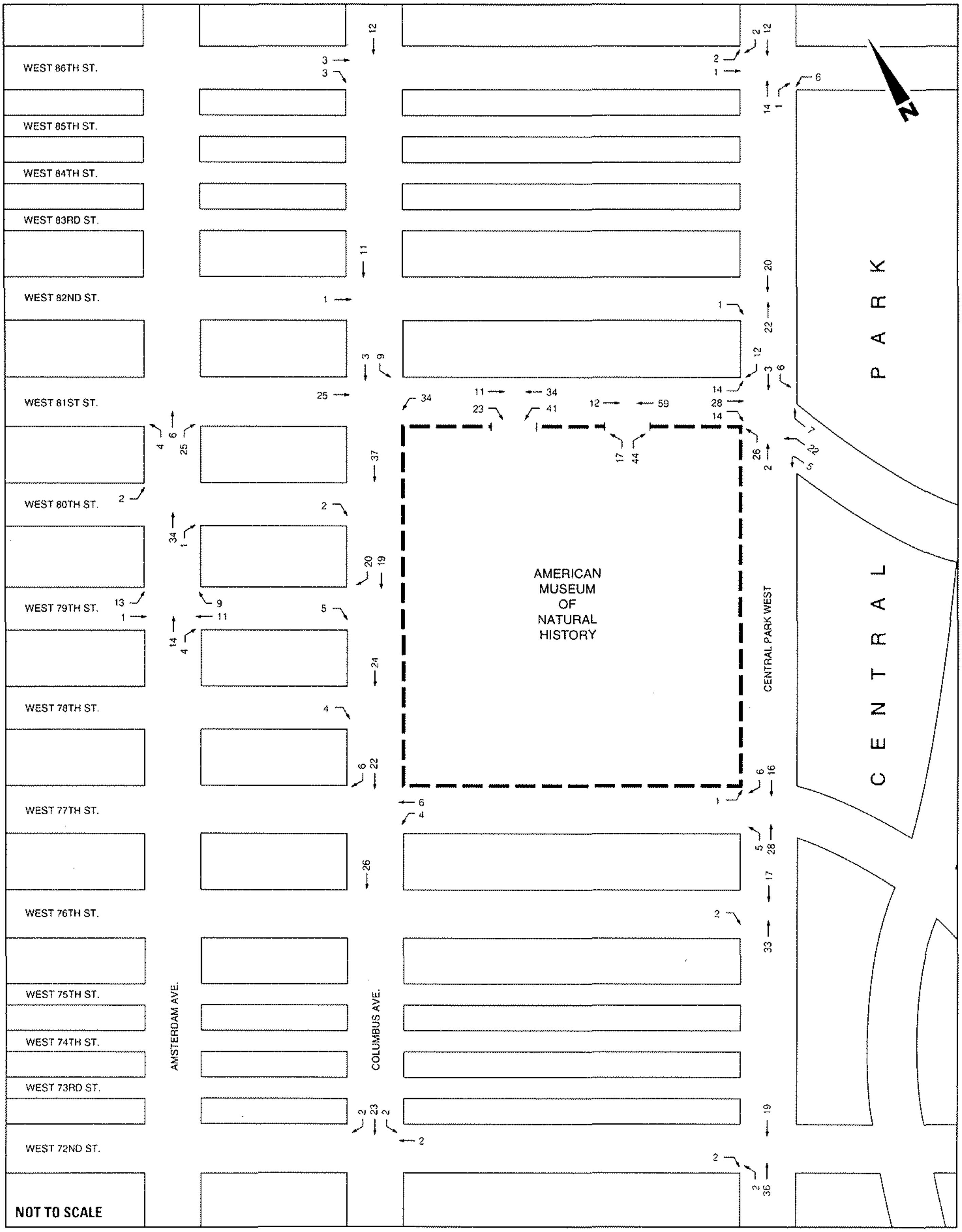
Figure 12-13



2001 Project-Generated Traffic • PM Peak Hour

Figure 12-14

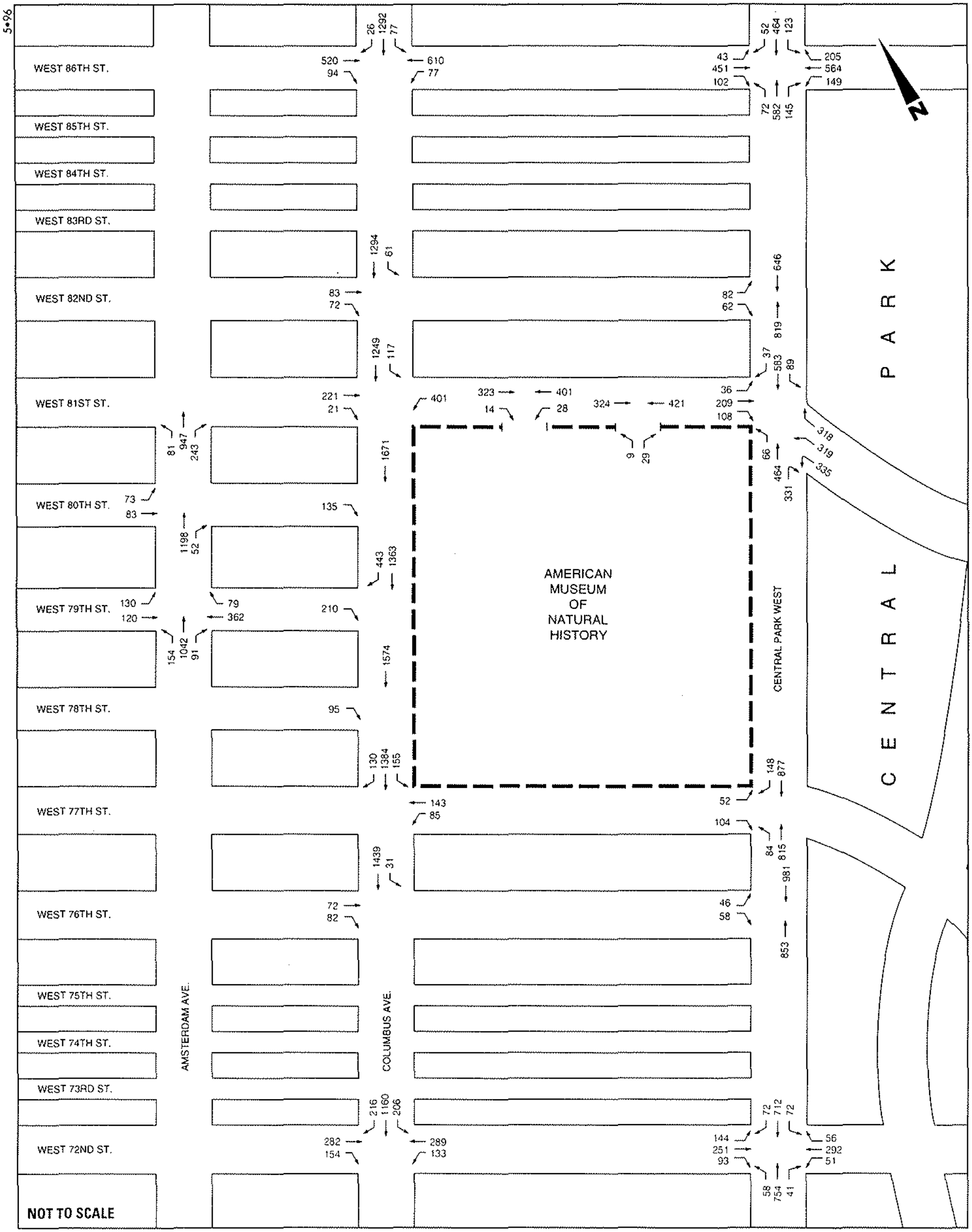
American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT



American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

2001 Project-Generated Traffic • Saturday Peak Hour

Figure 12-15

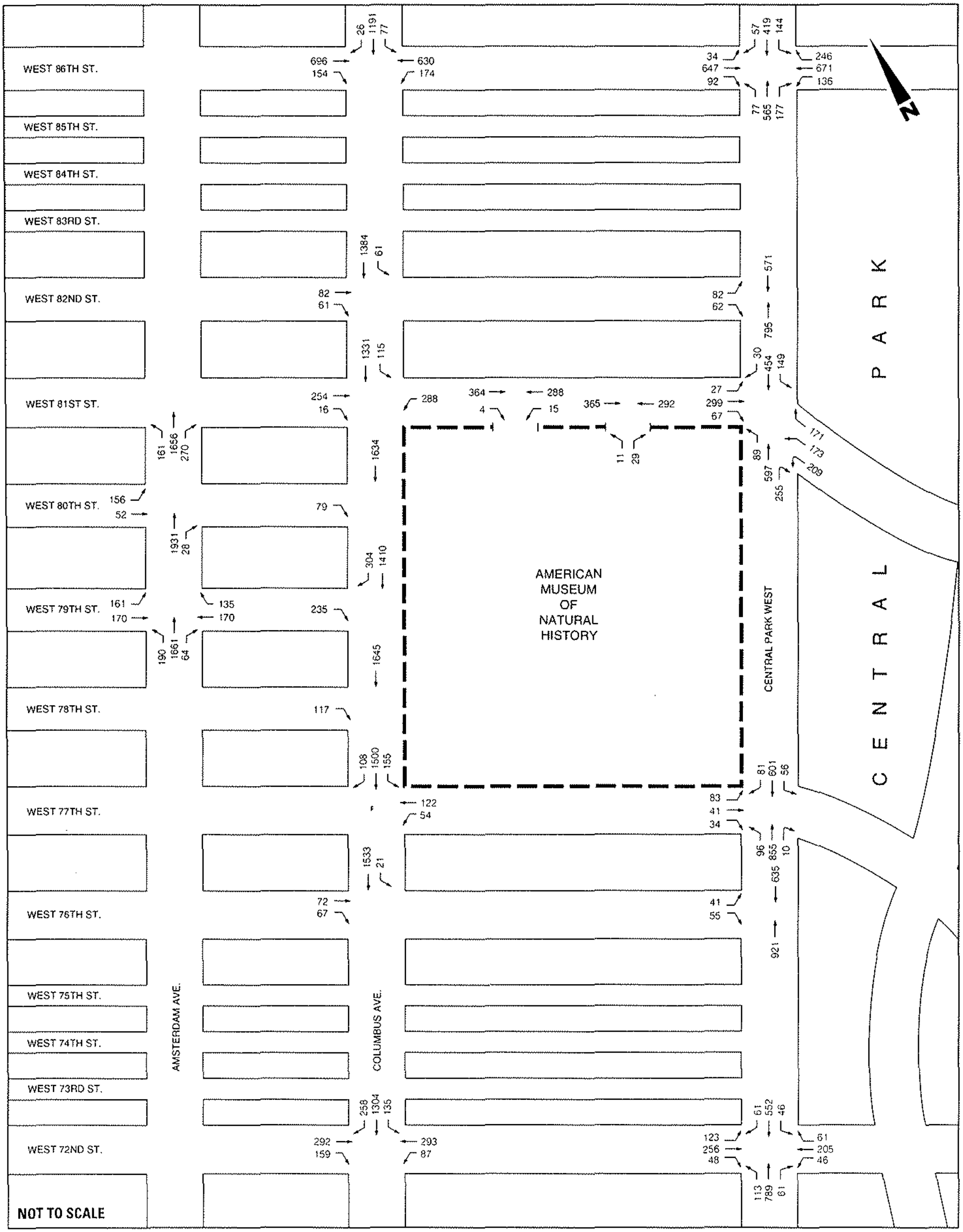


2001 Build Traffic Volumes • MD Peak Hour

Figure 12-16

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

4•96

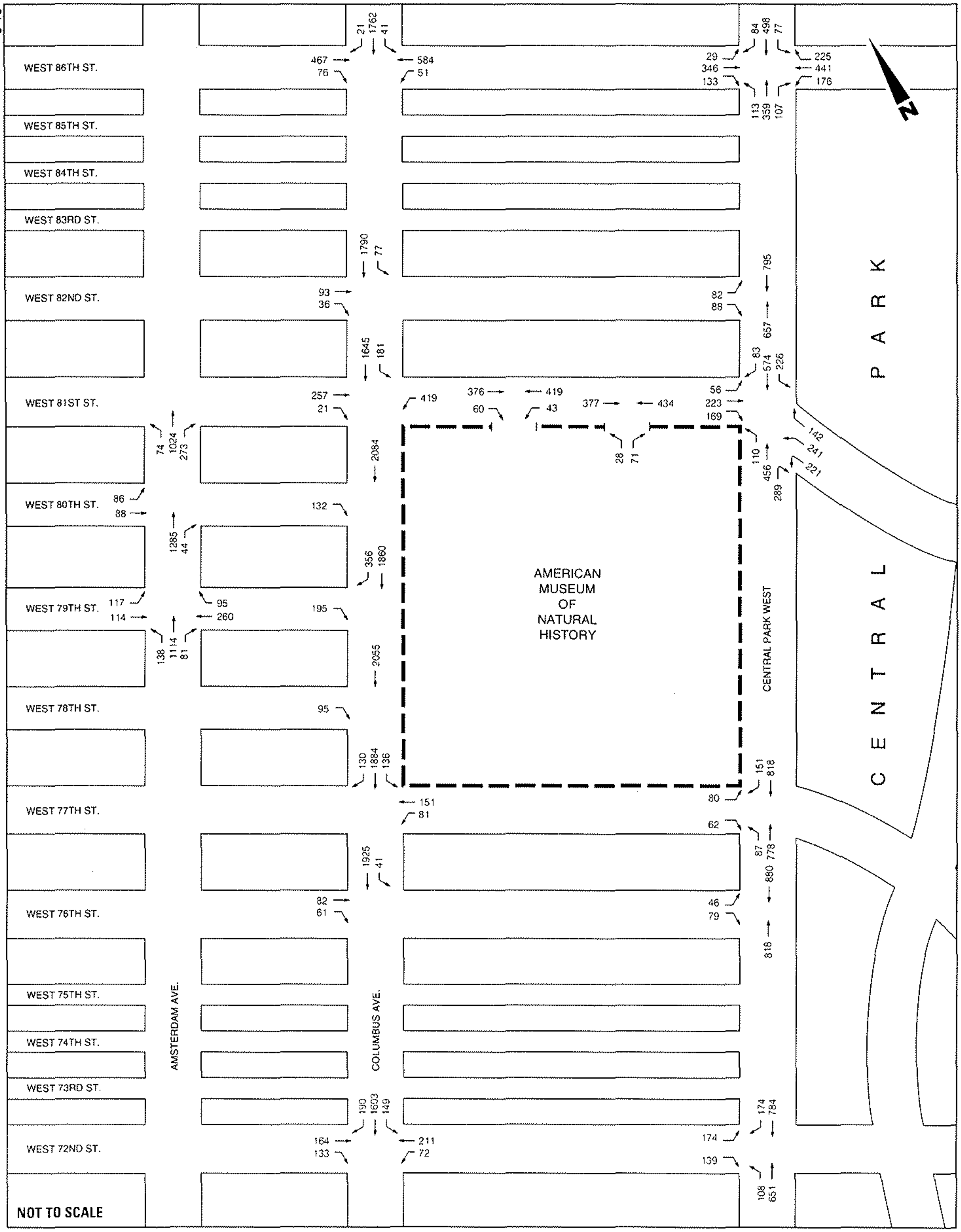


American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

2001 Build Traffic Volumes • PM Peak Hour

Figure 12-17



2001 Build Traffic Volumes • Saturday Peak Hour

Figure 12-18

American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

Buses

As discussed above (see section 12.C), school bus *demand levels are* not expected to change substantially in the future with or without the project. A small increase in tour buses traveling to the site can be expected, however. By providing adequate loading areas for school buses in the garage, the project would improve conditions associated with drop-off and pick-up. Delays in finding a spot would be reduced, and school groups would have a protected area for debarking and embarking.

The garage's top level would serve as a primary entry point for school buses. There would be positions for approximately 16 buses, of which 11 would be used for loading/unloading as well as parking, while the other 5 positions would be used primarily for bus parking. Given a capacity to process more than 60 school buses per hour, on most days all school bus loading would take place within the garage. Coach-type buses bringing school and camp groups would discharge in the West 81st Street driveway and/or on West 77th Street. Adult groups, which come exclusively in coach-type buses, would be handled on Central Park West. With this plan, the Museum would centralize all school bus loading and unloading on-site and reduce the problems associated with on-street bus loading and parking. The overall bus parking at the garage would be reduced from the approximately 30 spaces currently available. As discussed in Appendix E, studies of the garage concluded that it would not be possible to accommodate both unloading/loading and parking in the garage, except on days with relatively few buses. Although the footprint of the parking garage would be approximately that of the existing parking lot, the area of each floor devoted to parking would be less; columns, the entrance for students including a safe apron area in front of the doors, ramps to other floors, fire stairs and elevators, etc. all would reduce the area available for vehicles. Options to accommodate buses on more than just the top level were also considered. Unfortunately, the width and length of the ramps and associated turning area necessary to handle buses would greatly reduce the space available on either floor. The net result was an increase in bus parking at the expense of unloading capacity and, in one case, substantial disturbance to Theodore Roosevelt Park.

In a choice between unloading/loading schoolchildren or parking, unloading/loading schoolchildren was given priority in bus planning, first because of concern for the children's safety and, second, because the drop-off and pick-up operations were found by themselves to be the source of considerable traffic friction. Morever, the loss of on-site bus parking spaces would not result in an adverse impact because the Museum expects to provide dedicated off-site bus parking. A sufficient number of off-site spaces would be provided to accommodate buses that currently use the surface lot, as well as buses that park on the streets bordering the Museum.

The details of the bus management plan that has been prepared by the Museum are presented in Appendix E. This plan would be one component in the overall transportation management plan that the Museum is formulating.

As noted above in Section 12.D, if the Museum is not able to design and implement a successful bus management plan, the adverse conditions associated with bus loading and parking will persist in the future and will continue to contribute to weekday parking and traffic congestion problems in the area surrounding the site.

PARKING SUPPLY AND UTILIZATION

With the project, a new three-level parking garage would be constructed on the site of the existing surface lot. With valet parking, the garage would have a capacity of approximately 370 spaces for cars. On weekdays, when demand would be less, the self-park capacity would yield approximately *179* spaces for cars on the lower two levels*; the upper level would be used for bus loading/unloading and bus parking only.* As *originally* proposed, the garage would utilize the same driveway and circulation system as the current lot. *However, as discussed in Chapter 17, "Mitigation," the FEIS now proposes to incorporate an additional mitigation option into the project that would allow entering automobiles on the weekend to also use an existing Columbus Avenue service driveway to access the garage.*

The project would also result in the loss of some existing employee parking; with construction of the project, approximately 50 spaces in the Museum's below-grade service yard would be eliminated.

As shown in Table 12-11, with the new garage, as under existing and No Build conditions, there would be sufficient capacity for all weekday car parkers. *In addition to the weekday accumulation shown below, there is expected to be sufficient parking on the lower levels of the garage to accommodate the employee spaces displaced by the project. On the weekends, the service area is expected to be sufficient for employee parking and no spaces in the garage are anticipated to be needed.*

Table 12-11

2001 Build Conditions: 81st Street Museum Garage—Parking Demand and Accumulation

	Weekday			Saturday					
	Auto On-Site Parking Demand		Auto Accumulation	On-Site Parking Demand		Parking Lot Trips Accom on Site		Accumulation	Hrly Excess Demand
Time	In	Out		In	Out	In	Out		
8-9 AM	2	0	2	0	0	0	0	0	0
9-10 AM	5	0	7	19	0	19	0	19	0
10-11 AM	26	3	30	164	6	164	6	177	0
11-12 PM	29	8	51	124	19	124	19	282	0
12-1 PM	29	12	67	141	54	141	54	369	0
1-2 PM	26	15	78	173	91	92	91	370	81
2-3 PM	17	20	74	205	120	120	120	370	85
3-4 PM	25	30	69	113	150	113	150	333	0
4-5 PM	11	28	52	57	211	57	211	179	0
5-6 PM	17	18	50	39	210	39	129	89	0
6-7 PM	*51*	6	*95*	*61*	105	*61*	20	*130*	0
7-8 PM	*66*	4	*158*	*68*	30	*68*	30	*168*	0
Total 8 AM-8 PM	*302*	**145**	**NA**	*1,163*	**996**	*998*	**830**	**NA**	**NA**

Source: Edison Parking Corporation surveys November 1995, January and February 1996, and Allee King Rosen & Fleming, Inc. surveys February 1992 and March 1996.

On weekends, the project's garage would substantially improve the Museum's ability to accommodate on-site parking demand. On high-attendance Saturdays, the number of vehicles wishing to enter the lot but unable to because of constrained capacity would be significantly reduced from the No Build condition. This would result in a notable reduction in the weekend hours in which the on-site parking supply would be at capacity and demand forced to overflow to off-site locations. Under No Build conditions, the lot would be full from roughly 11 AM until 4 PM. With the increased capacity, the hours in which the garage is full would be reduced from roughly 1 to 3 PM. On the more lightly attended weekends, the garage would be full for only a single hour—from 2 to 3 PM. *(This analysis assumes that 50 percent of weekend visitors and 30 percent of weekday visitors park for an additional hour in the garage—see also section 12.D above.)*

Those parkers wishing to park off-site would be able to find available capacity at other parking facilities in the area, both on weekdays and weekends. Garages in the area are expected to have sufficient capacity. However, the utilization of curbside parking is constrained and would be more so in the future. As this occurs, some parkers would have to park at a farther distance from the site to find a curbside space.

In terms of evening activity from restaurant and terrace events, the parking garage would have adequate capacity for the project's demand. Peak parking accumulation from *a 1,000*-person terrace event, coupled with evening demand from the restaurant, is estimated to generate a demand for approximately *140* spaces. This demand could be accommodated on the project site and would not significantly affect parking supply and utilization in the surrounding neighborhood.

With the project, the number of on-site bus parking spaces would be reduced. Currently, the lot has a capacity of approximately 30 buses and typically parks 20 to 25 buses. With the project, depending on the layout, the capacity would be reduced to as few as *5 spaces on heavy bus days.* Given the floor-to-ceiling clearances, only school buses could utilize the garage; tour buses would not be able to enter the garage to load and unload. Without other measures, this change would increase the number of buses parking on the streets bordering the Museum, thereby exacerbating the problems caused by buses on weekdays. *As described above,* the Museum and Planetarium Authority have formulated a management program for bus loading, unloading, and parking to address this problem at the site and on the surrounding blocks.

The operational policies of the proposed parking garage have not yet been fully defined. While the garage would be managed with the intention of giving priority to Museum demand, so that its parkers are accommodated to the maximum extent possible, it is possible that there would be some availability for community parking. It is not expected that the increased availability of parking at this site would adversely affect conditions in the area.

SUMMARY

As presented in the discussion above, the project would result in the following changes to traffic conditions at the Museum and in the surrounding area:

- The project would attract additional visitors to the Museum, resulting in additional traffic on the nearby streets. This would result in significant adverse traffic impacts at five intersections in the study area (Central Park West at West 72nd, 77th, 81st, and 86th Streets, and Columbus Avenue at West 81st Street). These impacts could be completely mitigated with a variety of standard measures, including signal retiming and rephasing, changes in parking regulations, and striping plans for improving traffic flow. Mitigation measures are discussed in Chapter 17 of this EIS.

- *With the proposed garage, parking capacity would increase, so that the site could accommodate all of the No Build demand and most of the demand from the project. This would have the effect of reducing the hours during which the garage would be full (from 1 to 3 PM, compared with the No Build condition's 11 AM to 4 PM) and thus shortening the duration of queuing and its associated traffic friction on West 81st Street. With effective transportation management in place (see page 12-19), this queuing can be prevented. Without such management, a queue would persist, albeit for a shorter time compared with conditions without the project.*
- The project would improve conditions associated with drop-off and pick-up of schoolchildren at the Museum by providing adequate loading areas in the garage for school buses. Delays in finding a loading spot would be reduced, and school groups would have a protected area for loading and unloading. *Bus parking would be reduced on site; buses would be directed to an off-site lot to await dispatching back to the Museum for pick-up.* ❖

A. INTRODUCTION

As discussed in the Chapter 12, "Traffic and Parking," development associated with the proposed project can be expected to generate trips of all modes. This section examines the potential impact of the trips associated with the proposed project on pedestrian and public transit service levels in the area.

B. EXISTING CONDITIONS

PEDESTRIAN CONDITIONS

ANALYSIS METHODOLOGY

An examination of existing pedestrian conditions was conducted at the sidewalks, corners, and crosswalks at the intersections of 81st and 77th Streets with Central Park West and Columbus Avenue. Surveys of pedestrian volumes were conducted in November 1995 and April 1996, for one weekday and Saturday. Volumes at the locations studied are generally low to moderate during the weekday and Saturday peak hours. In addition, field measurements were taken of effective sidewalk widths, crosswalk widths, and of the total area within the reservoirs. (Effective sidewalk width is the width of the sidewalk at its narrowest point.) Taking all obstructions (e.g., fire hydrants, trash bins, planters, etc.) into account, effective sidewalk widths in the study area range from approximately 12.7 to 16.7 feet.

Using the methodologies presented in the *Highway Capacity Manual* (*HCM*) Special Report 209 (TRB, 1985), calculations were made to determine the adequacy of sidewalk, crosswalk, and corner reservoir capacities in relation to the demand imposed on them. Sidewalks were analyzed in terms of pedestrian flow. The calculation of the average pedestrians per minute per foot of effective walkway width is the basis for level of service (LOS) analysis. However, walkways are directly influenced by other elements of the transportation network and, to more accurately estimate the dynamics of walking, a platoon factor is applied in the calculation of pedestrian flow. This reflects that pedestrians move in congregated groups (platoons) because they cross and wait for green lights and get off the buses and subways in groups. This generally results in a LOS one level poorer than average flow rates.

Crosswalks and street corners are not easily measured in terms of free pedestrian flow, as they are influenced by the effects of traffic signals. Street corners must provide sufficient space for a mix of standing pedestrians (queued to cross a street) and circulating pedestrians (crossing the other street or moving around the corner). *HCM* applies a measure of time and space availability based on the area of the corner, the timing of the intersection signal, and the estimated time used by circulating pedestrians. The total "time-space" available for these activities is the net area of the corner (in square feet) multiplied by the cycle length and expressed as square feet per minute. The analysis then determines the total circulation time for all pedestrian movements at the corner (expressed as pedestrians per minute). The ratio of net time-space divided by pedestrian circulation time provides the LOS measurement of square feet per pedestrian.

Crosswalk LOS is also a function of time and space. Similar to the street corner analysis, crosswalk conditions are first expressed as a measurement of the area available (the crosswalk width multiplied by the width of the street) and the signal timing. This measure is expressed as square feet per minute. The average time it takes for a pedestrian to cross the street is calculated based on the width of the street and an assumed walking speed. The ratio of the measure (again expressed as pedestrians per minute) to the time space available in the crosswalk is the LOS measurement of available square feet per pedestrian. Additionally, in the first seconds of the "walk" cycle, the pedestrians who have queued to cross the street create a surge effect as they begin to cross. Therefore, the crosswalk LOS analysis includes a factor that adjusts for this "surge" to estimate worst-case conditions during the initial start-up. After the initial surge, the LOS analysis also takes into account vehicles turning the corner, thereby passing through the crosswalk.

Figure 13-1 expresses LOS standards on sidewalks and crosswalks, and Figure 13-2 expresses LOS for the street corners. Based on these measures, the operation of pedestrian pathways for the weekday midday and PM peak hours and the Saturday peak hours were assessed. The results are presented in Table 13-1.

EXISTING LEVELS OF SERVICE

Pedestrian volumes bordering the Museum block are heaviest along Central Park West during the Saturday midday period. During other hours and at other locations, the pedestrian volumes are generally lighter. The other notable pedestrian flow on the weekend, particularly during warm weather months, is the pedestrian volume moving in and out of Central Park at both 81st and 77th Streets. However, even with these factors, given the fairly generous widths of the sidewalks in the area, all study area pedestrian facilities operate at LOS B or better during all peak hours.

Very few people travel to the Museum by bicycle, and the Museum has no facilities for bicycles.

PUBLIC TRANSPORTATION

The project area is well served by public transportation facilities (see Figure 13-3), with nearby bus and rapid transit lines that provide access to other areas of the city. *The Museum has two major subway lines within easy walking distance—the IND (B and C trains, A train at night) with a direct connection into the lower level of the Museum, and the Broadway IRT (1 and 9 trains) to the west, as well as four bus lines serving the site at Central Park West, West 81st Street, and Columbus and Amsterdam Avenues. Because of these services, public transportation plays a large role in providing access for Museum visitors. On weekdays, approximately 33 percent of Museum visitors use public transportation and on Saturdays, approximately 17 percent. The outstanding connection to the public transportation network is an important factor in the growth of Museum attendance.*

SUBWAYS

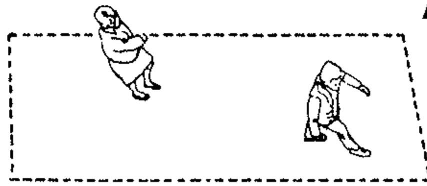
The subway station nearest the project site, the IND 81st Street station, is directly in front of the Museum along Central Park West. The station is served by two control areas. One control area, N-45, located south of the Museum's main entrance, is accessed from a street corridor along Central Park West at approximately West 78th Street, as well as directly from the lower level of the Museum, which has direct entry from the subway. This subway control area is closed at

LEVEL OF SERVICE A

Pedestrian Space: ≥ 130 sq ft/ped *Flow Rate:* ≤ 2 ped/min/ft

At walkway LOS A, pedestrians basically move in desired paths without altering their movements in response to other pedestrians. Walking speeds are freely selected, and conflicts between pedestrians are unlikely.

A

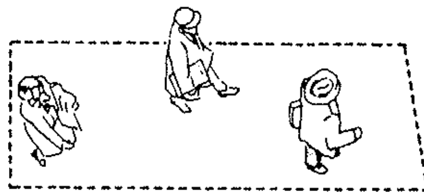


LEVEL OF SERVICE B

Pedestrian Space: ≥ 40 sq ft/ped *Flow Rate:* ≤ 7 ped/min/ft

At LOS B, sufficient area is provided to allow pedestrians to freely select walking speeds, to bypass other pedestrians, and to avoid crossing conflicts with others. At this level, pedestrians begin to be aware of other pedestrians, and to respond to their presence in the selection of their walking path.

B

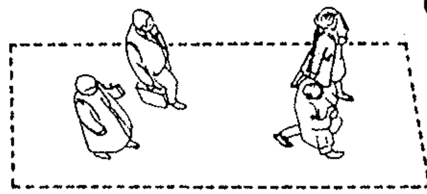


LEVEL OF SERVICE C

Pedestrian Space: ≥ 24 sq ft/ped *Flow Rate:* ≤ 10 ped/min/ft

At LOS C, sufficient space is available to select normal walking speeds, and to bypass other pedestrians in primarily unidirectional streams. Where reverse-direction or crossing movements exist, minor conflicts will occur, and speeds and volume will be somewhat lower.

C

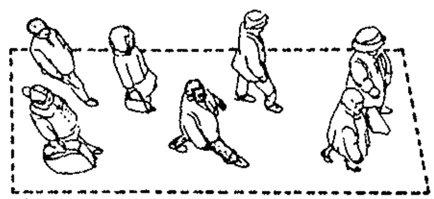


LEVEL OF SERVICE D

Pedestrian Space: ≥ 15 sq ft/ped *Flow Rate:* ≤ 15 ped/min/ft

At LOS D, freedom to select individual walking speed and to bypass other pedestrians is restricted. Where crossing or reverse-flow movements exist, the probability of conflict is high, and its avoidance requires frequent changes in speed and position. The LOS provides reasonably fluid flow; however, considerable friction and interaction between pedestrians is likely to occur.

D

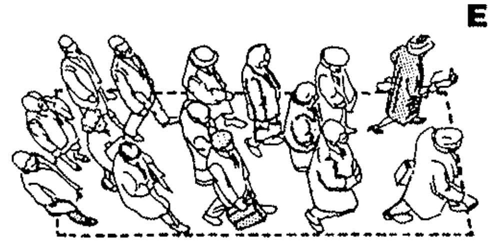


LEVEL OF SERVICE E

Pedestrian Space: ≥ 6 sq ft/ped *Flow Rate:* ≤ 25 ped/min/ft

At LOS E, virtually all pedestrians would have their normal walking speed restricted, requiring frequent adjustment of gait. At the lower range of this LOS, forward movement is possible only by "shuffling." Insufficient space is provided for passing of slower pedestrians. Cross- or reverse-flow movements are possible only with extreme difficulties. Design volumes approach the limit of walkway capacity, with resulting stoppages and interruptions to flow.

E



LEVEL OF SERVICE F

Pedestrian Space: ≥ 40 sq ft/ped *Flow Rate:* ≤ 7 ped/min/ft

At LOS F, all walking speeds are severely restricted, and forward progress is made only by "shuffling." There is frequent, unavoidable contact with other pedestrians. Cross- and reverse-flow movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristic of queued pedestrians than of moving pedestrians.

F

Pedestrian Levels of Service

Figure 13-1

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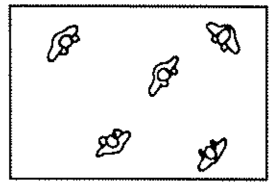
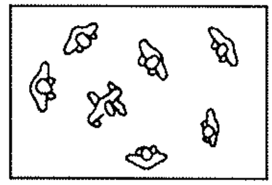
LEVEL OF SERVICE A

Average Pedestrian Area Occupancy: 13 sq ft/person or more
Average Inter-Person Spacing: 4 ft, or more
Description: Standing and free circulation through the queuing area is possible without disturbing others within the queue.



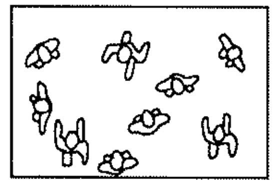
LEVEL OF SERVICE B

Average Pedestrian Area Occupancy: 10 to13 sq ft/person
Average Inter-Person Spacing: 3.5 to 4.0 ft
Description: Standing and partially restricted circulation to avoid disturbing others within the queue is possible.



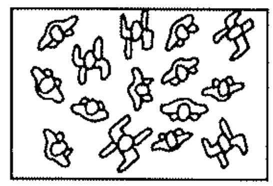
LEVEL OF SERVICE C

Average Pedestrian Area Occupancy: 7 to 10 sq ft/person
Average Inter-Person Spacing: 3.0 to 3.5 ft
Description: Standing and restricted circulation through the queuing area by disturbing others within the queue is possible; this density is within the range of personal comfort.



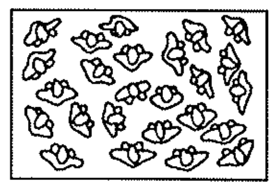
LEVEL OF SERVICE D

Average Pedestrian Area Occupancy: 3 to 7 sq ft/person
Average Inter-Person Spacing: 2 to 3 ft
Description: Standing without touching is possible; circulation is severely restricted within the queue and forward movement is only possible as a group; long term waiting at this density is discomforting.



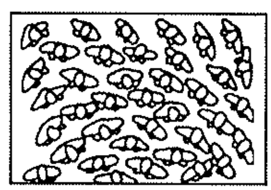
LEVEL OF SERVICE E

Average Pedestrian Area Occupancy: 2 to 3 sq ft/person
Average Inter-Person Spacing: 2 ft or less
Description: Standing in physical contact with others is unavoidable; circulation within the queue is not possible; queuing at this density can only be sustained for a short period without serious discomfort.



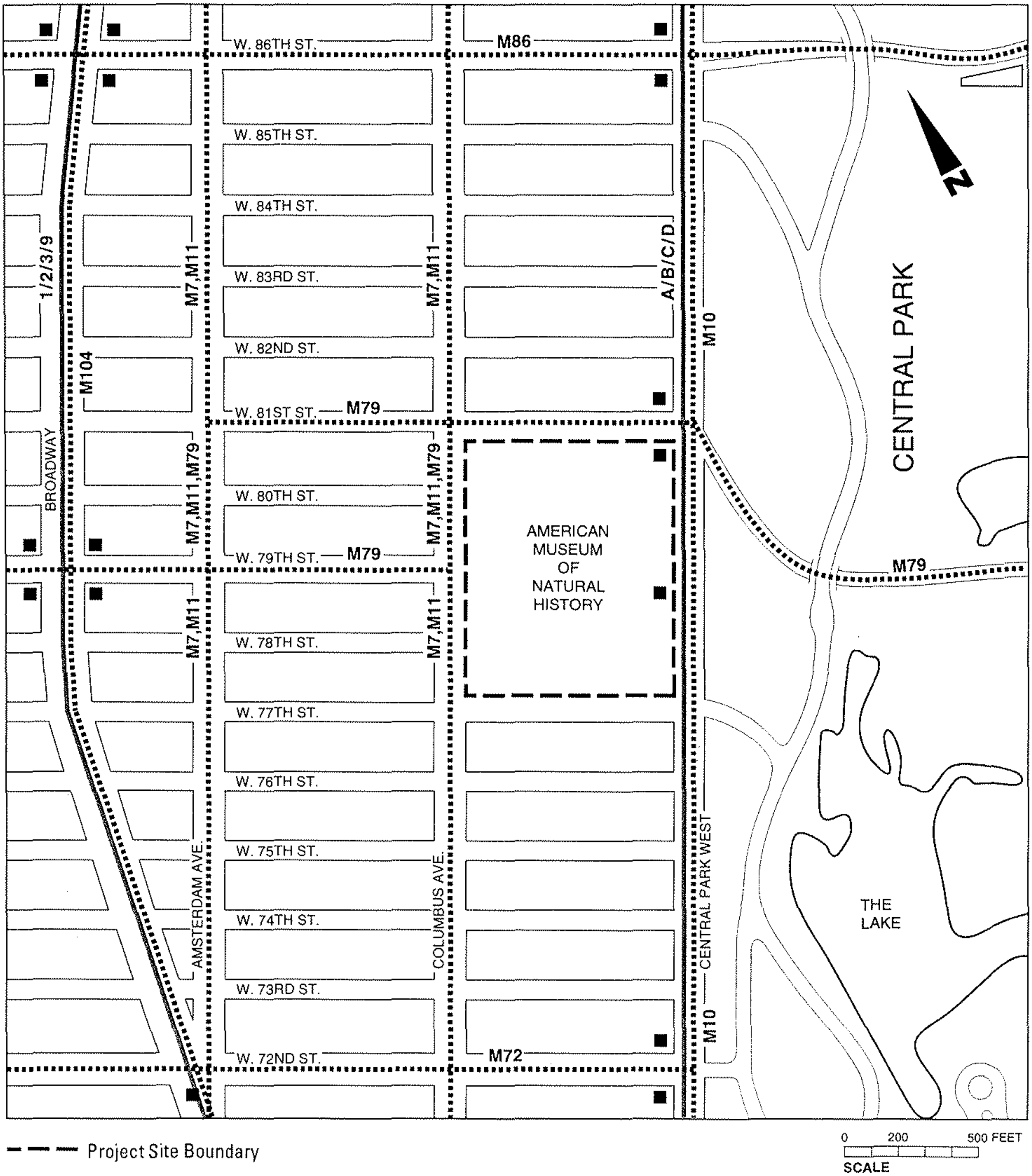
LEVEL OF SERVICE F

Average Pedestrian Area Occupancy: 2 sq ft/person or less
Average Inter-Person Spacing: Close contact with other persons
Description: Virtually all persons within the queue are standing in direct physical contact with those surrounding them; this density is extremely discomforting; no movement is possible within the queue; the potential for panic exists in large crowds at this density.



Standing Levels of Service

Figure 13-2



Project Site Boundary

Bus Route

Subway Line

Subway Stairway

American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

Public Transportation

Figure 13-3

Table 13-1
Existing Pedestrian Conditions, 1996
A: Sidewalk Analysis

	CPW: 77 to 81 West Sidewalk	W81: Col to CPW South Sidewalk	Col: 77 to 78 East Sidewalk	W77/CPW North Sidewalk
Weekday 12-1 PM				
15-min, 2-way vol	218	177	161	131
Average P/M/F	1	1	1	1
Average LOS	A	A	A	A
Platoon P/M/F	5	5	5	5
Platoon LOS	B	B	B	B
Weekday 5-6 PM				
15-min, 2-way vol	153	110	95	75
Average P/M/F	1	0	0	0
Average LOS	A	A	A	A
Platoon P/M/F	5	4	4	4
Platoon LOS	B	B	B	B
Saturday 2-3 PM				
15-min, 2-way vol	313	240	170	71
Average P/M/F	2	1	1	0
Average LOS	A	A	A	A
Platoon P/M/F	6	5	5	4
Platoon LOS	B	B	B	B

B: Crosswalk Analysis

	CPW at 81 St		CPW at 77 St		Col Ave at 81 St		Col Ave at 77 St	
	South	West	North	West	East	South	North	East
Weekday 12-1 PM								
Avg SF/P no vehs.	513	211	788	254	142	158	365	805
Avg LOS no vehs.	A	A	A	A	A	A	A	A
Avg SF/P with vehs.	386	204	770	234	132	130	365	755
Avg LOS with vehs.	A	A	A	A	A	A	A	A
Surge SF/P	303	92	469	108	68	77	211	339
Surge LOS	A	B	A	B	B	B	A	A
Weekday 5-6 PM								
Avg SF/P no vehs.	388	325	788	319	196	237	1158	4627
Avg LOS no vehs.	A	A	A	A	A	A	A	A
Avg SF/P with vehs.	327	310	752	299	183	208	1158	4341
Avg LOS with vehs.	A	A	A	A	A	A	A	A
Surge SF/P	229	141	469	136	95	116	669	1950
Surge LOS	A	A	A	A	B	B	A	A
Saturday 2-3 PM								
Avg SF/P no vehs.	219	163	501	551	93	102	157	291
Avg LOS no vehs.	A	A	A	A	B	B	A	A
Avg SF/P with vehs.	175	153	479	508	85	85	157	278
Avg LOS with vehs.	A	A	A	A	B	B	A	A
Surge SF/P	129	71	298	234	45	50	91	123
Surge LOS	B	B	A	A	B	B	B	B

Source: Allee King Rosen & Fleming, Inc. Surveys November 1995 and April 1996.
Notes: SF/P = Square feet per pedestrian; LOS = Level of Service.

Table 13-1 (Continued)
Existing Pedestrian Conditions, 1996
C: Corner Analysis

	CPW at 81 St	CPW at 77 St	Col Ave at 81 St	Col Ave at 77 St
	Southwest	Northwest	Southeast	Northeast
Weekday 12-1 PM				
SF/P	337	457	472	1880
LOS	A	A	A	A
Weekday 5-6 PM				
SF/P	492	559	723	6573
LOS	A	A	A	A
Saturday 2-3 PM				
SF/P	193	642	312	699
LOS	A	A	A	A

Source: Allee King Rosen & Fleming, Inc. Surveys November 1995 and April 1996.
Notes: SF/P = Square feet per pedestrian; LOS = Level of Service.

night, beginning at approximately 6 PM, when the Museum closes. The other control area, N-44, is located at the northern end of the Museum block, with street stairs at both sides of West 81st Street on the west side of Central Park West. *Subway counts were conducted for one weekday during the weekday midday and PM peak hours at all key control area station elements (i.e., stairways, passageways, exit gates, turnstiles, etc.).* Demand levels were estimated for the various station elements and passenger volumes were compared with the computed volume that each individual station element is capable of handling. Various capacity-reducing factors were applied to these station elements to account for pedestrian flow characteristics, such as friction caused by bidirectional flow and width reductions in stairwells prompted by handrails. A service volume flow rate at the midpoint of LOS C and LOS D (SVCD) is the level that New York City Transit (NYCT) uses to determine adequacy of various elements to accommodate demands at an acceptable LOS. When actual or projected demands are the less than the calculated SVCD, level of service is considered acceptable (LOS A, B, or C); demands that exceed the SVCD indicate undesirable levels of service (D, E, or F).

Table 13-2 shows Volume/SVCD (V/SVCD) ratios next to the level of service. V/SVCD ratios that range between 0 and 0.45 represent LOS A. For LOS B conditions, V/SVCD ratios range between 0.45 and 0.67. For LOS C conditions, V/SVCD ratios range between 0.67 and 1.00. LOS D, which indicates a moderate degree of congestion (typical throughout many of the subway stations in midtown and downtown Manhattan during the peak hours), has a V/SVCD ratio range between 1.00 and 1.33. At LOS E, when pedestrian volumes are unstable and congestion occurs, the V/SVCD ratio ranges between 1.33 and 1.67. LOS F, the level at which excessive delays occur, is represented by V/SVCD ratios in excess of 1.67, which indicates that the demand exceeds the capacity of the facility.

As shown in Table 13-2, all station elements currently operate at LOS A.

Table 13-2
Existing Conditions at Central Park West Subway Station, 1996

	81st Street Street Stairs		81st Street Token Booth		79 St Stair	79th Street Token Booth			
	S2	S3	3 Turn-stiles	Exit Gate	S1	3 Turn-stiles	Exit Gate	High Turn-stile	High Exit Gate
Width	10	10			11.8				
Effective width	9	9			10.8				
Weekday 12-1 PM (Peak 15 Minutes)									
Pedestrian In	72	38	95	15	141	68	45	27	NA
Pedestrian Out	59	32	91	0	86	69	2	NA	15
Friction Factor	0.9	0.9	NA	NA	0.9	NA	NA	NA	NA
SVCD Capacity	1,215	1,215	1,440	750	1,458	1,440	750	300	450
V/SVCD Ratio	0.108	0.058	0.129	0.020	0.156	0.095	0.063	0.090	0.033
LOS	A	A	A	A	A	A	A	A	A
Weekday 5-6 PM (Peak 15 Minutes)									
Pedestrian In	203	86	271	18	154	132	11	11	NA
Pedestrian Out	125	53	178	0	62	49	0	NA	13
Friction Factor	0.9	0.9	NA	NA	0.8	NA	NA	NA	NA
SVCD Capacity	1,215	1,215	1,440	750	1,296	1,440	750	300	450
V/SVCD Ratio	0.270	0.114	0.312	0.024	0.167	0.126	0.015	0.037	0.029
LOS	A	A	A	A	A	A	A	A	A

Source: Allee King Rosen & Fleming, Inc. Survey November 1995 and April 1996.
Notes: SVDC = Service volume flow rate at midpoint between LOSs C and D indicates acceptable LOS; V/SVDC ratio = Ratio of pedestrian volume to SVDC.
Stair capacity = 10 persons per effective foot width; turnstile capacity = 32 persons per minute (20 percent reduction for cross traffic); exit gate capacity = 50 persons per minute; from *CEQR Technical Manual.*

BUSES

As shown in Figure 13-3, the study area is well served by NYCT bus lines. North-south routes run along Central Park West (M10) and Columbus/*Amsterdam* Avenues (M7 *and M11*), while *the closest* crosstown route operates along West 81st Street (M79). The scheduled frequency of service during the peak hours ranges from 6 to 15 buses per hour. The actual frequency of bus service may vary depending on traffic conditions. The service levels for the those routes likely to be most influenced by project-generated trips were evaluated based on recent NYCT passenger and bus count summaries conducted in peak load points along the routes. As shown in Table 13-3, there was available capacity on all bus routes in the area during the weekday midday and PM peak hours.

Table 13-3

Passenger Loadings and Available Capacity on Study Area Bus Routes Existing Conditions, 1996

Route and Direction	Peak Load Point	Peak Load Pass	Buses per Hour	Head-way (Mins)	At Peak Load Point		
					Passengers per Bus	Hourly Capacity	Available Capacity
Weekday, 12-1 PM							
M7 SB	125 St/Lenox	207	9	6.7	23	540	333
M7 NB	34 St/Sixth Av	192	6	10	32	360	168
M10 SB	34 St/Seventh	181	6	10	30	360	179
M10 NB	34 St/Seventh	188	6	10	31	360	172
M11 SB	54 St/Ninth Av	186	6	10	31	360	174
M11 NB	66St/Amst Av	158	6	10	26	360	202
M79 WB	79 St/Lex&5th	576	10	6	58	600	24
M79 EB	81 St/CPW & 79th/Lex	402	10	6	40	600	198
Weekday, 5-6 PM							
M7 SB	125 St/Lenox & 86th St/Col	320	8	7.5	40	480	160
M7 NB	99 St/Amst & 34 St/Seventh	514	10	6	51	600	86
M10 SB	42 St/Eighth & 66 St/CPW	241	6	10	40	360	119
M10 NB	34 St/Seventh	341	8	7.5	43	480	139
M11 SB	66 St/Col Av & 42 St/Ninth Av	256	6	10	43	360	104
M11 NB	99 St/Amst Av	320	7	8.6	46	420	100
M79 WB	79 St/Lex&5th	545	15	4	36	900	355
M79 EB	81 St/CPW & 79th/Lex	782	15	4	52	900	118

Source: New York City Transit.

C. THE FUTURE WITHOUT THE PROJECT

PEDESTRIAN CONDITIONS

Pedestrian conditions were analyzed for 2001 No Build conditions for the locations discussed previously. Future pedestrian volumes were estimated using an annual 0.50 percent growth factor per year (as suggested in the *City Environmental Quality Review [CEQR] Technical Manual*, December 1993) plus an increase in pedestrian flows due to the projected increase in Museum attendance between 1996 and 2001.

As illustrated in Table 13-4, the estimated 2001 No Build volumes will result in modest changes from the existing conditions. All pedestrian facilities will operate at LOS A or B, with one location at LOS C.

Table 13-4

No Build Pedestrian Conditions, 2001

A: Sidewalk Analysis

	CPW: 77 to 81 West Sidewalk	W81: Col to CPW South Sidewalk	Col: 77 to 78 East Sidewalk	W77/CPW North Sidewalk
Weekday 12-1 PM				
15-min, 2-way vol	305	222	175	154
Average P/M/F	2	1	1	1
Average LOS	A	A	A	A
Platoon P/M/F	6	5	5	5
Platoon LOS	B	B	B	B
Weekday 5-6 PM				
15-min, 2-way vol	225	147	106	94
Average P/M/F	1	1	0	0
Average LOS	A	A	A	A
Platoon P/M/F	5	5	4	4
Platoon LOS	B	B	B	B
Saturday 2-3 PM				
15-min, 2-way vol	503	337	197	118
Average P/M/F	3	1	1	0
Average LOS	B	A	A	A
Platoon P/M/F	7	5	5	4
Platoon LOS	B	B	B	B

B: Crosswalk Analysis

	CPW at 81 St		CPW at 77 St		Col Ave at 81 St		Col Ave at 77 St	
	South	West	North	West	East	South	North	East
Weekday 12-1 PM								
Avg SF/P no vehs.	422	183	788	212	118	142	328	698
Avg LOS no vehs.	A	A	A	A	B	As	A	A
Avg SF/P with vehs.	318	177	770	192	110	116	328	655
Avg LOS with vehs.	A	A	A	A	B	B	A	A
Surge SF/P	249	79	469	90	57	69	190	294
Surge LOS	A	B	A	B	B	B	A	A
Weekday 5-6 PM								
Avg SF/P no vehs.	388	273	788	266	161	211	937	3,084
Avg LOS no vehs.	A	A	A	A	A	A	A	A
Avg SF/P with vehs.	327	261	752	250	150	185	937	2,894
Avg LOS with vehs.	A	A	A	A	A	A	A	A
Surge SF/P	229	119	469	113	78	103	542	1,300
Surge LOS	A	B	A	B	B	B	A	A
Saturday 2-3 PM								
Avg SF/P no vehs.	183	131	490	307	73	88	142	263
Avg LOS no vehs.	A	A	A	A	B	B	A	A
Avg SF/P with vehs.	146	123	468	278	67	74	142	250
Avg LOS with vehs.	A	B	A	A	B	B	A	A
Surge SF/P	108	57	292	130	35	43	82	111
Surge LOS	B	B	A	A	C	B	B	B

Source: Allee King Rosen & Fleming, Inc. Surveys November 1995 and April 1996.
Notes: SF/P = Square feet per pedestrian; LOS = Level of Service.

Table 13-4 (Continued)
No Build Pedestrian Conditions, 2001
C: Corner Analysis

	CPW at 81 St	CPW at 77 St	Col Ave at 81 St	Col Ave at 77 St
	Southwest	Northwest	Southeast	Northeast
Weekday 12-1 PM				
SF/P	269	398	404	1,678
LOS	A	A	A	A
Weekday 5-6 PM				
SF/P	393	488	603	5,222
LOS	A	A	A	A
Saturday 2-3 PM				
SF/P	146	456	252	634
LOS	A	A	A	A

Source: Allee King Rosen & Fleming, Inc. Surveys November 1995 and April 1996.
Notes: SF/P = Square feet per pedestrian; LOS = Level of Service.

PUBLIC TRANSPORTATION

As described in Chapter 12, "Traffic and Transportation," the Museum is planning to implement a transportation coordination plan covering all aspects of transportation at the Museum, including encouraging use of public transportation. This would include features such as special ticket/MetroCard or token packages; similar combinations with the Long Island Rail Road, Metro North, and New Jersey Transit tickets; information packages with reservations; joint advertising on buses and subways, etc.

Future subway and bus ridership was estimated, accounting for increased Museum attendance as well as an annual 0.50 percent growth factor per year (as suggested in the *CEQR Technical Manual*), plus a specific assignment from the Related Companies' proposed mixed-use residential and retail project on Amsterdam Avenue between West 89th and 90th Streets. Although demand for public transportation services in the study area is conservatively predicted to increase (NYCT has actually seen a decline in Manhattan bus ridership over time), no substantial change in subway or bus service conditions is expected by 2001.

SUBWAY

Independent of the project, NYCT may be undertaking improvements to the 81st Street subway station. The measures will make the station accessible to all users, as provided under the Americans with Disabilities Act (ADA). The changes are otherwise expected to be largely cosmetic and will not alter the capacity of the primary station elements. As illustrated in Table 13-5, the estimated 2001 No Build volumes will result in levels of service in the LOS A to LOS B range.

BUSES

As shown in Table 13-6, all bus routes will continue to operate with available capacity.

Table 13-5
No Build Conditions at Central Park West Subway Station, 2001

	81st Street Street Stairs		81st Street Token Booth		79 St Stair	79th Street Token Booth			
	S2	S3	3 Turn-stiles	Exit Gate	S1	3 Turn-stiles	Exit Gate	High Turn-stile	High Exit Gate
Width	10	10			11.8				
Effective width	9	9			10.8				
Weekday 12-1 PM (Peak 15 Minutes)									
Pedestrian In	77	42	104	15	151	76	46	28	0
Pedestrian Out	67	39	106	0	101	83	2	0	15
Friction Factor	0.9	0.9	NA	NA	0.9	NA	NA	NA	NA
SVCD Capacity	1,215	1,215	1,440	750	1,458	1,440	750	300	450
V/SVCD Ratio	0.118	0.067	0.146	0.021	0.173	0.111	0.064	0.092	0.034
LOS	A	A	A	A	A	A	A	A	A
Weekday 5-6 PM (Peak 15 Minutes)									
Pedestrian In	214	94	290	18	170	147	11	11	0
Pedestrian Out	130	56	186	0	67	54	0	0	13
Friction Factor	0.9	0.9	NA	NA	0.8	NA	NA	NA	NA
SVCD Capacity	1,215	1,215	1,440	750	1,296	1,440	750	300	450
V/SVCD Ratio	0.283	0.124	0.331	0.025	0.183	0.140	0.015	0.038	0.030
LOS	A	A	A	A	A	A	A	A	A

Source: Allee King Rosen & Fleming, Inc. Survey November 1995 and April 1996.
Notes: SVDC = Service volume flow rate at midpoint between LOSs C and D indicates acceptable LOS; V/SVDC ratio = Ratio of pedestrian volume to SVDC.
Stair capacity=10 persons per effective foot width; turnstile capacity=32 persons per minute (20% eduction for cross traffic; exit gate capacity=50 persons per minute; from *CEQR Technical Manual.*

Table 13-6
Passenger Loadings and Available Capacity on Study Area Bus Routes No Build Conditions, 2001

Route and Direction	Peak Load Point	Peak Load Pass	Buses per Hour	Head-way (Mins)	At Peak Load Point: Passengers per Bus	Hourly Capacity	Available Capacity
Weekday, 12-1 PM							
M7 SB	125 St/Lenox	216	9	6.7	24	540	324
M7 NB	34 St/Sixth Av	201	6	10	33	360	159
M10 SB	34 St/Seventh	189	6	10	32	360	171
M10 NB	34 St/Seventh	197	6	10	33	360	163
M11 SB	54 St/Ninth Av	195	6	10	32	360	165
M11 NB	66St/Amst Av	166	6	10	28	360	194
M79 WB	79 St/Lex&5th	596	10	6	60	600	4
M79 EB	81 St/CPW & 79th/Lex	431	10	6	43	600	169

Table 13-6 (Continued)
Passenger Loadings and Available Capacity on Study Area Bus Routes
No Build Conditions, 2001

Route and Direction	Peak Load Point	Peak Load Pass	Buses per Hour	Head-way (Mins)	At Peak Load Point		
					Passengers per Bus	Hourly Capacity	Available Capacity
Weekday, 5-6 PM							
M7 SB	125 St/Lenox & 86th St/Col	331	8	7.5	41	480	149
M7 NB	99 St/Amst & 34 St/Seventh	530	10	6	53	600	70
M10 SB	42 St/Eighth & 66 St/CPW	251	6	10	42	360	109
M10 NB	34 St/Seventh	353	8	7.5	44	480	127
M11 SB	66 St/Col Av & 42 St/Ninth Av	266	6	10	44	360	94
M11 NB	99 St/Amst Av	331	7	8.6	47	420	89
M79 WB	79 St/Lex&5th	564	15	4	38	900	336
M79 EB	81 St/CPW & 79th/Lex	817	15	4	54	900	83

Source: New York City Transit.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

PEDESTRIAN CONDITIONS

An analysis of pedestrian conditions in 2001 for the proposed project was conducted for the pedestrian network. The pedestrian assignment used in the analysis is actually a composite of assignments to and from the different components of the project (i.e., Planetarium, restaurant, and Museum). Project-generated trips to and from the bus stops, subway stations, and all off-site parkers are included for the pedestrian component of their trip as well as walk-only trips.

The proposed project would add 553, 428, and 1,078 pedestrians to the study area sidewalks during the midday, PM, and Saturday peak hours, respectively. As shown in Table 13-7, there would be no sidewalk, crosswalk, or street corner impacts, and all pedestrian facilities would continue to operate at LOS A or B, with one location at LOS C. *The project's increase in traffic and pedestrian activity is not expected to adversely affect pedestrian safety in the study area.* Therefore, the proposed project would not result in any significant impacts to pedestrian facilities bordering the Museum.

As part of the project, the Museum would add bicycle racks close to one of the major entrances, such as at the West 77th Street entrance.

PUBLIC TRANSPORTATION

Under 2001 Build conditions, demand for the study area public transportation facilities would increase as a result of the project-generated ridership.

Table 13-7

Build Pedestrian Conditions, 2001

A: Sidewalk Analysis

	CPW: 77 to 81 West Sidewalk	W81: Col to CPW South Sidewalk	Col: 77 to 78 East Sidewalk	W77/CPW North Sidewalk
Weekday 12-1 PM				
15-min, 2-way vol	357	283	216	167
Average P/M/F	2	1	1	1
Average LOS	A	A	A	A
Platoon P/M/F	6	5	5	5
Platoon LOS	B	B	B	B
Weekday 5-6 PM				
15-min, 2-way vol	269	195	132	103
Average P/M/F	1	1	1	0
Average LOS	A	A	A	A
Platoon P/M/F	5	5	5	4
Platoon LOS	B	B	B	B
Saturday 2-3 PM				
15-min, 2-way vol	614	453	263	141
Average P/M/F	3	2	1	1
Average LOS	B	A	A	A
Platoon P/M/F	7	6	5	5
Platoon LOS	B	B	B	B

B: Crosswalk Analysis

	CPW at 81 St		CPW at 77 St		Col Ave at 81 St		Col Ave at 77 St	
	South	West	North	West	East	South	North	East
Weekday 12-1 PM								
Avg SF/P no vehs.	350	152	788	178	102	132	294	627
Avg LOS no vehs.	A	A	A	A	B	A	A	A
Avg SF/P with vehs.	263	145	770	161	95	106	294	589
Avg LOS with vehs.	A	A	A	A	B	B	A	A
Surge SF/P	207	66	469	76	49	64	170	264
Surge LOS	A	B	A	B	B	B	A	A
Weekday 5-6 PM								
Avg SF/P no vehs.	342	219	788	223	138	194	757	2,177
Avg LOS no vehs.	A	A	A	A	A	A	A	A
Avg SF/P with vehs.	288	209	752	209	129	166	757	2,043
Avg LOS with vehs.	A	A	A	A	B	A	A	A
Surge SF/P	202	95	469	95	67	95	438	918
Surge LOS	A	B	A	B	B	B	A	A
Saturday 2-3 PM								
Avg SF/P no vehs.	156	101	490	193	61	81	129	239
Avg LOS no vehs.	A	B	A	A	B	B	B	A
Avg SF/P with vehs.	121	93	468	175	54	65	129	228
Avg LOS with vehs.	B	B	A	A	B	B	B	A
Surge SF/P	92	44	292	82	30	40	74	101
Surge LOS	B	B	A	B	C	B	B	B

Source: Allee King Rosen & Fleming, Inc. Surveys November 1995 and April 1996.
Notes: SF/P = Square feet per pedestrian; LOS = Level of Service.

Table 13-7 (Continued)
Build Pedestrian Conditions, 2001
C: Corner Analysis

	CPW at 81 St	CPW at 77 St	Col Ave at 81 St	Col Ave at 77 St
	Southwest	Northwest	Southeast	Northeast
Weekday 12-1 PM				
SF/P	233	344	353	1,460
LOS	A	A	A	A
Weekday 5-6 PM				
SF/P	333	423	419	3,914
LOS	A	A	A	A
Saturday 2-3 PM				
SF/P	125	332	216	571
LOS	B	A	A	A

Source: Allee King Rosen & Fleming, Inc. Surveys November 1995 and April 1996.
Notes: SF/P = Square feet per pedestrian; LOS = Level of Service.

Table 13-8
Build Conditions at Central Park West Subway Station, 2001

	81st Street Street Stairs		81st Street Token Booth		79 St Stair	79th Street Token Booth			
	S2	S3	3 Turn-stiles	Exit Gate	S1	3 Turn-stiles	Exit Gate	High Turn-stile	High Exit Gate
Width	10	10			11.8				
Effective width	9	9			10.8				
Weekday 12-1 PM (Peak 15 Minutes)									
Pedestrian In	87	42	113	15	156	82	46	28	0
Pedestrian Out	83	39	122	0	109	92	2	0	15
Friction Factor	0.9	0.9	NA	NA	0.9	NA	NA	NA	NA
SVCD Capacity	1,215	1,215	1,440	750	1,458	1,440	750	300	450
V/SVCD Ratio	0.140	0.067	0.164	0.021	0.182	0.121	0.064	0.092	0.034
LOS	A	A	A	A	A	A	A	A	A
Weekday 5-6 PM (Peak 15 Minutes)									
Pedestrian In	230	94	306	18	178	156	11	11	0
Pedestrian Out	135	56	192	0	71	57	0	0	13
Friction Factor	0.9	0.9	NA	NA	0.8	NA	NA	NA	NA
SVCD Capacity	1,215	1,215	1,440	750	1,296	1,440	750	300	450
V/SVCD Ratio	0.301	0.124	0.345	0.025	0.192	0.148	0.015	0.038	0.030
LOS	A	A	A	A	A	A	A	A	A

Source: Allee King Rosen & Fleming, Inc. Survey November 1995 and April 1996.
Notes: SVDC = Service volume flow rate at midpoint between LOSs C and D indicates acceptable LOS; V/SVDC ratio = Ratio of pedestrian volume to SVDC.
Stair capacity = 10 persons per effective foot width; turnstile capacity = 32 persons per minute (20 percent reduction for cross traffic; exit gate capacity = 50 persons per minute; from *CEQR Technical Manual*.

SUBWAY

Project-generated ridership would add 158 and 132 subway passengers during the weekday midday and PM peak hours, respectively. For the purpose of this analysis, all project trips were conservatively assumed to use the 81st Street station. With the addition of project-generated trips, all station elements would continue to operate at LOS A, as shown in Table 13-8. There would be no significant impacts at any of the subway facilities studied as a result of the proposed project.

BUSES

Project-generated ridership would add 51 and 43 passengers during the weekday midday and PM peak hours, respectively. Table 13-9 shows that all lines will continue to operate with sufficient capacity, with the exception of the M79 during the weekday midday peak hour (there would be a shortfall of space for 3 riders). This shortfall can be accommodated by adding an additional bus in the westbound direction during the weekday midday peak hour. It is NYCT policy to make changes when necessary in response to increased passenger loads in the future with the project.

Table 13-9

Passenger Loadings and Available Capacity on Study Area Bus Routes Build Conditions, 2001

Route and Direction	Peak Load Point	Peak Load Pass	Buses per Hour	Head-way (Mins)	At Peak Load Point		
					Passengers per Bus	Hourly Capacity	Available Capacity
Weekday, 12-1 PM							
M7 SB	125 St/Lenox	221	9	6.7	25	540	319
M7 NB	34 St/Sixth Av	205	6	10	34	360	155
M10 SB	34 St/Seventh	194	6	10	32	360	166
M10 NB	34 St/Seventh	201	6	10	34	360	159
M11 SB	54 St/Ninth Av	199	6	10	33	360	161
M11 NB	66St/Amst Av	171	6	10	28	360	189
M79 WB	79 St/Lex&5th	603	10	6	60	600	-3
M79 EB	81 St/CPW & 79th/Lex	450	10	6	45	600	150
Weekday, 5-6 PM							
M7 SB	125 St/Lenox & 86th St/Col	335	8	7.5	42	480	145
M7 NB	99 St/Amst & 34 St/Seventh	534	10	6	53	600	66
M10 SB	42 St/Eighth & 66 St/CPW	255	6	10	42	360	105
M10 NB	34 St/Seventh	357	8	7.5	45	480	123
M11 SB	66 St/Col Av & 42 St/Ninth Av	269	6	10	45	360	91
M11 NB	99 St/Amst Av	335	7	8.6	48	420	85
\M79 WB	79 St/Lex&5th	570	15	4	38	900	330
M79 EB	81 St/CPW & 79th/Lex	833	15	4	56	900	67
Source: New York City Transit.							

TRANSPORTATION MANAGEMENT PLAN

In recognition of the excellent opportunities for public transportation usage at the site, the Museum intends to make marketing and promoting public transit usage a key element in its transportation management plan. Increased use of public transportation represents an opportunity not only to potentially reduce the utilization of private auto and taxi by Museum visitors, but also to broaden the Museum's market. This is particularly important on weekends, when available transit services typically operate with large amounts of excess capacity, while as noted in Chapter 12, the street system around the site operates with problems and constraints. ❖

A. INTRODUCTION

This section identifies and quantifies significant direct and indirect air quality impacts from the operation of the proposed project. Direct effects stem from emissions generated by stationary sources on the project site such as emissions from garage exhausts or fuel burned on-site for heating and hot water systems. However, since the project would use steam provided by Con Edison for heating and hot water, no on-site emissions for these purposes would occur. Indirect effects are caused by emissions from motor vehicles traveling to and from the project site (mobile sources) after completion.

B. POLLUTANTS FOR ANALYSIS

In New York City, ambient concentrations of carbon monoxide, ozone, and lead are predominantly influenced by mobile source emissions; emissions of nitrogen oxides come from both mobile and stationary sources; and emissions of inhalable particulate matter and sulfur dioxide are associated mainly with stationary sources.

CARBON MONOXIDE

Carbon monoxide (CO), a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In New York City, approximately 80 to 90 percent of CO emissions are from motor vehicles. CO concentrations can vary greatly over relatively short distances. Elevated concentrations are usually limited to locations near crowded intersections, along heavily traveled and congested roadways. Consequently, CO concentrations must be predicted on a localized or microscale basis.

The proposed project would increase traffic volumes on streets near the project site and could therefore result in localized increases in CO levels. In addition, exhausts from the project's garage could affect ambient levels of CO near the proposed vent.

NITROGEN OXIDES AND OZONE

Nitrogen oxides are of principal concern because of their role as precursors in the formation of photochemical oxidants, such as ozone. There is a standard for average annual NO_2 concentrations, which is normally examined only for fossil fuel energy sources. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow and occur as the pollutants are diffusing downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of nitrogen oxide emissions from mobile sources are therefore generally examined on a regional basis. The change in regional mobile source emissions of these pollutants is related to the total number of vehicle trips and vehicle miles of travel throughout the New York metropolitan area. The proposed project would not have a significant effect on the overall volume of vehicular travel in the metropolitan area. It would not, therefore, have any measurable impact on regional nitrogen oxide emissions or on ozone levels, and an analysis is not warranted.

LEAD

Lead emissions are principally associated with industrial sources and motor vehicles that use gasoline containing lead additives. Most U.S. vehicles produced since 1975, and all produced after 1980, are designed to use unleaded fuel. As these newer vehicles have replaced the older ones, motor-vehicle-related lead emissions have decreased. As a result, ambient concentrations of lead have declined significantly. Nationally, the average measured atmospheric lead level in 1985 was only about one-quarter the level in 1975.

In 1985, the U.S. Environmental Protection Agency (EPA) announced new rules drastically reducing the amount of lead permitted in leaded gasoline. The maximum allowable lead level in leaded gasoline was reduced from the previous limit of 1.1 grams per gallon to 0.5 grams per gallon effective July 1, 1985, and to 0.1 grams per gallon effective January 1, 1986. Monitoring results indicate that this action has been effective in significantly reducing atmospheric lead levels. Even at locations in the New York City area where traffic volumes are very high, atmospheric lead concentrations are far below the national standard of 1.5 micrograms per cubic meter (3-month average). No significant sources of lead are associated with the project.

INHALABLE PARTICULATES—PM_{10}

Particulate matter is emitted into the atmosphere from a variety of sources: industrial facilities, power plants, construction activity, etc. Gasoline-powered vehicles do not produce any significant quantities of particulate emissions. Diesel-powered vehicles, especially heavy trucks and buses, do emit particulates, and inhalable particulate concentrations may, therefore, be locally elevated near roadways with high volumes of heavy diesel-powered vehicles. With respect to particulates, the primary concern is with those particulates that are less than 10 μm in diameter (PM_{10}) and therefore inhalable. Air quality monitoring indicates that inhalable particulate levels in Manhattan are below the applicable national ambient air quality standards for PM_{10}. Mobile and stationary sources associated with the project would not emit any significant quantities of particulates.

SULFUR DIOXIDE

Sulfur dioxide (SO_2) emissions are primarily associated with the combustion of sulfur-containing fuels: oil and coal. No significant quantities are emitted from mobile sources. Monitored sulfur dioxide concentrations in Manhattan are below the national standards. Since energy, in the form of steam, will be provided by Con Edison, no sulfur dioxide emissions would occur at the project site.

CONCLUSIONS

The areas of potentially significant air quality impacts from the proposed project that require an analysis are the following:

- Effects of the proposed project on CO concentrations from increased traffic generated by the proposed development;
- Potential stationary source impacts from air exhausted from the project's mechanically ventilated garage.

C. AIR QUALITY STANDARDS

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the Clean Air Act, primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: carbon monoxide, nitrogen dioxide, ozone, inhalable particulate matter, sulfur dioxide, and lead. (Hydrocarbon standards have been rescinded because these pollutants are primarily of concern only in their role as ozone precursors.) Table 14-1 shows the standards for these pollutants. These standards have also been adopted as the ambient air quality standards for the State of New York. The primary standards protect the public health, and represent levels at which there are no known significant effects on human health. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. For carbon monoxide, nitrogen dioxide, ozone, and inhalable particulates, the primary and secondary standards are the same.

Table 14-1

National and New York State Ambient Air Quality Standards

Pollutant	Primary		Secondary	
	PPM	Micrograms Per Cubic Meter	PPM	Micrograms Per Cubic Meter
Carbon Monoxide				
Maximum 8-Hour Concentration*	9		9	
Maximum 1-Hour Concentration*	35		35	
Lead				
Maximum Arithmetic Mean Averaged Over 3 Consecutive Months		1.5		
Nitrogen Dioxide				
Annual Arithmetic Average	0.05	100	0.05	100
Ozone				
1-Hour Maximum	0.12	235	0.12	235
Inhalable Particulates (PM_{10})				
Annual Geometric Mean		50		50
Maximum 24-Hour Concentration*		150		150
Sulfur Dioxide				
Annual Arithmetic Mean	0.03	80		
Maximum 24-Hour Concentration*	0.14	365		
Maximum 3-Hour Concentration*			0.50	1,300

Note: * Not to be exceeded more than once a year.
Source: 40 CFR Part 5—National Primary and Secondary Ambient Air Quality Standards 40 CFR 50.12 "National Primary and Secondary Standard for Lead," 43 CFR 46245.

STATE IMPLEMENTATION PLAN (SIP)

The Clean Air Act requires each state to submit to EPA a SIP for attainment of NAAQS. The 1977 and 1990 amendments require comprehensive plan revisions for areas where one or more of the standards have yet to be attained. In the New York City metropolitan area, the standard for ozone and the 8-hour average CO standard continue to be exceeded. The New York State Department of Environmental Conservation (DEC) is currently preparing a revision of the SIP. A CO attainment demonstration was submitted to the EPA by DEC in November 1992. This submission noted that with an Enhanced Inspection & Maintenance program in effect, there would be no CO violations in New York City by the 1995 attainment deadline. Recently, New York County (Manhattan) was designated non-attainment for PM_{10} by EPA. The City and State are currently planning a SIP revision for this pollutant.

New York City is implementing measures to reduce levels of hydrocarbons as part of its effort to attain the SIP ozone standard. As part of its effort to attain the CO standard, New York City is also committed to implementing areawide and site-specific control measures to reduce CO levels should unanticipated localized growth result in elevated CO levels before the attainment day and into the maintenance period. New York City is also implementing measures to reduce levels of hydrocarbons and nitrogen oxides as part of its effort to attain the SIP ozone standard.

DE MINIMIS CRITERIA

For all pollutants, causing the NAAQS to be exceeded generally constitutes a significant impact. In addition to the NAAQS, New York City has developed de minimis criteria to assess the significance of impacts on air quality that would result from a proposed development. These set the minimum change in CO concentration that defines a significant environmental impact. Significant increases with respect to CO concentrations in New York City are defined as: 1) an increase of 0.5 parts per million (ppm) or more in the maximum 8-hour average CO concentration at a location where the predicted No Build 8-hour concentration is equal to or between 8 and 9 ppm, or 2) an increase of more than half the difference between baseline concentrations and the 8-hour standard when No Build concentrations are below 8.0 ppm.

D. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS FROM MOBILE SOURCES

To compare estimated CO concentrations with the national and State ambient air quality standards for CO (which are based on 1- and 8-hour averages of CO concentrations), estimates of maximum concentrations for these same periods must be prepared.

INTRODUCTION

The prediction of motor-vehicle-generated CO concentrations in an urban environment characterized by meteorological phenomena, traffic conditions, and physical configurations is a challenging problem. Air pollutant dispersion models simulate mathematically how traffic, meteorology, and geometry combine to affect pollutant concentrations. The mathematical expressions and formulations that comprise the various models attempt to describe an extremely complex physical phenomenon as closely as possible. However, because all models contain simplifications and approximations of actual conditions and interactions, and because a worst-case condition is of most interest, most of these dispersion models are conservative and tend to overpredict pollutant concentrations, particularly under adverse meteorological conditions.

The CO analysis for the proposed project has employed a modeling approach approved by EPA that has been widely used for evaluating air quality impacts of projects in New York City, New York State, and throughout the country, and has coupled this approach with a series of worst-case assumptions relating to meteorology, traffic, background concentration levels, etc. This combination results in a conservative estimate of expected CO concentrations and resulting air quality impacts caused by the project.

DISPERSION MODELS FOR MICROSCALE ANALYSES

At all sites selected for analysis, maximum 1- and 8-hour average CO concentrations were determined using the EPA's CAL3QHC model, version 2 (*User's Guide to CAL3QHC, A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections,* Office of Air Quality, Planning Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina). The CAL3QHC model is based on the CALINE-3 line source dispersion model with an additional algorithm for estimating vehicle queue lengths at signalized intersections. The CALINE-3 model is a Gaussian model, which assumes that the dispersion of pollutants downwind of a pollution source follows a Gaussian (or normal) distribution, and is used for predicting CO concentrations along roadway segments. The pollution source is the emissions from motor vehicles operating under free-flow conditions. The refinement that CAL3QHC provides is the inclusion of the contribution of emissions from idling vehicles in the overall concentration. The queuing algorithm requires additional input for site-specific traffic parameters, such as signal timing, and performs delay calculations from the *1985 Highway Capacity Manual* traffic forecasting model to predict the number of idling vehicles.

WORST-CASE METEOROLOGICAL CONDITIONS

In general, the transport and concentration of pollutants from vehicular sources are influenced by three principal meteorological factors: wind direction, wind speed, and atmospheric stability. Wind direction influences the accumulation of pollutants at a particular receptor location. Wind direction was chosen to maximize pollutant concentrations at each of the prediction sites. In applying the CAL3QHC model, the wind angle was varied to determine the worst-case wind direction resulting in the maximum concentrations.

Following the recommendations of EPA and the procedures followed in the recent SIP submissions, CO computations were performed using a wind speed of 1 meter/second, and stability class D. A persistence factor of 0.7 for the 8-hour period was selected. A surface roughness of 3.21 meters was chosen, and, in addition, a 53° Fahrenheit ambient temperature was assumed for the emissions computations. At each receptor location, the wind angle that maximized the pollutant concentrations was used in the analysis regardless of frequency of occurrence.

ANALYSIS YEARS

The CO microscale analysis was performed for 2 years—1996, to determine existing conditions, and 2001, the year after completion of the project. The 2001 analysis was performed both without (the No Build) and with the proposed project (Build).

VEHICLE EMISSIONS DATA

To predict ambient concentrations of pollutants generated by vehicular traffic, emissions from vehicle exhaust systems must be estimated accurately. Vehicular emissions were computed using the EPA-developed Mobile Source Emissions Model, MOBILE5A. Emission estimates were made for six classes of motor vehicles:

- Light-duty, gasoline-powered automobiles,
- Light-duty, gasoline-powered new taxis,
- Light-duty, gasoline-powered used police car taxis,
- Light-duty, gasoline-powered trucks,
- Heavy-duty, gasoline-powered trucks, and
- Heavy-duty, diesel-powered vehicles.

No light-duty diesel-powered vehicles (automobiles and taxis), light-duty diesel-powered trucks, or motorcycles were assumed. In the case of motorcycles, the number of such vehicles on any street is generally small. In the case of diesel-powered vehicles, emissions from a comparable class of gasoline-powered vehicles were included. CO emissions from the gasoline-powered vehicles are higher than the comparable diesel-powered vehicle emissions, and thus yield conservative estimates of total composite CO emissions and concentrations. Oxygenated fuel credits were taken in the microscale modeling analyses. Emission estimates for oxygenated fuels were based on a gasoline blend with a 2.7 percent oxygen content.

Emission estimates were based on implementation of the New York State auto and light-duty gasoline-powered truck inspection and maintenance (I&M) program begun in January 1982 and the taxi I&M program begun in October 1977. The I&M program requires annual inspections of automobiles and light trucks to determine if CO and hydrocarbon emissions from the vehicles' exhaust systems are below emission standards. Vehicles failing the emissions test must undergo maintenance and pass a re-test to be registered in New York State. Credits for the heavy-duty truck I&M program, which began in January 1986, were incorporated into the analysis.

Heavy-duty vehicle emission estimates reflect local engine displacement and vehicle loading characteristics. Light-duty truck emissions were based on an assumed 73-27 percent split between trucks weighing less than 6,000 pounds and trucks weighing 6,000 to 8,500 pounds. These data were obtained from the New York City Department of Environmental Protection (DEP) and are based on vehicle registration data.

Recently, New York State has decided to revise its future I&M program. Originally, the future I&M program was envisioned to include centralized facilities that would test vehicles under an "enhanced" program, which would test vehicles at a dynamic load, instead of a simple idle test. However, New York State has recently decided that the future I&M program would still involve an enhanced I&M program, but motorists would be allowed to take their vehicles to nearby service stations, which would be allowed to both test and repair autos that failed the new I&M test. Since this was a relatively recent decision, DEC has not fully formalized the I&M input parameters for the New York City metropolitan region. However, DEC has provided interim draft guidance on the recommended input for the future I&M program for the MOBILE5A model, which were employed in this analysis. These inputs use the recommended input parameters for the previously planned enhanced I&M program, but allow for decentralized test, and repair operations.

For automobiles and light-duty gasoline-powered trucks, emission estimates account for three possible vehicle operating conditions: cold-vehicle operation, hot-start operation, and hot-stabilized operation. It is important to distinguish between these three operating categories, because vehicles emit CO at different rates depending on whether they are cold or warmed up. All taxis were assumed to be operating in a hot-stabilized mode; all arriving project-generated autos were assumed to be operating in a hot-stabilized mode; and all departing project-generated autos were assumed to be operating in a cold mode. Auto operating conditions used in the existing and future No Build emission calculations were obtained from data supplied by DEP, Bureau of

Science and Technology Report No. 34 (Revised). Light-duty truck operating conditions for Manhattan were based on data supplied by the former Tri-State Regional Planning Association, now the New York Metropolitan Transportation Coordinating Council (NYMTC). Table 14-2 summarizes the thermal state conditions used in the analysis.

Table 14-2
Vehicle Operating Conditions

Vehicle	PM	Saturday
Autos		
Percentage Cold (Non Catalytic)	19.8	11.2
Percentage Cold (Catalytic)	26.3	17.4
Percentage Hot (Catalytic)	4.2	7.6
Light-Duty Gasoline Trucks		
Percentage Cold (Non Catalytic)	3.2	3.2
Percentage Cold (Catalytic)	4.1	4.1
Percentage Hot (Catalytic)	45.3	45.3

TRAFFIC DATA

Traffic data for the air quality analysis were derived from traffic counts and other information developed as part of the project's traffic analysis described in Chapter 12, "Traffic and Parking," above. For the air quality analysis, the PM weekday and Saturday midday peak periods were subjected to full-scale microscale analysis. These time periods were selected for the mobile source analysis because the greatest project-generated traffic would occur in these time periods. Analyses were also performed for the Build scenario with the proposed mitigation measures for the predicted significant traffic impacts.

The peak 8-hour concentrations were determined by applying a persistence factor of 0.7 to the maximum predicted 1-hour local impact values. This persistence factor takes account of the fact that over 8 hours, vehicle volumes will fluctuate downward from the peak, speeds may vary, and wind directions and speeds will change somewhat as compared with the conservative assumptions used for the single highest hour.

BACKGROUND CONCENTRATIONS

Background concentrations are those pollutant concentrations not directly accounted for through the modeling analysis (which directly accounts for vehicular-generated emissions on the streets within 1,000 feet and line-of-sight of the receptor location). Background concentrations must be added to modeling results to obtain total pollutant concentrations at a prediction site.

One-hour average CO background concentrations used in this analysis were 5.8 and 5.4 ppm for the 1996 and 2001 predictions, respectively. Eight-hour average CO background concentrations used in this analysis were 2.7 and 2.1 ppm for the 2 years, respectively. These values, obtained from DEP, are based on CO concentrations measured at DEC monitoring stations and were adjusted to reflect the reduced vehicular emissions expected in the future analysis year.

MOBILE SOURCE RECEPTOR LOCATIONS

The air quality receptor sites in the study area selected for microscale analysis are shown in Table 14-3 and Figure 14-1. Receptor sites were placed on streets next to the project site, major feeders to the project site, and congested streets in the study area. Receptors were modeled at multiple sidewalk locations next to the intersections under analysis.

Table 14-3

Mobile Source Receptor Locations

Receptor Sites	Location
1	Central Park West and 81st Street
2	Columbus Avenue and 81st Street
3	Columbus Avenue and 77th Street

These receptor sites were selected because they are the locations where the greatest air quality impacts and maximum changes in the CO concentrations would be expected. They are locations in the study area where the largest levels of project-generated traffic are expected and overall constrained traffic conditions exist.

E. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS FROM STATIONARY SOURCES

The proposed project would include a mechanically ventilated garage. Exhaust from the garage ventilation system would contain elevated levels of CO due to emissions from vehicles using the facility. The exhaust could potentially affect ambient levels of CO at receptors near the proposed exhaust vent. An analysis was performed using the methodology in the *City Environmental Quality Review (CEQR) Technical Manual*, applying stationary source modeling techniques to the vent structure and calculating pollutant levels at various distances from the vent.

Emissions from vehicles entering, parking and exiting the garage were estimated using EPA's MOBILE5 mobile source emission model and an ambient temperature of 53°F. Other details regarding the MOBILE5 were described above in section 14.D. For all arriving and departing vehicles, an average speed of 5 miles per hour was conservatively assumed for travel within the parking garage. In addition, all departing vehicles were assumed to idle for 1 minute before proceeding to the exit. The concentration of CO within the garage was calculated assuming a minimum ventilation rate, based on New York City Building Code requirements, of 1 cubic foot per minute of fresh air per gross square foot of garage area. To determine compliance with the NAAQS, CO concentrations were determined for the maximum 1- and 8-hour average periods.

To determine pollutant levels in the vicinity of the vent, the exhaust from the garage was analyzed as a "virtual point source" using the methodology in EPA's *Workbook of Atmospheric Dispersion Estimates, AP-26*. This methodology estimates CO concentrations at various distances from the vent by assuming that the concentration in the garage is equal to the concentration leaving the exhaust, and determining the appropriate initial horizontal and vertical dispersion coefficients at the vent face. Background concentrations are then added to the modeling results to obtain the total ambient level at each receptor site.

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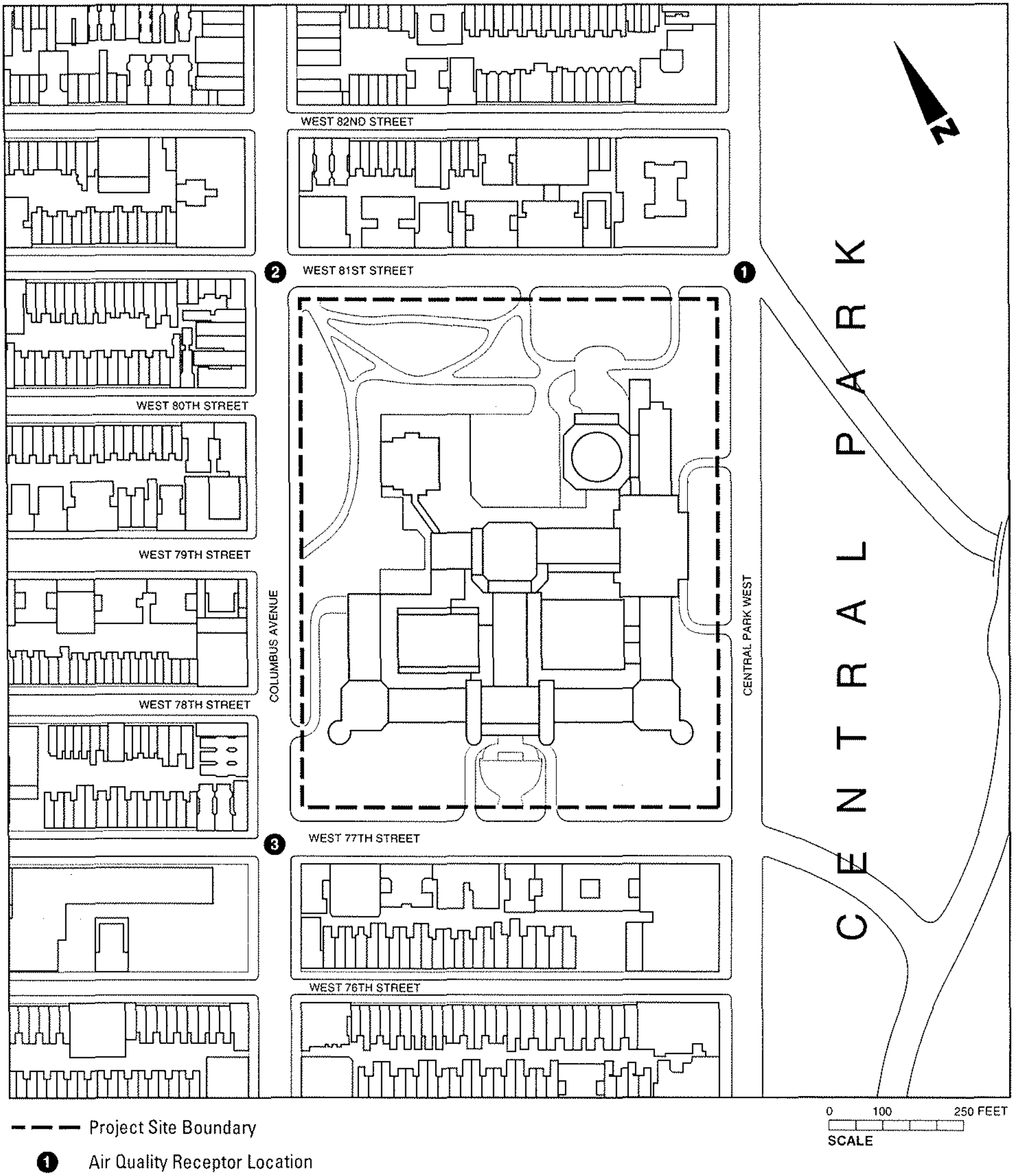


— — — Project Site Boundary

1 Air Quality Receptor Location

Air Quality Receptor Locations

Figure 14-1

F. EXISTING CONDITIONS

EXISTING MONITORED AIR QUALITY CONDITIONS (1994)

Monitored concentrations of CO, sulfur dioxide, particulates, nitrogen dioxide, lead, and ozone ambient air quality data for the area are shown in Table 14-4. These values, recorded in 1994, are the most recent monitored data available published by DEC for these locations. There were no monitored violations of the NAAQS for CO, SO_2, lead, and NO_2 at these monitoring sites in 1994. As in years past (1988-1991), the annual average PM_{10} NAAQS was exceeded at the Madison Avenue site, but other locations in the city were in compliance. The ozone standard was exceeded on 2 days in 1994 at the Queens College monitoring site.

PREDICTED CARBON MONOXIDE CONCENTRATIONS IN THE PROJECT AREA

As noted previously, receptors were placed at multiple sidewalk locations next to the three intersections under analysis. The receptor with the highest predicted CO concentrations was used to represent these intersection sites for the existing conditions. CO concentrations were calculated for each receptor location, at each intersection, for both the PM weekday and Saturday morning peak periods.

Table 14-5 shows the maximum predicted existing (1996) CO 1- and 8-hour average concentrations at these intersections. The values shown are the highest predicted concentrations for each receptor location for any time period analyzed. At receptor sites 1 and 3, the maximum predicted 1- and 8-hour average concentrations are within the national standards of 35 and 9 ppm, respectively. At site 2, located at the intersection of Columbus Avenue and West 81st Street, the maximum predicted 8-hour CO concentration is just above the standard of 9 ppm. This potential exceedance of the standard was predicted using EPA's first-level intersection dispersion model, CAL3QHC. With the refined model, CAL3QHCR, at this site the maximum predicted results are below 9 ppm.

The queue of cars that forms on weekends waiting for entry to the parking lot on West 81st Street contributes minimally to CO concentrations, but would not itself create air quality violations. Observations and the video survey (see Chapter 12) found that this queue is self-limiting and ranges from 1 to 2 cars to 14 cars. This number of idling vehicles does not reach the critical mass typical of queues that cause air quality problems. Queues in the City that have caused violations of the NAAQS in the past have been located at major midtown intersections and at bridge and tunnel approaches, where thousands of vehicles per hour stand or move very slowly to gain entry. Changes in emission control technology have reduced the potential for violations even from these large queues. Currently, the City has no measured CO violations, even at its bridge and tunnel approaches.

G. THE FUTURE WITHOUT THE PROJECT

CO concentrations for 2001 if the proposed project is not built, were determined for the 2001 analysis year using the methodology previously described. Table 14-6 shows future maximum predicted 1- and 8-hour average CO concentrations without the project at the three analysis intersections in the project study area. The values shown are the highest predicted concentrations for each receptor location for either PM weekday or Saturday midday peak period conditions. The 2001 No Build predicted values are all below the 1- and 8-hour NAAQS.

Table 14-4

Representative Monitored Ambient Air Quality Data, 1994

Pollutant	Location	Units	Period	Concentrations: Mean	Highest	Second Highest	Number of Exceedances of Federal Standard: Primary	Secondary
CO	Bloomingdale's Department Store 1000 Third Avenue	ppm	8-hour 1-hour	— —	NA	7.3 12.0	0 0	0 0
SO_2	P.S. 59 228 East 57th Street	ppm	Annual 24-hour 3-hour	0.018 — —	NA	0.064 — 0.116	0 0	— — 0
Inhalable Particulates (PM_{10})	Madison Avenue and 46th Street	$\mu g/m^3$	Annual 24-hour	53 —	— 132	— 130	1 0	0 0
NO_2	P.S. 59 228 East 57th Street	ppm	Annual	0.046	—	—	0	0
Lead*	Bowery Savings Bank Seventh Avenue and 34th Street	$\mu g/m^3$	3-month	—	0.06	—	0	0
O_3	Queens College	ppm	1-hour	—	0.131	0.126	2	0

Notes: * Lead sampling at Bowery Savings Bank was terminated on March 31, 1993.
Source: *New York State Air Quality Report, Ambient Air Monitoring Systems*, Annual 1994 DAR-95-1.

Table 14-5

Maximum Predicted Existing 1- And 8-Hour Average Carbon Monoxide Concentrations for 1996 (parts per million)

Receptor Site	Location	Time Period	1-Hour	8-Hour
1	Central Park West and 81st Street	Saturday	12.3	7.3
2	Columbus Avenue and 81st Street	Saturday	14.7	8.9
3	Columbus Avenue and 77th Street	Saturday	10.9	6.3

Table 14-6

Future (2001) Maximum Predicted 1- And 8-Hour Average Carbon Monoxide No Build Concentrations in the Project Study Area (parts per million)

Receptor Site	Location	Time Period	1-Hour	8-Hour
1	Central Park West and 81st Street	Saturday	11.5	6.4
2	Columbus Avenue and 81st Street	Saturday	13.3	7.6
3	Columbus Avenue and 77th Street	Saturday	10.3	5.5

H. PROBABLE IMPACTS OF THE PROPOSED PROJECT

INTRODUCTION

Operation of the proposed development would result in increased mobile source emissions in the immediate vicinity of Museum. The proposed project could also affect CO levels by emissions from the proposed project's garage exhaust system. Each of these areas of potential impact is examined below.

MOBILE SOURCE ANALYSIS

CO concentrations with the proposed project were determined for the 2001 analysis year using the methodology previously described. Table 14-7 shows the maximum predicted future (2001) 1- and 8-hour average CO concentrations with the proposed project (i.e., the 2001 Build values) at the three analysis intersections in the study area. The values shown are the highest predicted concentrations for each receptor location for any time period analyzed.

Table 14-7

Future (2001) Maximum Predicted 1- and 8-Hour Average Carbon Monoxide No Build and Build Concentrations (parts per million)

Receptor Site	Location	Time Period	No Build		Build	
			1-Hour	8-Hour	1-Hour	8-Hour
1	Central Park West and 81st Street	*Saturday*	*11.5*	*6.4*	*11.8*	*6.6*
2	Columbus Avenue and 81st Street	*Saturday*	13.3	*7.6*	13.4	*7.7*
3	Columbus Avenue and 77th Street	*Saturday*	10.3	*5.5*	10.5	*5.7*

The 2001 results indicate that the proposed development would not result in violations of the CO standards or exceedances of the de minimis criteria.

STATIONARY SOURCE ANALYSIS

As previously discussed, to assess the potential effects on ambient CO concentrations from emissions from the proposed parking garage, a stationary source analysis was performed. The analysis was conducted for two time periods. The maximum 1-hour concentrations were determined using the Saturday peak period, when 57 autos would enter the facility and 211 depart. This would be the time period of maximum emissions, since departing vehicles are 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. The average 8-hour concentrations were determined using the Saturday 12 to 8 PM time period, when overall garage usage would be the greatest. Again, this would be the time period when the greatest number of vehicles would exit the facility over an 8-hour period.

Based on current building plans, the exhaust from the proposed garage would be vented at two locations. One vent would be located in the service yard between the Ichthyology Building and the new galleria. The other would be at the fourth floor mechanical area of the new Planetarium. Since there would be no public access in these spaces, the closest nearby receptors would be windows on the north face of the existing Museum building south of the Planetarium. Therefore, maximum predicted 1- and 8-hour average concentrations were determined at these locations. Following the recommendations in the *CEQR Technical Manual*, an 8-hour persistence factor of 0.7 was used to account for meteorological variability over the average 8-hour period.

Based on the methodology previously discussed, the predicted 1- and 8-hour CO levels in the garage would be 10.3 and 3.9 ppm, respectively. At the nearest receptor, approximately 30 feet away, these concentrations would be 10.1 ppm and 3.6 ppm for the 1- and 8-hour average periods, respectively.

CONSISTENCE WITH THE NEW YORK STATE AIR QUALITY IMPLEMENTATION PLAN

All the mobile sources receptor locations analyzed under the Build scenario had predicted CO levels less than the corresponding ambient air quality standard. Therefore, the project would be consistent with the New York SIP. ❖

A. INTRODUCTION

Noise pollution in an urban area comes from many sources. Some are activities essential to the health, safety, and welfare of the city's inhabitants, such as noise from emergency vehicle sirens, garbage collection operations, and construction and maintenance equipment. Other sources, such as traffic, stem from the movement of people and goods, activities that are essential to the viability of the city as a place to live and do business. Although these and other noise-producing activities are necessary to a city, the noise they produce is undesirable. Urban noise detracts from the quality of the living environment and there is increasing evidence that excessive noise represents a threat to public health. The principal impact of the proposed project on ambient noise levels would result from the increased automobile and bus traffic generated by the proposed project, and noise from outdoor activities and events on the proposed outdoor terrace. These potential impacts are assessed in this section.

NOISE FUNDAMENTALS

Quantitative information on the effects of airborne noise on people is well documented. If sufficiently loud, noise may adversely affect people in several ways. For example, noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. It may also cause annoyance, hearing damage, and other physiological problems. Several noise scales and rating methods are used to quantify the effects of noise on people. These scales and methods consider such factors as loudness, duration, time of occurrence, and changes in noise level with time. However, it must be remembered that all the stated effects of noise on people vary greatly with the individual.

"A"-WEIGHTED SOUND LEVEL (dBA)

Noise is typically measured in units called decibels (dB), which are 10 times the logarithm of the ratio of the sound pressure squared to a standard reference presence squared. Because loudness is important in the assessment of the effects of noise on people, the dependence of loudness on frequency must be taken into account in the noise scale used in environmental assessments. One of the simplified scales that accounts for the dependence of perceived loudness on frequency is the use of a weighting network, known as A-weighting, in the measurement system, to simulate the response of the human ear. For most noise assessments, the A-weighted sound pressure level in units of dBA is used in view of its widespread recognition and its close correlation with perception. In the current study, all measured noise levels are reported in dBA or A-weighted decibels. Common noise levels in dBA are shown in Table 15-1.

Table 15-1
Common Noise Levels

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Train horn at 30 meters	90
Freight train at 30 meters	95
Heavy truck at 15 meters	
Busy city street, loud shout	80
Busy traffic intersection	
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Light car traffic at 15 meters, city or commercial areas or residential areas close to industry	
Background noise in an office	50
Suburban areas with medium density transportation	
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.
Source: Allee King Rosen & Fleming, Inc.

COMMUNITY RESPONSE TO CHANGES IN NOISE LEVELS

The average ability of an individual to perceive changes in noise levels is well documented (see Table 15-2). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

It is also possible to characterize the effects of noise on people by studying the aggregate response of people in communities. The rating method used for this purpose is based on a statistical analysis of the fluctuations in noise levels in a community, and integrating the fluctuating sound energy over a known period of time, most typically during 1 hour or 24 hours.

Table 15-2
Average Ability to Perceive Changes in Noise Levels

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A "dramatic change"
40	Difference between a faintly audible sound and a very loud sound

Source: Bolt Beranek and Neuman, Inc., *Fundamentals and Abatement of Highway Traffic Noise*, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.

Various government and research institutions have proposed criteria that attempt to relate changes in noise levels to community response. One commonly applied criterion for estimating response is incorporated into the community response scale proposed by the International Standards Organization (ISO) of the United Nations (see Table 15-3). This scale relates changes in noise level to the degree of community response and permits direct estimation of the probable response of a community to a predicted change in noise level.

Table 15-3
Community Response to Increases in Noise Levels

Change (dBA)	Category	Description
0	None	No observed reaction
5	Little	Sporadic complaints
10	Medium	Widespread complaints
15	Strong	Threats of community action
20	Very strong	Vigorous community action

Source: International Standards Organization, *Noise Assessment with Respect to Community Responses*, ISO/TC 43. (New York: United Nations, November 1969)

NOISE DESCRIPTORS USED IN IMPACT ASSESSMENT

Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over more extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific period, as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level," L_{eq}, can be computed. L_{eq} is the constant sound level that, in a given situation and period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted as $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors such as L_1, L_{10}, L_{50}, L_{90} and L_x are sometimes used to indicate noise levels that are exceeded 1, 10, 50, 90, and x percent of the time, respectively. Discrete event peak levels are given as L_{01} levels.

The relationship between L_{eq} and levels of exceedance is worth noting. Because L_{eq} is defined in energy rather than straight numerical terms, it is not simply related to the levels of exceedance. If the noise fluctuates very little, L_{eq} will approximate L_{50} or the median level. If the noise fluctuates broadly, the L_{eq} will be approximately equal to the L_{10} value. If extreme fluctuations are present, the L_{eq} will exceed L_{90} or the background level by 10 or more decibels. Thus, the relationship between L_{eq} and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the L_{eq} is generally between L_{10} and L_{50}. The relationship between L_{eq} and exceedance levels has been used in the current studies to characterize the noise sources and to determine the nature and extent of their impact at all receptor locations.

For purposes of the proposed project, the maximum 1-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in the noise impact evaluation. $L_{eq(1)}$ is the noise descriptor recommended for use in the *CEQR Technical Manual* (December 1993) for vehicular traffic noise impact evaluation and is used to provide an indication of highest expected sound levels. $L_{10(1)}$ is the noise descriptor used in the City Environmental Protection Order (CEPO)-CEQR noise exposure standards established by the New York City Department of Environmental Protection (DEP) for vehicular traffic noise. Hourly statistical noise levels (particularly L_{10}) and L_{eq} levels were used to characterize the relevant noise sources and their relative importance at each receptor location.

NOISE STANDARDS AND CRITERIA

Noise levels associated with the construction and operation of the proposed project are subject to the emission source provisions of the New York City Noise Control Code and noise standards set for the CEQR process. Other standards and guidelines promulgated by federal agencies do not apply to project noise control, but are useful to review in that they establish measures of impacts. Construction equipment is regulated by the Noise Control Act of 1972.

NEW YORK CITY NOISE CODE

The New York City Noise Control Code promulgates sound-level standards for motor vehicles, air compressors, and paving breakers, requires that all exhausts be muffled, and prohibits all unnecessary noise adjacent to schools, hospitals, or courts. The code further limits construction activities to weekdays between 7 AM and 6 PM. In 1979, Section 1403.3-6.01 of the code was re-enacted as Local Law No. 64. This new law established ambient noise quality criteria and standards based on existing land use zoning designations. (As described in Chapter 3, the residences along West 81st Street are zoned as R-10A; the Museum and Theodore Roosevelt Park, as mapped parkland, are not zoned.) Table 15-4 summarizes the ambient noise quality criteria established under Local Law No. 64. Conformance with the noise level values contained in the law is determined by considering noise emitted directly from stationary activities within the boundaries of a project. Construction activities and noise sources outside the boundaries of a project are not included within the provisions of this law.

Table 15-4
City of New York
Ambient Noise Quality Zone Criteria (dBA)

Ambient Noise Quality Zone (ANQZ)	Daytime Standards* (7 AM–10PM)	Nighttime Standards* (10 PM–7AM)
Low-Density Residential (R1 to R3) Land Uses (N1)	60	50
High-Density Residential (R4 to R10) Land Uses (N2)	65	55
Commercial (C1 to C8) and Manufacturing (M1 to M3) Land Uses (N3)	70	70

Note: * $L_{eq(1\ hour)}$.
Source: City of New York Local Law No. 64.

NEW YORK CEPO-CEQR NOISE STANDARDS

DEP's Division of Noise Abatement has set external noise exposure standards, as shown in Table 15-5. Noise exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable. The standards shown are based on maintaining an interior noise level for the worst-case hour L_{10} less than or equal to 45 dBA. Mitigation requirements for traffic, rail, and aircraft noise are shown in Table 15-6.

In addition, DEP's Office of Environmental Impact considers an increase of 3 decibels or more at the noise receptor to be a significant adverse noise impact. When the source of noise is traffic, the assessment is made using the $L_{eq(1)}$descriptor. The $L_{eq(1)}$descriptor is used in this document to quantify and describe traffic noise.

NOISE CONTROL ACT OF 1972

As a result of the Noise Control Act of 1972, a document entitled "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety" was published in 1974 by EPA (see Table 15-7). These levels do not constitute enforceable federal regulations or standards. Nevertheless, the noise levels identified by EPA represent valid criteria for evaluating the effect of project noise on public health and welfare.

IMPACT DEFINITION

For purposes of impact assessment, this report will utilize the following criteria:

- An increase of 5 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors to those calculated for the No Build condition, if the No Build levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period. For the 5 dBA threshold to be valid, the resultant Build condition noise level would have to be equal to or be less than 65 dBA.
- An increase of 4 dBA or more in Build $L_{eq(1)}$ noise levels at sensitive receptors from those calculated for the No Build condition, if the No Build levels are 61 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period. For the 4 dBA threshold to be valid, the resultant Build condition noise level would have to be equal to or be less than 65 dBA.

Table 15-5
CEPO-CEQR Noise Exposure Standards for Use in City Environmental Impact Review[1]

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Environs	Marginally Acceptable General External Exposure	Airport[3] Environs	Marginally Unacceptable General External Exposure	Airport[3] Environs	Clearly Unacceptable General External Exposure	Airport[3] Environs
1. Outdoor area requiring serenity and quiet[2]		$L_{10} \le 55$ dBA							
2. Hospital, Nursing Home		$L_{10} \le 55$ dBA		$55 < L_{10} \le 65$ dBA		$65 < L_{10} \le 80$ dBA		$L_{10} > 80$ dBA	
3. Residence, residential hotel or motel	7 AM to 11 PM	$L_{10} \le 65$ dBA		$65 < L_{10} \le 70$ dBA		$70 < L_{10} \le 80$ dBA		$L_{10} > 80$ dBA	
	11 PM to 7 AM	$L_{10} \le 55$ dBA	$L_{dn} \le 60$ dBA	$55 < L_{10} \le 70$ dBA	$60 < L_{dn} \le 65$ dBA	$70 < L_{10} \le 80$ dBA	(I) $65 < L_{dn} \le 70$ dBA, (II) $70 < L_{dn} \le$	$L_{10} > 80$ dBA	$L_{dn} > 75$ dBA
4. School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, out-patient public health facility		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)	
5. Commercial or office		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)	
6. Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Notes:

(i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more; (ii) CEPO-CEQR Noise Standards for train noise are similar to the above aircraft noise standards: the noise category for train noise is found by taking the L_{dn} value for such train noise to be an L_{dn}^{y} (L_{dn} contour) value (see table on the following page).

1 Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by ANSI Standards; all values are for the worst hour in the time period.

2 Tracts of land where serenity and quiet are extraordinarily important and serve an important public need and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and old-age homes.

3 One may use the FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.

4 External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

Source: New York City Department of Environmental Protection (adopted policy 1983).

Table 15-6
CEPO-CEQR Exterior Noise Standards and Attenuation Values

Noise Category	Marginally Acceptable	Marginally Unacceptable		Clearly Unacceptable		
Vehicular[a, b]	$65 < L_{10} \le 70$	$70 < L_{10} \le 75$	$75 < L_{10} \le 80$	$80 < L_{10} \le 85$	$85 < L_{10} \le 90$	$90 < L_{10} \le 95$
Train[a, b]	$60 < L_{dn} \le 65$	$65 < L_{dn} \le 70$	$70 < L_{dn} \le 75$	$75 < L_{dn} \le 80$	$80 < L_{dn} \le 85$	$85 < L_{dn} \le 90$
Aircraft[a, b]	$65 < L^{y}_{dn} \le 65$	$65 < L^{y}_{dn} \le 70$	$70 < L^{y}_{dn} \le 75$	$L^{y}_{dn} > 75$	N/A	N/A
Required Attenuation[c]	25 dB(A)	(I) 30 dB(A)	(II) 35 dB(A)	(I) 40 dB(A)	(II) 45 dB(A)	(III) 50 dB(A)

Notes:

[a] Different descriptors are used for each noise source: L_{10} for vehicular traffic; L_{dn} for train noise; and L^{y}_{dn} (L_{dn} Contour) for aircraft noise.[*,†]

[b] The various noise sources at a receptor location are measured and reported separately in accordance with generally accepted procedures for assessing an overall noise level. Cases where there is not a clearly dominant noise source require a judicious decision based on adequate field experience and analysis to determine the final noise category that is deemed appropriate for the overall noise exposure at each noise receptor site.

[c] The above composite window-wall attenuation values are for residential dwellings. Commercial office spaces and meeting rooms would be 5 dB(A) less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.

[*] L_{dn} requires a 24-hour measurement or supportive analysis if a shorter period is employed.

[†] L^{y}_{dn} = "L_{dn} Contour" is an annual average of L_{dn} values ("y" indicates "yearly average").

Table 15-7
Noise Levels Identified as Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety

Effect	Level	Area
Hearing loss	$L_{eq(24)} \le 70$ dB	All areas.
Outdoor activity interference	$L_{dn} \le 55$ dB	Outdoors in residential areas and farms, and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq(24)} \le 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \le 45$ dB	Indoor residential areas.
	$L_{eq(24)} \le 45$ dB	Other indoor areas with human activities, such as schools, etc.

Source: Report No. EPA-550/9-74-004, March 1974.

- An increase of 3 dBA or more in Build $L_{eq(1)}$ noise levels at sensitive receptors from those calculated for the No Build condition, if the No Build levels are less than 62 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period. For the 3 dBA threshold to be valid, the resultant Build condition noise level would have to be equal to or be less than 65 dBA.
- An increase of 3 dBA or more in Build $L_{eq(1)}$ noise levels at sensitive receptors from those calculated for the No Build condition, if the analysis period is a nighttime period (defined by the CEPO-CEQR standards as being between 10 PM. and 7 AM).
- A Build $L_{eq(1)}$ ambient noise level of 65 dBA at sensitive receptors if the analysis period is a daytime period (defined by the ANQZ standards as being between 7 AM and 10 PM), or a Build $L_{eq(1)}$ ambient noise level of 55 dBA at sensitive receptors if the analysis period is a nighttime period (defined by the ANQZ standards as being between 10 PM and 7 AM).

NOISE PREDICTION METHODOLOGY

MOBILE NOISE SOURCES

A proportional modeling technique was used to determine approximate increases in noise levels due to changes in traffic volumes. Using this technique, the prediction of future traffic noise levels is based on a calculation using measured existing noise levels and predicted changes in traffic volumes to determine No Build and Build levels. No Build traffic volumes were based on applying a growth factor to the existing traffic volumes. Future Build traffic volumes were obtained by adding project-generated traffic values to No Build conditions. Traffic generated by outdoor terrace events and the Museum restaurant were included in the Build traffic as a worst-case scenario for noise analysis purposes. The vehicular traffic volumes were converted into Passenger Car Equivalent (PCE) values, for which one medium-duty truck (having a gross weight between 9,400 and 25,000 pounds) is assumed to generate the noise equivalent of 16 cars, and one heavy-duty truck (having a gross weight of more than 25,000 pounds) is assumed to generate the noise equivalent of 85 cars. Future noise levels are calculated using the following equation:

$$F\ NL - E\ NL = 10 * \log_{10} (FPCE / EPCE)$$

where:

F NL = Future Noise Level

E NL = Existing Noise Level

F PCE = Future PCEs

E PCE = Existing PCEs

Because sound levels use a logarithmic scale, this model proportions logarithmically with traffic change ratios. For example, assume that traffic is the dominant noise source at a particular location. If the existing traffic volume on a street is 100 PCE and if the future traffic volume were increased by 50 PCE to a total of 150 PCE, the noise level would increase by 1.8 dBA. If the future traffic were increased by 100 PCE, or doubled to a total of 200 PCE, the noise level would increase by 3.0 dBA. The proportional model screening technique was used to examine impacts both during construction and operation of the proposed project.

As mentioned previously, DEP considers a 3.0 dBA or higher increase in daytime noise levels a significant impact when the No Build noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period. Therefore, a doubling of traffic, where traffic is the dominant source of noise, results in a significant noise impact when daytime No Build noise levels are 62 dBA or greater, or during a nighttime hour. For ambient No Build noise levels less than 60 dBA, a noise level increase of 5 dBA is considered a significant increase in noise level by DEP. Traffic volumes must increase by a factor of three for traffic-generated noise levels to increase by 5 dBA.

Proportional modeling data are summarized in *Appendix F*.

TERRACE EVENT NOISE

A distance attenuation modeling technique was used to determine approximate increases in noise levels resulting from noise generated by outdoor activities and events on the proposed terrace area. These events could have as many as 800 attendees, and may include outdoor amplified music and outdoor presentations. The events would take place in the evening and at night when the Museum is closed, and would end prior to midnight.

Noise from outdoor terrace events were treated as stationary sources using an attenuation modeling technique. Using this technique, measurements were made on similar outdoor events, both with and without music, at a reference distance. A distance was measured from the proposed terrace to the nearby sensitive receptors. This distance was used in relationship to the model source reference distance, and an attenuation constant was calculated. This distance attenuation calculation assumes a 6-dBA reduction per doubling of the reference distance. This attenuation was then subtracted from noise levels measured at the reference distance. For instance, noise levels of 65 dBA at 100 feet for a particular event are calculated to be 59 dBA at 200 feet, or 53 dBA at 400 feet.

In addition, as summarized below under section D, "Probable Impacts of the Proposed Project," additional studies of terrace event noise were undertaken after completion of the DEIS. The complete studies are included in Appendix G.

B. EXISTING CONDITIONS

SITE DESCRIPTION

Areas that are sensitive to noise near the proposed project include residences in the apartment buildings directly across West 81st Street from the existing Hayden Planetarium, as well as residences along Central Park West and Columbus Avenue. Existing traffic volumes range from 65 to 1,860 vehicles per hour in the area near the Hayden Planetarium. Schoolbus activity on West 81st Street is particularly heavy during normal school hours and significantly contributes to existing noise levels during those time periods.

SELECTION OF NOISE RECEPTOR LOCATIONS

Three noise receptor locations were selected to evaluate potential noise impacts of the proposed project (see Figure 15-1). The locations include sensitive receptor sites and locations where maximum project impacts would be most likely to occur. Noise receptor sites and locations are given in Table 15-8.

Table 15-8
Noise Receptor Locations

Site Number	Location
1	Central Park West between West 81st and 82nd Streets
2	West 81st Street, directly across from the existing driveway entrance
3	Columbus Avenue between West 79th and 80th Streets

NOISE MONITORING

Noise levels at the receptor sites were monitored during various time periods on March 14, 1996, March 16, 1996, and March 23, 1996. Twenty-minute measurements were made at each receptor location during the following time periods: weekday midday, PM, late evening, and Saturday midday, PM, and late evening.

EQUIPMENT USED

The instrumentation used for the 20-minute measurements at sensitive receptor sites was a Larson Davis Labs (LDL) Model MK224 microphone connected to an LDL preamplifier attached to an LDL Model 700 Type 1 (according to ANSI Standard S1.4-1983) sound level meter. The instrument was mounted at a height of 4 feet above the ground on a tripod. The meter was calibrated before and after readings with a Brüel & Kjær Type 4230 sound level calibrator using the appropriate adaptor. Measurements at each location were made on the A-scale (dBA) for a sampling period of 1 hour. The data were digitally recorded by the noise analyzer and displayed at the end of the measurement period in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. A windscreen was used during all sound measurements except for calibration. All measurement procedures conformed with the requirements of ANSI Standard S1.13-1971 (R1976).

RESULTS OF MEASUREMENTS

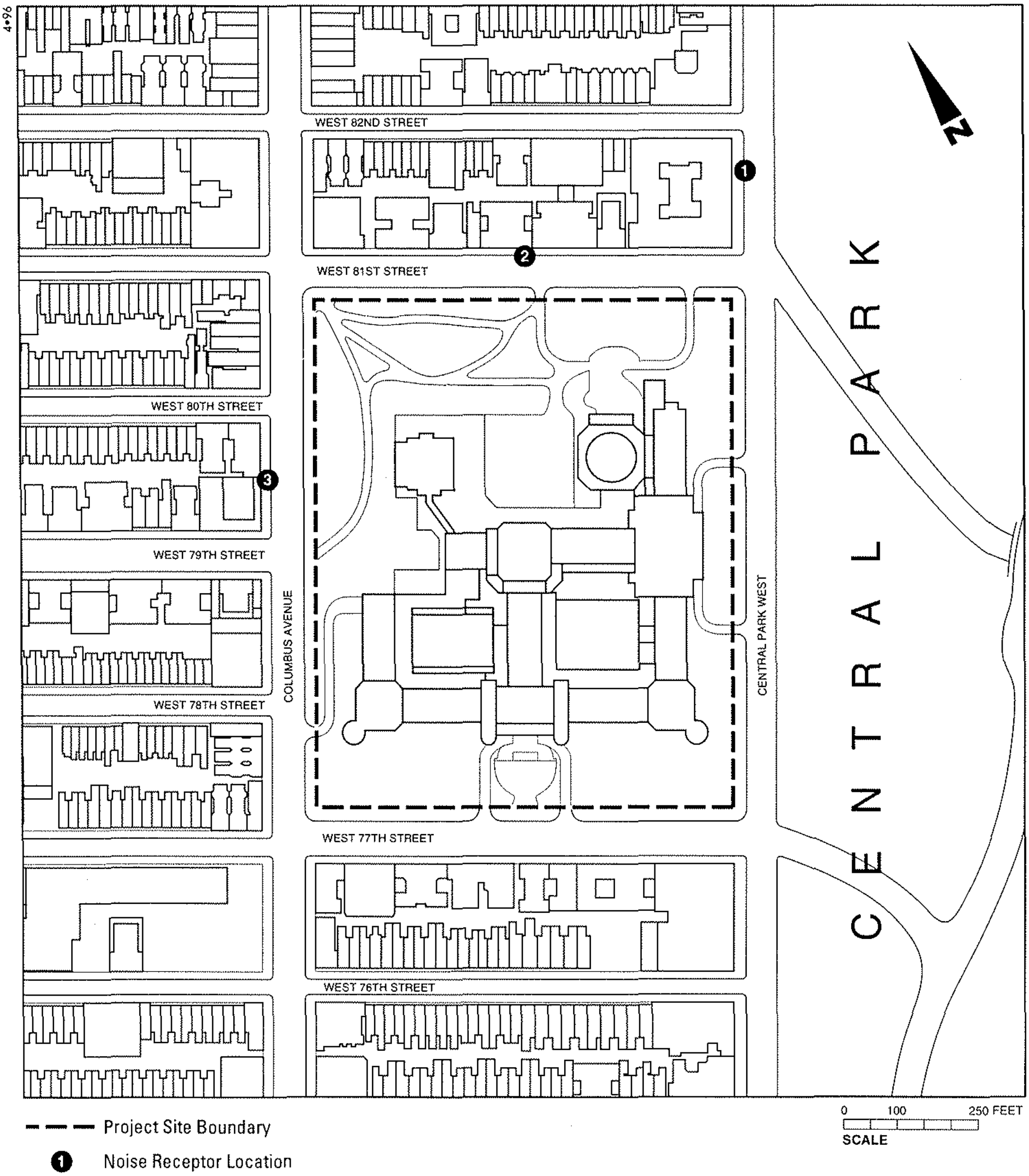
Existing peak hour and nighttime $L_{eq(1)}$ and $L_{10(1)}$ noise levels at the receptor sites are summarized in Table 15-9. Measured noise levels, including measured statistical noise levels, are shown in *Appendix F*.

In terms of the New York City CEPO-CEQR standards, existing noise levels at Sites 1 and 3 are in the "marginally unacceptable" category, and existing noise levels at Site 2 is in the "marginally acceptable" category.

C. THE FUTURE WITHOUT THE PROJECT

Using the proportional modeling methodology previously described, $L_{eq(1)}$ noise levels for No Build conditions will change slightly compared with existing noise levels. At all sites $L_{eq(1)}$ noise levels for No Build conditions will increase by less than 0.4 dBA. Changes of this magnitude will be imperceptible and not significant. In terms of CEPO-CEQR standards Sites 1 and 3 will remain in the "marginally unacceptable" category and Site 2 will remain in the "marginally acceptable" category.

Complete 24-hour $L_{eq(1)}$ noise values, $L_{eq(24)}$ values, and L_{dn} values are given for existing conditions and No Build conditions at all sites in *Appendix F*.



American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Noise Receptor Locations

Figure 15-1

Table 15-9
Existing Noise Levels

Location/Time Period	$L_{eq(1)}$	$L_{10(1)}$
Site 1: Central Park West between West 81st and 82nd Streets		
Weekday Midday Peak	69.9	73.0
Weekday PM Peak	68.7	71.5
Weekday Late Evening	67.8	71.0
Saturday Midday	69.1	71.5
Saturday PM	68.3	70.5
Saturday Late Evening	68.4	71.0
Site 2: West 81st Street, directly across from the existing driveway entrance		
Weekday Midday Peak	64.8	67.5
Weekday PM Peak	66.8	69.0
Weekday Late Evening	64.8	68.0
Saturday Midday	64.6	67.0
Saturday PM	68.4	68.5
Saturday Late Evening	64.8	68.0
Site 3: Columbus Avenue, between West 79th and 80th Streets		
Weekday Midday Peak	69.7	73.5
Weekday PM Peak	68.1	71.0
Weekday Late Evening	66.9	70.0
Saturday Midday	68.3	71.5
Saturday PM	68.6	71.5
Saturday Late Evening	67.2	70.5

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

OPERATIONAL IMPACTS

Noise from operation of the proposed project would be attributed to increased traffic (see Chapter 12) and outdoor terrace events. Outdoor terrace events may include amplified music and would generate increased traffic volumes during the evening. Cumulative effects of traffic-generated noise and terrace event noise are investigated.

MOBILE SOURCE IMPACTS

Using the proportional modeling methodology previously described, $L_{eq(1)}$ noise levels for Build conditions would change slightly compared with No Build noise levels. Build traffic conditions include traffic generated by outdoor terrace events, and represent a worst-case traffic scenario. At all sites, $L_{eq(1)}$ noise levels for Build conditions would increase by less than 1.7 dBA. Changes of this magnitude would be barely perceptible and not significant. In terms of CEPO-CEQR standards, Sites 1 and 3 would remain in the "marginally unacceptable" category and Site 2 would remain in the "marginally acceptable" category.

During late night hours, no traffic would be traveling to or from the project. The operational characteristics of the proposed garage have not been finalized. If the garage is open 24 hours to serve a limited number of neighborhood residents, fewer than five vehicles per hour would be expected to travel to and from the garage during late night hours. This volume of traffic would not be significant and would not contribute significantly to the noise generated by traffic volumes along West 81st Street or Columbus Avenue at that time.

Complete 24-hour $L_{eq(1)}$ noise values, $L_{eq(24)}$ values, and L_{dn} values are given for Build and No Build conditions at all sites in Appendix B.

TERRACE EVENT NOISE

Using the distance attenuation methods previously described, *the DEIS predicted* outdoor terrace event noise in Theodore Roosevelt Park and near residences along West 81st Street. *The DEIS analysis concluded that,* based on CEQR criteria, noise from terrace events alone would result in a significant impact within the park at locations adjacent to the terrace area, after 10 PM. *The DEIS also concluded that* in front of residences on West 81st Street, noise from terrace events would not result in a significant impact based on CEQR criteria, *but that* low frequency noise generated during such events (such as drum beats, amplified bass, and other special effects) would be discernable, and *possibly* intrusive to some residents.

Because of concerns related to potentially intrusive noise levels, after completion of the DEIS a detailed noise analysis was performed for terrace events and is included as Appendix C. This study examined the feasibility of implementing control measures to reduce noise levels. Potential terrace noise was evaluated for restaurant activity alone, and for terrace events involving a range of activities, including potential amplified musical performances.

The results of the terrace noise analyses indicate that restaurant activities alone would not result in significant noise impacts to either Theodore Roosevelt Park or outside residences along West 81st Street.

Other events potentially taking place on the terrace were analyzed in three categories. The first, Group 1, including events with light unamplified music, would not produce noise levels audible to residents along West 81st Street between 10 AM and midnight. However, these events may be intrusive to some users of Theodore Roosevelt Park. The second type of terrace event analyzed, Group 2, including larger unamplified musical groups, partially amplified musical performances, and amplified speech, would be audible and could be intrusive to both West 81st Street residents and people in Theodore Roosevelt Park. Similarly, the third type of event, Group 3, including amplified music and unamplified groups using heavy percussion instruments, would be perceptible and potentially intrusive to both residents along West 81st Street and users of Theodore Roosevelt Park.

To avoid these noise impacts associated with terrace events, the Museum would implement noise control measures as outlined in Chapter 17, "Mitigation."

CUMULATIVE OPERATIONAL IMPACTS

Cumulative operational impacts were derived by combining the $L_{eq(1)}$ noise levels from increased traffic volumes with the noise levels from outdoor terrace events *(ranging from single restaurant activities to various event group categories)*. Cumulative operational impacts are expected to be significant in the park. Build $L_{eq(1)}$ noise levels in the park are expected to range from 59 dBA to *70* dBA, *with instantaneous noise levels as high as 79 dBA* during outdoor terrace events.

Cumulative operational $L_{eq(1)}$ noise levels at noise receptor locations would be similar to traffic-related $L_{eq(1)}$ noise levels for Build conditions. Due to the distance between the outdoor terrace and noise receptor locations, noise from outdoor terrace events would not contribute significantly to the cumulative $L_{eq(1)}$ noise levels of traffic and outdoor terrace events. However, low frequency noise generated during such events (such as drum beats, amplified bass, and other special effects) would be discernable, and may be intrusive to some residents. *Without any mitigation measures, instantaneous noise levels from outdoor terrace events may exceed 65 dBA at nearby residences along West 81st Street.* Cumulative operational $L_{eq(1)}$ noise levels at noise receptor locations would be the same as the predicted Build traffic-related hourly noise levels given in Appendix *G.1*.

With open windows, residences along West 81st Street would provide attenuation of up to 10 dBA in exterior noise levels. With closed windows and alternate forms of ventilation, 20 to 35 dBA of attenuation can be expected, depending on construction methods and materials used. Attenuation of this type would be adequate in reducing interior L_{dn} and $L_{eq(24)}$ noise levels below 45 dBA, *but would not be adequate to reduce noises produced by outdoor terrace events to inaudible levels. Additional noise control measures, described in Chapter 17, "Mitigation," would be employed to minimize noise impacts as a result of outdoor terrace events.* ❖

A. OVERVIEW OF CONSTRUCTION ACTIVITIES

Construction of the American Museum of Natural History's Planetarium and North Side project would start with minor utility relocation activities in the fall of 1996. Beginning in March 1997, full construction would take 32 months with completion expected in 2000. The Planetarium, the parking lot, and portions of Theodore Roosevelt Park bordering the Museum complex would be closed during the construction period. Trucks and construction equipment would enter and exit the existing West 81st Street driveway. The construction of the proposed project would cause temporary disruptions to residents, workers, and visitors in the vicinity of the Museum. This chapter begins with a general outline of construction scheduling and activities by site, describes the types of impacts that would occur during the construction period, and assesses methods that may be employed to minimize those impacts. Among the mitigation measures that would be employed are traffic mitigation measures, requiring construction contractors to plan and carry out noise and dust control, tree protection and erosion control plans for Theodore Roosevelt Park, a historic resource protection plan to protect the Museum complex, and strict compliance with all applicable construction safety measures.

In addition to these measures, the Museum and Planetarium Authority would establish a construction coordination group that would include the Museum, its construction manager, community groups, the Community Board, the local Police Department precinct, and other affected groups. This group would meet regularly, to keep the community informed about construction activities and address any problems or concerns raised. The construction manager would also establish a phone number that neighbors could call with questions or concerns.

B. DESCRIPTION OF CONSTRUCTION ACTIVITIES BY SITE

Work on the project would begin in March 1997 with excavation for the parking garage and Planetarium; by September 1997, all sites would be simultaneously under construction. *No public parking would be provided from the onset of construction until the garage is completed and can be operated safely.* The type of equipment utilized and the traffic generated would vary by phase. Typical equipment used for demolition, excavation, and pouring the foundation would include excavators, bulldozers, rockbreakers, backhoes, tractors, pile-drivers, hammers, cranes, and concrete pumping trucks. Trucks would arrive at the site with pre-mixed concrete and other building materials, and would remove any excavated material and construction debris. The construction equipment likely to be used during erection of the superstructure and framing would include large and small cranes, compressors, derricks, hoists, bending jigs, and welding machines. During facade and roof construction, hoists and cranes would continue to be used. Trucks would remain in use for material supply and construction waste removal. Interior and finishing work would employ the greatest number of construction workers, and a wide variety of fixtures and supplies would have to be delivered to the site. Large numbers of small pieces of construction equipment would be used for material supply and construction waste removal.

Construction activities would normally take place Monday through Friday, although the delivery or installation of certain critical equipment could occur on weekend days. The permitted hours of construction are regulated by the Department of Buildings, apply in all areas of the city, and are reflected in the collective bargaining agreements with major construction trade unions. In accordance with those regulations, work would begin at 8 AM on weekdays, although some workers would arrive and begin to prepare work areas between 7 and 8 AM. Normally, work would end at 4:30 PM unless overtime is required to maintain the schedule. Night or early morning deliveries may be required for certain oversized materials to comply with the requirements of the Department of Transportation. Occasionally, overtime would be required to complete some time-sensitive tasks, such as the surface finishing of concrete slabs poured during the normal work day. However, weekend work during the early phases is not anticipated. In the later phases, some interior work on weekends within the enclosed buildings may be required to meet the schedule, but this would be unlikely to affect surrounding residences.

Construction would not involve closing lanes of traffic or sidewalks, and all construction activities would occur close to the Museum. Portions of Theodore Roosevelt Park adjacent to the north and west sides of the Museum would be fenced off during most of the construction period to accommodate construction equipment and activities (and for safety purposes). More information about staging locations and effects on the park is provided later in this chapter under section C, "Probable Construction Impacts of the Proposed Project," in the subsection entitled, "Open Space and Recreational Facilities."

The general sequence and timing of construction activities by site is estimated as follows:

GARAGE

MONTHS 1-6: EXCAVATION AND FOUNDATION

Construction of the parking garage would begin with excavating the existing surface parking lot, preparing the underlying rock for the building piles, capping the piles, and pouring the slab.

MONTHS 6-9: ERECTION OF CONCRETE SUPERSTRUCTURE

This would involve constructing the building columns, placing structural steel, and pouring the concrete.

MONTHS 10-15: FACADE, ELEVATOR, AND UTILITY INSTALLATION

This phase of construction would involve masonry and stone work on the facade of the garage; the installation of elevators; and mechanical, electrical, and plumbing installation.

PLANETARIUM

MONTHS 1-6: DEMOLITION, EXCAVATION, AND FOUNDATION

Following a schedule that parallels work on the garage, the first *six* months of construction on the Planetarium would entail demolition and site clearance; digging, pile-drilling and possible pile-driving, and pile capping; excavation for the foundation on the north end of the Planetarium site; and reinforcing and pouring the foundation.

MONTHS 5-12: CONCRETE AND STEEL SUPERSTRUCTURE

Once the foundation has been completed, the concrete superstructure and steel framework would take place. This process involves concrete form work, pouring concrete, and the installation of beams, columns and decking, and the installation of the steel globe and tripods supporting it.

MONTHS 12-19: FACADE AND ROOF CONSTRUCTION, INSTALLATION OF GLASS CURTAIN WALLS

This would include the assembly of glass, cables, and metal panels for the glass curtain walls; masonry and stone work on the Planetarium facade facing West 81st Street; and roof construction consisting of installation of steel trusses, roof deck, and roofing materials.

MONTHS 16-31: GLOBE SKIN AND INTERIOR WORK, MECHANICAL INSTALLATION, INTERIOR AND FINISHING WORK, EXHIBIT INFRASTRUCTURE, AND EXHIBIT INSTALLATION

This phase would include assembly of the globe skin, interior finishing, installation of exhibit infrastructure, and exhibit installation. Specifically, the work would include installing gypsum panels on the globe, assembling the interior dome; installation of heating, ventilation, and air conditioning (HVAC) equipment and duct work; installation and checking of elevator, escalator, and life safety systems; work on interior walls, ceilings, and finishes; installation of doors, windows, and appliances; terrazzo installation; exhibit infrastructure; and mechanical, electrical, and plumbing installation for the base building and the exhibit infrastructure.

GALLERIA AND COLUMBUS AVENUE ENTRANCE

MONTHS 6-8: EXCAVATION AND FOUNDATION

This work would involve excavating the soil and pouring the foundation for the Columbus Avenue entrance.

MONTHS 8-10: CONCRETE AND STEEL STRUCTURE

This would involve constructing the concrete and steel structure for the Columbus Avenue entrance pavilion and the steel structure for the galleria.

MONTHS 11-13: GLASS SYSTEM AND ROOFING

Work would consist of installation of the glass system, including the glass facade facing the plaza on the upper level of the galleria and the glass curtain wall at the Columbus Avenue entrance; and roofing for the two-story exhibition galleria and walkway.

MONTHS 13-23: INTERIOR WORK

Interior work would consist of installation of drywall, ceilings, and flooring; finishes; installation of utility systems; and special fit-out areas including temporary exhibit areas, classroom space, and resource rooms.

POWER HOUSE

EARLY MONTHS: PREPARATION WORK

Work would begin with the removal of the existing bridge connecting the Ichthyology Building and the Power House, and the preparation of the lower level, including some interior removals.

MONTHS 1-19: BASE BUILDING INTERIOR RENOVATION

This would include installation of heating, ventilation, and air conditioning (HVAC) equipment and ductwork; steel framing; pouring concrete slabs; replacement windows and drywalls; elevator installation; and main mechanical, electrical, and plumbing installation.

MONTHS 19-31: RESTAURANT FIT-OUT

The restaurant contractor would install interior duct work, electrical systems, kitchen equipment, and finishes for the restaurant.

HALL OF PLANET EARTH

Work to construct the new Hall of Planet Earth would consist of interior work within the Museum's existing Whitney Wing.

EARLY MONTHS: EXHIBIT REMOVAL

Renovation of the first floor of the Whitney Wing into a new exhibit hall would not begin until Month 12. However, earlier, the hall would be closed to the public and the existing Biology of Birds exhibit would be removed to make temporary space available for storage and offices in relocation.

MONTHS 12-16: DRYWALL, CEILINGS, AND UTILITIES

Construction of the new exhibit hall would actually begin in Month 11 and would include sheet rocking and installing utilities for the base building and the exhibit infrastructure.

MONTHS 17-27: EXHIBIT INSTALLATION

This would involve installing exhibits in the new Hall of Planet Earth.

TERRACE

MONTHS 10-19

The development of a terrace atop the garage would involve waterproofing the top of the garage; installing paving materials; installing mechanical, electrical, and plumbing systems for lighting, fountains, and drainage; and installing landscaping and outdoor display artifacts from the Museum.

C. PROBABLE CONSTRUCTION IMPACTS OF THE PROPOSED PROJECT

Construction of the project would result in inconveniences to neighborhood residents during the 3-year construction period. This would include temporary limitations on use of portions of Theodore Roosevelt Park, as well as the temporary noise and dust associated with *construction activities.* The following sections examine the overall temporary effects of construction on community facilities and parks, historic resources, transportation (traffic, transit, and pedestrians), air quality, noise, and utilities.

COMMUNITY FACILITIES AND SERVICES

Construction of the proposed project would result in unavoidable disruptions to Museum and Planetarium operations during the construction period. Planetarium operations would cease during the construction period, from the closing of the existing Planetarium 2 months prior to start of construction, to the opening of the new Planetarium at the beginning of 2000. Museum operations would also be affected. The Biology of Birds exhibit would be removed from the first floor of the Whitney Wing in October/November 1996. In addition, noise and vibration related to excavation and general construction activities could potentially affect IMAX operations, such as the IMAX theater, during the beginning of the construction period.

OPEN SPACE AND RECREATIONAL FACILITIES

AREAS OF DISTURBANCE TO THEODORE ROOSEVELT PARK

Construction activities would require that portions of Theodore Roosevelt Park be temporarily closed to the public. As shown in Figure 16-1, portions of the park adjacent to the northern and western sides of the Museum complex would be fenced off throughout most of the construction period to accommodate construction equipment and activities and for safety purposes. In addition, a portion of the park immediately north of the West 81st Street driveway would be used during construction of the parking garage as a lay-down storage area for construction materials. After construction of the garage is completed in June 1998, material lay down, storage, and shanties would be relocated to the parking structure for the remainder of the construction period. *A plan for protection of the park during construction would be developed, reviewed, and approved by the Parks Department and discussed with interested groups, such as Community Board 7 and the construction coordination group.*

Truck traffic would enter and exit the construction site via the West 81st Street driveway. Construction trailers would also be parked along the eastern side of the West 81st Street driveway until the parking garage is completed, at which time they would move to a location there. During construction of the Columbus Avenue entrance, light trucking would be permitted on the northern footpath on the Columbus Avenue side of the park.

CONSTRUCTION PERIOD IMPACTS TO PARK AND ITS VISITORS AND OPERATIONS

Construction of the proposed project would curtail use of portions of Theodore Roosevelt Park. These areas of disturbance, shown in Figure 16-1, consist of passive open space areas. No recreational facilities would be physically displaced during construction of the proposed project. Noise and vibration, particularly during the initial months when pile-driving and demolition for construction of the garage and Planetarium would occur, would disturb visitors to the park (see noise analysis, below). Similarly, the movement of trucks and heavy equipment in and out of the construction site would disturb visitors. As a result, attendance at the park—particularly in the northern and western sections—would decline during the construction period, particularly in the early months.

The following mitigation measures would be employed during the construction period to protect Theodore Roosevelt Park and its visitors:

- The entire construction site would be fenced.
- A tree protection plan would be followed to ensure that all trees within the construction area would be protected and would remain undisturbed;
- Erosion control measures would be implemented;
- Construction materials would be placed on chocks to maintain adequate drainage;
- Soldier piles and lagging (i.e., fencing below grade designed to hold back the soil) would be utilized to protect trees and adjacent lawn areas; and
- Disturbed lawns areas would be restored upon project completion.

HISTORIC AND ARCHAEOLOGICAL RESOURCES

As described in Chapter 7, "Historic and Archaeological Resources," the American Museum of Natural History complex, including the Hayden Planetarium, is a significant historic resource in a historically significant area.

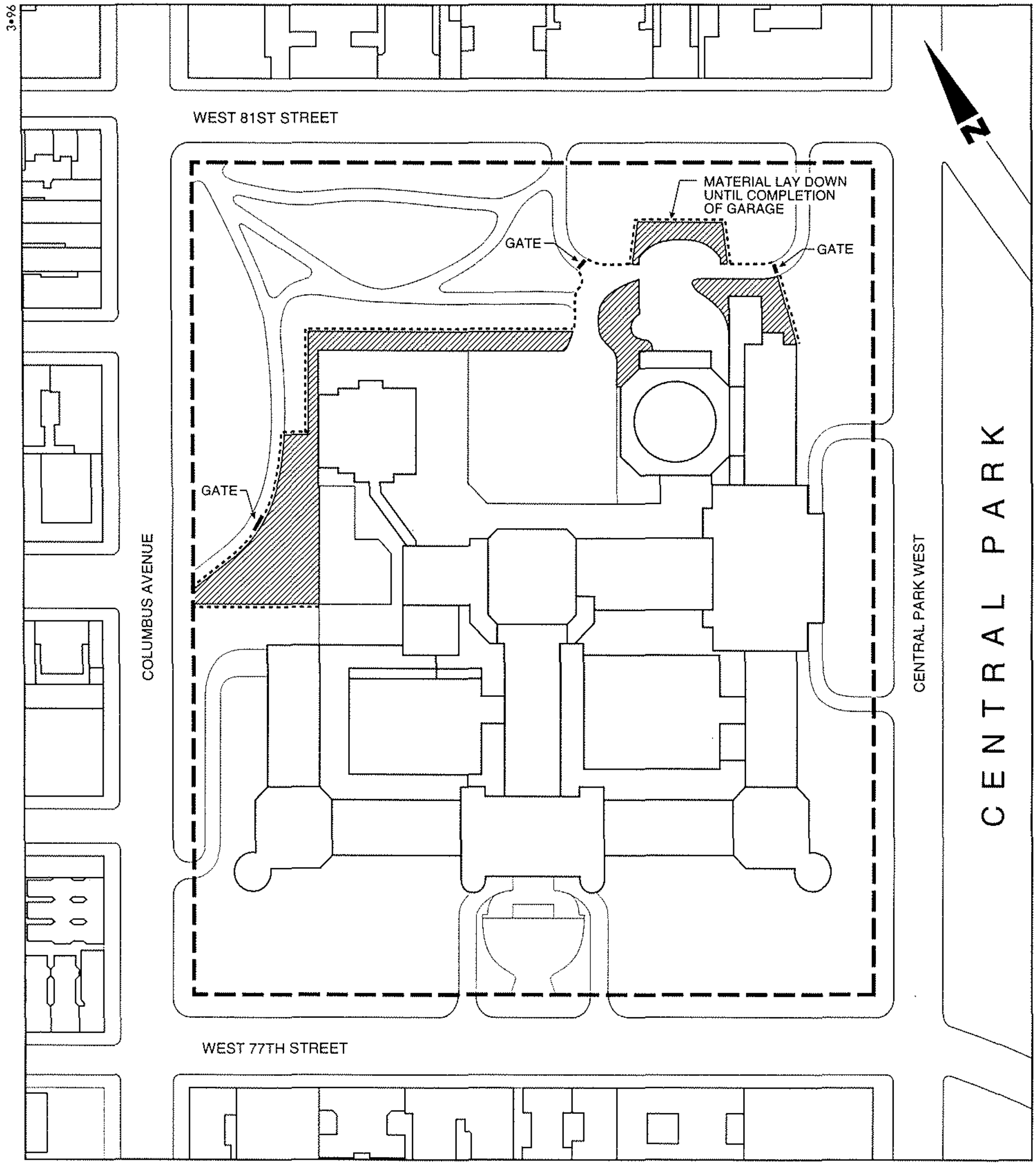
Construction activities could affect those resources not under construction in the Museum complex. The nearby structures in the historic district are too far from the project site to be adversely affected. To prevent damage to the Museum, these effects would be controlled by a historic resource protection plan developed in the planning process. This plan would be conducted by an independent structural engineer, and would cover the following points, as appropriate:

- Inspecting and reporting on the current foundation and structural condition of the Museum complex to identify sensitivity to damage from demolition and construction;
- Establishing a monitoring program to measure vertical and lateral movement and vibration to the historic structures;
- Establishing the methods of seismographic monitoring of vibration;
- Establishing and monitoring construction methods to limit vibrations to levels that would not cause damage to the historic structures as determined by the condition survey;
- Determining the method and extent of shoring and underpinning necessary during the excavation and construction of the foundation;
- Determining the need for and extent of "tell-tales" in the Museum complex;
- Establishing, if necessary, construction dewatering procedures to prevent potential settling problems for nearby structures; and
- If necessary, monitoring and maintaining, as required, groundwater levels during period of dewatering activity.

TRAFFIC AND PARKING/TRANSIT AND PEDESTRIANS

The project would generate considerable traffic resulting from movement of materials and equipment, removal of construction waste, and arriving and departing workers. Construction vehicles would enter and exit the site via the existing driveway on West 81st Street. Wherever possible, the scheduling of deliveries and other construction activities would take place during off-peak travel hours. No on-site parking would be provided for construction employees, most of whom are expected to come to the site via public transportation. The construction plan and sequencing would be designed to limit impacts on traffic, transportation, and pedestrians.

Construction workers are generally expected to arrive prior to the morning rush period (the construction day is generally *8:00* AM to 4:30 PM) and depart prior to the PM peak period. The number of workers on-site would vary, depending on the stage of construction, and would typically range from approximately 50 to 250. Since most construction workers use public



Project Site Boundary

Area of Disturbance to Theodore Roosevelt Park

Fence

American Museum of Natural History

PLANETARIUM AND NORTH SIDE PROJECT

Areas of Disturbance During Construction

Figure 16-1

transportation and travel outside of the network peak periods, their trips are not expected to significantly affect traffic service levels in the area.

The deliveries of goods and materials would be spread throughout the workday. Again, the level of trucking would vary, depending on the stage of construction, and would probably range from approximately 10 to 25 trucks and service vehicles per day. The heaviest volume of trucking would probably be during the first 12 months of construction, when excavation, foundation, and framing work is under way. The increase in trucking is expected to exacerbate weekday traffic congestion along West 81st Street. Given the space provided by the West 81st Street driveways, it is expected that most construction vehicles would be able to move directly onto the site without queuing space on West 81st Street. Similarly, construction material and equipment would generally be staged on-site without requiring the use of a curbside lane.

From the start of construction until the garage is completed and can be operated safely, the Museum's parking facility would be closed to tour buses, school buses, and cars. This would result in a substantial parking shortage. While parking is generally available at other commercial facilities in the area, although at a greater walking distance than some *visitors* may prefer, their use would result in greater congestion and circulation in the surrounding area as Museum *visitors* search for a parking location. This problem would be most severe on weekends. Similarly, the loss of bus parking would create a temporary construction impact.

The Museum's *transportation coordination group will* evaluate parking strategies and plans for managing bus drop-offs and parking, to minimize off-site impacts while the garage is under construction. *As part of its bus management plan, the Museum intends to identify an off-site* bus parking *lot to which it would direct all buses during construction. The Museum will also commit* traffic management personnel to direct the unloading and parking of buses. *Buses and cars would be routed to drop off on Central Park West or West 77th Street to avoid conflicts with construction vehicles. Traffic management personnel would redirect automobiles to other parking lots. Through its literature and reservation system, the Museum will inform its visitors that no parking is available on site.*

The following measures would be employed to manage construction period impacts. These include:

- Regulation of on-site construction activities, storage, and deliveries to minimize disruptions to adjacent sidewalks and streets;
- Coordination of materials delivery and handling to limit this activity to on-site areas as much as possible, to minimize conflict among construction sites, and to avoid (to the extent feasible) possible peak traffic and pedestrian periods;
- Coordination, if necessary, of traffic routes, detours, and enforcement;
- Coordination of construction scheduling on project sites to minimize conflict and impact; and
- Constant monitoring to determine the effectiveness of the measures taken.

AIR QUALITY

Possible impacts on local air quality during construction of the proposed action include:

- Fugitive dust (particulate) emissions from land clearing operations; and
- Mobile source emissions, including hydroczarbons, nitrogen oxide, and carbon monoxide.

FUGITIVE EMISSIONS

Fugitive dust emissions can occur from land clearing, excavation, hauling, dumping, spreading, grading, compaction, wind erosion, and traffic over unpaved areas. Actual quantities of emissions depend on the extent and nature of the clearing operations, the type of equipment employed, the physical characteristics of the underlying soil, the speed at which construction vehicles are operated, and the type of fugitive dust control methods employed. The U.S. Environmental Protection Agency (EPA) has suggested, in general, an overall emission rate of about 1.2 tons of particulate per acre per month of active construction from all phases of land clearing operations with no fugitive dust control measures. However, this is a national estimate and actual emissions vary widely depending on many factors, including the intensity and type of land clearing operations. Much of the fugitive dust generated by construction activities consists of relatively large-size particles, which are expected to settle within a short distance from the construction site and not significantly affect nearby buildings or people. All appropriate fugitive dust control measures—including watering of exposed areas and dust covers for trucks—would be employed.

MOBILE SOURCE EMISSIONS

Mobile source emissions are emissions of air pollutants from motor vehicles, referred to as mobile sources. During construction, such emissions may result from the operation of construction equipment, trucks delivering materials and removing debris, workers' private vehicles, or occasional disruptions in traffic near the construction site.

Localized increases in mobile source emissions would be minimized by incorporating traffic maintenance requirements into the construction contract documents to ensure that:

- Construction requiring temporary street closings for the relocation of utilities and for other purposes in heavily traveled areas would be performed, to the maximum extent possible, during off-peak hours;
- Existing number of traffic lanes would be maintained to the maximum extent possible; and
- Idling of delivery trucks or other equipment would not be permitted during periods when they are being unloaded or are not in active use.

NOISE

Impacts on community noise levels during construction of the proposed action would include noise and vibration from the operation of construction equipment and noise from construction and delivery vehicles traveling to and from the site. Construction noise is expected to be similar to that generated by other comparable construction projects in the city. Significant increases in noise levels resulting from project-generated construction activities can be expected to be greatest during the early stages of construction and would be of relatively short duration.

EQUIPMENT-RELATED CONSTRUCTION NOISE IMPACTS

Impacts on noise levels during construction of the proposed action include noise and vibration from construction equipment operation. The level of impact of these noise sources depends on the noise characteristics of the equipment and activities involved, the construction schedule, and the location of potentially sensitive noise receptors. Noise and vibration levels at a given location are dependent on the kind and number of pieces of construction equipment being operated, as well as the distance from the construction site. Typical noise levels of construction equipment expected to be employed during the construction process are presented in Table 16-1. Noise levels caused by construction activities would vary widely, depending on the phase of construction—land clearing and excavations, foundation and capping, erection of structural steel, construction of exterior walls, etc.—and the specific task being undertaken.

Increased noise levels caused by construction activities can be expected to be most significant during the early phases of construction. The most significant noise source associated with the construction equipment would be the use of pile-drivers and pile-drillers during construction of the garage and Planetarium. As a worst case, it is estimated that 85 caps ranging from 3 to 5 piles in each cap would be installed during a 3-month period in the initial stages of project construction. It is possible that some existing piles from the Planetarium can be used, thereby reducing the amount of pile driving. Bearing piles, as opposed to friction piles, would be used to the maximum extent possible. Pile drilling to bedrock generates much less noise and would be attempted whenever feasible to avoid driving piles.

The pile-driving operation has been analyzed and evaluated separately from other construction operations because of the high noise levels that would be produced, albeit for a relatively short period. Pile-driving operations, although of a temporary nature, can produce noise levels sufficient to cause general annoyance and interference with day-to-day activities in the project vicinity. This noise would be intrusive and would be discernable to residences, businesses, visitors in Theodore Roosevelt Park, and other uses within several blocks of the project site.

NOISE FROM CONSTRUCTION AND DELIVERY VEHICLES

Increases in noise levels caused by delivery trucks and other construction vehicles would not be significant. Small increases in noise levels are expected to be found near a few defined truck routes and the streets in the immediate vicinity of the project site. *Night or early morning deliveries may be required for certain oversized materials to comply with the requirements of the Department of Transportation. Understanding that these deliveries may be intrusive, the Museum will seek to limit their number.*

CONTROL MEASURES

Construction noise is regulated by the New York City Noise Control Code and EPA noise emission standards for construction equipment. These local and federal requirements mandate that certain classifications of construction equipment and motor vehicles meet specified noise emissions standards; that, except under exceptional circumstances, construction activities be limited to weekdays between the hours of 7 AM and 6 PM; and that construction material be handled and transported in such a manner as not to create unnecessary noise. These regulations would be carefully followed. In addition, appropriate low-noise emission level equipment and operational procedures would be used. Compliance with noise control measures would be ensured by including them in the contract documents as material specification and by directives to the construction contractor.

HAZARDOUS MATERIALS

As described in Chapter 10, "Hazardous Materials," asbestos, lead-based paint, and possibly other hazardous materials may be disturbed during construction.

Regulation of asbestos emissions due to demolition and renovation activities is controlled by 40 CFR Part 61.22, Emissions Standards for Hazardous Air Pollutants. These standards require that anyone undertaking demolition or renovation of most major facilities supply certain information

Table 16-1
Typical Noise Emission Levels for Construction Equipment

Equipment Item	Noise Level at 50 Feet (dBA)
Air Compressor	81
Asphalt Spreader (Paver)	89
Asphalt Truck	88
Backhoe	85
Bulldozer	87
Compactor	80
Concrete Plant	83[1]
Concrete Spreader	89
Concrete Mixer	85
Concrete Vibrator	76
Crane (Derrick)	76
Delivery Truck	88
Diamond Saw	90[2]
Dredge	88
Dump Truck	88
Front End Loader	84
Gas-driven Vibro-compactor	76
Hoist	76
Jackhammer (Paving Breaker)	88
Line Drill	98
Motor Crane	83
Pile Driver/Extractor	101
Pump	76
Roller	80
Shovel	82
Truck	88
Tug	85[3]
Vibratory Pile Driver/Extractor	89[4]

Notes:

[1] Wood, E.W. and A.R. Thompson, Sound Level Survey, Concrete Batch Plant: Limerick Generating Station, Bolt Beranek and Newman Inc., Report 2825 Cambridge, MA, May 1974.

[2] New York State Department of Environmental Conservation, Construction Noise Survey, Report No. NC-P2, Albany, NY, April 1974.

[3] Bungener, J.H., Sound Level Survey: Wise's Landing, Kentucky, Bolt Beranek and Newman Inc., Report 2880, Downers Grove, IL, June 1975.

[4] F.B. Foster Company, Foster Vibro Driver/Extractors, Electric Series Brochure, W-925-10-75-5M.

Source: Patterson, W.N., R.A. Ely, and S.M. Swanson, Regulation of Construction Activity Noise, Bolt Beranek and Newman, Inc., Report 2887.

to EPA, including the location of the facility to be removed, the scheduled starting and completion dates of demolition, the methods of demolition to be employed, an estimate of the amounts of asbestos to be removed, and the procedures to be used to meet the other requirements of the emission standards. These requirements include:

- Prior removal, where possible, of friable asbestos;
- Wetting of friable asbestos materials not removed; and
- Wetting of stored asbestos materials that have been removed.

Alternatively, a local exhaust ventilation and collection system, rather than wetting, may be employed to prevent emissions.

An Asbestos Materials Survey was conducted that identified asbestos-containing materials in various forms in the bridge, Power House, and Planetarium. Based on the findings of the survey, a comprehensive asbestos abatement program—including removal, disposal, and air monitoring —would be completed prior to demolition of these structures. Asbestos would be removed from the piping and duct insulation and mechanical space. In addition, floor and ceiling tiles made from asbestos-containing materials would be removed. Despite this program, there is a chance that small amounts of asbestos would remain in isolated cases of hidden piping in enclosed areas. If any asbestos is found during construction of the proposed project, it would also be removed and disposed of in accordance with all applicable laws and regulations. Although it is not anticipated that significant quantities of asbestos emissions would be generated, the construction contracts would include provisions that the requirements of federal, state, and city regulations be met, and that appropriate control measures be taken where necessary to reduce airborne asbestos emissions to negligible levels.

Lead paint does not pose a hazard to the environment when it is well fixed to a wall or other structural element and as such can be disposed of as construction debris. However, lead could become airborne during the demolition. Although these particles would be heavy and would settle rapidly, the Health and Safety Plan will set procedures for protection of workers (as required by U.S. Occupational Safety and Health Administration regulations) and residents during removal of this material.

A Health and Safety Plan will be developed for use during construction to protect workers and residents from contact with hazardous materials. The plan will specify worker clothing and procedures for excavation, demolition, disposal, and storage of potentially hazardous materials on the construction site.

UTILITIES AND WASTE DISPOSAL

Construction of the proposed project would affect the area's utilities in several ways. The new construction and possibly the renovations must tie into the existing water, sewer, electrical, gas, steam, and telephone lines buried under the adjacent park, streets, and sidewalks. These new service connections do not generally cause major disruptions to other uses and can be done in off-hours to minimize any inconvenience if an interruption of service is required. As the Museum complex currently has full utility services, reconnection to these lines would not be expected to cause significant disruption.

Construction and demolition activities would also generate large amounts of solid waste. This material is typically removed by carting firms who specialize in transportation and disposal of construction wastes. The methods and sites for disposal of this material are controlled by regulation. ❖

A. INTRODUCTION

The technical analyses presented in Chapters 2 through 16 examine the potential for significant impacts resulting from the proposed project. Where potential significant adverse impacts have been identified, measures are proposed to minimize or avoid them. This chapter discusses these mitigation measures in the areas of historic resources, hazardous materials, traffic, public transit, *noise,* and construction.

B. HISTORIC RESOURCES

As described in Chapter 7, "Historic and Archaeological Resources," the American Museum of Natural History complex is a New York City Landmark, listed on the State and National Registers of Historic Places, and is located within the Upper West Side/Central Park West Historic District. Although the project would replace the Hayden Planetarium with a new structure, the New York City Landmarks Preservation Commission (LPC) found that the proposed project would be appropriate. Specifically, the new building and other alterations on the north side of the Museum would unify this side of the complex architecturally, would relate harmoniously to the complex without overwhelming any of its significant historic buildings, and would retain the cultural associations of the Planetarium. LPC also found that the proposed project would enhance the special architectural, historic and cultural significance of the Museum complex and of the Upper West Side/Central Park West Historic District. The Museum *has already begun to* document the existing Hayden Planetarium, with photographs, plans, and archival material. As part of planning for the project's design and construction, the possibility of saving and incorporating in the new project certain features or artifacts from the Hayden Planetarium is under consideration. *As part of its exhibit programming, the new Planetarium will mount an exhibit on the Hayden Planetarium, probably at the time of opening.*

During construction, however, there would be concern for maintaining the integrity of the historic structures on the project site. To mitigate this potential effect, particularly in the early phases of construction, renovation and construction activities—such as pile-driving, vibration, and dewatering—will be controlled by a historic resource protection plan developed in the planning process to prevent damage. Such a plan would be implemented by an independent structural engineer, and would cover the following points, as appropriate:

- Inspecting and reporting on the current foundation and structural condition of the Museum complex to identify sensitivity to damage from demolition and construction;
- Establishing a monitoring program to measure vertical and lateral movement and vibration to the historic structures;
- Establishing the methods of seismographic monitoring of vibration;
- Establishing and monitoring construction methods to limit vibrations to levels that would not cause damage to the historic structures as determined by the condition survey;

- Determining the method and extent of shoring and underpinning necessary during the excavation and construction of the foundation;
- Determining the need for and extent of "tell-tales" in the Museum complex;
- Establishing, if necessary, construction dewatering procedures to prevent potential settling problems for nearby structures; and
- If necessary, monitoring and maintaining, as required, groundwater levels during period of dewatering activity.

These measures would prevent any accidental damage to the historic structures in the Museum Construction mitigation for Theodore Roosevelt Park, also a historic resource, is discussed below in section *G*, "Construction."

C. HAZARDOUS MATERIALS

Investigation of the site found lead and asbestos in project buildings, which, if unabated, could lead to hazardous materials impacts during construction. Therefore, the project proposes the following mitigation measures:

- The areas to be disturbed by the Planetarium and North Side project are scheduled to have all asbestos abated prior to construction in those areas. An asbestos abatement plan is being developed that will detail the specifications for keeping the environmental impact of this abatement project to a minimum. This plan must be approved by the New York City Department of Environmental Protection (DEP), and the U.S. Department of Labor must be notified. This plan will include containment of the work area; containment involves sealing off an area having airborne asbestos fibers present so that the fibers will not migrate and contaminate other areas. Air monitoring, a process of measuring the fiber content of a specific quantity of air over a given amount of time, will also be included in the asbestos abatement plan. These measures will minimize the risk posed to the environment and the neighboring residents during the abatement project.
- Lead paint does not pose a hazard to the environment when it is well fixed to a wall or other structural element and as such can be disposed of as construction and demolition debris. However, lead could become airborne during the demolition. Although these particles would be heavy and would settle rapidly, procedures would be established for protection of workers, residents, and the environment during demolition of this material. Any construction activities involving lead-based paint must be performed in accordance with the applicable Occupational Safety and Health Administration (OSHA) regulations, OSHA 29 CFR 1926.62, "Lead Exposure in Construction."
- During construction, dewatering would be necessary. The project would comply with DEP regulations by ensuring that the groundwater meets DEP's pretreatment requirements before discharging it to the municipal sewer system.
- Potential leaks or spills of chemicals in the now-unused storeroom in the basement of the Power House would be properly cleaned up before construction.

This program would avoid potential impacts to workers, nearby residents, and the environment.

D. TRAFFIC

INTRODUCTION

The mitigation analyses for the project's traffic impacts take a two-tiered approach. In the first section, the impacts identified in Chapter 12 are outlined and potential traffic improvement measures are reviewed on an intersection-by-intersection basis. These mitigation measures include such conventional traffic improvement measures as signal retiming and rephasing, changes in parking regulations, and striping plans for improving traffic flow. In the second section, *additional* mitigation *is presented that provides a second* parking garage driveway on Columbus Avenue. This approach, formulated in response to concerns raised during project planning, addresses traffic friction along West 81st Street associated with the concentration of Museum traffic at the existing driveways.

STANDARD MEASURES TO MITIGATE PROJECT TRAFFIC IMPACTS

As discussed in Chapter 12, "Traffic and Parking," approaches at five intersections bordering the site and two other intersections in the study area could experience significant traffic impacts as a result of increases in project-related vehicular traffic, as follows:

LOCATION OF IMPACTS

Intersections Bordering the Site

- The northbound approach at the Central Park West/77th Street intersection in all three time periods.
- The westbound approach at the Central Park West/81st Street intersection in all three time periods.
- The northbound approach at the Central Park West/81st Street intersection during the weekday PM and weekend peak hours.
- The southbound approach at the Central Park West/81st Street intersection during the weekday PM and weekend peak hours.
- The eastbound approach at the Columbus Avenue/81st Street intersection during the weekday PM and weekend peak hours.

Other Study Area Intersections

- The northbound approach at the Central Park West/72nd Street intersection during the weekday PM and weekend peak hours.
- The southbound approach at the Central Park West/86th Street intersection during the weekday PM peak hour only.

PROPOSED MITIGATION

Table 17-1 presents the description and the results of the mitigation measures for the midday, PM, and Saturday midday peak hours. The mitigation measures are described below for each intersection.

Table 17-1
Signalized Intersections:
2001 No Build, Build, and Build with Mitigation Conditions Level of Service Analyses

	Midday														
	No Build								Build						
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Central Park West & West 77th Street															
Eastbound	LTR	0.29	14.9	B	14.9	B	16.1	C	0.29	14.9	B	14.9	B	19.3	C
Northbound	LT	1.01	25.0	C	25.0	C			1.05	32.3	D *	32.3	D		
Southbound	TR	0.72	8.5	B	8.5	B			0.73	8.6	B	8.6	B		
Central Park West & West 81st Street															
Eastbound	LTR	0.32	15.6	C	15.6	C	24.9	C	0.34	15.7	C	15.7	C	29.6	D
Westbound	DfL	1.12	107.5	F	50.3	E			1.18	140.8	F *	61.7	F		
	TR	0.69	19.8	C					0.71	20.1	C				
Northbound	LTR	0.84	11.2	B	11.2	B			0.89	13.4	B	13.4	B		
Southbound	LTR	0.83	11.4	B	11.4	B			0.85	12.3	B	12.3	B		

Note: * = Significant Impact

	Midday								
	Build with Mitigation								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied
Central Park West & West 77th Street									
Eastbound	LTR	0.31	16.0	C	16.0	C	13.7	B	Signal Retiming: Subtract 2 Second Green Time EB/WB and Add 2 Seconds Green Time NB/SB.
Northbound	LT	1.00	20.8	C	20.8	C			
Southbound	TR	0.70	7.2	B	7.2	B			
Central Park West & West 81st Street									
Eastbound	LTR	0.32	13.7	B	13.7	B	17.5	C	Multiple Changes: Create NB/SB Left-Turn Lanes; Add a Protected Leading Left-Turn Phase to the Traffic Signal, NB/SB; Prohibit Parking on the NB/SB Approaches During Weekday & Saturday Peak Hours; and Re-stripe WB Approach with an Exclusive Left-Turn Lane, a Shared Left-Thru Lane, & a Shared Thru-Right Lane.
Westbound	L (Exclsv)	0.91	43.4	E	23.4	C			
	LTR	0.71	18.1	C					
Northbound	L	0.29	8.9	B	16.0	C			
	TR	0.75	16.6	C					
Southbound	L	0.47	10.7	B	13.4	B			
	TR	0.54	13.7	B					

Table 17-1 (Continued)
Signalized Intersections:
2001 No Build, Build, and Build with Mitigation Conditions Level of Service Analyses

	PM														
	No Build								Build						
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Central Park West & West 72nd Street															
Eastbound	DfL	0.90	47.6	E	25.1	D	31.0	D	0.90	47.6	E	25.1	D	34.7	D
	TR	0.43	16.5	C					0.43	16.5	C				
Westbound	LTR	0.54	17.7	C	17.7	C			0.54	17.7	C	17.7	C		
Northbound	LTR	1.08	53.6	E	53.6	E			1.10	62.7	F *	62.7	F		
Southbound	LTR	0.73	8.6	B	8.6	B			0.74	8.8	B	8.8	B		
Central Park West & West 77th Street															
Eastbound	LTR	0.28	14.8	B	14.8	B	34.0	D	0.28	14.8	B	14.8	B	42.0	E
Northbound	LTR	1.12	52.7	E	52.7	E			1.16	67.6	F *	67.6	F		
Southbound	LTR	0.87	13.8	B	13.8	B			0.88	14.5	B	14.5	B		
Central Park West & West 81st Street															
Eastbound	LTR	0.40	16.2	C	16.2	C	44.1	E	0.42	16.3	C	16.3	C	60.5	F
Westbound	DfL	1.13	124.4	F	57.3	E			1.21	171.9	F *	75.1	F		
	TR	0.40	16.2	C					0.41	16.3	C				
Northbound	LTR	0.94	17.8	C	17.8	C			0.99	25.9	D *	25.9	D		
Southbound	DfL	1.54	349.5	F	88.7	F			1.66	505.5	F *	126.6	F		
	TR	0.76	9.7	B					0.76	10.0	B				
Central Park West & West 86th Street															
Eastbound	LTR	1.03	56.4	E	56.4	E	83.1	F	1.05	61.5	F *	61.5	F	85.4	F
Westbound	LTR	0.63	16.5	C	16.5	C			0.63	16.5	C	16.5	C		
Northbound	LTR	1.08	54.6	E	54.6	E			1.09	59.6	E *	59.6	E		
Southbound	DfL	1.88	1103.6	F	267.6	F			1.88	1103.6	F	266.1	F		
	TR	0.77	12.6	B					0.78	12.8	B				
Columbus Avenue & West 81st Street															
Eastbound	TR	1.07	88.8	F	88.8	F	26.7	D	1.12	109.0	F *	109.0	F	29.9	D
Westbound	L	0.41	21.9	C	21.9	C			0.44	22.1	C	22.1	C		
Southbound	LT	0.74	15.7	C	15.7	C			0.74	15.8	C	15.8	C		

Note: * = Significant Impact

	PM								
	Build with Mitigation								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied
Central Park West & West 72nd Street									
Eastbound	DfL	0.90	47.6	E	25.1	D	20.0	C	Parking Restriction:
	TR	0.43	16.5	C					Prohibit Parking at the NB Approach During the PM Peak
Westbound	LTR	0.54	17.7	C	17.7	C			Hour.
Northbound	LTR	0.99	25.2	D	25.2	D			
Southbound	LTR	0.74	8.8	B	8.8	B			
Central Park West & West 77th Street									
Eastbound	LTR	0.30	15.9	C	15.9	C	30.0	D	Signal Retiming:
Northbound	LTR	1.11	46.6	E	46.6	E			Subtract 2 Seconds Green Time EB/WB and Add 2
Southbound	LTR	0.85	11.4	B	11.4	B			Seconds Green Time NB/SB.
Central Park West & West 81st Street									
Eastbound	LTR	0.44	16.5	C	16.5	C	18.9	C	Multiple Changes:
Westbound	L (Exclsv)	1.01	82.3	F	36.6	D			Create NB/SB Left-Turn Lanes; Add a Protected Leading
	LTR	0.79	23.8	C					Left-Turn Phase to the Traffic Signal, NB/SB; Prohibit Park-
Northbound	L	0.30	7.2	B	12.9	B			ing on the NB/SB Approaches During Weekday & Saturday
	TR	0.72	13.5	B					Peak Hours; and Re-stripe WB Approach with an Exclusive
Southbound	L	0.83	25.5	D	13.8	B			Left-Turn Lane, a Shared Left-Thru Lane, & a Shared
	TR	0.40	10.4	B					Thru-Right Lane.
Central Park West & West 86th Street									
Eastbound	LTR	1.00	48.5	E	48.5	E	35.2	D	Signal Retiming:
Westbound	LTR	0.63	16.5	C	16.5	C			Subtract 1 Second Green Time from WB Leading
Northbound	LTR	0.63	9.0	B	9.0	B			Phase, Add 1 Second Green Time to EB/WB
Southbound	DfL	1.47	324.7	F	85.2	F			Phase, & Prohibit Parking at the NB Approach.
	TR	0.78	12.8	B					
Columbus Avenue & West 81st Street									
Eastbound	TR	1.07	86.6	F	86.6	F	27.4	D	Signal Retiming:
Westbound	L	0.44	22.1	C	22.1	C			Subtract 1 Second Green Time SB and Add 1 Second
Southbound	LT	0.76	16.7	C	16.7	C			Green Time EB.

[illegible] Columbus / 78th [illegible]

Signs on 78th Street [illegible]

Table 17-1 (Continued)
Signalized Intersections:
2001 No Build, Build, and Build with Mitigation Conditions Level of Service Analyses

	Saturday															
	No Build								Build							
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Central Park West & West 72nd Street															
Eastbound	LTR	0.28	13.4	B	13.4	B	17.3	C	0.28	13.4	B	13.4	B	22.1	C
Northbound	LT	1.00	26.8	D	26.8	D			1.05	39.0	D *	39.0	D		
Southbound	TR	0.78	11.3	B	11.3	B			0.80	11.6	B	11.6	B		
Central Park West & West 77th Street															
Eastbound	LTR	0.23	14.5	B	14.5	B	14.5	B	0.23	14.5	B	14.5	B	19.5	C
Northbound	LT	0.99	21.6	C	21.6	C			1.05	32.7	D *	32.7	D		
Southbound	TR	0.70	8.2	B	8.2	B			0.72	8.5	B	8.5	B		
Central Park West & West 81st Street															
Eastbound	LTR	0.53	17.4	C	17.4	C	56.0	E	0.63	18.5	C	18.5	C	67.9	F
Westbound	DfL	1.08	97.9	F	47.1	E			1.10	109.2	F *	50.2	E		
	TR	0.37	16.0	C					0.40	16.2	C				
Northbound	LTR	1.14	83.2	F	83.2	F			1.26	110.1	F *	110.1	F		
Southbound	DfL	1.13	108.0	F	53.5	E			1.16	124.5	F *	64.2	F		
	TR	1.02	34.9	D					1.05	43.5	E *				
Columbus Avenue & West 81st Street															
Eastbound	TR	1.07	88.7	F	88.7	F	32.4	D	1.17	139.2	F *	139.2	F	39.4	D
Westbound	L	0.61	23.9	C	23.9	C			0.66	24.7	C	24.7	C		
Southbound	LT	0.98	26.0	D	26.0	D			0.98	27.0	D	27.0	D		
Note: * = Significant Impact															

	Saturday								
	Build with Mitigation								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied
Central Park West & West 72nd Street									
Eastbound	LTR	0.31	15.0	B	15.0	B	16.7	C	Signal Retiming:
Northbound	LT	0.98	20.8	C	20.8	C			Subtract 3 Seconds Green Time EB/WB and Add 3 Seconds
Southbound	TR	0.75	8.9	B	8.9	B			Green Time NB/SB.
Central Park West & West 77th Street									
Eastbound	LTR	0.25	16.1	C	16.1	C	12.0	B	Signal Retiming:
Northbound	LT	0.98	17.7	C	17.7	C			Subtract 3 Seconds Green Time EB/WB and Add 3 Seconds
Southbound	TR	0.68	6.4	B	6.4	B			Green Time NB/SB.
Central Park West & West 81st Street									
Eastbound	LTR	0.67	19.2	C	19.2	C	21.1	C	Multiple Changes:
Westbound	L (Exclsv)	0.70	25.3	D	24.8	C			Create NB/SB Left-Turn Lanes; Add a Protected Leading
	LTR	0.80	24.7	C					Left-Turn Phase to the Traffic Signal, NB/SB; Prohibit Park-
Northbound	L	0.43	9.4	B	17.7	C			ing on the NB/SB Approaches During Weekday & Saturday
	TR	0.84	18.9[F]	C					Saturday Peak Hours.; Restripe WB Approach with an Ex-
Southbound	L	0.95	45.3	E	23.4	C			clusive Left-Turn Lane, a Shared Left+Through Lane, and a
	TR	0.73	16.2	C					Shared Through+Right Lane.
Columbus Avenue & West 81st Street									Change Parking Regulations:
Eastbound	TR	0.44	22.1	C	22.1	C	26.0	D	Prohibit Parking on the EB Approach During the Saturday
Westbound	L	0.66	24.7	C	24.7	C			Afternoon Peak.
Southbound	LT	0.98	27.0	D	27.0	D			

Intersections Bordering the Site

- Central Park West and West 77th Street: The impact at the northbound Central Park West approach can be mitigated by a retiming of the traffic signal. During both weekday peak hours, this would involve subtracting 2 seconds of green time from the east-west (West 77th Street) phase and adding it to the north-south (Central Park West) phase. During the Saturday peak hour, 3 seconds of green time must be subtracted from the east-west phase and added to the north-south phase.

- Central Park West and West 81st Street: Because of the difficult service conditions at this intersection, an overall redesign of the signal program and lane utilization is proposed (see Figure 17-1). The specific elements of the proposed mitigation include providing exclusive north-south left-turn lanes, adding a protected north-south left-turn phase, and restriping the westbound approach to provide an exclusive left-turn lane, a shared left-through lane, and a shared through-right lane.

  An additional lane in each of the north- and southbound approaches on Central Park West would be provided by eliminating parked cars for a distance of 100 feet extending back from the corner in both directions during the hours of Museum operation (10 AM to 6 PM).* Three to 5 parking spaces would be removed during this time in both directions, for a total of 6 to 10 spaces. Clearing the approaches of parked cars would create three roadway lanes there, which would be striped as follows: an exclusive left-turn lane, a through lane, and a shared through-right lane.

  A signal phasing system with left-turn arrows would be instituted. These could be adjusted to reflect changing conditions and directions of flow at different times of day and days of the week. Based on the peak hour analyses, during the midday peak hour, the signal timing would be as follows: 10 seconds (7 seconds of green and 3 seconds of amber) for the leading north-south left-turn movement, and 40 seconds each (35 seconds of green and 5 seconds for the change interval) for the shared north-south and the shared east-west phases. During the PM peak hour, the signal timing would be as follows: 10 seconds (7 seconds of green and 3 seconds of amber) for the leading north-south left-turn movement, 44 seconds (39 seconds of green and 5 seconds for the change interval) for the shared north-south phase, and 36 seconds (31 seconds of green and 5 seconds for the change interval) for the shared east-west phase. During the Saturday midday peak hour, the signal timing would be as follows: 14 seconds (11 seconds of green and 3 seconds of amber) for the leading north-south left-turn movement, 40 seconds (35 seconds of green and 5 seconds for the change interval) for the shared north-south phase, and 36 seconds (31 seconds of green and 5 seconds for the change interval) for the shared east-west phase. The cycle length would remain at 90 seconds.

- Columbus Avenue and West 81st Street: During the weekday peaks, the impact at the eastbound West 81st Street approach can be mitigated by a retiming of the traffic signal. This would involve subtracting 1 second of green-time from the south (Columbus Avenue) phase and adding it to the east (West 81st Street) phase during the PM and Saturday peak hours.

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* It may not be necessary to restrict parking for this entire length of time over all seven days of the week. As the mitigation is further refined, a less exclusive arrangement may prove just as effective—limiting the No Parking regulation to certain key hours of the day, for example.

During the Saturday peak period,* however, mitigation of this impact would require removing parking on the south side of West 81st Street west of Columbus Avenue for 100 feet extending from the intersection. From three to five spaces would be removed. This would create an additional moving lane and eliminate the Saturday impact.

Other Study Area Intersections

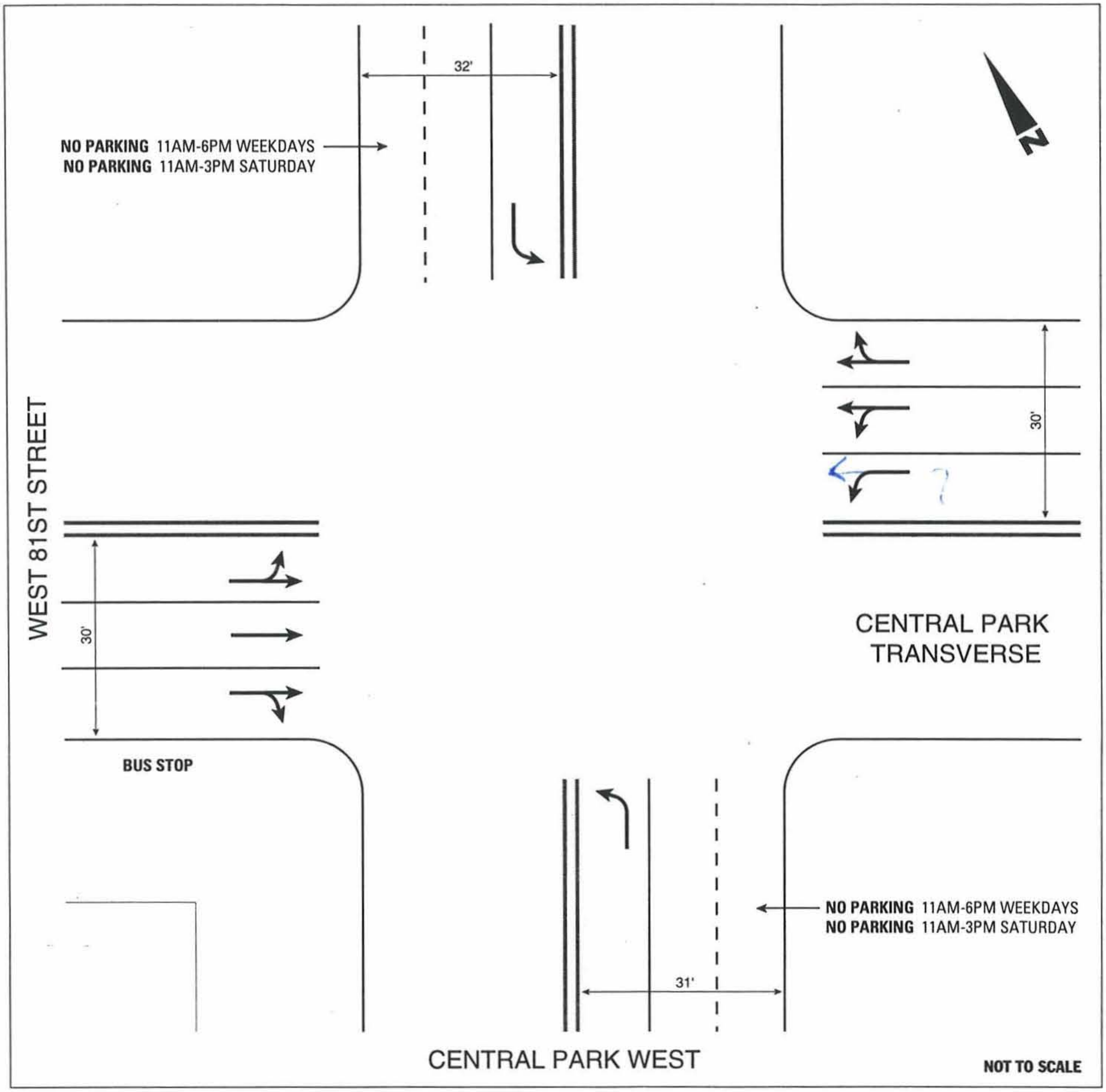
- Central Park West and West 72nd Street: During the PM peak hour, the impact at the northbound Central Park West approach can be mitigated by prohibiting parking at this approach, thus adding an additional moving lane. During the Saturday peak hour, the impact at the northbound approach can be mitigated by subtracting 3 seconds of green time from the east-west (West 72nd Street) phase and adding it to the north-south (Central Park West) phase.
- Central Park West and West 86th Street: During the PM peak hour, the impact at the *north*bound approach can be mitigated by eliminating *approximately three to five* parked cars for a distance of 100 feet extending back from the corner at the northbound Central Park West approach during the hours of Museum operation (10 AM-6 PM)** and by *subtracting 1 second of green time from the leading westbound phase and adding it to the shared east-west phase.* These mitigation measures would not adversely affect operating conditions during the midday and Saturday peak hours (no impacts were identified at any of the intersection approaches during these peak hours). *This mitigation represents a modification of the measures described in the DEIS; in response to signal timing changes recently implemented by the New York City Department of Transportation (NYCDOT), the mitigation proposal was revised.*

All the project-related impacts could be mitigated without significantly affecting the opposing flow at the other legs. Although on-street parking is used to capacity in the study area, the small number of spaces removed for the mitigation would not constitute a significant impact. The Museum and Planetarium Authority would coordinate with the Police Department to see that the parking regulations are enforced, particularly during peak periods.

The traffic mitigation measures outlined above require approval and implementation by NYCDOT. Should NYCDOT decide not to implement these measures, it is possible that the project would result in unmitigated traffic impacts. The Museum and Planetarium Authority will coordinate with NYCDOT and, at the time the project is ready for completion, notify NYCDOT and provide appropriate support. Based on prevailing traffic conditions and the extent to which projections presented in these analyses are realized, NYCDOT would then make a final determination regarding the need and appropriateness for implementing these measures.

* Based on the relative difference in attendance between Saturdays and Sundays, it appears that the restriction on parking can be limited to Saturday, from approximately 11 AM to 4 PM. As mitigation is further refined, the No Parking hours can be more specifically delineated.

** It may not be necessary to restrict parking for this entire length of time over all seven days of the week. As the mitigation is further refined, a less exclusive arrangement may prove just as effective—limiting the No Parking regulation to certain key hours of the day, for example.



 New Pavement Marker (Typical)

Note: A protected north-south left turn phase will be added to the traffic signal

Traffic Mitigation Measures at Central Park West and 81st Street

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Figure 17-1

MITIGATION PROGRAM WITH PROVISION OF NEW GARAGE ACCESS ON COLUMBUS AVENUE

As proposed *in the DEIS,* the project anticipated continued use of the existing entrance and exit driveways along West 81st Street to provide access to the *new* garage; *applying the measures outlined above,* all traffic impacts *under that plan could* be mitigated. However, concerns were raised during project planning about driveway access, and some members of the community requested that alternative access points to the garage be considered. In response to these concerns, an additional mitigation approach was formulated utilizing a new garage driveway on Columbus Avenue. This mitigation *approach* addresses project impacts at specific intersections, while also attempting to reduce traffic delay and friction along West 81st Street, which occurs on weekends, by reducing the concentration of project traffic at the existing driveways.

In the DEIS, six basic driveway plans were identified for study as part of the mitigation program. In all cases, the existing driveways on West 81st Street would be retained. The six options, which are for use by automobiles only, are grouped as follows:

Options that have in common a new curb cut and driveway in the park:

- Option 1, with a driveway entrance/exit along Columbus Avenue between West 79th and 80th Streets.
- Option 2, with a driveway entrance/exit along Columbus Avenue at West 79th Street.
- Option 3, with a driveway entrance/exit along Columbus Avenue between West 78th and 79th Streets.

Options that use the existing curb cut and service drive south of West 78th Street:

- Option 4, which would utilize the existing service driveway as a *second* auto entrance *on weekends.*
- Option 5, which would provide a *second* full-time auto entrance by widening a portion of the existing service driveway and extending a new covered roadway that would detour away from the service road to the garage beneath the park.
- Option 6, which is identical to Option 5 except that it would also reconfigure and expand the Museum's below-grade service area.

Following extensive discussions with local community organizations, public review of the DEIS, a weighing of the six options' relative advantages and disadvantages, and a feasibility assessment, this FEIS proposes Option 4 as the preferred option. At a much lower cost than the other options, it offers an opportunity to reduce Museum-related traffic problems on West 81st Street. And, of the six options, it is the only one that would not create major problems in terms of potential impacts on Theodore Roosevelt Park, historic and archaeological resources, and visual character. The following sections contain a description of the preferred option along with an analysis of its potential traffic and environmental impacts. Following that discussion is an evaluation of the other five options.

PREFERRED OPTION (OPTION 4)

Option 4 would make use of the existing service driveway just south of West 78th Street to provide an automobile entrance to the new parking garage. Buses could not use this driveway because of its slope and sharp turns. Cars would travel through the Museum's *existing loading area along the partially covered roadway bordering the western edge of the Museum and enter the garage at the basement level (see Figures 17-2 and 17-3). The drive would serve only entering automobiles. Given the width of the roadway, the grade, and the sight lines, the driveway would be able to accommodate traffic in only one direction at a time; it is not suitable for heavy volumes of exiting traffic due to the limited sight distance for vehicles approaching the top of the driveway. Buses entering the garage and all exiting vehicles would use the existing driveways on West 81st Street. During weekdays, when the service driveway would be more heavily used by vehicles accessing the loading areas, parking garage entry and exit would continue to be provided only along West 81st Street.*

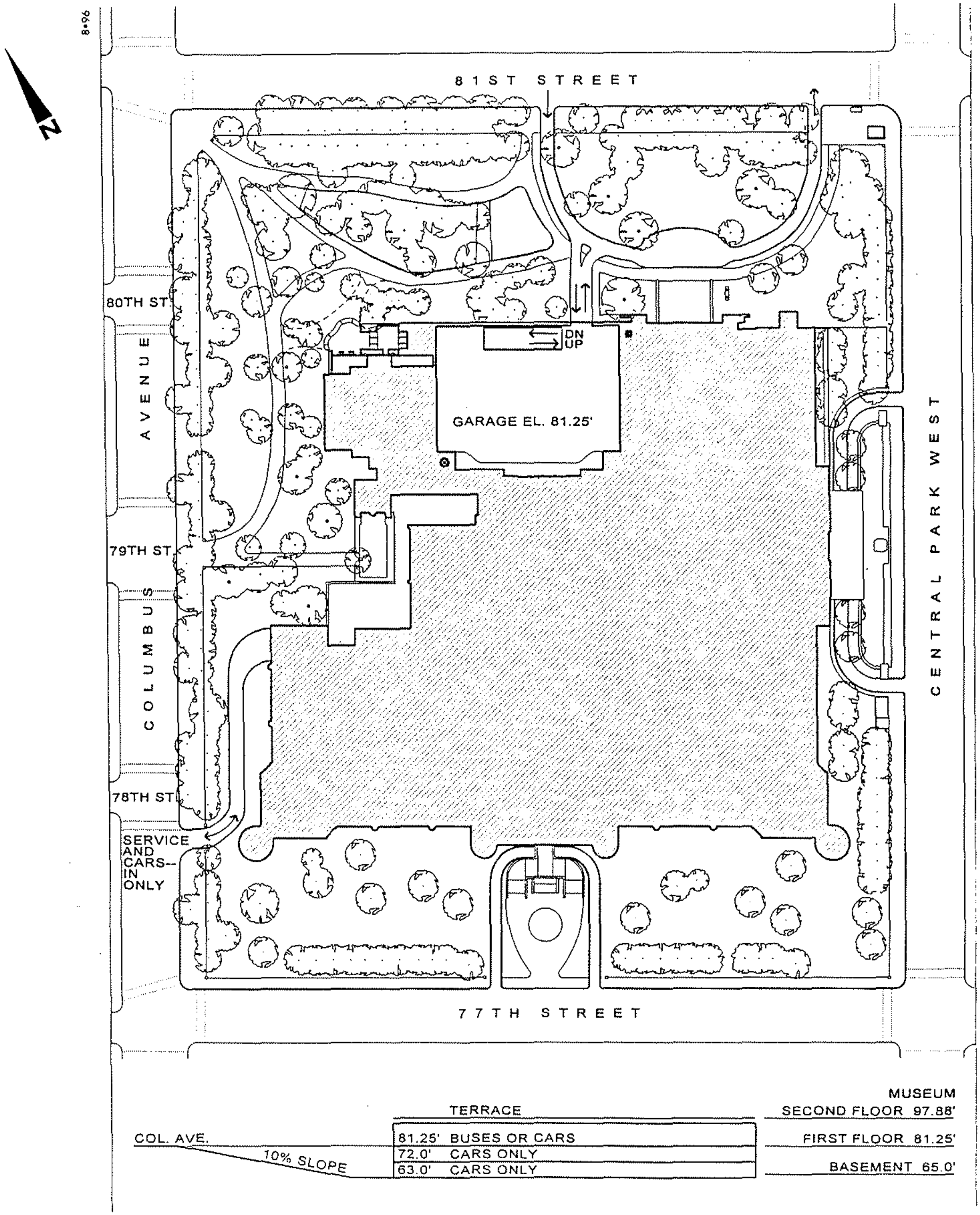
Construction of this option would add approximately $250,000 to $1 million to the cost of the project. This option would need no special approvals.

Traffic and Service Operations

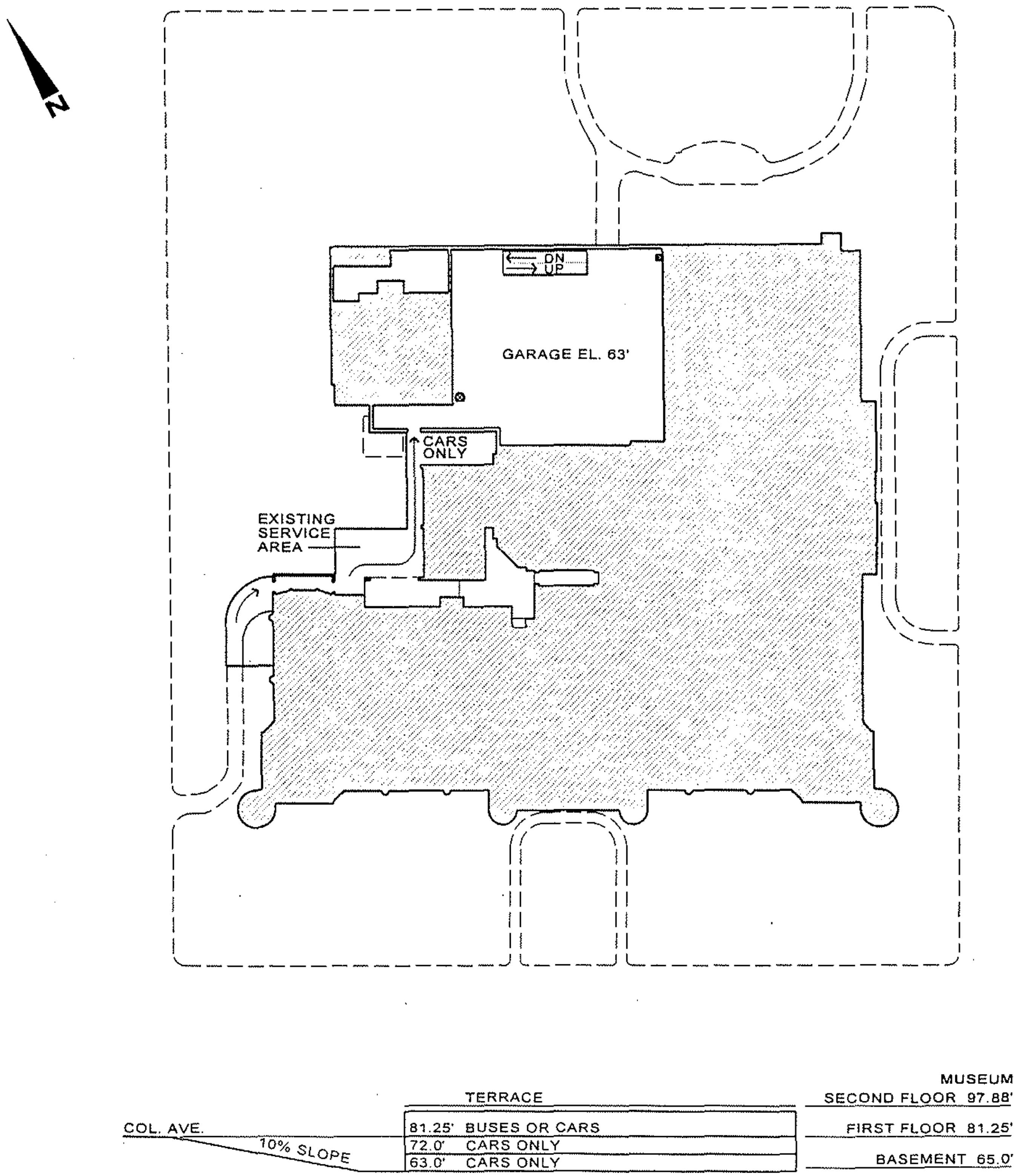
Option 4, like the other options, has the advantage of providing access from a main arterial (i.e., Columbus Avenue). It would provide direct access from the north and good access from the west. Unlike Options 1, 2, and 3 it would not add a new curb cut to Columbus Avenue.

As mentioned above, in order to maintain controlled access to the service area during weekdays when deliveries take priority, the service driveway would be open for garage patrons only on weekends. And, due to the narrowness and steepness of the driveway, it would provide one-way operations serving only entering garage vehicles. However, both of these restrictions are compatible with responding to traffic problems on 81st Street, where the driveway conflicts are almost exclusively from entering vehicles, and the congestion occurs on weekends, not weekdays. After completion of the DEIS, a feasibility assessment of this alternative was prepared to evaluate the service and operational problems posed by this alternative. That assessment identified a number of changes that would be required if the plan is to accommodate access for Museum visitors, while still serving Museum delivery and service functions. The specific measures include:

- *Restricting or eliminating delivery operations during those weekend hours when the service driveway is used for garage access.*
- *Demarcating a clear, well-marked pathway to effectively channel entering autos through the service yard to the garage.*
- *Establishing physical barriers to secure service areas and restrict public access to the non-travel way portions of the service yard at times when the service road is used for garage access.*
- *Providing dedicated supervisory personnel at the service driveway when it is used for garage access to provide effective traffic management and prevent queuing of entering vehicles at the entrance to the service driveway or along Columbus Avenue when the garage is full.*
- *Providing a guard booth with a barrier gate.*



Alternative Garage Access Option 4
First Level Plan



Alternative Garage Access Option 4
Basement Level Plan

Figure 17-3

American Museum of Natural History
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With these changes, use of the driveway for garage access on weekends would be operationally feasible.

Traffic conditions with the proposed project and Columbus Avenue garage access using the preferred option were assessed quantitatively for the Saturday peak hour; conditions in the weekday analysis periods would be unchanged. Vehicles were reassigned, as appropriate, to paths leading to the access driveway, and the study area intersection analysis was recomputed. It is expected that the diversion to Columbus Avenue would help diminish some of the frictions associated with the increment of Museum-generated traffic. However, while improving conditions along West 81st Street, this option would also create new significant impacts elsewhere, which would trigger the need for further mitigation. This assessment is presented below.

Traffic Assignment

Under the preferred option, autos would be able to access the garage both from West 81st Street and the existing service driveway located on Columbus Avenue between West 77th and 78th Streets. The driveway on Columbus Avenue would be an entrance only; therefore, departing autos would continue to exit at the West 81st Street driveway. Buses would enter and exit the garage at West 81st Street only.

Based on an examination of the project-generated traffic patterns, it was determined that approximately 45 percent of the Museum visitors and 75 percent of the restaurant patrons arriving at the garage would use the Columbus Avenue driveway to access the garage. This represents a total shift of approximately 46 auto trips (including project trips, as well as reassigned No Build trips) from West 81st Street to Columbus Avenue during the Saturday peak hour.

Queuing on Columbus Avenue

Currently, the Museum has a problem with weekend traffic queues forming at the entrance driveway on West 81st Street when the garage is full. These queues adversely affect service conditions along West 81st Street between Central Park West and Columbus Avenue. The provision of a new entrance utilizing the service driveway would have the potential to create an additional queue of cars on Columbus Avenue waiting to enter the garage when it is full. However, the transportation plan proposed by the Museum anticipates stationing personnel at the Columbus Avenue entrance to direct entering vehicles and prevent cars queuing illegally as they wait for entry to the driveway. With this enforcement, it is expected that the formation of vehicle queues on Columbus Avenue can be avoided. This approach would be applied similarly to the West 81st Street entrance. With the location of the service drive entry south of West 78th Street, no queue on West 79th Street is expected.

Without this enforcement, it is possible that two self-limiting lines may form, one at each driveway access. Conservatively assuming the worst-case scenario, in which the queue on Columbus Avenue would consist of as many as 15 vehicles, this would result in the loss of a moving lane on Columbus Avenue at both the West 78th and 79th Streets approaches (a distance of approximately 300 feet). This lane loss would not be acceptable; therefore, the Museum is committed to seeing that such illegal queuing would not occur.

Traffic Conditions

Intersection Analysis. The incremental traffic associated with the preferred option would increase traffic on some streets in the study area. Compared with the proposed project, traffic *on West 81st Street from Amsterdam Avenue to Central Park West and on Amsterdam Avenue between West 79th and 81st Streets would decrease, while traffic on Columbus Avenue, West 79th Street, and West 78th Street would increase as a result of the entrance-only driveway on Columbus Avenue. Traffic volumes on the other study area streets would be very similar to those presented for the proposed project without this option.*

While the proposed project would still result in increases in traffic volumes at most study area intersections during the Saturday peak hour (see Figure 17-4), there would be locations where traffic would be less than that presented in the No Build condition. For example, West 81st Street would experience less traffic under this scenario, because autos with origins west of the site would use West 79th Street (rather than West 81st Street) to access the garage via Columbus Avenue. The 2001 Build traffic for the preferred option is shown in Figure 17-5 for the Saturday peak hour. Street capacities for the most part would be adequate to accommodate the increases. In general, the significant traffic impacts predicted to occur with the project without this mitigation option would also occur with this option. However, at three locations bordering the project site, this option would have different impacts than those predicted for the project without this option. Those changes would be as follows.

- *The impact at the eastbound West 81st Street approach at Columbus Avenue that was predicted with the proposed project would be eliminated under this scenario.*
- *A new significant impact would occur at the southbound Columbus Avenue approach at West 76th Street. The southbound approach would continue to operate at level of service (LOS) D (delay increasing from 30.7 to 37.1 seconds).*
- *A new significant impact would occur at the southbound Columbus Avenue approach at West 77th Street. The southbound approach would drop from LOS C to D (delay increasing from 21.8 to 27.3 seconds).*

<u>Traffic on West 79th Street</u>. *Because of the diversion of traffic associated with the Columbus Avenue driveway, this mitigation plan would decrease the traffic on West 81st Street between Amsterdam Avenue and Central Park West and on Amsterdam Avenue between West 79th and 81st Streets, and would increase the volume of weekend Museum traffic traveling on West 79th Street between Amsterdam and Columbus Avenues. (The maximum increase would be approximately 30 arriving vehicles in a peak hour.) This block of West 79th Street is relatively lightly traveled for a crosstown street because it ends at a "T" intersection with Columbus Avenue and consequently does not provide an east-west through route. Therefore, even with diverted traffic, good service conditions with LOS C or better would prevail on West 79th Street during all peak periods. The increased traffic would not result in significant changes in service conditions at the intersection with Columbus Avenue, and all traffic movements would continue to operate acceptably. With the location of the service drive entry south of West 78th Street, no queue on West 79th Street is expected. During weekdays, when the driveway would not be open to Museum visitors, the mitigation plan would not have any effect on West 79th Street traffic conditions.*

<u>Mitigation</u>. *The two new impacts could be mitigated by simple signal retiming. Table 17-2 presents the description and results of the mitigation for the Saturday peak hour. The mitigation measures are described below for each intersection:*

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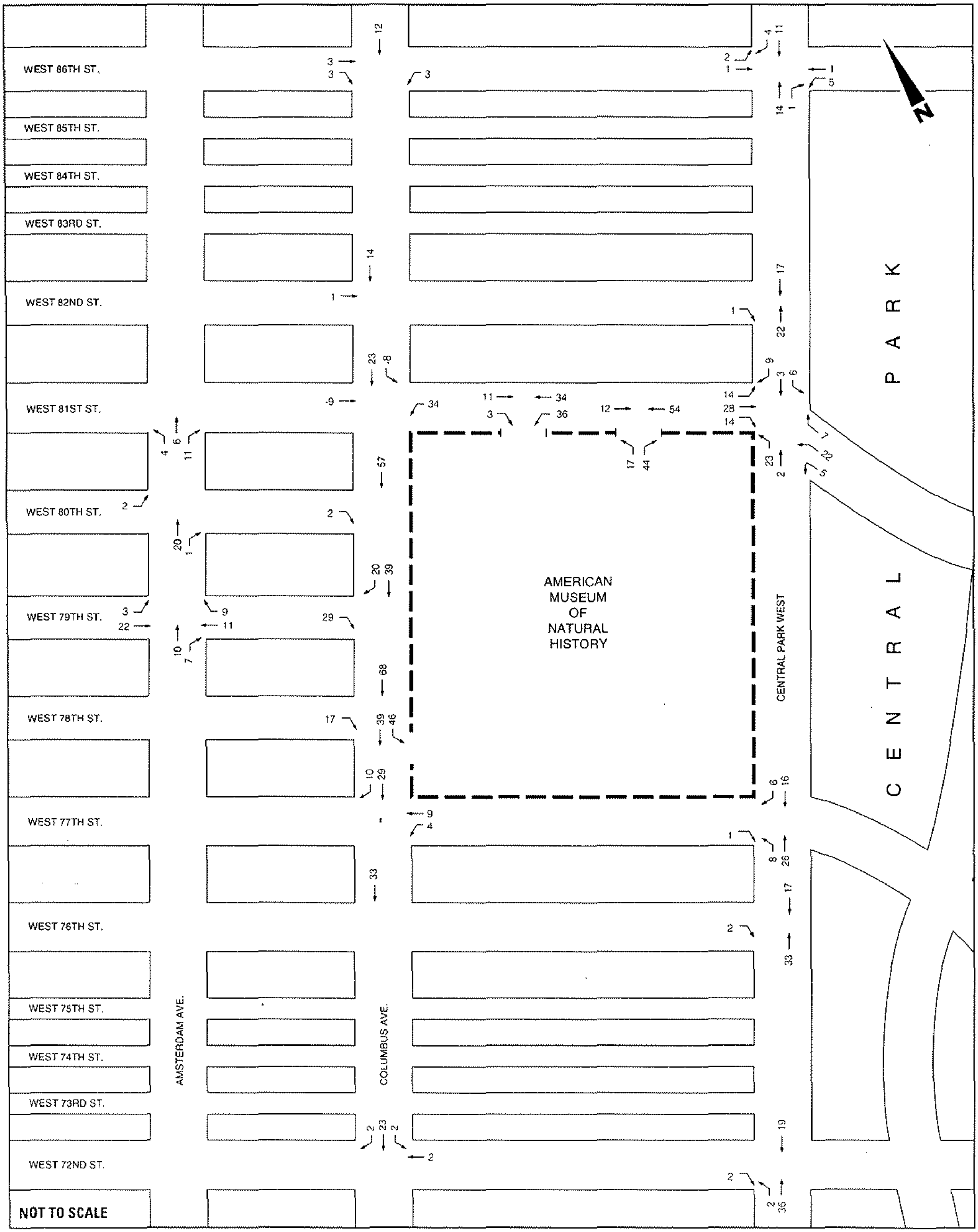

Preferred Option Build Increment Traffic Volumes
Saturday Peak Hour

Figure 17-4

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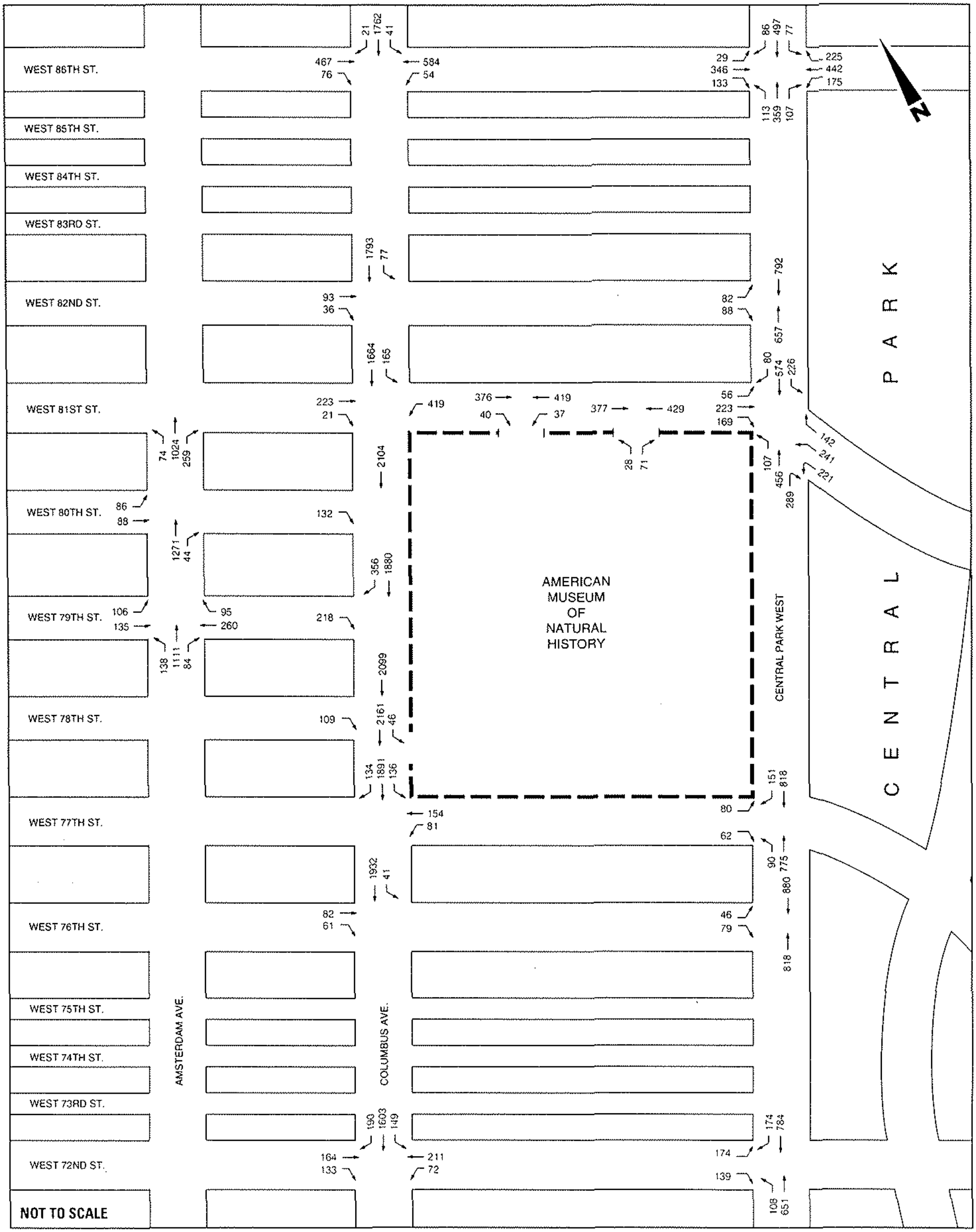


Preferred Option 2001 Build Traffic Volumes
Saturday Peak Hour

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Figure 17-5

Table 17-2#
Preferred Option Additional Impacts at Signalized Intersections: 2001 No Build, Build with the Preferred Alternative Garage Access (Option 4), and Mitigation Level of Service Analyses

Intersection	Saturday Peak Hour: No Build: Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Build Option 4: Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Columbus Avenue & West 76th Street																
Eastbound	TR	0.49	18.0	C	18.0	C	29.9	D	TR	0.49	18.0	C	18.0	C	35.8	D
Southbound	LT	1.04	30.7	D	30.7	D			LT	1.06	37.1	D*	37.1	D		
Columbus Avenue & West 77th Street																
Westbound	LT	0.30	15.9	C	15.9	C	21.3	C	LT	0.31	16.0	C	16.0	C	25.4	D
Southbound	LTR	1.00	21.8	C	21.8	C			LTR	1.02	26.4	D	26.4	D*		

Notes:
The impact that would occur at the Columbus Avenue and 81st Street intersection under the proposed project would NOT occur with the Preferred Alternative Garage Access (Option 4).
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual.*

Intersection	Saturday Peak Hour: Build Option 4 with Mitigation: Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied
Columbus Avenue & West 76th Street									Signal Retiming:
Eastbound	TR	0.51	18.8	C	18.8	C	28.8	D	Add 1 Second Green Time Southbound and Subtract
Southbound	LT	1.04	29.5	D	29.5	D			1 Second Green Time Eastbound.
Columbus Avenue & West 77th Street									Signal Retiming:
Westbound	LT	0.32	16.6	C	16.6	C	20.6	C	Add 1 Second Green Time Southbound and Subtract
Southbound	LTR	1.00	21.0	C	21.0	C			1 Second Green Time Westbound.

Notes:
The impact that would occur at the Columbus Avenue and 81st Street intersection under the proposed project would NOT occur with the Preferred Alternative Garage Access (Option 4).
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane because of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual.*

= This Table is new to the FEIS.

- *Columbus Avenue and West 76th Street: the impact at the southbound Columbus Avenue approach can be mitigated by subtracting 1 second of green time from the east-west (76th Street) phase and adding it to the south (Columbus Avenue) phase.*
- *Columbus Avenue and West 77th Street: the impact at the southbound Columbus Avenue approach can be mitigated by subtracting 1 second of green time from the east-west (77th Street) phase and adding it to the south (Columbus Avenue) phase.*

Other Potential Environmental Impacts

The preferred option would not carve a new path through or under Theodore Roosevelt Park and so would not disturb it or create any changes in visual character. With the increased weekend use of the service drive, this option would create occasional disruption of pedestrian flow along Columbus Avenue. Construction activities associated with this option would be limited and would occur entirely within the site.

OTHER COLUMBUS AVENUE ACCESS OPTIONS

In planning for Columbus Avenue access, five other alternatives were also considered. These alternatives are described below, followed by an evaluation of the traffic impacts associated with each of the plans. The section that follows then reviews the potential for other environmental impacts.

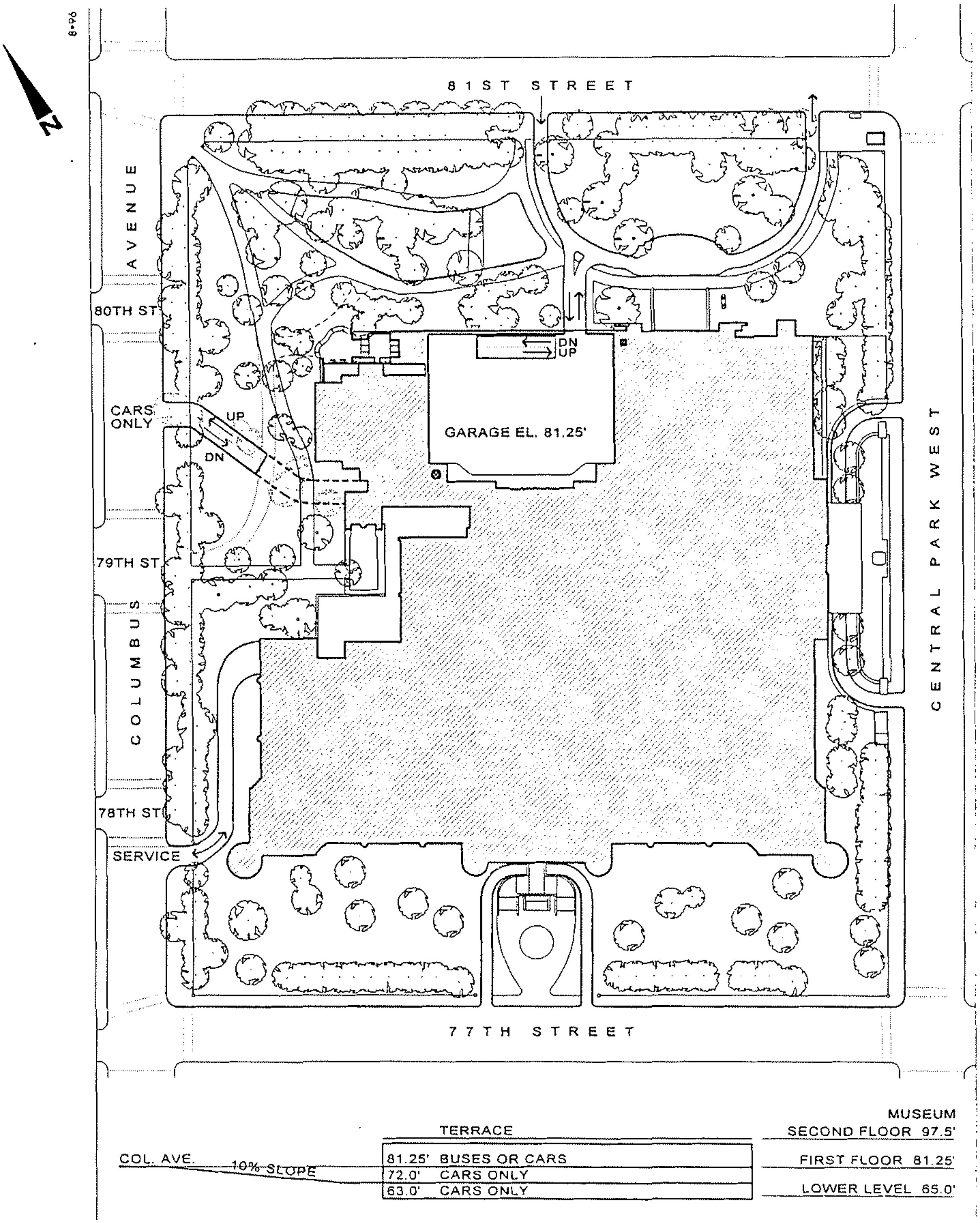
Like Option 4, these mitigation options would all have the advantage of providing new access from Columbus Avenue, thereby diverting traffic from West 81st Street and helping to diminish some of the frictions associated with the increment of Museum-generated traffic. However, again like Option 4, these plans would result in new traffic impacts and would to some degree adversely affect the ability of the Museum to serve its existing buildings and/or the proposed project.

New Driveway Options (1-3)

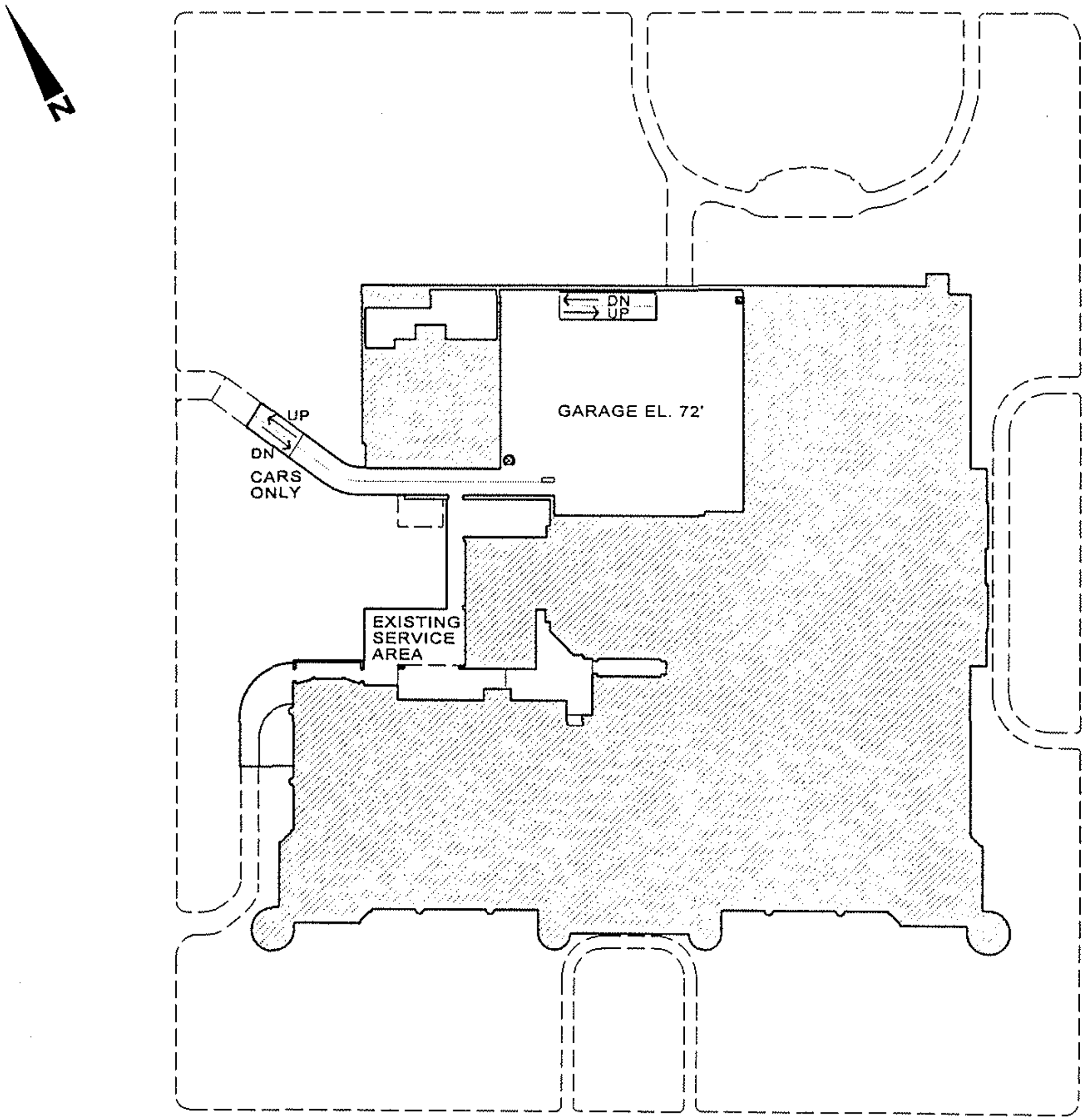
Option 1. This option would create a 24-foot wide entrance/exit driveway on the east side of Columbus Avenue, roughly midpoint between West 79th and 80th Streets. The driveway, which would be for use only by automobiles, would cross diagonally into *Theodore Roosevelt* Park for approximately 136 feet, dropping at a 10 percent grade into a portal, where it would continue in a covered section below the park, before entering into the middle level of the three-floor garage (see Figures 17-6 and 17-7). Only automobiles could use this driveway because of its grade, because of the height of the garage's middle level, and because, to allow clearance for buses, the driveway would have to be in an open cut for its full length through the park.

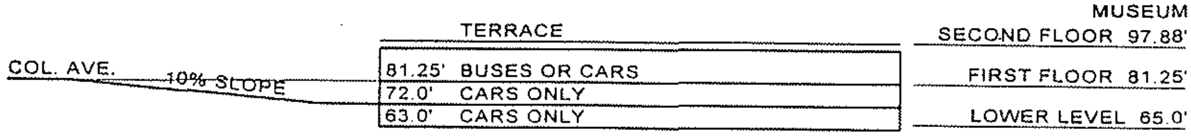
Like the other access options, Option 1 would provide direct access from a southbound main arterial and would increase reservoir space to handle access queues. *However,* this option would add a curb cut to Columbus Avenue in a location uncontrolled by a traffic light, thus raising the issues of traffic and pedestrian safety. In addition, the 10 percent ramp grade, while adequate, is not ideal for the safety of exiting vehicles. The situation of the curb cut north of West 79th Street would deny direct access to the garage from the west, so that it could only take advantage of flows from the north. Should an on-street queue of more than five or six cars form, it would interfere with the pedestrian crosswalk at West 80th Street.

Under this option, the existing service drive that would provide truck access to the Power House and possibly the lower level service corridor and freight elevator of the Power House would have to be re-engineered and reconstructed to allow trucks to access the service entrance, since



Alternative Garage Access Option 1
First Level Plan





Alternative Garage Access Option 1
Mid Level Plan

Figure 17-7

the bottom of the proposed garage ramp would create a space not high enough for the passage of large vehicles. Moreover, even with this remedial work, not all trucks would be able to drive directly to the Power House. For example, freezer trucks serving the restaurant would not be able to unload at the Power House. This would be a particularly difficult issue when equipment would be needed on the public terrace for events, exhibitions, or maintenance.

This option would add approximately $1.5 to $2 million to the cost of the project and would require approval from the New York City Department of Parks and Recreation (DPR) and the New York City Art Commission, an advisory report from LPC, and a curb cut authorization from the City Planning Commission.

Option 2. Option 2 would be similar to Option 1, except the 24-foot wide, two-way driveway would enter the park on alignment with West 79th Street (see Figures 17-*8* and 17-*9*). Entering on a northeast diagonal, the roadway would also reach a portal approximately 136 feet into the park, and then traverse a covered section beneath the park to reach the garage. The connection to the mid-level of the garage would be identical to that with Option 1. *Like the other access options, this option would provide direct access from a southbound arterial and would increase reservoir space to handle queues. In addition,* this option, located on axis at 79th Street, would provide direct access on a major street to and from the west as well as the north. Traffic exiting at this location and pedestrians going to the garage would be controlled by a signal. *However,* like Option 1, this option would add a curb cut to a wide street, although activities at the curb cut would be controlled by a signal. Also like Option 1, the grade of the ramp would be somewhat steep. More important, this option would do least well in handling queues. Its location would be approximately 35 feet south of a pedestrian crosswalk, so that a line of more than two or three cars would interfere with pedestrians. Cars approaching from the west when the garage was filled would not be able to get in line on Columbus Avenue. They would either have to circle around to the West 81st Street entrance or form an alternative line stretching west on 79th Street.

This option would also have similar problems with service vehicle operations *as Option 1.*

This *option* would cost approximately $1.5 to $2 million to construct and would have the same approval requirements as Option 1.

Option 3. Option 3 would be similar in design to Option 1 and 2, except that the Columbus Avenue driveway entrance would be farther to the south, between West 78 and 79th Streets. The driveway would descend at a 10 percent grade and run northeast diagonally into the park. At a point roughly in line with West 79th Street, the driveway would descend below grade through a portal (see Figure 17-*10*). Underground, the driveway would run east-west beneath the park, entering the southeast corner of the garage's middle level (see Figure 17-*11*). This option would provide good access from the west as well as the north. It would have the advantage of permitting cars approaching from the west to get in line, if a line was formed. *However,* this option, like Options 1 and 2, would add a curb cut to a wide street. In this case, the configuration of the ramp (it would have to incorporate a tighter turn towards the north to provide access to the garage) could create conflicts between entering and exiting vehicles and could also limit sight lines for pedestrians. This ramp would also be close to the south crosswalk on Columbus Avenue at 79th Street so that if a queue formed, it would interfere with pedestrians.

This option would also have similar problems with service vehicle operations *as Option 1.*

Construction of this option is estimated to cost $2 to $2.5 million, and would have the same approval requirements as Option 1.

Other Options That Use the Service Drive (5-6)

Option 5. *Like Option 4,* this option would also use the service driveway, but would widen it by 6 feet and add 1 foot of structure to create a 24-foot-wide driveway. The widened driveway, providing an auto entrance only for use on weekdays and weekends, would extend as a new section of covered roadway crossing from the base of the service driveway *and* under a portion of the park, to enter the garage at the basement level (see Figures 17-*12* and 17-*13*). The slope and curve of the driveway would prevent its use for buses.

In terms of traffic, this option would *be similar to* Option 4. In addition, it would be able to accommodate two-way traffic and could operate as a garage entrance on weekdays as well as weekends. Except that the ramp would be widened under this option, the disadvantages stemming from the configuration and location of the existing service drive on Columbus Avenue would be similar to those of Option 4. This option would share a portion of the service driveway, which would present some operational and security concerns. Additional security would be required to prevent visitor cars from straying into the service entrance and yard.

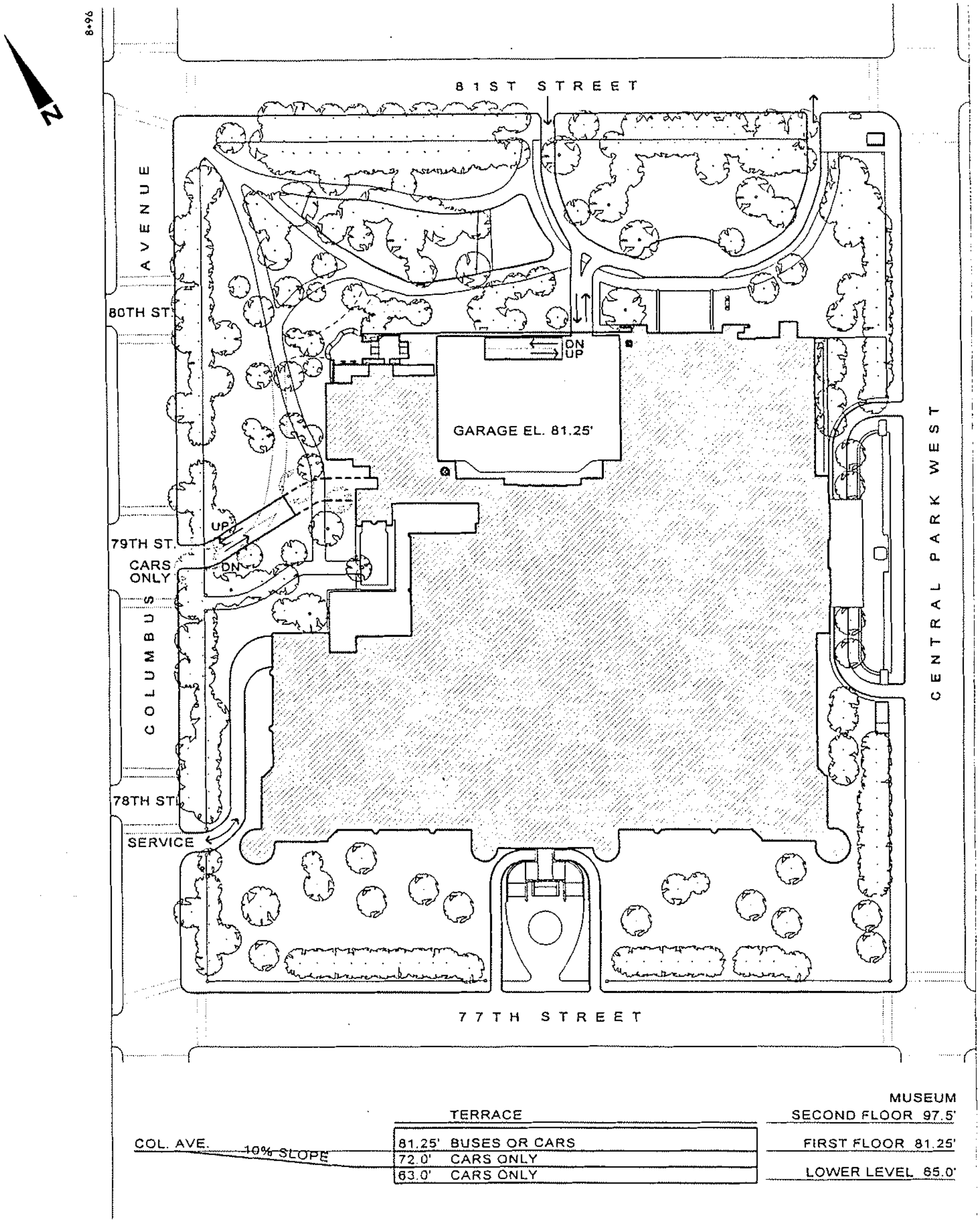
This option would require demolition and replacement of portions of the retaining wall along the driveway. Construction would add approximately $3.8 to 4.8 million to the cost of the project. This option would require approval from DPR and New York City Art Commission and an advisory report from LPC.

Option 6. This option, similar to Option 5, would also use and widen the existing service driveway. As in Option 5, a new portion of covered roadway would extend northward, crossing from the base of the service driveway to enter the garage at the basement level (see Figures 17-*14* and 17-*15*). This option would expand on the proposal in Option 5 by enlarging and reconfiguring the adjacent Museum service area. *In terms of traffic, this option would be identical to* Option 5. In addition, it would provide the Museum with a very needed expansion to the service yard. Among its other advantages, this would allow large trucks to enter the driveway head first, turn around in the yard, and leave head first as well. Now, large trucks are required to back down the driveway.

It would add approximately $4.5 to $5.5 million to the cost of the project and would require demolition and replacement of portions of the retaining wall along the driveway. Like Option 5, this option would require approval from DPR and the New York City Art Commission and an advisory report from LPC.

Traffic And Service Operations of Other Columbus Avenue Access Options

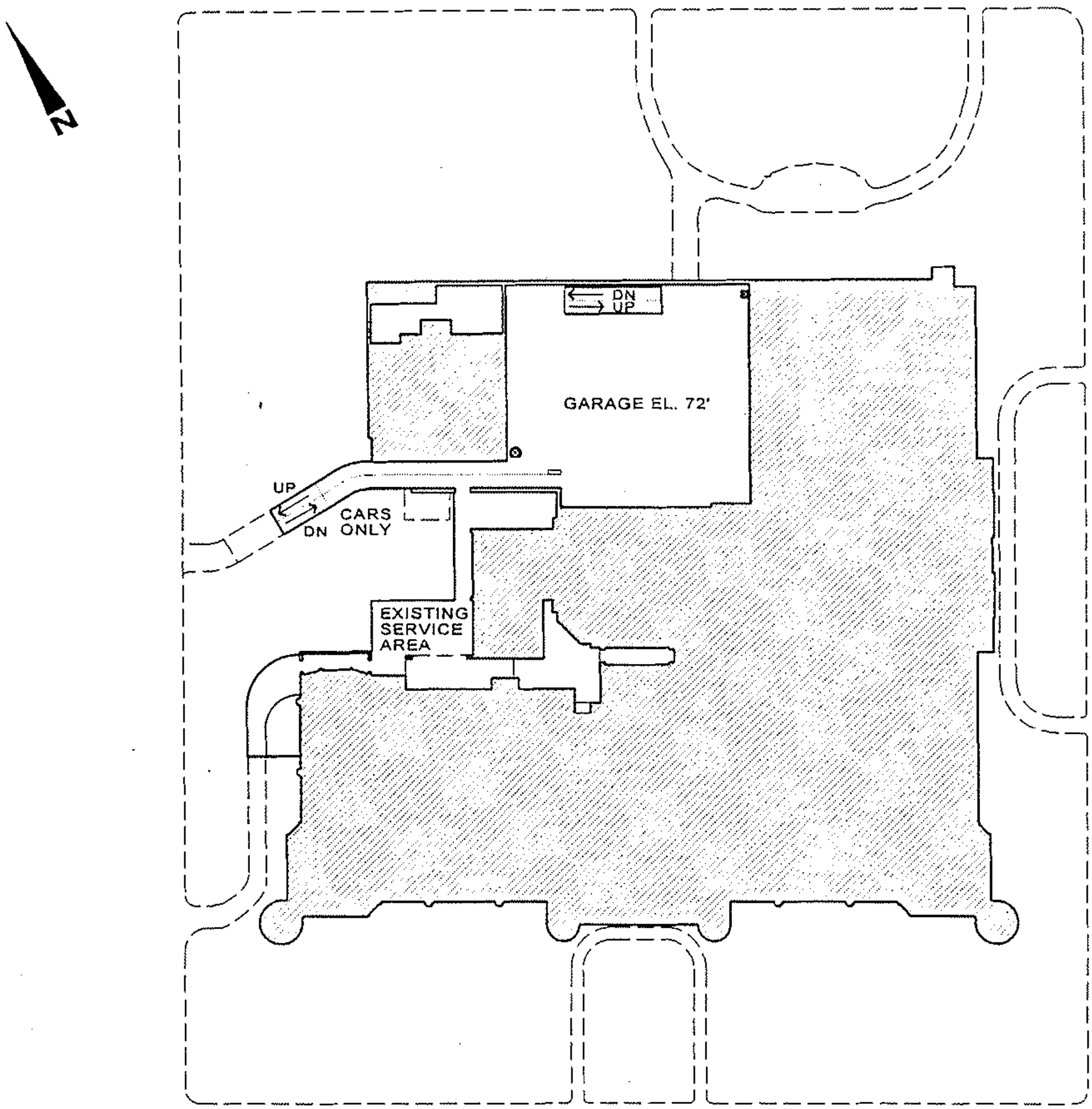
Traffic conditions with the other Columbus Avenue garage access options were also assessed quantitatively. Vehicles were reassigned, as appropriate, to paths leading them to each of the access driveways, and the study area intersection analysis was recomputed. Like Option 4, these mitigation options all have the advantage of providing access from Columbus Avenue, thereby diverting traffic and helping to diminish some of the frictions on West 81st Street associated with the increment of Museum-generated traffic. As with Option 4, all the other options would eliminate the impact at the eastbound West 81st Street approach at Columbus Avenue during the Saturday peak hour. Impacts would occur at the same intersections discussed above for the preferred option, and the same mitigation would be called for (details about quantified traffic analyses are provided in Appendix H).

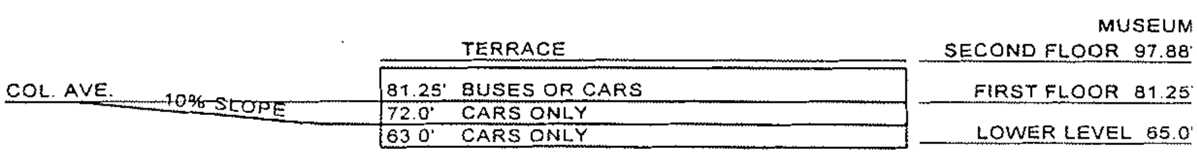


Alternative Garage Access Option 2
First Level Plan

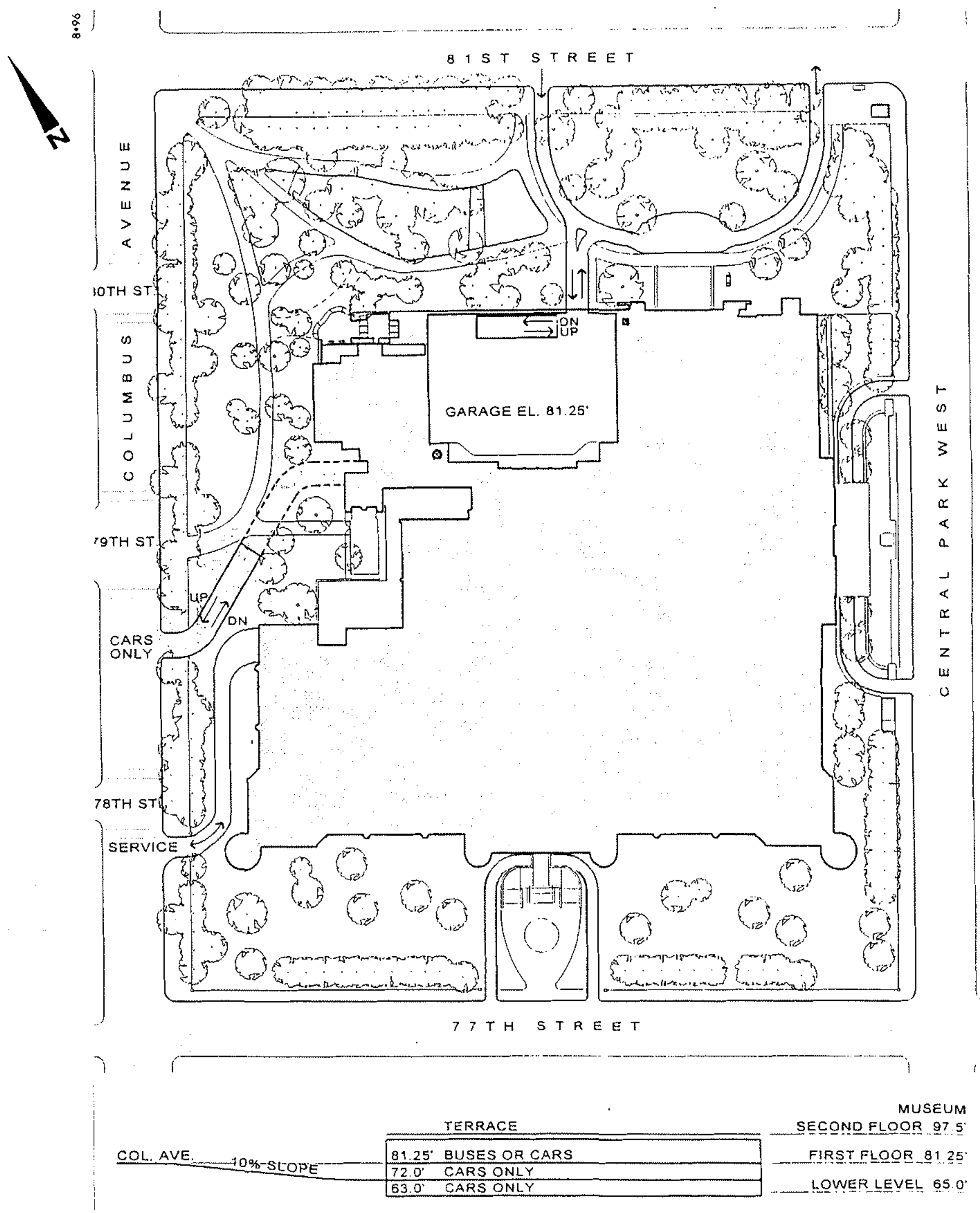
American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Figure 17-8



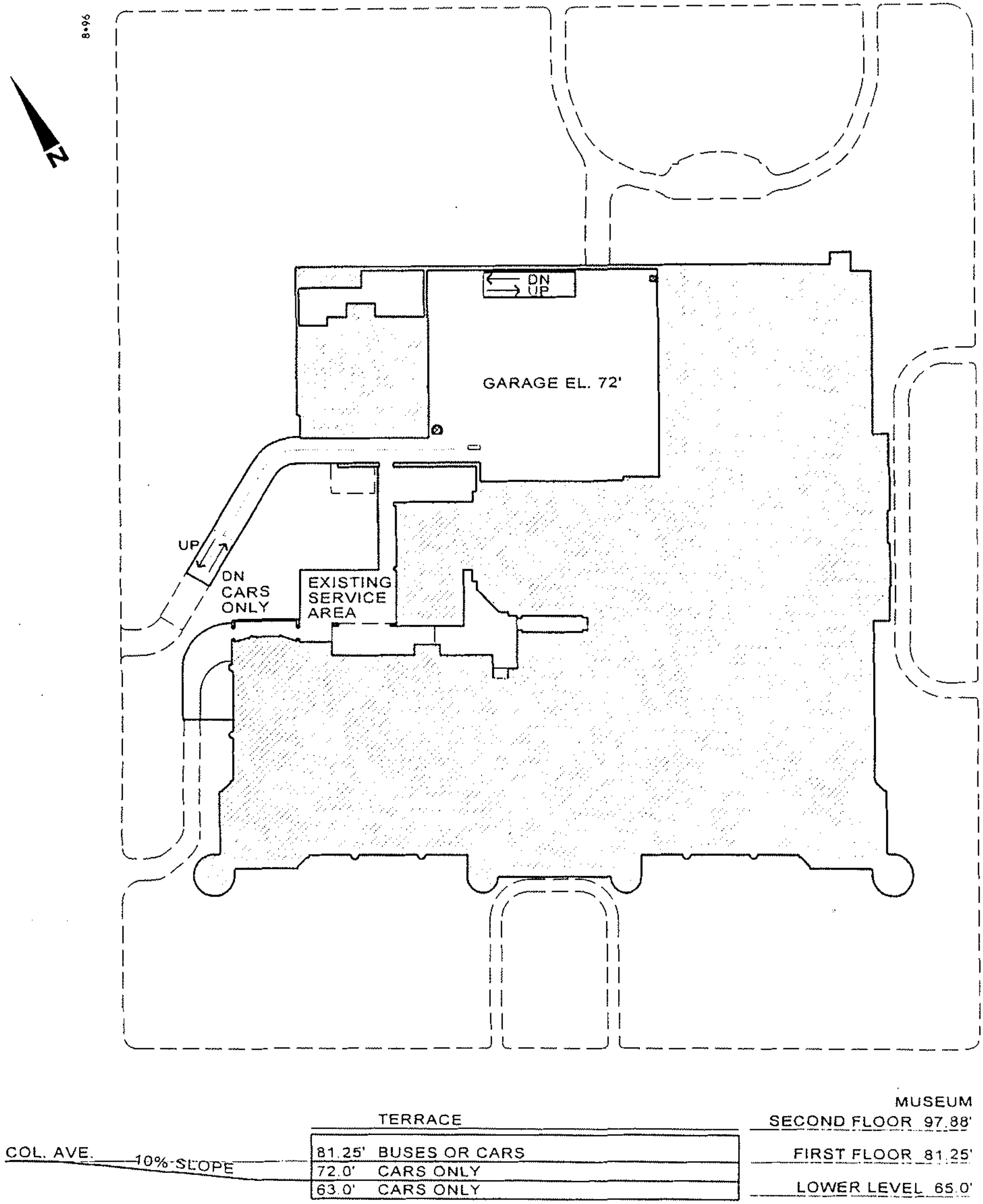


Alternative Garage Access Option 2
Mid Level Plan
Figure 17-9



Alternative Garage Access Option 3
First Level Plan

Figure 17-10



Alternative Garage Access Option 3
Mid Level Plan

Figure 17-11

Potential Environmental Impacts Associated With Other Garage Access Options

The following section compares the impacts associated with each group of driveway plans with those under the proposed project. In addition to traffic, which is discussed above, the areas in which impacts could be different from those of the proposed project relate to Museum operations, use of the park, historic and archaeological resources, air quality, and noise. In all cases except Option 4, *the preferred option,* these options would increase the project's construction activity *and result in additional impacts.*

New Driveway Options (1-3).

Impact on Theodore Roosevelt Park. These options would add a driveway along a section of the park that otherwise would not have any vehicular traffic, and would require conversion of approximately 3,200 square feet of what is now landscaped park into paved roadway. The options would also require disruption to a portion of parkland (6,300 square feet, involving 36,000 cubic feet excavated) during construction and would create an area of park over roadway tunnel, where the depth of soil would not support large trees. All three options would result in the permanent removal of mature trees both in the park and on the street, as follows:

- Option 1 would remove nine trees in all, five in the park and four on the street. All of the park trees are of large to very large caliper (21 to 38 inches). In particular, three very large, healthy American elm trees would be removed. This species has been widely decimated by Dutch elm disease throughout the northeast, so that finding healthy elm trees has become an increasingly rare occurrence. A 21-inch caliper sweetgum tree, in good condition, would also be removed.
- Option 2 would remove seven trees in all, including four large to very large caliper trees (21 to 38 inches) in the park. These would include one 38-inch diameter American elm tree, two large red oak trees in fair and good condition, and a sweetgum tree in particularly good condition.
- Option 3 would remove nine trees in all, six of them in the park. The park trees are all large to very large caliper (16 to 38 inches), and include two 38-inch caliper American elms, three sweetgums in good to very good condition, and a red oak, also in good condition.

The new roadway would create a barrier in this section of the park as it descended in an open cut into a portal leading to the covered section. The new driveway in Options 1 and 2 would also interrupt an existing pedestrian path, requiring its relocation to the east, where it could cross over a covered section of the roadway. Although landscaping could reduce the visual impact, the roadway and associated traffic would tend to lessen the attractiveness of this section of the park. Some type of fencing or barrier at or near the retaining walls of the driveway would be necessary to prevent a pedestrian hazard. The park's unity in this area would be diminished, and the flexibility in programming reduced by dividing it into two sections. This effect would be partially offset by the improvement in park ambience that could be expected on West 81st Street from reduction in traffic there.

In addition, Option 2 would alter the layout of the new pedestrian entrance to the Museum at West 79th Street. The path would need to be relocated about 30 feet to the south, and would curve toward the entrance.

Historic and Archaeological Resources. In addition to being located in a historic district, Theodore Roosevelt Park is part of a designated landmark site, and thus is considered a historic resource. Altering paths, removing trees, and diminishing the park's unity in this area would create an effect on the historic resource. Options 2 and 3 would have the added effect of placing the garage entrance on (or near, as in Option 3) axis with West 79th Street, which would make it extremely difficult for the Museum to expand in the future in accordance with the original master plan. That plan required a strong ceremonial entrance on axis with West 79th Street. Thus, the location of the driveway would conflict with the basic plan for the historic Museum complex.

The archaeological resources study completed for the proposed project (discussed in more detail in Chapter 7) concluded that the areas subject to disturbance by these access options have already been extensively disturbed and do not have the potential to contain archaeological resources.

Visual Character. The loss of several major trees in the park would change its visual character in this location. In addition, all three options would remove from three to four street trees. Although these trees are not in as good condition as those within the park, since they are planted too close together, they do form an attractive shaded arcade for the entire four-block length of the Museum's west side. The loss of the trees would be visible; however, it is likely that the remaining trees on either side of the driveway, with more space, would expand their leaf cover to partially fill the overhead gap.

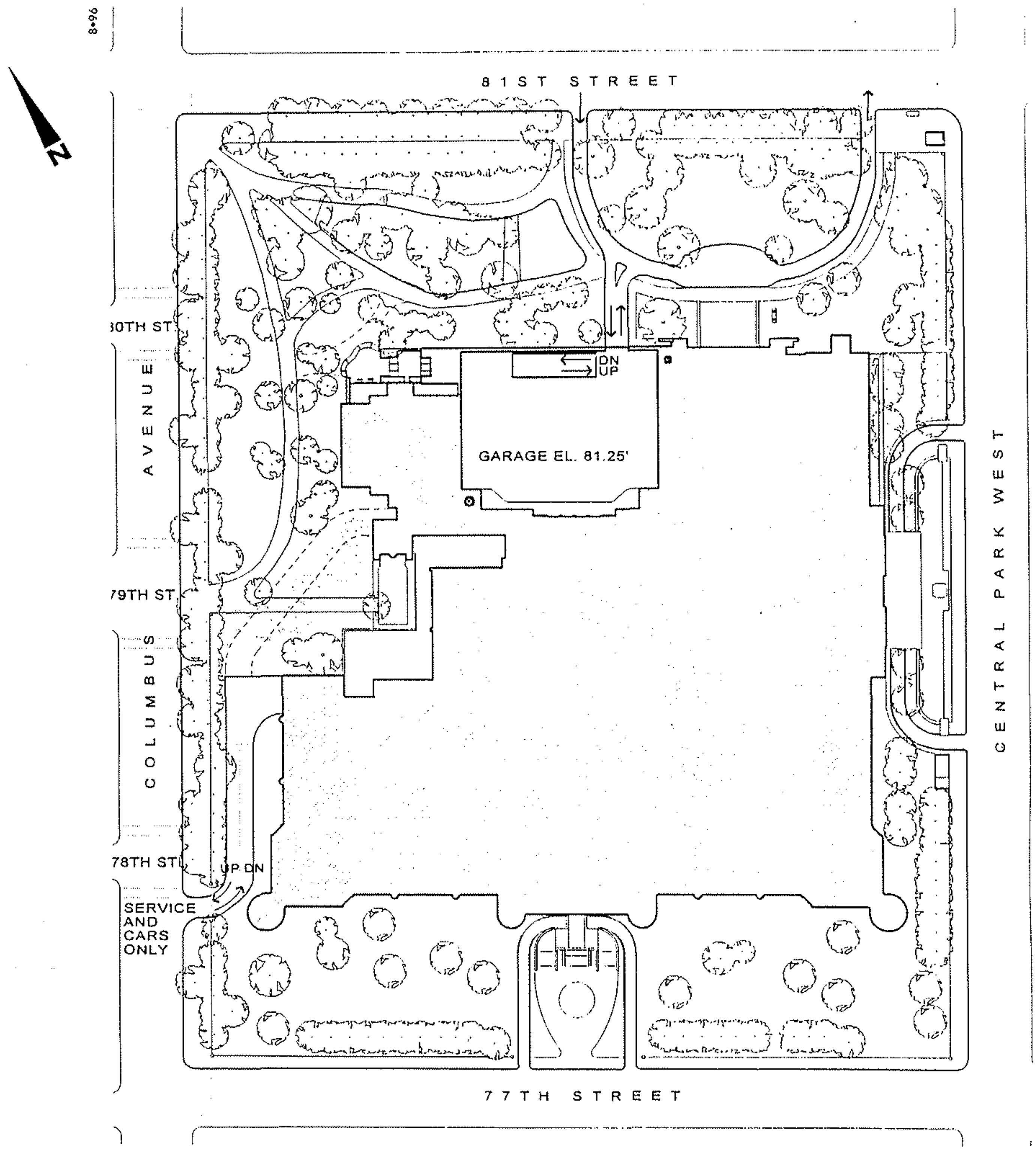
Air Quality. The rerouting of traffic under this mitigation plan would not result in any air quality impacts. As with the proposed project, the queue that might form on Columbus Avenue would not create air quality impacts. Mechanical ventilation for the covered portions of the driveway would be installed as necessary.

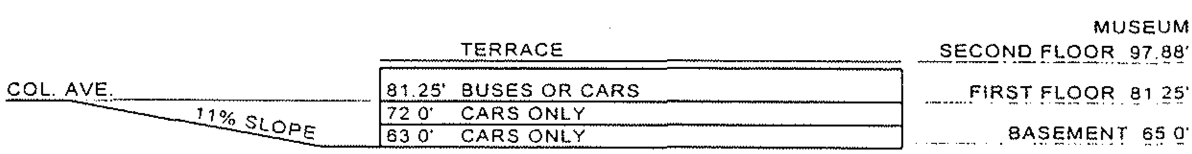
Noise. There would be slightly more traffic on Columbus Avenue, and a reduction on West 81st Street. Given the ambient noise levels and baseline traffic volumes in the area, the increase on Columbus Avenue would not be sufficient to result in any perceptible increase in noise.

Construction Impacts. This option would result in the temporary loss of parkland while construction of the new driveway is under way. Pedestrian circulation would be blocked in this section of the park, and additional areas would be fenced off in the vicinity of the excavation area.

<u>Options that Use the Service Drive (5-6).</u>

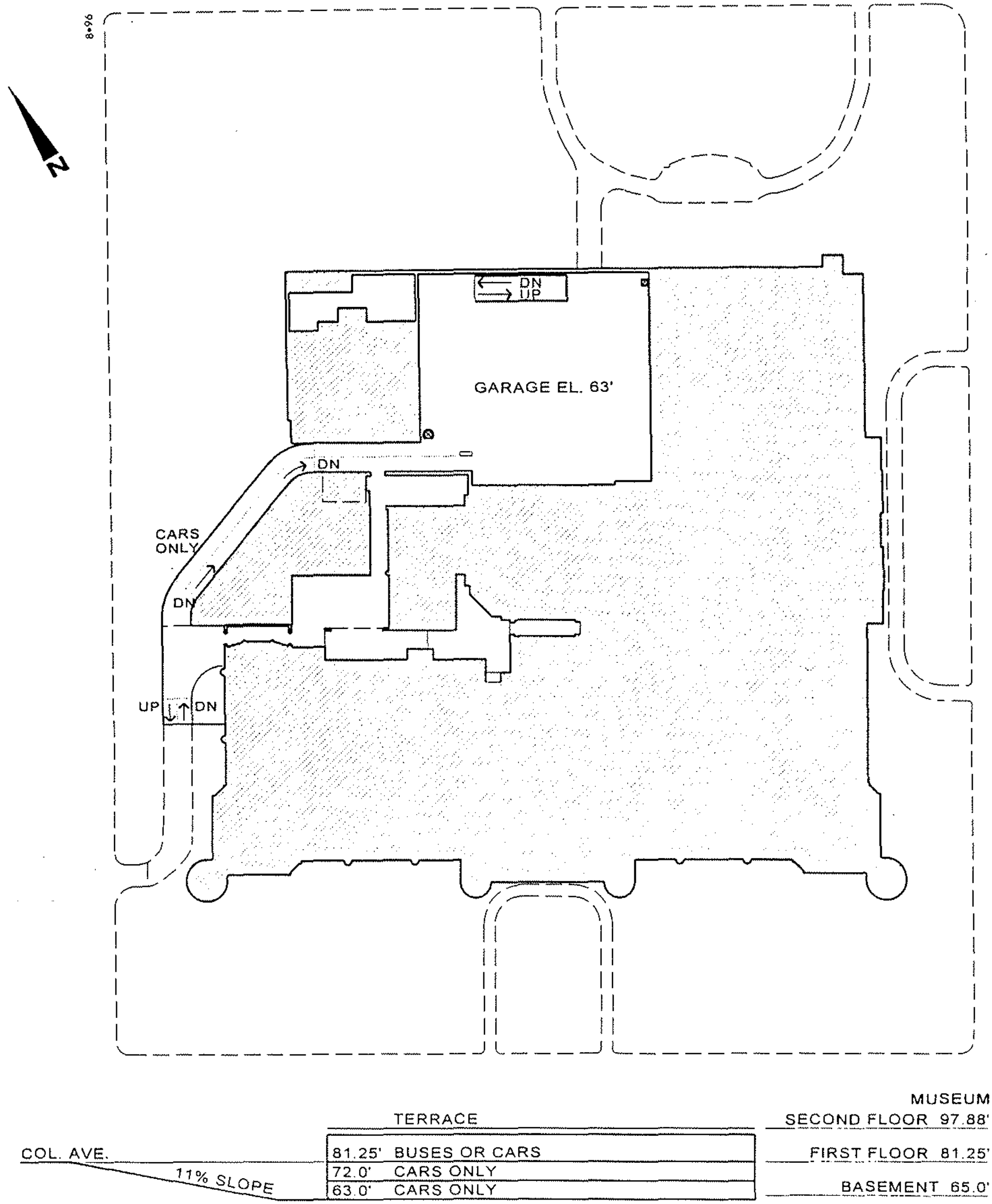
Theodore Roosevelt Park. These options would not require the use of any additional parkland for vehicular traffic. The diversion in traffic from the West 81st Street driveway would offer some improvement to park ambience in that section of the park. However, Options 5 and 6 would cause short-term disruption to this section of the park. With Option 5, approximately 122,000 cubic feet of soil would have to be removed and an area of more than 7,000 feet of completed park would lie on top of the driveway tunnel. Under Option 6, at a minimum, approximately 365,900 cubic feet of soil would be removed and an area of 23,735 square feet would rest on top of the driveway and expanded service area. All plantings in these areas, including nine mature trees and several street trees, would be displaced. Because of the driveway and service area beneath the park, the new park area would not contain trees. Option 4 would remove no trees. Option 5 would remove eight trees, all in the park, and seven of them of large to very large caliper (16 to 38 inches). Two 38-inch caliper American elms would be removed, along with three sweetgums and two red oaks, in good to very good condition. Option 6 would remove the most park trees of all six options—11-10 of which are of large to very large caliper (14 to 38 inches). These would include two 38-inch caliper American elms, four sweetgums in good to very good condition, and four red oaks, also in good to very good condition.





Alternative Garage Access Option 5
First Level Plan

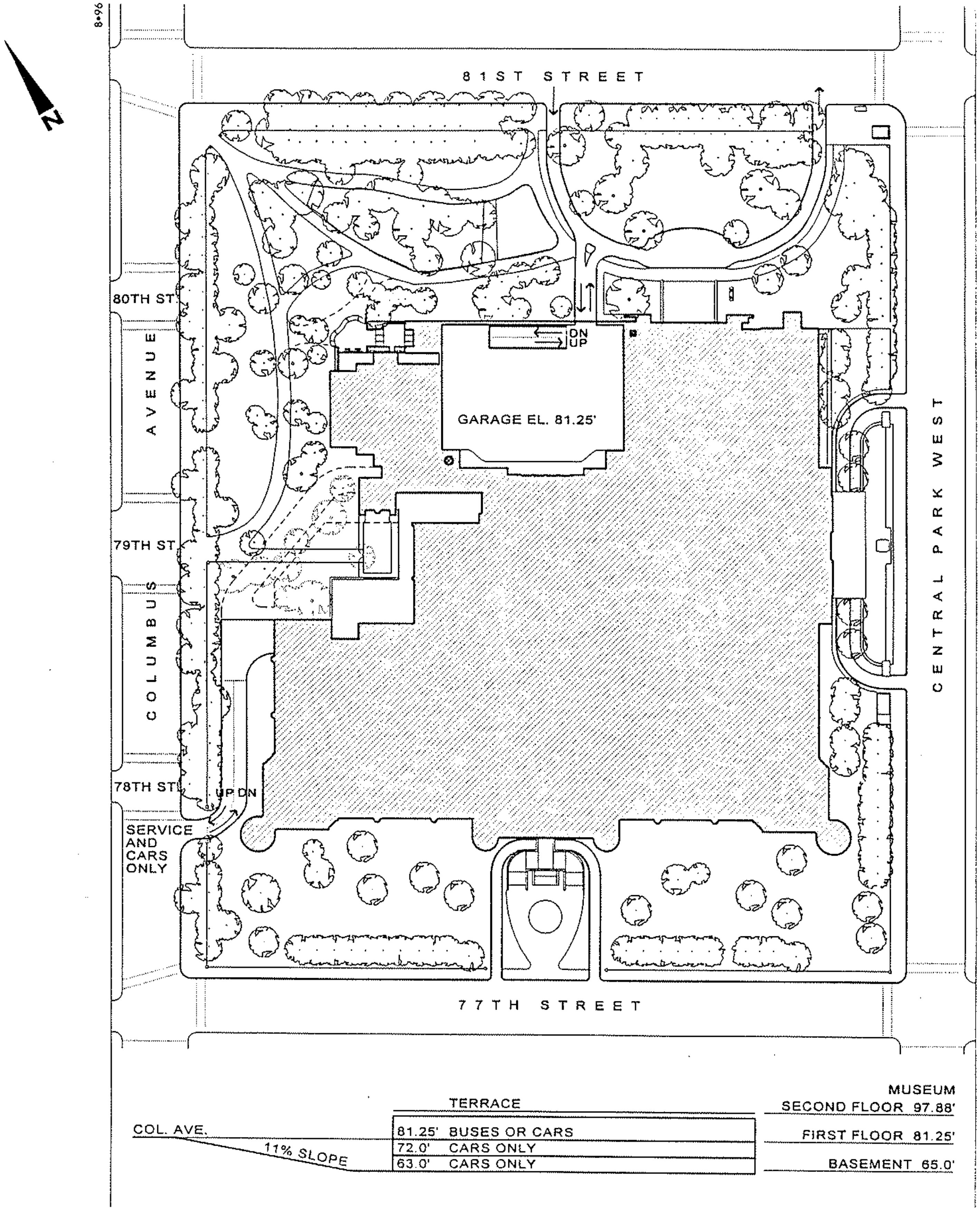
Figure 17-12



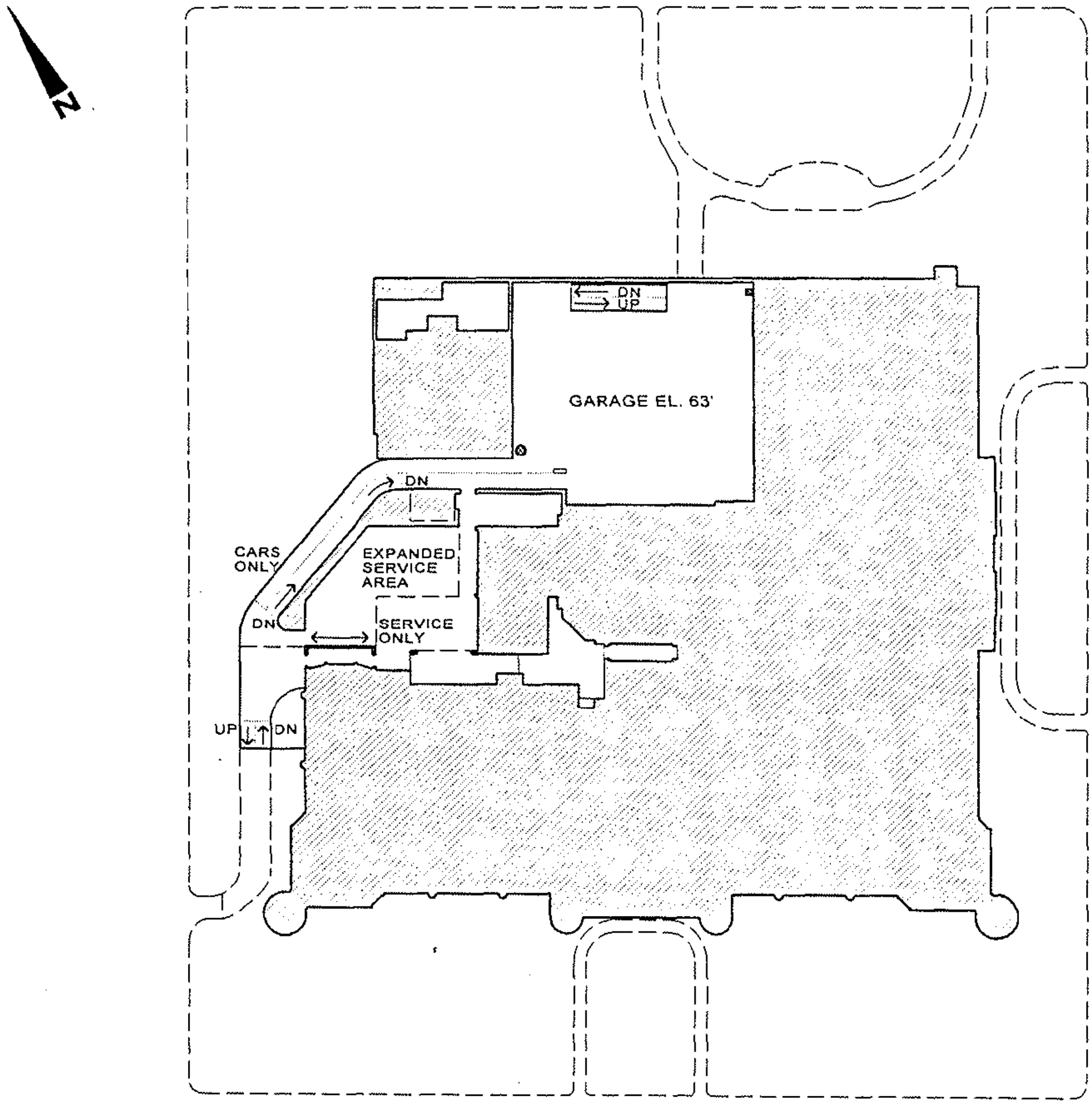
Alternative Garage Access Option 5
Basement Level Plan

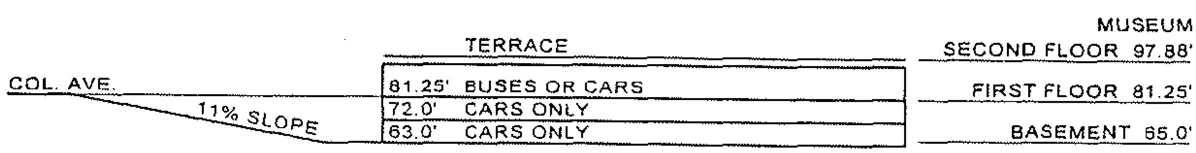
Figure 17-13

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT



Alternative Garage Access Option 6
First Level Plan





Alternative Garage Access Option 6
Basement Level Plan
Figure 17-15

Historic and Archaeological Resources. Under Option 4, there would be no alteration to the park or the Museum and thus this plan would not cause any impacts on historic and archaeological resources. Options 5 and 6 would require removal of a stone retaining wall, which was constructed in 1909, and is an element of the historic Museum complex.

Visual Character. The loss of major trees in the park with Options 5 and 6 would alter the visual character of the west side of the park. Neither of these options would remove street trees, however, so the arcade of trees along this stretch of Columbus Avenue would remain unchanged.

Air Quality. The rerouting of traffic under these three options would not result in any air quality impacts. As with the proposed project, the queue that might form on Columbus Avenue would not create air quality impacts. Mechanical ventilation for the covered portions of the driveway would be installed as necessary.

Noise. With these options, there would be an increase in traffic on Columbus Avenue, and a reduction on West 81st Street. Given the ambient noise levels and baseline traffic volumes in the area, the increase on Columbus Avenue would not be sufficient to result in any perceptible increase in noise.

Construction Impacts. Option 4 would not result in any notable new construction activities. Options 5 and 6 would require the temporary closing of a section of the park by the covered roadway and the expanded service area (Option 6) while construction is under way.

E. PUBLIC TRANSIT

The M79 bus route may operate with a small shortfall in capacity in the westbound direction during the midday peak hour as a result of the proposed project. The addition of one more bus during the midday peak hour would accommodate the shortfall in capacity. It is New York City Transit (NYCT) policy to make adjustments in the bus schedule, if necessary, to accommodate increases in demand.

F. NOISE

Measures to control noise include those that reduce noise after it has been created and those that will limit noise production.

Examples of noise control measures that reduce noise after it has been created include noise barriers and absorptive wall treatments, and electronic limiting devices, which cut off power supply to any amplified system when a predetermined noise level is exceeded. Noise barriers and wall treatments are not feasible for an open terrace or tented event, and electronic limiting devices only prevent a second occurrence of an unacceptable noise level and are therefore not suitable measures.

Examples of noise control measures that limit noise production include a dedicated sound system, which would be required for all instruments that use amplification (including voice) and used for oral presentations, scheduling of events to avoid noise-sensitive times, and an ongoing noise monitoring with on-the-spot action. The noise monitoring program would be difficult to implement, would require constant noise mitigation action by terrace management during terrace events if predetermined levels are exceeded, and is therefore not feasible. The proposed noise control measures are recommended as follows:

SCHEDULING

Monitoring of noise levels along West 81st Street show a drop in ambient levels at approximately 11 PM. Until that time, the ambient noise would mask noise from most Group 2 terrace events, so that they would not be audible at residences. It is therefore proposed that amplified sound and other potentially intrusive noise at terrace events conclude by 11 PM.

DEDICATED SOUND SYSTEM

With this measure, the Museum would install a sound system and require that it be used at all events requiring amplification. This system would control speaker type, orientation, layout, and sound emissions to control noise levels at sensitive receptors, particularly at residences along West 81st Street. Based on a detailed analysis of noise levels at the sensitive receptors, the maximum emissions from the dedicated system would be set to a predetermined level that would ensure that the sound produced by instruments requiring amplification and voice would not be audible at those receptors. This system would provide a long-term solution to a potential noise problem of Group 2 events.

LIMITING THE NUMBER OF EVENTS

The two measures described above would in most cases eliminate problems from Group 1 or Group 2 events and would provide some relief from Group 3 events. However, they would not entirely eliminate the intrusive noise levels that are likely to occur for Group 3 events. Such noise levels could only be completely mitigated by bringing the event indoors in an enclosed portion of a building. At a minimum, the number of these terrace events would be limited to minimize noise intrusion at nearby residences and in Theodore Roosevelt Park.

G. CONSTRUCTION

THEODORE ROOSEVELT PARK

Assessments in Chapter 16, "Construction Impacts," found potential temporary impacts on Theodore Roosevelt Park and on local noise levels during construction of the proposed project. Mitigation is discussed below.

Construction work for the proposed project would entail intensive activities, such as excavation and staging that, if unmitigated, could adversely affect the landscape of Theodore Roosevelt Park. Therefore, the following mitigation measures would be employed during the construction period to protect the park:

- A tree protection plan would be followed to ensure that trees within the construction area would be protected and would remain undisturbed;
- Erosion control measures would be implemented;
- Construction materials would be placed on chocks to maintain adequate drainage;
- Soldier piles and lagging (i.e., fencing below grade designed to hold back the soil) would be utilized to protect trees and adjacent lawn areas; and
- All disturbed lawns areas would be restored upon project completion.

These measures would ensure that construction of the proposed project would not result in permanent impacts to the park.

TRAFFIC AND PARKING/TRANSIT AND PEDESTRIANS

The project would generate considerable traffic resulting from movement of materials and equipment, removal of construction waste, and arriving and departing workers. In addition, while the parking garage is under construction, the Museum would have to operate without on-site parking for visitors and school buses, creating a substantial parking shortage.

The following measures will be employed to manage construction period transportation impacts:

- Institution of parking strategies and plans for managing bus drop-offs and parking, to minimize off-site impacts while the garage is under construction. This may include the identification of satellite locations for bus parking and the use of traffic management personnel to direct the unloading and parking of buses.
- Regulation of on-site construction activities, storage, and deliveries to minimize disruptions to adjacent sidewalks and streets;
- Coordination and scheduling of materials delivery and handling to limit this activity to on-site areas as much as possible, to minimize conflict among construction sites, and to avoid (to the extent feasible) possible peak traffic and pedestrian periods;
- Coordination, if necessary, of traffic routes, detours, and enforcement;
- Coordination of construction scheduling on the project site to minimize conflict and impact; and
- Constant monitoring to determine the effectiveness of the measures taken.

NOISE

Impacts on community noise levels during construction of the proposed action would include noise and vibration from operation of construction equipment, and noise from construction and delivery vehicles traveling to and from the site. Mitigation would be as follows:

- Bearing piles, as opposed to friction piles, would be used to the maximum extent possible. Pile drilling to bedrock generates much less noise and would be attempted whenever feasible to avoid driving piles.
- Construction noise is regulated by the New York City Noise Control Code and by the U.S. Environmental Protection Agency's noise emission standards for construction equipment. These local and federal requirements mandate that certain classifications of construction equipment and motor vehicles meet specified noise emissions standards; that, except under exceptional circumstances, construction activities be limited to weekdays between the hours of 7 AM and 6 PM; and that construction material be handled and transported in such a manner as not to create unnecessary noise. These regulations would be carefully followed. In addition, appropriate low-noise emission level equipment and operational procedures would be used. Compliance with noise control measures would be ensured by including them in the contract documents as material specification and by directives to the construction contractor. ❖

A. INTRODUCTION

A number of alternatives to the proposed action have been considered in its planning and analysis. These include a No Build alternative, in which the project does not go forward; alternatives that save the Hayden Planetarium, either for refurbishment as a planetarium or for reuse, with the new Planetarium at a different location; alternative garage size and locations and phased implementation of the project. Impacts of these alternatives are assessed below, as appropriate, and compared to impacts of the proposed action. Garage access options were also studied carefully. Because these options could work in conjunction with the existing (and proposed) entrance on West 81st Street, and because they respond to specific impacts, these are more appropriately discussed in Chapter 17, "Mitigation."

B. NO BUILD ALTERNATIVE

The No Build alternative represents the future conditions expected at the American Museum of Natural History in 2001, if the proposed Planetarium and North Side project does not go forward. This is the condition described throughout earlier chapters of the EIS as "the future without the project," although in this chapter the No Build condition is compared to the proposed project.

Under the No Build alternative, no changes related to the project would occur at the Museum complex by 2001. Attendance at the Museum would increase overall but would be little increased at the Planetarium. Theodore Roosevelt Park would be improved, and there would be slight increases in population, employment, and traffic in the surrounding neighborhood.

LAND USE, ZONING, AND PUBLIC POLICY

Under the No Build alternative, no material changes to land use or to zoning or other public policy are expected to occur on the project site or in the surrounding area.

ECONOMIC CONDITIONS

Under the No Build alternative, the benefits from increased attendance and from project construction would not accrue to the Museum and the City and State. An anticipated increase in attendance of 5 percent per year would take place, but the additional 612,616 annual paying visitors associated with the project would not materialize, nor would the revenues associated with their trips accrue to the Museum or the City and State.

COMMUNITY FACILITIES AND SERVICES

Without the proposed project, Museum attendance is expected to increase by about 5 percent a year, placing some new demand on the police or fire department. Like the proposed action, the No Build case would not tax the capacity of the police or fire department to meet the new demand. The Planetarium would remain obsolete as an educational tool. Access to the Museum complex from the community would not be improved since there would be no new Columbus Avenue entrance.

OPEN SPACE AND RECREATIONAL FACILITIES

With the No Build alternative, reconstruction and restoration of Theodore Roosevelt Park (familiarly known as "Museum Park") is expected to be completed by 2001. Park renovation planning and design is being overseen by a committee consisting of the Borough President and the local City Councilmember, City Department of Parks and Recreation, the American Museum of Natural History, Community Board 7, Friends of Museum Park, and the West 81st Street Block Association and civic groups. The park improvement project will reconstruct and regrade the asphalt paths, add new drain structures, install a granite block edge, restore lawn areas, and provide seating and lighting.

Under this alternative, the 35,000-square-foot publicly accessible terrace would not be created, and a new pavilion and plaza at the Columbus Avenue entrance would also not be added. Without the proposed project, no new uses would be added to enliven the north and west sides of the Museum and the nearby park areas.

Under No Build conditions the area's open space ratios would be well within guidelines set by the City, although the residential passive open space ratio would be slightly lower than that of the proposed project.

HISTORIC AND ARCHAEOLOGICAL RESOURCES

Under the No Build alternative, the Hayden Planetarium would remain intact. No single facade would be created on the north side enhancing the architectural relationship between the Museum and West 81st Street in the Central Park West historic district. The north side would remain an unfinished, ragged edge to the historic Museum complex. The opportunity to create a new Planetarium that would enhance the complex would be foregone. In addition, there would be no new entrance from Columbus Avenue and thus no contemporary focal point and visual connection between the Museum and the buildings along Columbus Avenue in the historic district.

URBAN DESIGN AND VISUAL RESOURCES

Under the No Build alternative, the north and west sides of the Museum complex would remain as they are today. The north side would not present a cohesive facade to its neighbors, nor would it contain the strong, active visual element proposed for the new planetarium and adjacent terrace and galleria. On the west side, visual and physical access to the Museum would not be introduced, nor would there be a lit pavilion and entry plaza to help make this section of the park safer and more attractive to its users.

NEIGHBORHOOD CHARACTER

Under the No Build alternative, there would be no change in neighborhood character. The ambience of the Central Park West historic district would not be strengthened by the new elements on the north and west sides of the Museum complex.

HAZARDOUS MATERIALS

Without the proposed project, there would be no soil disturbance, demolition, or renovation to raise the potential for exposure to hazardous wastes on the project site.

INFRASTRUCTURE, SOLID WASTE, AND ENERGY

With the No Build alternative the insignificant increases in water usage and sewage and solid waste generation anticipated with the proposed action would not occur.

TRAFFIC AND PARKING

Under the No Build alternative, traffic would worsen compared with existing conditions, decreasing levels of service (LOSs) at major study area intersections from generally acceptable conditions (LOSs B-D) to some unacceptable LOSs of E and F. In particular, the northbound approaches on Central Park West at West 77th and 81st Streets would be at LOS F during some peak hours. The situation on West 81st Street would worsen: the parking lot would be more overloaded, and queues of vehicles would wait to enter for longer periods (11 AM to 4 PM) on the weekends, compared with 1 PM to 3 PM with the project. There would be no garage and no associated relief from this problem.

However, impacts on *five* intersections in the *study area (Central Park West at West 72nd, 77th, 81st, and 86th Streets, and Columbus Avenue at West 81st Street)* would not occur under the No Build alternative.

TRANSIT AND PEDESTRIANS

As with the proposed project, pedestrian and subway conditions would operate acceptably under the No Build alternative. However, there would be no need to add a bus in the M79 route during the weekday midday peak.

AIR QUALITY

As with the proposed project, under the No Build alternative, there would be no violations of CO standards or de minimis criteria.

NOISE

Under the No Build alternative, there would be no terrace and thus no special events to create *intrusive* noise in the surrounding park.

CONSTRUCTION IMPACTS

Under the No Build alternative, the impacts associated with project construction, including additional traffic and noise and temporary closing of sections of the park, would not occur.

C. RENOVATION OR REUSE OF THE HAYDEN PLANETARIUM

As described in Chapter 7, "Historic and Archaeological Resources," the American Museum of Natural History complex including the Hayden Planetarium is a significant historic resource. This scenario considers alternatives for renovation or reuse of the Planetarium for its original purpose, and possible reuse of the building for another purpose with a new Planetarium located elsewhere.

RENOVATION OF HAYDEN PLANETARIUM

Planning for this project began with the mandate of renovating the Hayden Planetarium to replace out-of-date displays with new, state-of-the-art exhibits of the universe as it is understood today. This alternative would avoid demolition of a historic resource, its major benefit over the proposed action. However, for the reasons cited below, this alternative would not meet the Museum's goals for a modern scientific and educational facility, nor would it increase attendance and revenues at the Planetarium.

As the scientists, exhibit designers, and architects worked through their ideas it became apparent that the existing building could not accommodate the needs of a modern planetarium. The physical structure limits its ability to accommodate new technologies. The original building design offered circulation areas surrounding two theater areas, the Guggenheim and sky theaters. There was almost no space for exhibits. Over the years, portions of the circulation space were used for exhibits; this was a compromise that left the facility with inadequate displays and pedestrian space. The planners concluded that the existing Planetarium building is not large enough to house the new state-of-the-art exhibition space to adequately explain the workings of the universe. The Museum's goals for the new exhibition space include a new Hall of the Universe to supplement the Sky Show. The current Planetarium has 24,000 square feet available for exhibition, of which 5,000 square feet are occupied by the sky theater and 19,000 square feet by other exhibit space. The new program calls for a 5,000-square-foot sky theater supplemented by 45,000 square feet of exhibit space in the new Planetarium structure—more than twice the space available in the existing structure.

Some consideration was given to creating the new exhibition space in a different building from the Planetarium. However, the scientists and exhibition designers studying the project concluded that it is vital that the exhibits be in the same building as the sky theater, to allow a logical connection and progression between them. Also, no space was available for this purpose in the Museum without displacing other exhibitions. Construction of new space for the exhibits while leaving the planetarium in place would pose problems similar to those of the alternative discussed below.

REUSE OF THE PLANETARIUM FOR ANOTHER PURPOSE, WITH THE NEW PLANETARIUM IN AN ALTERNATIVE LOCATION

Reuse of the Hayden Planetarium for another purpose, such as a restaurant or storage space, with a new planetarium nearby would create identity problems and confusion: both buildings would be clearly identifiable as planetariums. Further, removing the actual planetarium use from its current site at the Museum would remove the "memory" of the planetarium from its original location and therefore not respect the historic layout of the Museum.

If this option were pursued, other possible locations for the new planetarium include: in the existing parking lot, on the site of the existing Power House, or in the center of the museum (atop the IMAX theater). These locations are shown in Figure 18-1. In addition to the problems of identity described above, each of these alternatives would also create circulation issues, by separating the Planetarium from its companion hall, the new Hall of Planet Earth in the Whitney Wing. Visitors would not be able to connect directly from the new exhibits about the workings of the universe to the new exhibit about our planet, and an important educational and contextual link would be lost. Other specific drawbacks of each of these alternative locations are as follows.

- In the parking lot. Placing the new Planetarium next to the old one would create a serious identity problem and confusion. This "pavilion"-like placement would also be inconsistent with the intentions of the original master plan for the Museum, which envisioned such pavilions symmetrically placed at opposite ends of the Museum. This alternative would place two such pavilions, the IMAX theater and the new Planetarium, side by side with no long hall between to provide symmetry to other parts of the Museum.

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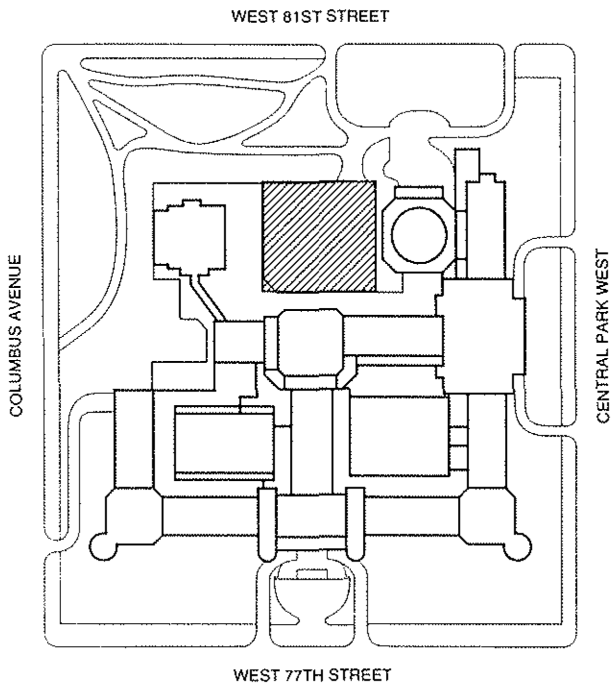
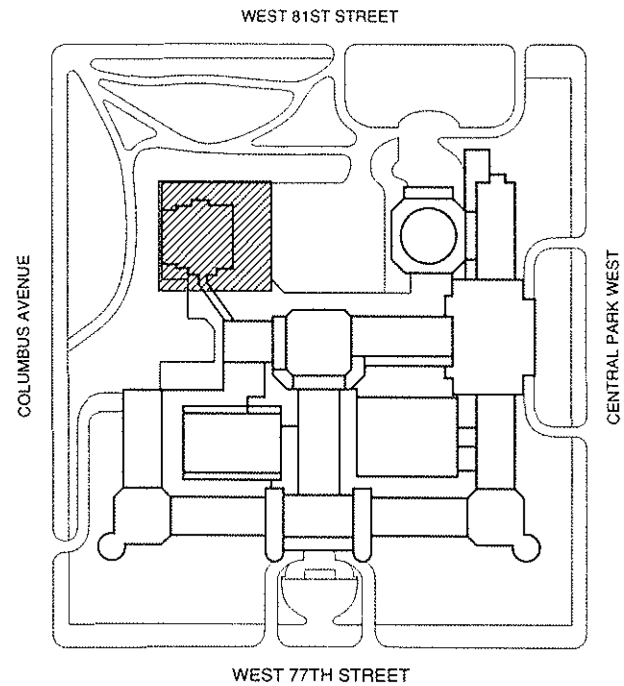
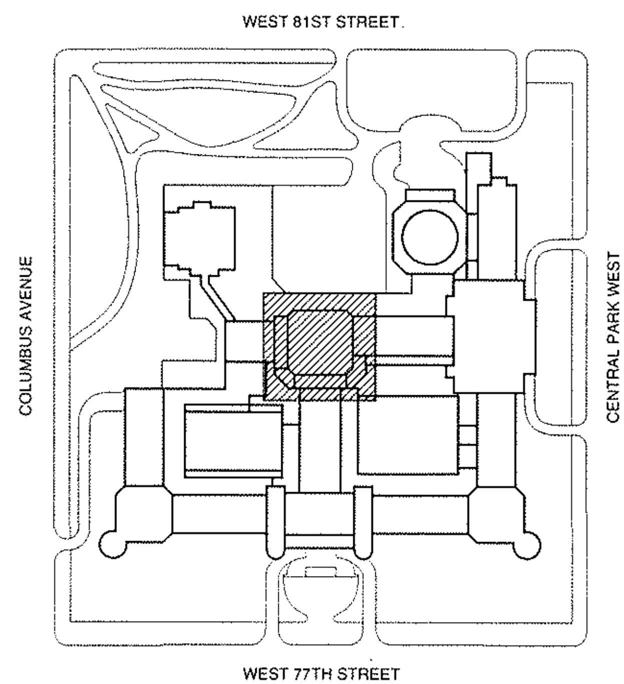


AT THE PARKING LOT



IN PLACE OF THE POWER HOUSE



IN THE CENTER OF MUSEUM
(at NatureMax Theater)

N

Alternative Locations for the New Planetarium

Figure 18-1

Placing the Planetarium on the site of the parking lot would eliminate the proposed parking garage, unless a garage were provided beneath the Planetarium. To allow the amount of exhibit space proposed by the project, the parking garage would have to be lower than is currently proposed. This would put adjoining existing portions of the Museum at risk. Furthermore, the new Planetarium atop the garage would be higher than all the other Museum buildings. This scenario would also eliminate the new 35,000-square-foot, publicly accessible terrace that is proposed as part of the project.

- In place of the Power House. The Power House is the most isolated location in the Museum complex today, with no direct connections to any exhibit space. This location would completely disconnect the new Planetarium from the Museum's Roosevelt Rotunda on Central Park West, making it much farther away and more difficult to reach than the existing Planetarium. This would isolate the new planetary exhibitions from the exhibition sequence of the Museum. Of the three possible alternative locations, this one is also farthest from the proposed Hall of Planet Earth in the Whitney Wing.

  This alternative would involve demolition of the Power House, which, like the Hayden Planetarium, is a historic resource. Moreover, it would involve the loss of a large amount of space (60,000 square feet) the Museum uses for collection storage, exhibit preparation, and departmental offices. This is in contrast to the approximately 13,370 square feet of such space in this building that is to be converted to restaurant use with the proposed project.

- In the center of the Museum (at the IMAX theater). Under this scenario, the Planetarium would be constructed atop the existing IMAX theater. This existing building contains two high stories. Therefore, the new Planetarium would begin at the third floor under this scenario and would be removed from the general circulation patterns on the ground floors of the Museum. All visitors to the Planetarium would need to use stairs or elevators to reach its entrance.

D. GARAGE ALTERNATIVES

Garage alternatives considered include a smaller garage (essentially a "No Build" for the facility), and two different garage locations. Six options for access to the garage at its proposed location and size are discussed in Chapter 17, "Mitigation."

REDUCED-SIZE GARAGE

Under this alternative, the project would include a one-level garage, rather than the three-level garage proposed. This garage would be at-grade and covered by the publicly accessible terrace, with a slightly smaller capacity than the existing parking lot (which accommodates 180 cars with valet service). Access to the garage would be from West 81st Street, the same as for the proposed three-level garage. This alternative would look the same as the proposed project, but would actually be similar to the No Build condition in its operations.

The major difference in environmental effect between the proposed project and the project with this reduced-size garage would be related to traffic and parking. As discussed above, the alternative, like the No Build alternative, would be inadequate to handle existing and future demand with or without the proposed project. In fact, conditions with the project in place with a reduced-size garage would be considerably worse than conditions in the No Build alternative. Queues outside the driveway would persist from around 10:30 AM to after 5 PM, and circulation of cars looking for alternative parking would increase considerably.

Under this alternative, since auto usage would still be an important mode for Museum visitors, particularly on weekends, the overall traffic volume generated by the project is not expected to change substantially. Given this traffic activity, the exacerbation of the on-site parking shortage would increase overall traffic impacts from the project, and worsen traffic conditions on the streets bordering the site. Museum visitors would spend more time traveling on local streets searching for either on-street spaces or nearby garages. Those visitors coming first to the site, either for drop-offs at the Planetarium or in search of parking, would create a larger problem on West 81st Street. This would push more traffic through the intersections along West 81st Street at both Central Park West and Columbus Avenue and would increase delays and impacts at these two locations. Westbound traffic would then travel southbound on Columbus Avenue and then travel farther west before finding available off-street parking along Amsterdam Avenue. This would increase traffic along both these corridors and on the cross street providing access to area garages. Those vehicles traveling eastbound along West 81st Street would travel north- or southbound on Central Park West and then reverse direction, perhaps having to cross Columbus Avenue to find off-street parking. These patterns would increase vehicle travel on the blocks near the Museum, thereby creating new and worsened project impacts. The smaller garage would require less excavation and thus less disturbance during construction.

ALTERNATIVE GARAGE LOCATIONS

In 1992, before planning for the proposed project began, the Museum prepared a feasibility study evaluating alternative locations for a new parking garage. This study, led by the design firm of Kevin Roche, John Dinkeloo and Associates, identified from several alternatives three logical locations for the garage. One was the footprint of the existing surface lot, adjacent to the Planetarium; the second, along Columbus Avenue, occupied a parcel roughly in line with West 79th Street south of the Power House; and the third was along the southern edge of the Museum, facing West 77th Street between Central Park West and Columbus Avenue (see Figure 18-2).

SITE 1

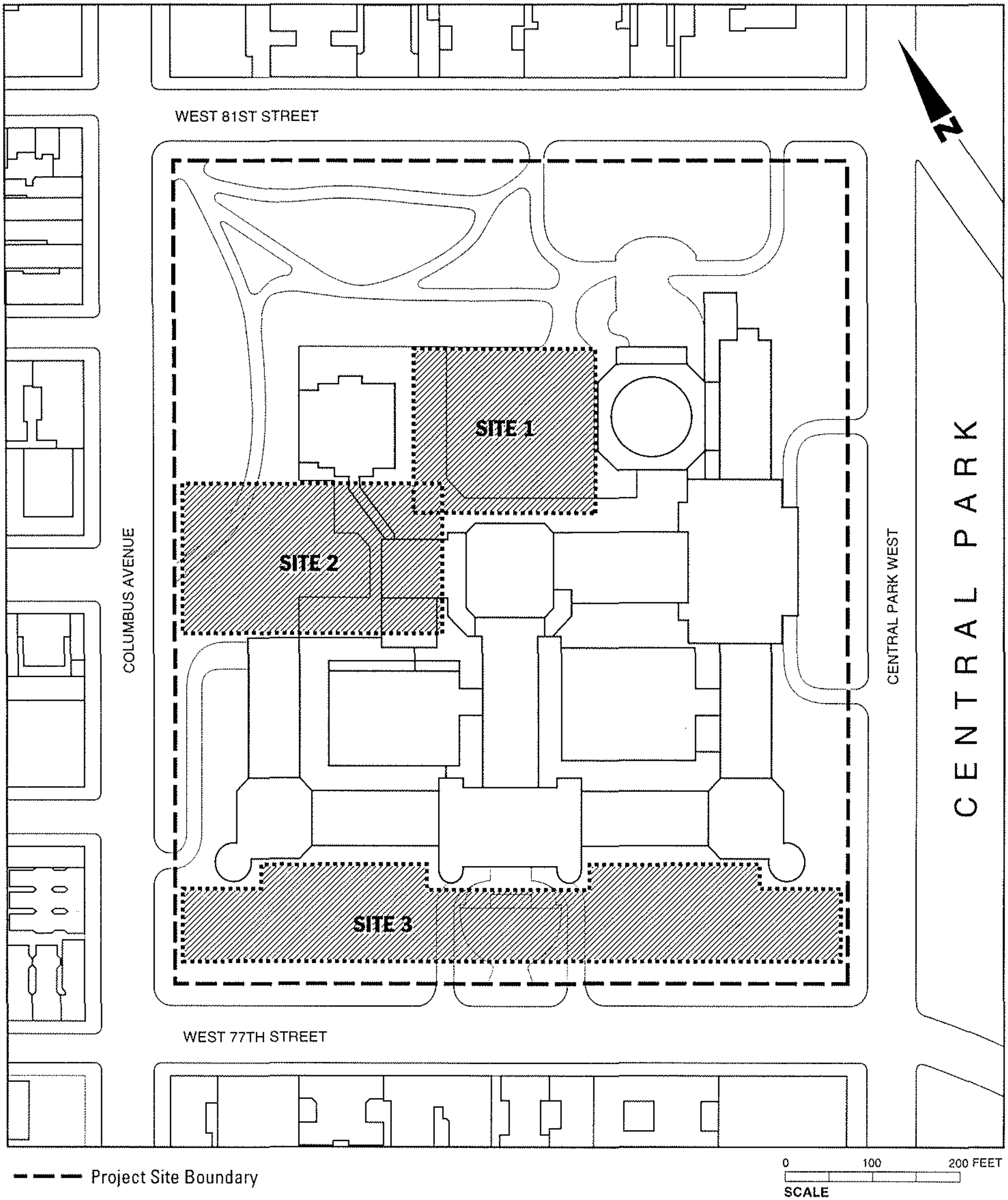
Description

Three different schemes were developed for Site 1. These included: (1A) four levels above grade with a capacity of 475 autos; (1B) four levels above grade and one below, with a capacity of 579 autos; and (1C) four levels above grade, including a ground level with sufficient clearance for buses and an overall capacity of 352 autos and 35 buses. Because it involved above grade construction with virtually no demolition construction costs on this site would have been far less expensive than either of the other two sites considered.

Potential Impacts

This alternative garage location would be similar to the proposed project as follows:

- Because it would be at the same site, it would offer similar advantages for coordination with other project element, e.g., a convenient entrance to the Planetarium, new galleria and IMAX theater.
- Like the proposed project, because it would not place new vehicular access in Theodore Roosevelt Park, it would make no permanent changes in the park.



American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Alternative Parking Garage Locations

Figure 18-2

3•96

- With special design, it might help "finish" the ragged edge of the Museum's north side.
- For the alternative 1A, it would have a similar capacity to the proposed project's garage and thus yield similar traffic patterns and conditions on West 81st Street.

However, this garage location would have several disadvantages and impacts that would not occur with the proposed project:

- The structure would be above grade, which would contravene the original master plan for the Museum, preventing continuation of the inner transept; this would affect the Museum complex as a historic resource.
- Such a structure next to the new Planetarium would make it impossible to construct the Planetarium as designed for the proposed project.
- There would be no opportunity to provide 35,000 square feet of publicly accessible open space, and the location of a restaurant on the project's terrace level of the power house would be problematical.
- However, without the terrace, there would be no *intrusive* noise *in* Theodore Roosevelt Park *resulting from events on the terrace.*

SITE 2

Description

The planning for Site 2 looked at two below-grade schemes: (2A) three below-grade levels providing 296 auto spaces; and (2B) with four below-grade levels, providing 463 spaces. In both cases, the new garage was coupled with retaining the existing surface lot to provide an additional area for buses and/or cars. Scheme 2B created a larger parcel by extending into the existing rear service area and replacing the Ichthyology Building (Building 15) and also provided for new loading docks and a new service area. In Scheme 2A, the access from Columbus Avenue would be south of West 79th Street, from a single combined entrance and exit driveway, entering into the park and then ramping down to the upper level of the parking garage. In Scheme 2B, two separate driveways were planned along Columbus Avenue; the entry driveway would be roughly in line with the existing service driveway near 78th Street, and the exit driveway would access Columbus Avenue at approximately West 80th Street.

Probable Impacts

This alternative garage site had the advantage of drawing traffic to Columbus Avenue as well as West 81st Street, but it would have created impacts, not anticipated with the project, as follows:

- This location, far from existing entrances to the Museum, would provide poor access to the complex from the garage.
- The scheme contemplated demolishing the Ichthyology Building, a landmark structure in the Museum complex. Replacing a functioning building that contributes to a historic resource in order to build a garage and extend a service area would be considered a significant adverse effect on the resource, rendering this scheme impracticable, since other alternatives that would not have this effect are available.
- This scheme contemplated keeping the existing lot for bus parking, which, if implemented would make the terrace and probably the power house restaurant infeasible. However, for

additional cost, it would be possible to create an enclosed parking lot on this site, similar to the reduced-size garage alternative discussed above.

- Construction would have required considerable disturbance to Theodore Roosevelt Park, and the net result would have been either one or two additional driveways cutting through the park.

SITE 3

Description

Site 3 entailed construction of a long, rectangular, below-grade parking structure along the south face of the Museum between Central Park West and Columbus Avenue. Scheme 3A at this site would provide five levels of parking with a capacity of 559 cars; Scheme 3B with four levels of parking would have a capacity of 451 cars. Under both schemes, the existing surface lot from West 81st Street would be retained for bus and auto parking. There would be separate entrance and exit driveways along West 77th Street, just to the east and west of the oval on the south face of the Museum. Again, the costs for this alternative would be much higher than at the West 81st Street site.

Probable Impacts

Once completed, this alternative would have been operationally acceptable, since it was proposed to be underground (and therefore relatively unseen) and would have brought traffic in and out on the least trafficked edge of the Museum site. Also, this location would have provided good capacity and excellent access to the Museum. The two schemes at this location had the following disadvantages and impacts:

- Placing the garage at this site would have significant impacts on the Museum's 77th Street facade, which was constructed at the turn of the century and is a strong contributing element to the complex's historic status. The entrance stairs and driveway would have to be demolished and rebuilt; in the end, there would be no Belgian block circular drive, since the entrances to the garage would use those curb cuts and take the place of the drive. Such an impact would have made it extremely difficult for the Museum to obtain approval for the scheme.
- An underground garage in this location—along the entire length of 77th Street—would have caused major disruption both during construction and afterwards, since the soils depths above the underground structure would not support full-sized trees.
- The cost of construction would have been extremely high.

E. ALTERNATIVE PROJECT PHASING

As currently planned, all project elements would be constructed to be completed together by 2000. However, depending on funding sources and other timing issues, the Museum could decide to construct certain elements at a later date. These would be likely to include the renovation of the power house, the portion of the galleria west of the garage entrance, and the new entrance pavilion and plaza on Columbus Avenue at 79th Street. The analysis below assumes that construction of these elements would be substantially delayed, by perhaps five years. The phasing would have the following impacts, compared to the project as proposed:

- Trips to and from the restaurant would not occur, reducing very slightly the trip generation from the proposed project until 2005 or later.

- Until the second phase was built, there would be no new neighborhood entrance to the Museum, and no new activity enhancing safety in that part of Theodore Roosevelt Park.
- The north side of the Museum complex would not look quite as complete with Phase 1 only. The Columbus Avenue side would look as it does now.
- In the first phase, the terrace would not function as well as it would with the completed project, since its westerly edge would abut an unrenovated power house.
- The disruption to the Museum from construction would take place twice. Total construction costs would also be greater, if the project were split into two phases. ❖

Unavoidable adverse impacts are defined as those that meet the following two criteria:

- There are no reasonably practicable mitigation measures to eliminate the impact.
- There are no reasonable alternatives to the proposed action that would meet the purpose and need of the action, eliminate the impact, and not cause other or similar significant adverse impacts.

Potential impacts identified for the proposed action could all be mitigated, as described in Chapter 17, "Mitigation," except as described below.

A. HISTORIC RESOURCES

The proposed project would generally meet the first of the criteria of adverse effect (destruction or alteration) that the New York City Landmarks Preservation Commission (LPC) uses in identifying impacts on historic resources. As mandated by the site's Landmark status, the proposed project has been reviewed in detail with LPC in public hearings and meetings, and LPC has issued a report on the project. In that report, LPC found both the demolition and alteration to be appropriate to proceed with the proposed project. Regarding the Planetarium, LPC's findings included the following (quoted from its report of November 21, 1995):

- That the Planetarium "has a minimal role in establishing the distinctive architectural character of this landmark";
- That "the building is not a distinguished example of the architecture of the 1930's"; and
- That the building's inclusion in the Museum's Landmark designation "related primarily to its cultural associations as the Museum's Planetarium and to the public's experience of its programming and exhibits rather than to its architectural importance."

With regard to the proposed new construction and alterations, LPC findings in its November 21, 1995, report included the following:

- That the project would "create a single facade for this portion of the complex, unifying it architecturally";
- That "the height and massing of the addition will ensure that it relates harmoniously to the complex without overwhelming any of the significant historic buildings";
- That "the cultural associations of the Planetarium will be retained in both the location and architectural expression of the new Planetarium structure";
- That the project's garage "will enhance the appearance of the streetscape along West 81st Street within the Upper West Side/Central Park West Historic District, and that creating a finished facade on the north side will enhance the architectural relationship between the Museum complex and the buildings along the north side of West 81st Street";

- That the new Columbus Avenue entrance "will establish a visual connection between the Museum and the buildings along Columbus Avenue within the Upper West Side/Central Park West Historic District;" and
- That "this proposed construction will enhance the special architectural, historic, and cultural significance of the American Museum of Natural History complex and of the Upper West Side/Central Park West Historic District."

For further discussion of the LPC report, see Chapter 7, "Historic and Archaeological Resources."

B. NOISE

As described in Chapter 15, "Noise," use of the project's outdoor terrace for events that include amplified music or sound would result in noise impacts. *Control measures have been proposed that would mitigate impacts from most events (see Chapter 17, "Mitigation"). However, noise emissions from events with fully amplified music or heavy percussion can be reduced, but not fully mitigated. Therefore, the number of such events would be limited.* ❖

Chapter 20: Growth-Inducing Aspects of the Proposed Project

By 2000, the proposed action would result in the development of a new Planetarium, parking garage and terrace, galleria, and a Columbus Avenue entrance pavilion. Other facilities, including a restaurant, would occupy existing buildings within the Museum complex. The project would increase the number of Museum visitors and would add to employment as well. The additional employment and out-of-town visitors would add economic activity and tax revenues to city and state coffers.

Because the proposed project would result in an extension of the facilities and institutional uses currently at the Museum, and because the surrounding area is already densely developed, the project is not expected to stimulate any new residential or commercial development activity in the surrounding area. ❖

Chapter 21: Identification of Irreversible and Irretrievable Commitment of Resources

With the proposed project, several resources, both natural and built, would be expended in the construction and operation of the structures that would be built on the project site. These resources include use of the land, building materials, energy, and the human effort required to develop, construct, and operate the new facilities. They are considered irretrievably committed because their reuse for some other purpose besides the new structures on the project site would be highly unlikely.

The land (including its development potential) that makes up the project site is a basic resource irreversibly committed to the proposed project. In addition, the actual building materials used in the construction of the project's components (bricks, steel, concrete, glass, etc.) and the energy consumed during their operation by the various mechanical systems (heating, hot water, air-conditioning) are also irretrievably committed to this particular undertaking. ❖

A. INTRODUCTION

The Environmental Review Committee of the American Museum of Natural History Planetarium Authority issued the Draft Environmental Impact Statement (DEIS) for the Planetarium and North Side project on May 23, 1996. Its publication marked the beginning of public review under the State Environmental Quality Review (SEQR) regulations. This chapter summarizes and responds to the substantive comments on the DEIS received through the close of the comment period on July 17, 1996, as well as additional comments received after the close of the comment period.

During that period, the Planetarium Authority met with city agencies, community groups, and members of Manhattan Community Board 7; answered questions at a Community Board hearing on the project on June 18, 1996 and at a Community Board meeting on July 2, 1996; and held SEQR public hearings on June 27, 1996 at 2 PM and 7 PM for the purpose of receiving comments on the DEIS. Spoken comments were received at the SEQR public hearings and at the other hearings and meetings; written comments were also submitted. Section B of this chapter lists the names (and when available, the affiliations) of people who commented on the DEIS. Comments and responses are organized in Section C by major subject area following the outline of the Environmental Impact Statement (EIS). Comments about the same topic are grouped together in a single comment, with references to the authors of the comment, followed by a response. Where text of this Final EIS (FEIS) has been revised to reflect responses, the reader is referred to the appropriate chapter. Appendix I contains a copy of each written comment received on the DEIS.

B. COMMENTERS

SEQR PUBLIC HEARINGS

Baker, Mike, Resident of West 81st Street
Barton, Christine, President of the 35 West 81st Street Dwellers
Cohen, Hope, Resident of West 77th Street, speaking as an individual
Gissler, Sig, Resident of the Park Belvedere
Houston, Matt, Representing Community Board 7 (Some comments superseded by Community Board 7 *Report, Response, and Resolution* of July 17, 1996)
Kearns, Betsy, Resident of the Park Belvedere
Krawchuk, John, for Landmark West, Certificate of Appropriateness Committee
Lipnick, Jonathan, Secretary of the West 81st Street Block Association
Mayer, Sidney, Resident of West 81st Street
Needham, Sandy, President of 145 West 79th Street, Manchester House

* **This entire chapter is new in this FEIS.**

Neuwelt, Klari, speaking as an individual
Plotkin, Jeff, Resident of the Park Belvedere
Roose, Gina, Resident of 15 West 81st Street
Schein, Alvin, West 81st Street Block Association
Tankel, Claire

COMMUNITY BOARD 7 PUBLIC HEARING, JUNE 18, 1996

At the Community Board 7 public hearing on the project, the Community Board 7 Planetarium and North Side Project joint committee presented a list of questions. Many of these have been superseded by the Board's resolution of July 2, 1996 and so not all the questions are listed separately in section C below. The following are speakers whose comments are summarized in section C, below.

Adler, Barbara, Co-Chair of Community Board 7 Transportation Committee (Some comments superseded by Community Board 7 *Report, Response, and Resolution* of July 17, 1996)
Albert, Andrew, Co-Chair of Community Board 7 Transportation Committee
Barton, Christine, President of 35 West 81st Street Dwellers
Cohen, Hope, for Community Board 7
Facchino, Jon, Resident of West 81st Street
Flam, Jack, Resident of West 81st Street
Gissler, Sig, Resident of the Park Belvedere
Grousman, Richard, Resident of West 81st Street
Gustav, Philippe, Resident of the Park Belvedere
Lipnick, Jonathan, Secretary of the West 81st Street Block Association
Marks, Janice, Resident of the Park Belvedere
Neuwelt, Klari, for Community Board 7
Neuwelt, Klari, speaking as an individual
Starkey, Elizabeth, for Community Board 7
Strauss, Steve, Resident of CB7, Public Member of Transportation Committee
Unidentified members of the audience (three)

BRIEFING WITH COMMUNITY BOARD 7 "SUPERCOMMITTEE," MAY 29, 1996

Adler, Barbara
Albert, Andrew
Bratcher, Diane
Houston, Matt
Neuwelt, Klari
Ryan, Penny
Sheffer, Ethel

BRIEFING WITH THE WEST 81ST STREET BLOCK ASSOCIATION, JUNE 3, 1996

Belizzi, Nicholas, of THP, Inc.
Futterman, Philip
Greenes, Steven
Jaff, Stephen
Lipnick, Jonathan
Rudolf, Edith
Rudolf, William

Schein, Alvin
Siegel, Glen

BRIEFING WITH THE WEST 81ST STREET BLOCK ASSOCIATION, JUNE 10, 1996

Baker, Mike
Belizzi, Nicholas, of THP, Inc.
Futterman, Philip
Jaff, Stephen
Lipnick, Jonathan
Schein, Alvin

BRIEFING WITH RESIDENTS OF WEST 79TH STREET, JUNE 11, 1996

Hoser, Doris
Needham, Sandy

BRIEFING WITH THE WEST 81ST STREET BLOCK ASSOCIATION, JULY 1, 1996

Baker, Mike
Greenes, Steven
Jaff, Stephen
Schein, Alvin
Siegel, Glen

COMMUNITY BOARD 7 MEETING, JULY 2, 1996

Community Board 7 Resolution
Adler, Barbara, for Community Board 7
Albert, Andrew, for Community Board 7
Baldwin, Billy, Resident of 15 West 81st Street
Berman, Dr., Resident of 211 Central Park West
Cohen, Hope, for Community Board 7
Houston, Matt, for Community Board 7
Lochtenberg, Cary, Resident of 11 West 81st Street
Martin, Elizabeth, for Community Board 7
Mayer, Eve, Resident of 15 West 81st Street
Neuwelt, Klari, for Community Board 7
Sheffer, Ethel, for Community Board 7
Schein, Alvin, President of West 81st Street Block Association
Springer, Arthur, Resident of 125 West 93rd Street
Starkey, Elizabeth, for Community Board 7
Strauss, Steve, public member of Transportation Committee of Community Board 7

OTHER COMMENTS RECEIVED BY CLOSE OF PUBLIC COMMENT PERIOD (JULY 17, 1996)

Stringer, Scott M., Assemblymember, statement of July 10
Messinger, Ruth, Manhattan Borough President, letter of July 16
Community Board 7, *Report, Response and Resolution*, dated July 17, 1996
Bellizzi, Nicholas, P.E., THP, Inc., letter of July 17
Donahue, Mary A., letter of July 11

Favretti, Giovanni D., letter of July 16
Garfield, Bruce, President, 145 West 79th Street Owners' Corporation, letter of July 10
Gissler, Sig and Mary, letter of June 28, 1996
Harrison, Paul, and Bauer, Janine, Transportation Alternatives and Tri-State Transportation Campaign, letter of July 17
Hornos, Ricardo, letter of July 9
Kaputa, Catherine, letter of July 10
Kistler, William III, letter of July 9
Kohl, Lisa J., letter of July 9
Leff, Samuel, Past President and Trustee, W. 79th Street "Museum" Block Association, letter of July 16
Leff, Walli F., letter of July 16
Lerner, Betty, letter of July 1
Levko, Leo, letter to New York City Department of Parks and Recreation Commissioner Henry Stern of July 11
Levy, Sacha, letter received July 16
Malanga, Greg, letter of July 11
Marks, James D., letter of July 15
Mauser, Francis Thomas, letter of July 9
Needham, Sandy for RESTT (Response to the Environmental Impact Statement on Traffic and Trees for the museum extension), letters of July 15 and 17 transmitting petitions from residents of buildings on West 79th Street
Rizzo, Raymond J., letter of July 10
Schein, Alvin, telephone call
Sherman, Carl R., letter of July 16
Strauss, Steve, letter of July 14
Szymanski, Alfred, letter of July 8
Westenberger, Fritz, letter of July 17
Wiemer, Fred, letter of July 16
[one illegible signature]

Letters from members of West 79th Street "Museum" Block Association (letter-writers who also included additional comments are also cited individually in section C, below):
Brown, Dorothy K.
Forbes, Laura
Selmon, Linda
Stagers, __

Letters from residents of West 79th Street, July 4:

Adler, Jane	Cochran, J.R.	Forbes, Laura and Douglas
Bauer, Ian	Cohen, Donna	Gallagher, Jane
Berlin, Barbara	Colasurdo, Diane E.	Golding, Sally and Brad
Borgman, Joanne	de Lobo, S.K.	Gordon, Joseph
Bowen, Mary	Derevenco, Maria R.	Gousseland, __
Brimeyer, Jerome	Diaz, Marisol	Gowen, Mimi
Brown, Dale M.	Dwyer, Martha M.	Grande, Gerf
Cavanaugh, Eileen T.	Evans, Susan	Granville, Bernard J.
Chiaronni, Jo	Famighetti, Lori	Greenberg, David
Coblence, Nora	Fontanet, Françoise	Greene, James B. and family

Hata, Yoko
Hanafi, Faiza
Hauser, Karen
Holzer, Bonnie
Iben, Michael Thomas
Kaminsky, Susan
Kandler, Erica
Kaplow, James R.
Kendalton, David
Kyriacon, Nancy
Lam, Wilson
Lazarevic, Martha
Lerner, Ellen
Lidz, Judith
Lobel, Wendy
Mahoney, Kaitilin B.
Mantione, Lynn
Matthews, Brian and Rachel
Mayer, Gerald
McConnell, Jacqui
McGuire, Elizabeth/Bruce
Manuel, Maria Teresa
Needham, Sandy
Oertell, Ingrid
Oganesoff, Nobuko
Ravenal, Cornelia
Raymar, Steve/Debbie Kane
Rosenblatt, Sol and Vicky
Rybakoff, René
Schreck, Jane H.
Sheehan, Bob and Lisa
Sheiner, Naomi
Slavin, Morlyn
Sparks, Helen K.
Sprowl, Jennifer
Sternlight, Judith
Stromer, Mr. and Mrs. Jay
Stokien, Julia and James
Thall, Bernard
Torok, Katherine
Trahan, David
Traube, Victoria
Upshie, Cara
Valenti, Monica and Angelo
Wadia, Diana
Weinberg, Fred
Weiner, Sheri
Whitehead, Carol R.
Wommack, Thomas
Yanowitz, Sandra
Zenis, Sarah
Zucker, Harriet S.
[one illegible signature]

OTHER COMMENTS RECEIVED AFTER CLOSE OF PUBLIC COMMENT PERIOD

Landmark West!, comments on the DEIS of July 26
Allaway, Eleanor, letter of July 18
Budinger, Peyton, letter of July 15
Castro, Bernadette, Commissioner, New York State Office of Parks, Recreation, and Historic Preservation, July 31
Fay, Claire, telephone call
Gershon, Richard, letter of May 16, received July 22
Gissler, Sig, telephone call
Hollander, Joe, letter of July 17
Kennedy, Daniel, letter of July 16
Ketas, Joseph W., Assistant Commissioner, New York City Department of Environmental Protection, letter of August 22
Leff, Sam, telephone call
Maiden, Elizabeth and James, Jr., letter of July 16
Perrotta, Lucille A., M.D., letter of July 9
Poma, David, telephone call
Rasheed, Naim, Director, Office of Project Analysis/CEQR, New York City Department of Transportation, memorandum of August 7
Ravenel, Cornelia, letter of July 17
Schein, Alvin, memorandum of August 1

Letters from members of West 79th Street "Museum" Block Association (letter-writers who also included additional comments are also cited individually in section C, below):
Azorin, Ellen
Calamandre, Judith
Davis, Anne B.
Flause, K.
Giroux, Nicole

Kaufman, Carole Richard
Lerner, Leila and Edward
Silva, Francisco R.

Letters from residents of West 79th Street, July 4:

Betancourt, Jeanne	Fredman, Michael	Miele, Dianna L.
Burget, Kevin	Groves, Dennis P., MD	Saltz, Carole
Donaldi, Maria	Kaufman, Carole Richard	Wiener, Margaret and Jerry
Fredman, Beth	Kleinman, Mark	

C. COMMENTS AND RESPONSES

PROJECT DESCRIPTION

Comment 1: Who will operate the restaurant in the Power House? What kind of restaurant would it be? What are its expected hours of operation? How will visitors gain access to the restaurant after the Museum is closed and will visitors be able to use the garage? (Neuwelt for CB7)

Response: The type of restaurant and operator that will occupy the Power House has not yet been determined. For the purposes of the EIS, it is assumed that the main restaurant is similar to others in the neighborhood, with similar operating characteristics and operated under lease to the Museum. Pedestrian access to the restaurant would be from Columbus Avenue near West 79th Street via the new entry pavilion and from within the Museum. It is assumed for the EIS that restaurant patrons could use the garage.

Comment 2: Where will revenue from the garage be directed, especially if persons other than Museum visitors or employees are permitted to use the garage? (Neuwelt for CB7)

Response: The Museum is a not-for-profit institution and any operating revenue from the garage will be used by the Museum for its ongoing expenses, which include costs associated with its educational and scientific mission, and may include the costs for garage construction as well.

Comment 3: While AMNH states that the driving force behind the project is the need for a modern planetarium, the various revenue-producing elements included in the proposal (garage, restaurant, terrace) could call the purely educational mission of the project into question. (Cohen, W. Leff)

The use of revenue from the restaurant is a dedication of public space for private use. (Sheffer for CB7)

The project would effectively change the Planetarium's zoning by creating a consumer and entertainment project in the guise of developing science education. (Museum Block Association letters)

Response: The Museum currently has a cafeteria-style restaurant, a sit-down restaurant, and, at times, mobile food service carts for the convenience of its visitors. It proposes to create another such restaurant in the hopes that it will better serve the Museum's visitors. Providing attractive food service opportunities for visitors is typical of, expected from, and appropriate for major cultural institutions. Income derived from serving visitors as well as the public will help support the Museum's scientific and educational activities as well. The garage is needed on weekends to meet the demand of visitors who drive to the Museum, as shown clearly in Chapter 12, "Traffic and Parking." As noted above, any operating revenue from the garage will be used by the Museum for ongoing expenses. The terrace is included in the overall project to accommodate some Museum activities and provide a publicly accessible amenity and as a key feature of the design—one that helps organize and complete the north facade of the Museum complex and, as noted in the Landmarks Preservation Commission report, enhances the Central Park West/Upper West Side Historic District.

The project's uses—exhibition space, public outdoor space in a public park, off-street parking, and restaurant—are all common to the neighborhood, and in fact are not new uses to the Museum block either. These new Museum elements would be constructed within the Museum's existing footprint on the block (except for a very small area—2,620 square feet of the 370,260-square-foot park—to be used for the new Columbus Avenue entrance), and would represent a continuation of existing Museum functions there.

Comment 4: A good-faith gesture to the community (as well as a close-to-home investment) would be to dedicate a portion of the revenue from independent commercial operations at the Museum (the garage and restaurant) to the preservation and maintenance of Theodore Roosevelt Park and the 81st Street IND subway station. (Cohen, CB7 Resolution/Response)

Response: The Museum has committed $1 million to the renovation of Theodore Roosevelt Park being undertaken by the Museum Park Working Group, plus the cost of design fees. As stated above, revenues from the project would be used by the Museum to offset its operating expenses.

Comment 5: AMNH's claim of exclusive control over the public open space on the terrace does not mean AMNH should consider this outdoor space as equivalent, for the purpose of management, to any of its indoor spaces. The terrace is exposed to the community in a manner completely different from other Museum spaces. Because of its location in city parkland, maybe the terrace should be considered public park as well. Should the Museum be the only entity with the right to hold events there? (Cohen, Neuwelt, Flam)

What gives the Museum the right to impose its internal affairs on the neighborhood with a terrace and restaurant? (Flam)

Response: The terrace, which would be built within the existing Museum footprint, would provide an entirely new amenity for the neighborhood. The Museum recognizes that the terrace is not exactly equivalent to its indoor spaces, although it would be built and maintained by the Museum. The Museum will work with the community toward a programming policy that addresses both Museum and community needs.

Comment 6: The DEIS calls the terrace 35,000 square feet of public space, but it is not to be used publicly. Part of the terrace would be used for the restaurant, and the terrace would at times be closed for special events. (Neuwelt)

Response: The terrace would generally be open to the public, although it would be closed when the Museum is closed and occasionally for special events. As discussed in Chapter 6, "Open Space and Recreational Facilities," approximately 1,150 square feet would be used by the restaurant, with the remaining 33,850 square feet publicly accessible. See also response to Comment 7 for a discussion of terrace use.

Comment 7: Community Board 7 encourages the Museum to create a terrace that is truly a public open space, and to maximize public use of the terrace with benches and movable tables and chairs available for use by the public free of charge throughout regular Museum hours and during whatever additional hours may be appropriate, depending on hours of daylight, weather, etc. (CB7 Resolution/Response)

Response: It is the Museum's intention to create such a public amenity. The terrace would generally be open to the public when the Museum is open. It could be closed occasionally to allow its use for special events or Museum-related activities. The design of the terrace and its elements has not yet been finalized, but it is expected to include features to encourage public use, such as landscaping, lawn, benches, tables, and seating, etc. The preliminary design will be provided to CB7 and interested neighbors for discussion.

Comment 8: The Park Working Group, in consultation with the community at large, could be an effective mechanism to develop a comprehensive plan for the use of the public terrace, with such a plan to define: hours to maximize access for the public; the relationship between use by the public and use by the new restaurant; limitations on hours for and frequency of private events to be held on the terrace. (Neuwelt for CB7, CB7 Resolution/Response)

Response: The Museum will work with the community on guidelines for programming of events on the terrace. The Museum Park Working Group will participate in the development of the terrace program.

Comment 9: The DEIS needs to be more specific about proposed uses on the terrace and their timing, so that traffic and noise implications can be examined. (Schein)

Response: The DEIS describes the proposed uses on the terrace as well as their timing in Chapter 12 ("Traffic and Parking") and Chapter 15 ("Noise"), and the traffic and noise implications of those uses are considered in the document. Since completion of the DEIS, the Museum has undertaken a detailed noise study to consider more specifically the noise effects of different uses on the terrace; Appendix G and Chapter 15 of the FEIS reflect the results of that study.

Comment 10: How much of the terrace will be for the public and how much will be devoted to outdoor dining at the restaurant? What hours will it be open and what kind of supervision will there be? How will the public gain access? (Neuwelt for CB7, Mayer)

Response: Generally, outdoor dining space of 1,150 square feet will be reserved for restaurant use and the remaining 33,850 square feet will be available to the public, including a 4,000-square-foot area where tables and chairs will be provided for public use. It is anticipated that the terrace will be open during Museum hours; access will be available both through the Museum (from the new Planetarium, galleria, restaurant, and Columbus Avenue entrance) and from Theodore Roosevelt Park, via a staircase at the northwest corner of the terrace. The terrace, like other portions of the Museum, will be patrolled and maintained by the Museum's security staff.

Comment 11: The representatives of the Museum have stated their case for a new educational facility which will educate our youth somehow all over the country. People are objecting to the parking garage and the terrace restaurant. And it seems to me very simple: build the new Planetarium, renovate the Museum, and forget the terrace restaurant and forget the parking garage. (Plotkin, Flam)

Response: The primary purpose of the project is to further the Museum's mission of education and science. However, as stated in response to Comment 3, the other program elements proposed would provide important services for Museum visitors, as well as contributing funds to the continuation of the Museum's mission.

Comment 12: The DEIS implies that dwindling attendance at the Planetarium is due to its being "out of date" without recognizing that it has not been maintained and that no effort has been made at keeping it current. (Landmark West)

Response: As described in Chapter 18, "Alternatives," the first effort at the Planetarium was to plan for its renovation and upgrading of its exhibits. However, as noted below in the response to Comment 22 and in Chapter 18, the existing Planetarium structure is not large enough to adequately accommodate today's technology and the space needs of state-of-the-art exhibitions about the universe.

The decision about the Hayden Planetarium's suitability for use as a modern-day facility was not based on its current physical condition.

Comment 13: Pigeons will make the glass of the new Planetarium dirty. How will you clean it? (Hoser)

Response: Because the Planetarium's walls would be vertical, no pigeon perches would be available. Window washing equipment would be built into the building.

Comment 14: The park around the Museum is unkempt; the dog run is particularly unattractive. Do you propose to fix that? (Hoser)

Response: As described in the EIS, the northern and western portions of Theodore Roosevelt Park will be renovated independent of the Planetarium and North Side project. The renovation is being undertaken by the Museum Park Working Group, which consists of the Borough President, local Councilmember, the Department of Parks and Recreation, the Museum, CB7, Friends of Museum Park, the West 81st Street Block Association, and civic groups. The renovation will improve the drainage, repair and maintain existing vegetation, and provide new landscaping and walkways and better lights and security. As part of this effort, the issue of the dog run will be addressed. The Museum has committed $1 million to the renovation of the park, plus the cost of design fees.

Comment 15: I am concerned that the project would attract drug dealers to the park, particularly at night. (Hoser)

Response: As described in the EIS, the project would enliven now-quiet areas of the park with its new Columbus Avenue entrance, new restaurant with windows facing the park, and other elements. At night, lighting would be provided as needed for security. The terrace would be gated at night, and would be patrolled by the Museum's security staff.

ECONOMIC CONDITIONS

Comment 16: Community Board 7 encourages the Museum to use New York City-based and where possible community-based businesses to provide goods and services in connection with the Planetarium project. (CB7 Resolution/Response)

Response: The Museum will encourage its contractors to use city and local businesses to the extent possible.

Comment 17: The DEIS fails to consider the economic effect of project construction and permanent increases in traffic and noise on the value of adjacent real estate. (Baker, Baldwin)

Response: The EIS concludes, as does the report from the New York City Landmarks Preservation Commission (LPC), that the project will enhance the character of the surrounding neighborhood and the Central Park West/Upper West Side Historic District. There is no reason to conclude that the value of surrounding properties would be diminished. Similarly, there is no reason to conclude that the limited (three-year) construction period would have adverse effects on surrounding property values. The EIS analyses of neighborhood character (Chapter 9) and of construction impacts (Chapter 16) conclude that the project would not have adverse effects on neighborhood character. Please note that SEQR does not require an analysis of economic effects, such as the effects on property values, except as those economic effects would result in changes to neighborhood and community character.

Comment 18: With the proposed new garage, local parking lots would lose business. (Kistler)

Response: Given the predicted increase in attendance at the Museum from the proposed project, it is likely that all garages would see some increase in business in the future. The parking analysis in Chapter 12 assigns cars to the Museum garage, local garages, and on-street spaces. There is no reason to assume that local parking garages would lose business. (Please also note that SEQR does not require an analysis of economic effects in the EIS, except as such economic effects might affect neighborhood character.)

Comment 19: Given the magnitude and attraction of this project, the EIS estimate of attendance may be too low. (Schein, Albert)

Response: As described in Chapter 4, "Economic Conditions," a range of attendance increases could occur in the future both without and as a result of the project. The high end of that range was assumed for the EIS analyses. That magnitude of attendance requires that the Museum substantially increase its share of the national and international market, to a level that, while not beyond reason, is very optimistic.

OPEN SPACE AND RECREATIONAL RESOURCES

Comment 20: We oppose this project's negative effects on Theodore Roosevelt Park, which is a special resource for the city. The project would completely disrupt the green belt created by the park, encroaching on and decreasing the usability of the park space. (Museum Block Association letters, Giroux, Davis)

Response: The proposed project would not encroach on the park, except for the very small (2,620 square feet of the approximately 8.5-acre, or 370,260-square-foot, park) area it would use to create the new Columbus Avenue entrance pavilion. This loss would be offset by the addition of 2,800 square feet created by covering over the subsurface service yard, also as part of the Columbus Avenue entrance. Construction of the new entrance pavilion and plaza would not require removal of any trees in the park or along Columbus Avenue. The DEIS did include an analysis of the potential effects on the park of six different mitigation options, all of which involved new driveways to the parking garage from Columbus Avenue. However, as described in the response to Comment 114, the FEIS is now proposing mitigation Option 4, which would reuse an existing service drive and therefore would not require removal of any trees or parkland. Chapters 1 and 17 in the FEIS reflect this change.

HISTORIC AND ARCHAEOLOGICAL RESOURCES

Comment 21: While we support and commend the Museum's efforts to be technically current and competitive, we are not convinced that this may be achieved only by the sacrifice of the existing Planetarium structure. It is a rare building type, unique in New York City, and a cultural landmark for the city. Every alternative to demolition should be pursued. In practice, if this particular site were owned privately or by a nonprofit organization, it is highly unlikely that the Landmarks Commission would have approved the demolition without requiring proof of hardship. (Krawchuk for Landmark West, Museum Block Association letters)

The Background Research Report on the history of the Planetarium that was submitted to the Landmarks Preservation Commission clearly spells out the technological importance of the Hayden Planetarium in the United States. The construction technology of the planetarium building is of local and national significance. (Landmark West)

We feel that the Hayden Planetarium's status as a historic resource has not been seriously considered. Saving a few grilles or architectural and decorative elements is a poor substitute to saving the building. We believe that the Museum's architects could find a solution to the problem of keeping the existing building while constructing a new one. (Landmark West)

Response: The Landmarks Preservation Commission (LPC) found demolition of the Planetarium to be appropriate after review of detailed documentation and several public hearings. This review included examination of alternatives to renovate or reuse the existing structure. In its report on the project (summarized in detail in Chapter 7 of the FEIS), LPC noted "that the Hayden Planetarium is one component of a complex of buildings forming an individually designated landmark, and that it has a minimal role in establishing the distinctive architectural character of this landmark"; and "that although the building was included as part of the individually designated Museum complex, its inclusion in that designation relates primarily to its cultural associations as the Museum's Planetarium and to the public's experience of its programming and exhibits rather than to its architectural importance." About the proposed new Planetarium, LPC noted "that the cultural associations of the Planetarium will be retained in both the location and architectural expression of the new Planetarium structure."

The EIS includes an analysis of alternatives to renovate or reuse the existing structure (see Chapter 18, "Alternatives"). As described there, reuse of the Planetarium for another purpose with a new planetarium nearby would create identity problems and confusion, and would not respect the historic layout of the Museum. The existing planetarium building is not large enough to accommodate state-of-the-art exhibition space (see response to Comment 22).

Comment 22: Where in New York City do we destroy a historic structure that is in excellent condition? What is the technical reason for the destruction of the existing sphere? Is it merely to gain an extra 5 feet in the sphere? The Historic Districts Council, not only Landmark West, opposes this. (Tankel, Maiden, Allaway, Stagers, Wiemer)

With exciting programming, the Planetarium would be full of visitors. (Tankel)

Response: As noted above, LPC found demolition of the Planetarium to be appropriate after thorough review of the options. The technical reason for this decision was not the structural integrity of the building, but its ability to support the educational mission of the Museum for a subject whose technological requirements are not available in the existing structure. The programming analysis found that the existing building cannot accommodate exciting, state-of-the-art programming in astronomy and related sciences. The existing building is not large enough to house the new state-of-the art exhibition space needed adequately to explain the workings of the universe. The current Planetarium has 24,000 square feet available for exhibition, of which 5,000 square feet are now occupied by the sky theater and 19,000 square feet by other exhibit space. The new building is expected to have a 5,000-square-foot sky theater and 45,000 square feet of exhibit space—more than twice the space available in the existing structure.

Comment 23: If the project was needed simply to provide facilities to accommodate the large increase in visitors projected for the future and was as sensitive to its surroundings as the most recent building, there would be no problem. However, this project is not appropriate for a Manhattan historic district, despite the Landmarks Preservation Commission's vote. Building glass structures in brick and stone historic districts is now unacceptable in New York and elsewhere. I do not see in the proposal a legitimate attempt to meet the increasing demands of your important cultural and educational mission, but instead ambition and creation of demands where they do not presently exist. (Wiemer, Davis, Kennedy)

Response: As noted above, the need for the project is to allow the Museum to support its educational mission for a subject whose technological advances now require a kind of space and exhibitry not available in the existing structures at the

Museum. In terms of the materials from which the project is constructed, the LPC report notes that the Museum complex encompasses buildings constructed at different times with different materials and that the form of the proposed new Planetarium structure is a contemporary expression of the building's purpose. The LPC found the proposed design appropriate and consistent with the Museum's long history of building wings as needed in styles that express their periods of construction.

Comment 24: Tearing down a historic landmark for the purpose of increasing profits is appalling. (Westenberger, Davis)

Response: As noted in Chapter 2, "Project Description," the purpose of this project is not to increase profits, but rather to support and enhance the Museum's scientific and educational mission.

Comment 25: While we appreciate the effort that has been made by both the Museum and architect to involve Landmark West!, the process has not allowed our group to have a full understanding of the complete picture, since the plan had originally been presented without the benefit of an EIS. (Landmark West!)

Response: The Museum has presented the project to any interested community group or individual, through a series of public hearings and informal briefings and meetings throughout both the SEQR and LPC review processes. Plans for the project remain virtually identical to plans presented to LPC and Landmark West at the time of the LPC review, particularly as regards the landmark issues. As formal LPC approval is not required for the project (LPC has consultative review jurisdiction), SEQR does not require an environmental review as part of the LPC review process. However, the LPC review process was open to the public and Landmark West (among many others) submitted comments on the record during that proceeding. Since the SEQR review commenced at the same time as the LPC review process, an environmental assessment form for the project was prepared, filed, and available for public review prior to the completion of the LPC review process. LPC has submitted its resulting report as part of the SEQR review.

Comment 26: Without a comprehensive design for the park, we cannot fully evaluate this project. (Krawchuk for Landmark West!)

Response: The park planning is being undertaken independent of the proposed project (see Chapter 6, "Open Space and Recreational Facilities," section C, "The Future Without the Project"). As described in Chapters 2 and 6, this work is aimed at improving poor physical conditions and is not a comprehensive design effort.

URBAN DESIGN AND VISUAL RESOURCES

Comment 27: Community Board 7 looks forward to participating in the analysis of schemes for lighting the planetarium globe, and to reviewing AMNH's plans for lighting of and around the public terrace and Columbus Avenue entrance. Community Board 7 supports the further testing of Planetarium lighting with project models and looks forward to participating in the analysis of the findings from such testimony. (CB7 Resolution/Response)

Response: The Museum will share the lighting studies and plan with members of Community Board 7. There is no plan to "test" the lighting with project models, however.

Comment 28: Community Board 7 supports lighting on the public terrace, but believes that lighting should be limited to brightness levels required only for security purposes. (CB7 Resolution/Response)

Response: The lighting plan for the terrace conforms with the suggested approach.

Comment 29: Community Board 7 is supportive of additional lighting and banners at the Columbus Avenue entrance but would like to see a plan for the entrance lighting so that placement of fixtures does not disturb the streetscape of Columbus Avenue from 77th Street to 81st Street. (CB7 Resolution/Response)

With regard to the park design, lighted banners are mentioned in the DEIS. We are concerned about the size and impact of what seems like an advertising medium on the traditionally quiet park. (Landmark West!)

Response: The lighting plan and design for the Columbus Avenue entrance, including the lighted banners, would be designed to minimize disturbance to this portion of the park.

Comment 30: The Museum does not adequately address shadows created by the project on Theodore Roosevelt Park. With the new building there would be 75 percent more shadow coverage on the park in February at 2 PM. The EIS must address these impacts and mitigation measures. (Facchino)

Response: In response to this comment, an analysis of project shadows on Theodore Roosevelt Park has been prepared, which addresses conditions during the winter (December 21) and during the growing season (March 21, May 5 and June 21). As shown in Appendix B and described in Chapter 8, the project would create small increments of additional shadow on the portion of Theodore Roosevelt Park in front of the Planetarium. This small area of the park is not used for activities requiring sun (e.g., sunbathing, seating, sports), nor does it contain sun-sensitive vegetation. The incremental shadows are therefore not considered significant.

NEIGHBORHOOD CHARACTER

Comment 31: The DEIS is incorrect in saying that the project would have no impact on West 81st Street. The project would greatly increase the traffic on the street and the new terrace with its loud music would also have impacts. This should be a peaceful neighborhood. (Lochtenberg, Baldwin)

Response: The EIS includes detailed analyses of the project's effects on neighborhood character, visual quality, traffic, and noise, among other issues, with a particular focus on the effects on West 81st Street (see Chapter 9). The new traffic on the street is described in the EIS (see Chapter 12, "Traffic and Parking"). As explained in the EIS, there would be significant traffic impacts on West 81st Street at both Columbus Avenue (at the eastbound approach only) and at Central Park West, but mitigation measures have been proposed that would ameliorate those impacts. As described in Chapter 17, these include traffic mitigation and use of the Museum's service drive on weekends to permit a second access to the garage. Regarding noise, the EIS concludes, after detailed study, that the project would mitigate nearly all of the intrusive noise from terrace events on West 81st Street (see Chapter 15, "Noise"). See also responses to Comments 78 and 80.

Comment 32: The project will bring an additional 670,000 people a year to the neighborhood on top of a new 670,000 attendance increase anticipated without the project. That's an increase of 1,340,000 new people a year without the countless others who will come as consumers to the outdoor terrace, restaurant, galleria, and other yet-to-be anticipated activities. This project promises an irreparable dose of traffic jams, pollution, safety concerns, overcrowding, stress, and chaos for our neighborhood. (Museum Block Association letters, Wiemer, Forbes, Selmon, Stagers, Giroux, L. and E. Lerner)

The new restaurant will bring chaos. (Berman)

Response: The increases in attendance are detailed in Chapter 4, "Economic Conditions." As described there, without the project, paid attendance at the Museum is projected to increase 5 percent a year to 2001, including an additional 10 percent to account for a total (not annual) increment of 670,334 by that year. With the project, the overall paid attendance at the Museum is projected to increase at a higher rate, at approximately 8 percent per year, and attendance at the Planetarium would also increase dramatically. In total, the project would bring an additional 673,878 visitors in 2001. These projections account for all new visitors expected at the Museum, including those who come to use the outdoor terrace, restaurant, and other features of the Museum. Accounting for these attendance projections, the FEIS includes analyses of the project's effects in terms of neighborhood character, traffic, noise, air quality, etc. See also the response to Comment 31, above.

Comment 33: While improvements to the Museum's north side were in order, this massive futuristic and "Mall-like" plan is clearly incompatible with the character and quality of life requirements of our community. It introduces a complex of concepts and elements foreign to the character of our landmark neighborhood. (S. Leff, Westenberger, Maiden, Ravenal, Kennedy, Gershon, Allaway, Museum Block Association letters, Davis, Giroux)

Response: The EIS and LPC report found that the proposed project would be compatible with the surrounding neighborhood. The uses that it introduces—exhibition space, terrace in a park, off-street garage, and restaurant with entrance on Columbus Avenue—are all common to the neighborhood. The EIS includes an analysis of the project's effects on neighborhood character in Chapter 9 and an analysis of the effects on historic resources, including the historic district, in Chapter 7. As previously noted in response to Comments 21 and 22, the proposed project was found by the Landmarks Preservation Commission to enhance the Central Park West/Upper West Side Historic District.

TRAFFIC AND PARKING

Comment 34: Community Board 7 urges AMNH to dedicate and empower managerial staff to develop and implement a **comprehensive** transportation plan encompassing management of unloading, parking, and loading of school buses, tour buses, vans, taxis, and passenger cars, as well as encouragement of non-automotive forms of transportation. (CB7 Resolution/Response, Messinger)

Response: Chapter 12, "Traffic and Parking," has been revised to spell out the Museum's intention to develop and implement an ongoing transportation management policy, covering all aspects of transportation at the Museum, traffic management, automobile parking, bus management, parking, loading and unloading, coordinating with the Police Department and Parks Enforcement Patrol to enforce existing regulations, and promoting public transportation. This will include hiring of a qualified transportation coordinator and dedication of senior managerial staff at the Museum.

Comment 35: Community Board 7 is supportive of the appointment of a transportation coordinator and expects that such a post will be filled by an applicant who is experienced and highly qualified in all transportation matters. (CB7 Resolution/ Response)

Response: As noted in the response to Comment 34, the Museum has committed to hiring a qualified transportation coordinator.

Comment 36: What commitments will the Museum make about what it will do if the traffic problems turn out to be severe? (Unidentified)

Response: The EIS considers a conservative, "worst case" for traffic, in which attendance and traffic estimates are at the highest end of the range, so that the analysis will encompass very severe conditions that are unlikely to be surpassed in impact. In addition, the comprehensive transportation plan outlined in Chapter 12 will be ongoing, enabling the Museum to respond appropriately to more severe consequences if they occur.

Comment 37: The FEIS should provide information on other major museums and whether they provide on-site parking facilities for their visitors. We would need to know the number of annual visitors and whether the Museum provides any parking, and if so, how many spaces, so as to determine whether AMNH's garage is similar or dissimilar to its peers. (Strauss)

Response: This information is not readily available and not relevant to AMNH's particular situation. The other New York City museums have different attendance patterns and visitor characteristics (for example, on weekends families comprise a large portion of AMNH visitors, and there are substantial numbers of schoolchildren during the week). In terms of its content and mission, AMNH is most similar to other science museums, which are all located in other cities, in which visitor patterns and transit availability differ greatly from that of New York.

Comment 38: Community Board 7 requests the opportunity to review all aspects of the parking policy in the new garage. This would include the parking policy as it would pertain to the commercial vehicles as well as vehicles which may be parked there pursuant to a plan to permit community parking. (Houston for CB 7)

Response: Priority in the garage would always be for visitor parking, and therefore the parking policy for the garage cannot be finalized until the project is completed and that demand is known. It is possible that some weekday spaces on the lower level could be made available to members of the community.

Comment 39: How will the Museum determine whether to make monthly parking available to residents of the community? If it decides to do so, how will this type of garage impact the neighboring community? (Adler for CB7)

Response: See response to Comment 38. If spaces do become available for the community, these would be on weekdays only, and would not adversely affect the neighboring community.

Comment 40: The DEIS states that very few people travel to the Museum by bicycle, and that the Museum has no facilities for bikes. Community Board 7 encourages the Museum to promote this type of transit by installing bike racks and by studying other possible ways to encourage travel to the Museum by bicycle. (CB7 Resolution/Response, Mauser)

Consider installing rollerblade lockers. (Mauser)

Response: The Museum will install bicycle racks close to one of its main entrances, such as at the West 77th Street entrance.

Comment 41: Community Board 7 believes that undertaking origin and destination studies of the Museum's visitors is necessary and needed to predict traffic patterns and public transportation usages, and could facilitate the development of a comprehensive transit and traffic plan. (CB7 Resolution/Response)

Response: The traffic studies in the EIS used surveys of the origins of its visitors to confirm the traffic routing assignments for the project. Those assignments were based on actual field observations at the parking lot and therefore on actual distributions of cars entering and exiting the garage and arriving at and leaving the site. This information is very specific as to the actual route taken—it tells how the visitor or employee came to the site—so that the traffic analysts could prepare a traffic assignment without having to make assumptions based on knowing only where the trip began or ended, as would be necessary using only an origin and destination study. As part of the traffic studies for the EIS, surveys of visitors' modal splits were also undertaken in March 1992. These surveys provide actual information about the means of transportation visitors use to reach the Museum, which would not be available through the use of origin and destination surveys.

Comment 42: Has the Planetarium Authority taken into account the exponential increase in demand for parking, once the new garage spaces become available? If not, will this figure change any of the DEIS's assumptions concerning levels of service, traffic flow, etc.? (Albert for CB7)

CB7 will be making a quality of life mistake if it endorses a 100 percent increase in available parking. Although some say the new garage will reduce congestion, the provision of additional parking will increase traffic and encourage more people to drive. Experience has shown that increases in vehicular transportation capacity lead to higher vehicle use, not reduced congestion. The FEIS should explain how the Museum's parking plans will not worsen the existing modal split between automobiles and other means of reaching the Museum. (Strauss, Flam, B. Lerner, Harrison and Bauer, Needham)

Doubling the garage's capacity won't solve the problem; it just means that more cars will come, more than are currently anticipated. (Gustav, Gissler, Albert for CB7)

The DEIS mistakenly assumes that parking demand is a function of Museum attendance rather than a function of parking supply. Museum attendance is actually unrelated to parking supply, except perhaps, for the upper-level donors who demand special treatment. (Harrison and Bauer)

Response: As noted in response to Comments 36 and 19, the attendance figures underlying the traffic analysis are extremely conservative (high), both for the No Build and Build conditions, so that the analyses encompass severe conditions. The decision regarding which means of transportation to use for any given trip ("modal choice") is primarily a function of travel time, income, out-of-pocket cost, comfort, and the availability of alternative modes. Based on visitor surveys, Museum visitors already exhibit a high auto share—30 percent on weekdays and 50 percent on weekends. Given the fact that the new garage would represent primarily a visitor amenity, rather than a major change in the variables affecting visitor modal choice (parking is now available on-site and in the surrounding neighborhood), it is not expected that the provision of a new parking garage at the site would substantially change these patterns.

On weekdays, under existing conditions, the lot rarely reaches capacity, so the provision of increased parking at the site would not affect the factors contributing to modal choice decisions. On weekends, the surface lot does reach capacity, but there are other parking facilities within an easy distance that supplement the supply of parking available to Museum visitors. While the new garage will allow a higher percentage of weekend visitors to park on-site, it does not represent a change of the magnitude required to substantially alter modal choice patterns. (The difficulty the New York City Department of Transportation [NYCDOT] and the Department of City Planning [DCP] have faced in Manhattan, where a policy of restricting parking has failed to change auto use patterns, demonstrates that factors other than parking are critical in modal choice decisions.) For those Museum visitors coming from within New York City, constituting more than 50 percent of the Museum visitors, many do not own or rely on an auto; for these people the increase in parking is irrelevant and would not affect their means of transportation. Finally, it should be noted that the Museum as part of its transportation plan will be initiating programs to promote the use of public transportation for visitors to the Museum. It is the intention of these programs to increase the attractiveness of using public transportation and perhaps reduce auto usage at the site.

Comment 43: The traffic analysis in the DEIS recorded information at only one time of the year. Did it account for the fact that Museum attendance may be higher at other times of the year? Was the peak attendance used? (Lipnick)

Response The counts of existing vehicular traffic were conducted over several years and during several different months and seasons. The counts included the period soon after the new dinosaur exhibits opened, and therefore reflect a high average condition.

Comment 44: How many spaces in the garage will be reserved for Museum personnel, and has employee use of the garage already been factored into the DEIS? (Albert for CB7, Harrison and Bauer, Strauss, Cohen)

The EIS should include more discussion of employee commutation practices, including whether the Museum is subject to the Employee Commute Options (ECO) requirement of the Clean Air Act, how many employees the Museum has and will have, what is the modal split for current employee commutation, and what is expected once the project is complete. (Plotkin, Strauss)

We hope that the Museum would not contribute to the city's congestion and pollution problems by subsidizing commuting by automobile. No free parking should be provided for employees. Employees should not be encouraged to park at the Museum. (Harrison and Bauer, Kaputa)

Response: Chapter 12, "Traffic and Parking," has been revised to include information on employee parking. In all, 50 employee spaces in the service area will be removed by the project. On weekdays, when the garage is not expected to be full, there is expected to be sufficient parking on the lower levels of the garage to accommodate the employee spaces displaced by the project. On the weekends, the service area is expected to be sufficient for employee parking and no spaces in the garage are anticipated to be needed. As noted in the response to Comment 34, the Museum's ongoing transportation management policy will include promoting the use of public transportation. The Museum is subject to ECO requirements.

Comment 45: Will a traffic signal be installed on West 81st Street at the entrance to the garage to regulate the flow of cars, both in and out of the garage? (Albert for CB7)

Response: It is unlikely that a traffic signal would be installed in this location, since the number of cars that constitute the cross movement (turning into the driveway) would not be enough to meet the criterion that NYCDOT has set to warrant installation of a traffic signal.

Comment 46: Personnel should be placed at the West 81st Street driveway to direct traffic. (Houston for CB7)

On most weekends, unbelievable chaos and horn honking take place on West 81st Street when the traffic goes into the parking lot. When somebody is there to control traffic it gets better, but that person is not there all of the time. (Mayer, Schein)

The Museum has turned a deaf ear to those turning left into the driveway from West 81st Street. They've seen it happening and done nothing. (Unidentified resident of West 81st Street)

The FEIS should consider as a possible mitigation measure prohibiting left turns into the West 81st Street driveway. (Baker)

Response: As noted in response to Comment 34, the Museum intends to develop and implement a transportation plan that would, among other things, include organization of the approaches to garage entrances and coordinating with the Police Department and Parks Enforcement Patrol to enforce existing regulations, which do not permit standing in traffic lanes. This plan would include use of a transportation coordinator hired by the Museum.

The traffic studies have shown that the left-turn movement into the West 81st Street driveway is only a problem when the lot is full and vehicles are unable to enter the site. At other times, there are sufficient gaps in the traffic stream to comfortably complete this maneuver without adversely affecting traffic. With the increased parking associated with the project, the periods in which the lot is full and turning movements create a problem have been greatly reduced. In addition, as part of its traffic management plan the Museum plans to station personnel who will direct traffic movements at the West 81st Street driveway during peak periods. Consequently, a ban on left turns, which would increase the distance vehicles would travel to access the driveway and possibly induce an increased incidence of illegal U-turns to approach the driveway, is not appropriate mitigation.

Comment 47: The FEIS should consider the possibility of prohibiting left turns for cars exiting from the 81st Street driveway. Allowing right turns only would direct traffic away from 81st Street and the surrounding neighborhood, and it would prevent a queue from forming on the driveway in the park. Left-turning vehicles might also pose a safety hazard to pedestrians. (Lipnick)

Response: The traffic studies have not identified a problem from left-turning exiting vehicles at the West 81st Street driveway. Observations at that driveway indicate left-turning vehicles are able to exit without excessive delay or a safety hazard. Prohibiting vehicles from turning left and forcing all traffic to exit eastbound onto West 81st Street would exacerbate traffic conditions at the intersection of West 81st Street and Central Park West and would increase overall congestion in the area. Currently, because it provides the most direct travel path, approximately one-third of the exiting vehicles turn left at the driveway and a substantial percentage of these trips then head farther west toward the West Side Highway. Diverting these trips toward Central Park West would force travel on a circuitous route, thereby adding to vehicle travel in the area and exacerbating traffic conditions along Central Park West.

Comment 48: After construction of the project, traffic problems should not be exacerbated on West 81st Street. (Barton)

Response: As explained in Chapter 12, "Traffic and Parking," the provision of the new parking garage, coupled with implementation of a transportation management plan should result in an overall improvement in traffic conditions along West 81st Street. Impacts that could occur at the intersections along West 81st Street at Central Park West and Columbus Avenue could be mitigated by signal retiming, lane restriping, and modifications to parking regulations. These measures are described in Chapter 17, "Mitigation."

Comment 49: The DEIS seems to indicate that the proposed new garage will actually improve the traffic situation on the block, which we believe is ludicrous. (Schein, Lipnick, Barton)

Response: The detailed analysis in the EIS, which is based on field observations and videotaping, shows that queuing occurs when the parking lot is full. With greater capacity and even with the increased number of visitors, the amount of time in which the garage would be full would be less than what occurs now or will occur in the future without the project. The intersection analysis in Chapter 12 does not claim that traffic will improve on West 81st Street with the proposed project; the project would create significant impacts at Central Park West and West 81st Street and on West 81st Street approaching Columbus Avenue. Mitigation has been proposed for these impacts.

Comment 50: The DEIS does not properly consider that the increased Museum and Planetarium attendance caused by the attraction of the proposed new facility will, by definition, draw many more vehicles to the block, since the only garage entrance will be on West 81st Street. (Schein, Lipnick, Barton Baker)

Significantly increasing attendance at the Museum will bring even greater traffic to the area, further overcrowding an already crowded area. (Hollander, Museum Block Association letters)

Response: The EIS analyzes in detail the increase in traffic on West 81st Street as well as other blocks in the study area (see also the response to Comment 49). As noted in the response to Comment 114 (below), a second weekend garage entrance on Columbus Avenue is now proposed as an additional project mitigation measure.

Comment 51: The FEIS should reexamine the project's effect on westbound traffic along West 81st Street approaching Columbus Avenue. We have observed that all of the westbound vehicles typically turn from a single lane, the left lane. The DEIS included left-turning vehicles from two lanes and stated that the project would not have a significant adverse impact there. (Schein)

Response: Impacts at this intersection were examined as part of the EIS. The traffic studies accounted for the fact that the street width and geometry provide capacity for two left-turn lanes and a curb lane. Depending on the demand levels and curb frictions, this capacity was observed to reflect intersection operations. During periods of lighter demand and/or when illegal double-parking occurs, the approach may at times forms only a single westbound lane.

Comment 52: The queue for the parking lot/garage should be considered as a moving lane in conducting the LOS analysis. (Bellizzi)

Response: An LOS analysis was conducted for signalized intersections in the study area; based on field observations, the parking queue did not affect service conditions at the intersections along West 81st Street. At the driveway itself, service conditions and the effect of the queue are described qualitatively in the EIS.

Comment 53: The Museum study of existing traffic conditions on the block caused by the parking lot entrance and exit is faulty, because during the videotaping, on which the study was based, the Museum placed an attendant at the entrance of the parking lot to dissuade drivers from waiting on line. This skewed the results of the study. The entrance attendant is not a Museum employee, nor has a permanent entrance attendant been guaranteed in connection with the proposed garage. After the videotaping, the entrance attendant disappeared. The study should have been done under normal conditions, without an entrance attendant; we therefore believe that the entire traffic study is invalid. (Schein, Lipnick, Barton)

Response: The traffic analysis in the EIS is based only in part on the videotaping; extensive counts of the existing traffic in the neighborhood were made over several years using both manual and automatic traffic recorder surveys, and field observations of conditions on West 81st Street as well as other streets in the study area were made on a number of other occasions. At most of those times, there was no attendant at the parking lot entrance. At the request of the community, beginning in the winter of 1996, the Museum asked the operator of the parking lot to station the attendant at the drive when the lot is full, to help alleviate congestion at those times by directing visitors to parking garages in the area. During the videotaping, the attendant was present during only part of the day; when he was gone and the lot was full, the queue formed and traffic blockages and friction were clearly observed.

Comment 54: When the videotaping used for the traffic analysis was made, there was a sign indicating that left turns were not allowed. Does the DEIS assume no left turns for the existing or Build condition? (Lipnick)

Response: The EIS assumes left turns are permitted, because this is the worst-case condition. Left turns into the driveway were observed throughout the videotaping. Approximately 60 percent of the Museum-bound traffic comes from the east.

Comment 55: Not enough is known about the terrace and its uses. Will the terrace also produce additional traffic on the block, as well as additional demand for parking spaces in the proposed garage? (Schein)

Response: Traffic from terrace events and the restaurant is included in the EIS traffic and parking analyses (see Tables 12-8, 12-9, and 12-11).

Comment 56: There is not a lot of public parking available in the neighborhood. The garage I park in on 82nd Street fills up by 10:30 AM on a busy weekend and the Museum parking lot opens at 10 AM. (Mayer)

Response: Detailed parking surveys in the study area indicate that parking typically is available with an overall utilization rate of approximately 30 to 70 percent depending on the time of day and day of the week. Although the parking situation at an individual garage may vary on a day-to-day basis, overall, observations made on June 23, 1995 and June 20 and 21, 1996, plus an update on July 25, 1996, confirm that parking is usually available throughout the area surrounding the Museum.

Comment 57: The DEIS does not consider that the proposed garage may be filled up, especially on weekends, by persons who are not visiting the Museum or who leave their cars in the garage long after they depart the Museum. If this occurs, then the usage calculations in the DEIS are incorrect. (Schein, Lipnick, Barton, Rudolph)

Response: The Museum intends the garage for use primarily by Museum visitors. The parking accumulation in the EIS is based on current in-and-out patterns at the parking lot. These estimates account for the actual length of stay at the lot, not simply the Museum portion of the trip. The parking estimates for new trips to the garage include the length of stay at the Museum plus an assumption that approximately 30 percent of the visitors on weekdays and 50 percent of the visitors on Saturdays will remain parked in the garage while participating in additional activities in the neighborhood outside the Museum.

Comment 58: The Museum garage should be used by Museum goers only (with the exception of community parking); it must not become an enticement for non-Museum goers to bring their cars to the neighborhood. Prices should not undercut the fees charged by local commercial garages. (Cohen, Schein)

Response: As it does now, the Museum will lease the garage to an operator who will charge rates for spaces comparable to those at other neighborhood facilities. Non-Museum-goers can bring cars to the neighborhood now; surveys for the EIS found that local garages have excess capacity. At the same market rates, the Museum's garage would offer convenient space for Museum-goers. However, the garage would not offer a better location or price for non-Museum-goers, and would be unlikely to entice them to the neighborhood.

Comment 59: The DEIS is incorrect in its assumption that visitors to the Museum with a new Planetarium will stay the same amount of time as visitors to the Museum do today. Therefore, the garage will stay full longer than predicted in the DEIS. (Bellizzi)

Response: The amount of time visitors spend at the Museum is limited by their physical energy and interest; many visitors have children, who will not want to stay longer. Nonetheless, to be conservative, half of new visitors to the Museum are presumed to park for an additional hour in the lot (see Chapter 12, "Traffic and Parking," section D).

Comment 60: Assuming the 370 spaces are distributed equally over the three levels of the proposed garage, the top level should be able to accommodate 120 cars; such a space surely should be able to accommodate 40 buses if empty of cars. I am forced to conclude that approximately 60 spaces on the top level are earmarked for employees. AMNH must commit to a garage configuration that accommodates at least the 30 school buses that its parking lot accommodates today. (Cohen)

Community Board 7 insists that AMNH pursue all possible traffic mitigations (for problems from buses), including employing the special expertise of transportation architects to redesign the garage to accommodate all school buses and coaches, conducting all bus loading and unloading within the garage (the plan proposed in the draft *Bus Management Plan* is unacceptable to CB7), using a reservation system to guarantee parking availability for arriving buses, implementing and evaluating "soft" traffic mitigations proposed in the DEIS, continuing the construction-period policy of directing passenger cars to local commercial garages when the Museum garage space is unavailable. (CB7 Resolution/Response)

The garage should be able to take both cars and buses on weekdays and weekends. (Sheffer for CB7)

The garage should provide as many, if not more, school bus parking spaces as there are in the present lot, even if that would require dedicating the entire first level to school bus parking. (CB7 Resolution/Response)

Response: As described clearly in the Bus Management Plan, Appendix E, and also shown in Figure 12-9, the entire top parking level of the garage is to be dedicated for use by school buses on weekdays. The Museum's policy seeks to give priority to providing safe off-street unloading and loading of schoolchildren within the garage. Once that need has been met, the next priority is parking buses in the garage. No automobile parking on the bus level would be permitted during the weekdays. As described in Chapter 12 and the Bus Management Plan, the parking capacity for buses in the garage is limited by the constraints of the structure (e.g., column spacing, configuration of ramps, interior schoolchildren's entrance, and the size and turning requirements of buses).

Also as described in the Bus Management Plan, it is not possible under any scheme to accommodate all the buses for unloading/loading and parking in the garage. Adding a second level would reduce the numbers of bus unloading/ loading spaces available in the top level (a larger ramp and increased turning area takes substantial space), while not providing enough parking for all buses to park on site. Adding a bus level by providing an external ramp would create substantial impacts in Theodore Roosevelt Park. Altering the garage structure to permit bus parking on all three levels would not give the capacity needed for busy days. It should be noted, however, that on approximately 50 percent of the weekdays, all of the buses could be accommodated on the first level of the parking garage under the current plan.

As noted in the response to Comment 64 (below) and in the revised Bus Management Plan, the Museum is making arrangements for off-site bus parking and intends to dedicate its own personnel to seeing that the plan is adhered to.

As assessed in Chapter 12, "Traffic and Parking," the major traffic conflicts on the weekends stem from passenger vehicle parking demand; the tour buses that deliver visitors to the site do not create such conflicts. Therefore, it is most reasonable to devote the garage to automobiles on weekends.

Comment 61: We ask the Museum to revisit the garage design and find a way to accommodate tour buses. (CB7 Resolution/Response, Stringer, Schein)

According to the Draft Bus Management Plan, it appears that the number of bus parking spaces will be reduced from 30 spaces to approximately 7, and that on-site tour bus parking will no longer be accommodated. The garage should be redesigned to accommodate the parking and loading and unloading of all buses, including tour buses. Accommodating buses should take precedence over accommodating private vehicles, since excess off-street parking for autos is widely available within the surrounding community. (Messinger)

Response: As described in the Bus Management Plan (Appendix E), although the garage could be adapted to permit buses of tour bus height to enter the top level, the number of such buses that could be accommodated to unload/load or park would be small because of their greater length and wider turning radius.

As described in response to Comment 60, the Museum's priority is to accommodate the safe unloading and loading of schoolchildren in the garage over bus or automobile parking. Once that need is addressed, parking of school buses is given the next priority, taking precedence over parking of automobiles.

Comment 62: More and more schools are using larger buses. It would be embarrassing if in 25 years, no one uses yellow school buses anymore, but tour buses won't fit into the Museum's garage. (Starkey for CB7, Schein)

Response: According to the bus planning expert who has been working with the Museum, school bus-type vehicles will remain the predominant bus for school groups traveling to the Museum. They are cheaper to purchase and more maneuverable than tour buses and are completely adequate for transporting schoolchildren on relatively short trips. The dimensions of that vehicle can be accommodated within the garage, and there are no foreseeable reasons why the design of the vehicle would undergo a substantial change. Given the greater cost of the larger buses and the fact that they are generally used only for relatively long trips, it is not expected that they would ever become the primary carrier for school groups to the Museum. Most of the schoolchildren who come to the Museum are from nearby, so travel in a school bus is appropriate. Children from farther away come in tour buses to allow school buses in their districts to remain available for their regular routes.

Comment 63: Why cannot tour buses use the West 77th Street entrance and school buses use the Central Park West driveway now impeded by Museum staff parking, thus better distributing some of the access problems around the area? (Gissler)

Can the existing Museum carriageways (on 77th Street and on Central Park West) be used for drop-offs? (Lipnick)

Response: An analysis of the geometry of the driveway at 77th Street as it curves in front of the Museum entrance found it to be insufficient to accommodate the turning requirements of a bus. Similarly, the Central Park West driveway is not suitable for the turning movements and clearance requirements of a bus; also, it must be kept clear as an emergency entrance. Therefore, buses dropping off at these blocks must use curbside positions for loading and unloading, rather than pulling on-site.

Comment 64: The DEIS does not consider that the inability of tour buses to park in the garage, coupled with an increase in tour buses from the project, will increase double-parking by buses and further compound traffic problems. (Schein, Stringer, Lipnick, Barton)

Response: The DEIS and FEIS both discuss conditions expected given the increase in buses expected with the project and given that tour buses would not fit in the garage. As discussed in the revised Bus Management Plan, which is appended to the FEIS, the Museum intends to designate an off-site parking area for buses. The Museum is currently discussing such an arrangement with the Department of Parks and Recreation, to create a bus parking area for waiting buses in one of three parking fields around Yankee Stadium. All buses will be required to move off site and directed to go to the designated off-site lot. All bus drivers will be given instructions where to park under both the immediate and future plans; the transportation coordinator and staff will be responsible for seeing that these buses do not park illegally around the Museum both through their own actions and through coordination with the Parks Enforcement Patrol and the Police Department.

Comment 65: Because the parking garage as designed cannot accommodate coach-type buses, the Bus Management Plan relies on the use of "off-site" areas for coach bus parking. However, no such areas have been identified, nor has the feasibility of the plan been evaluated in any manner. No convenient long-term off-site bus parking facilities are located on the West Side, and out-of-borough locations such as Yankee Stadium (whose long-term viability is also in question) are not feasible due to severe cost and travel time/inconvenience factors. Therefore, the coach-capable garage is the most cost-effective alternative to mitigate the charter bus congestion and street parking/idling problem. The Bus Management Plan does not effectively demonstrate that this alternative is infeasible. (Bellizzi)

Response: As discussed in response to Comment 64, the Museum intends to designate an off-site parking lot for buses. Even if the parking garage were modified to accommodate coach-size buses, it still would not have sufficient capacity to accommodate the full demand for bus parking on all days. Given the overall volume of demand for bus parking, and the fact that on high demand days the garage would be used primarily for bus loading and unloading, a key element in eliminating the problem caused by parking on the blocks bordering the Museum is to provide dedicated off-site parking locations. That requirement would exist independent of whether the garage can accommodate coach-type buses.

The travel time to the lot at Yankee Stadium, which the Museum is currently considering for its off-site bus parking area, is 20 to 30 minutes. This is acceptable, given that the schoolchildren's stay at the Museum is 3 to 4 hours. The willingness of bus drivers to travel this far is borne out by the fact that drivers for several companies with lots in the Bronx now return to home base rather than wait at the Museum. In addition, the off-site lot chosen will act as a dispatch site; to be dispatched back to the Museum, buses will have to park in the designated lot.

Regarding the long-term viability of the Yankee Stadium lot, any changes to Yankee Stadium would occur in the very long-term. Moreover, the Parks Department owns the lots, not the Yankees. If changes occur, the Museum's ongoing transportation plan would address identification of a new off-site location for bus parking.

Comment 66: The Bus Management Plan's recommendations to improve the efficiency of bus loading and unloading, eliminate parking spaces on neighborhood streets, and limit the garage to arrivals and departures need further discussion and review, and the plan needs to be broadened to include tour buses and a more comprehensive role of a traffic coordinator. (CB7 Resolution/Response)

Community Board 7 strongly supports a detailed plan that would set out the manner for directing tour and school buses to appropriate parking. Community Board 7 considers it the Museum's responsibility to see that all traffic regulations with respect to school buses and tour buses be enforced. (Houston for CB7)

Response: Chapters 12 and 17 have been revised to reflect the continued planning for bus and general traffic management. See also response to Comments 34 and 46.

Comment 67: The DEIS has numerous references to the Bus Management Plan, but that document was not ready for review when the DEIS was complete. The Bus Management Plan should be included in the DEIS. (Lipnick)

Response: The Bus Management Plan was not available when the DEIS was issued, but a draft of the plan was circulated at the SEQR public hearings and distributed to every agency and person who received a copy of the DEIS. The Museum has received a substantial number of comments on the plan, and a revised Bus Management Plan is included as Appendix E to the FEIS. It should be noted that the Bus Management Plan is not proposed as mitigation for a project impact, but rather is a solution to an existing problem at the Museum.

Comment 68: The alternatives proposed [in the Bus Management Plan] will go far in alleviating the potential congestion of bus traffic, while providing for the convenience of the public and the normal operations of the Museum. (Castro)

Response: Comment noted.

Comment 69: There is a critical omission in the DEIS and backward thinking in the planning of the garage. The DEIS does not say where the tour buses are supposed to go while they wait for their passengers. Further, the Museum is favoring the automobile over buses by making the proposed garage inaccessible to tour buses. This is a serious mistake that should be rectified by the project planners. (Schein)

Response: As described in response to Comment 60, the Museum's priority will be for use of the garage by school buses on weekdays. Also, as described in the Bus Management Plan, the issue of accessibility for tour buses is unrelated to a bus vs. automobile policy. Rather, accommodating tour buses would greatly reduce the total number of buses that could unload/load or park in the garage, since they are much longer and need considerably more room to maneuver than school buses. The question of where tour buses will go while they wait for their passengers has been addressed in the Bus Management Plan by provision of an off-site lot and active coordination by the transportation coordinator at the Museum.

Comment 70: Community Board 7 requests the opportunity to review in detail the current garage design and the configuration of the loading zone for arriving and departing school buses. (CB7 Resolution/Response)

Response: The FEIS has been revised to include garage plans, including loading and unloading areas for school buses. See Figures 12-9 through 12-12 in the FEIS (Chapter 12, "Traffic and Parking").

Comment 71: We support widening the driveway for coach bus parking, as proposed in the Bus Management Plan. (Schein)

Response: Comment noted.

TRANSIT AND PEDESTRIANS

Comment 72: The encouragement of Museum goers' use of mass transit is the most fundamental and potentially most effective mitigation of traffic impacts. Community Board 7 urges the Museum to develop a comprehensive marketing plan and innovative promotions to increase mass transit usage, including at the very least: highlighting in all appropriate visitor materials and publications directions to the Museum by mass transit, including by suburban rail and express-bus lines; admission/transit-fare incentive packages—perhaps a commemorative and discounted MetroCard; participating in community efforts to maintain or increase service levels on subway and bus lines serving the Museum. (CB7 Resolution/Response, Sheffer for CB7, Cohen, Gissler, Strauss, Gustav, 79th Street letters, 79th Street petitions, B. Lerner, Kaputa, Levko, Sherman, Favretti, Landmark West) ....

and incentive parking fees for high-occupancy vehicles. These mitigations should begin now. (Cohen)

Response: Chapter 17, "Mitigation," has been revised to describe guidelines for the Museum's ongoing transportation coordination. Encouraging the use of mass transit is included in the guidelines. Incentive parking fees for high-occupancy vehicles are not included, because a survey of auto users—particularly on weekends and holidays, which are peaks for automobile traffic at the Museum —found that average vehicle occupancy is already high, at 3.5 persons per vehicle. Most visitors who drive to the Museum are those who bring children and other family members.

Comment 73: Service on the M79 bus has been cut back over the years. Will the Museum lend its voice to forestall any future cutbacks in this and other subway and bus lines serving the Museum? (Albert for CB7)

Response: The Museum will support mass transit as a major access option for its visitors and will review all MTA/New York City Transit (NYCT) proposals in light of this policy.

Comment 74: It is very difficult for pedestrians to cross both 79th Street and Columbus Avenue; the additional traffic brought by the project will make it even more difficult. West 79th Street is particularly dangerous because the midblock hill limits visibility. (Kaufman, Wadia, Fay)

Response: The project would not impede pedestrian safety in the area. Adequate green time for pedestrian crossings would continue to be provided at all crosswalks in the area. The proposed garage access mitigation option would not adversely affect pedestrian safety. The Museum's transportation management plan includes appropriate signage and staff assigned to prevent cars from queuing outside the driveway entrances.

AIR QUALITY

Comment 75: I live at 15 West 81st Street on the third floor. Frequently at night I must go into my children's room and close the windows because of the fumes coming in—they are sleeping in what is essentially a garage. And to tell me that you are going to alleviate this situation by building a nearly 400-car garage—how stupid do you think we are? (Roose)

Response: As noted in responses to Comments 3 and 143, the EIS concludes that, with the project and its associated higher attendance as well as the attendance increases brought by other renovations, such as the new Dinosaur Halls, the proposed garage is a necessity. The air quality analysis (Chapter 14), which carefully examines the effects of the project's traffic and garage, has found no significant increases in air pollution from the project.

Comment 76: The DEIS is incorrect in its conclusion that the project is air quality neutral. The Museum is the largest source of traffic in the neighborhood and a very important contributor to air quality problems because of traffic and idling buses. (Springer, Levko, Rudolph)

Response: The analysis of air quality in the EIS (Chapter 14) examines the effects of the project's traffic, taking into consideration both the existing and predicted future traffic in the neighborhood as well. It concludes that the project would not result in any significant increases or significant impacts in air pollution.

Comment 77: The Department of Environmental Protection's Office of Environmental Planning and Assessment has reviewed the air quality and noise sections of the May 1996 DEIS and supporting technical documentation subsequently provided at our request. The technical support documentation includes: 1) the air quality analyst's backup submitted at a meeting held August 1, 1996; 2) the revised CAL3QHC input and output file for Site #2 submitted on August 19, 1996; and 3) the Terrace Noise Analysis submitted in Appendix G on August 13, 1996. Our review of the air quality and noise sections presented in the above documents finds the analyses and methodologies to be acceptable, assuming the noise impacts and proposed control measures remain fully disclosed in the FEIS. (Ketas for DEP)

Response: Comment noted.

NOISE

Comment 78: What is the basis for the statement that noise from events on the public terrace is an unavoidable impact (see page 19-2)? (Cohen)

We disagree with the DEIS's characterization of noise from special events on the terrace as an "unavoidable adverse impact" and insists that AMNH prohibit amplified sound on the terrace. (CB7 Resolution/Response, Stringer, Messinger, Kaputa, Poma)

I don't understand the need for the terrace to have amplification. I know I wouldn't like to be dining in the restaurant if there is an event going on on the terrace. (Szymanski)

Response: The DEIS considers the impacts of the project as proposed, which include events on the terrace, as described in Chapter 12, "Traffic and Parking," and Chapter 15, "Noise." In that light, the noise effects from these events are "unavoidable." However, the Museum has undertaken detailed technical studies to help make informed decisions about the terrace programming, including such options as restricting time of day, type of event, and type of music (see Appendix G). That analysis demonstrates which types of events can be held without impact, which types can be mitigated, and those for which there would be no practicable mitigation. The FEIS recommends restricting the number of these latter events and requiring conclusion of amplified sound and other potentially intrusive noises by 11 PM at all events.

Comment 79: The DEIS needs a fuller analysis of events on the terrace, including time of day, type of event (e.g., concerts, music), and other uses. We are concerned about music and the noise associated with people congregating as well. (Schein)

Response: As discussed in response to Comment 78, the Museum has undertaken a detailed analysis of events on the terrace. Chapter 15, "Noise," has been revised to reflect the additional work.

Comment 80: The West 81st Street Block Association is extremely concerned about noise from terrace activities and from possible use of the garage driveway at West 81st Street for pick-up and drop-off for visitors of the restaurant or terrace events. Will the terrace and restaurant create traffic at night? (Schein)

Response: The entrance to the restaurant at times when the Museum is closed would be from Columbus Avenue at West 79th Street. The entrance to the terrace would be from the Museum itself. For EIS purposes, it is assumed that visitors attending events on the terrace could use the parking garage. The FEIS includes a detailed analysis of the possible noise effects from restaurant and from terrace event traffic (see Chapter 15, "Noise") and concludes that no significant noise impacts would occur from that traffic.

Comment 81: You are going to put an open restaurant right at my eye level with unbelievable noise and lights and sound. (Roose, unidentified)

I am opposed to the new terrace restaurant because it will be noisy. (Baldwin)

Response: As noted in the FEIS, the sounds from the terrace restaurant would be imperceptible at residences on West 81st Street given the noise levels on West 81st Street itself. As noted in Chapter 8, "Urban Design and Visual Resources," lighting of the terrace would not be intrusive and would have less glare than existing lighting in the parking lot.

Comment 82: I am opposed to moving the dog run closer to 81st Street [because of its intrusive noise]. (Schein)

Response: Planning for park improvements is being undertaken by the Museum Park Working Group, independent of the proposed project. The Museum Park Working Group consists of the Borough President, local Councilmember, the Department of Parks and Recreation, the American Museum of Natural History, Community Board 7, Friends of Museum Park, the West 81st Street Block Association, and civic groups.

Comment 83: The sound monitoring that was undertaken on West 81st Street as part of the terrace event noise study occurred when there were an unusually high number of school buses and minivans and their occupants on the block. According to reports from residents of 15 West 81st Street, there was an extraordinary amount of noise on the block as a result of this event. Therefore, on behalf of the West 81st Street Block Association, I request that any sound monitoring data collected at that time be disregarded for the purposes of the EIS, as the site conditions at that time were atypical and such data would have the effect of distorting any analysis of the sound levels on West 81st Street between Central Park West and Columbus Avenue. (Schein)

Response: As noted on page G-2 of Appendix G, "Terrace Noise Analysis," unusually high noise levels occurred on West 81st Street on Thursday, August 1, 1996, between 10:00 AM and 2:30 PM. These data were omitted from the analysis.

CONSTRUCTION IMPACTS

Comment 84: The Museum should establish a 24-hour construction hot line for neighborhood residents who may have specific concerns and complaints during the three-year period of construction (Lipnick, CB7 Resolution/Response) ... and a telephone number for callers to hear regularly updated reports by AMNH on the progress of construction. (CB7 Resolution/Response)

Response: The project will establish a phone number that neighbors could call with questions or concerns. Chapter 16, "Construction Impacts," and Chapter 17, "Mitigation," have been so revised.

Comment 85: Community Board 7 proposes to form a Museum Construction Oversight Group (consisting of representatives of AMNH, CB7, Museum-neighboring block associations, appropriate government agencies, and elected officials) to plan for construction period impacts, monitor mitigation of construction-period impacts, and coordinate response to unforeseen construction-period problems. (CB7 Resolution/Response)

Response: The Museum will establish a construction coordination group that will include the Museum, its construction manager, community groups, the Community Board, the local Police Department precinct, and other affected groups.

Comment 86: If the parking lot will be inaccessible during construction, exactly how will the Museum accommodate bus and car parking? There is no proposed mitigation for construction period traffic congestion and loss of parking. (Cohen for CB7, Unidentified, Lipnick, Baker, Schein)

Community Board 7 supports the Museum's plan to provide information on other parking facilities in the area and clearly inform visitors that parking isn't available during construction. (CB7 Resolution/Response)

Response: Under the Bus Management Plan, the Museum will identify an off-site parking lot to which it will direct all buses, during construction and afterwards (see response to Comment 64). During construction, the Museum would inform visitors when they make reservations or call for information that no parking is available and would encourage the use of public transportation. The

Museum's brochures would also contain this information and would give the locations of other parking facilities. In addition, the Museum will hire a transportation coordinator to manage traffic both during construction and afterwards, as discussed in FEIS Chapter 17, "Mitigation."

Comment 87: Will the Museum and Planetarium Authority form and share with Community Board 7 a detailed plan to protect the park resources during construction? (Cohen for CB7)

Response: Use of portions of the park during construction has been identified in Chapter 16, "Construction Impacts." Protection of the park during construction will be developed, reviewed, and approved by the Parks Department and will be discussed with interested groups, such as Community Board 7 and the construction coordination group established by the Museum. An outline of items in the protection plan is presented on page 16-6.

Comment 88: The DEIS discusses air quality and noise levels, but fails to measure a neighbor's tolerance level over an intensive three-year period of construction. (Lipnick)

The three-year long construction period will bring chaos into our community, which is particularly unwelcome after two years of Columbus Avenue reconstruction. (S. Leff, Maiden, Giroux, Museum Block Association letters, Kaufman, Hoser, Selmon)

Response: Chapter 16, "Construction Impacts," clearly describes the schedule and types of construction taking place within the 3-year period. As noted there, the construction would not involve closing lanes of traffic or sidewalks, and all construction activities would occur close to the Museum (see also the response to Comment 90, below). The EIS has been revised to acknowledge inconvenience to all neighborhood residents.

Comment 89: During the entire period of construction, increased traffic will exist on our block (West 81st Street between Central Park West and Columbus Avenue). The DEIS does not recommend implementing any of the Museum's proposed traffic mitigation measures, including a Columbus Avenue egress and ingress, until after construction. We strongly urge the Museum to implement traffic mitigation measures before construction begins, including a second entrance to the parking lot. (Lipnick)

Response: During the construction period, the parking lot and West 81st Street driveway would be closed, so that there would be no visitor traffic entering or leaving the driveway or forming a queue on West 81st Street. The Museum would notify visitors that no parking is available and would encourage the use of public transportation (see the response to Comment 86, above). NYCDOT has approved the proposed mitigation for intersection traffic impacts; if NYCDOT determines it appropriate, this mitigation could be implemented early at the

Community Board's request. In addition, the Museum would hire a transportation coordinator to manage traffic both during construction and afterwards, as discussed in FEIS Chapter 17, "Mitigation."

Comment 90: The DEIS states that construction would be staged on-site, generally without use of curbside lanes. Does this mean that during some periods of time street parking would be suspended for neighborhood residents? Materials and equipment must be parked off the street at all times. (Lipnick, Jaff, Schein)

Response: Although extended sidewalk and lane closures are common construction practice, this project does not anticipate requesting a lane closure on West 81st Street except as might be required for short durations for the delivery of oversized materials or perhaps for a major concrete pour. No materials would be stored outside the construction fence. (The location of the construction fence is depicted in Figure 16-1 in the FEIS.)

Comment 91: The DEIS states the general daily time limits for construction, but does not say what types of work can or cannot be performed at specified times during the work day. The Museum should limit construction work from 9 AM to 5 PM and suspend all work on weekends and holidays. Mitigation should include measures to muffle the sound of pile drivers and pile drillers. Also, the DEIS does not identify nighttime delivery of materials as a serious negative impact on neighborhood residents. The hours of construction should be those mutually agreeable to the Museum and the residents on West 81st Street. (Lipnick, Barton, Hoser, Schein)

What's under the parking lot and how long will it take to excavate? (Baker)

Response: The permitted hours of construction are regulated by the Department of Buildings, apply in all areas of the city, and are reflected in the collective bargaining agreements with major construction trade unions. In accordance with those regulations, work would take place on weekdays, beginning at 8 AM, although some workers would arrive and begin to prepare work areas between 7 and 8 AM. Normally, work would end at 4:30 PM unless overtime is required to maintain the schedule. Night or early morning deliveries may be required for certain oversized materials to comply with the requirements of the Department of Transportation. Understanding that these deliveries may be intrusive, the Museum would seek to limit their number. Occasionally, overtime and weekend work would be required to complete some time-sensitive tasks, such as the surface finishing of concrete slabs poured during the normal work day. Generally, however, work on weekends and holidays during the early phases is not anticipated. In the later phases, some interior work on weekends within the enclosed buildings may be required to meet the schedule, but this would be unlikely to affect surrounding residences.

Air compressors and other heavy equipment would be muffled, according to Department of Building requirements. However, it is not possible to muffle pile-driving and rock-breaking equipment.

As described in the response to Comment 84, the Museum would establish a construction coordination group that would include the Museum, its construction manager, community groups, the Community Board, the local Police Department precinct, and other affected groups.

As described in Chapter 10 of the EIS, borings that were conducted on the project site identified similar fill material throughout the site. The construction schedule for the project is described in Chapter 16, "Construction Impacts." As noted there, excavation for the garage and Planetarium would occur during the first six months of construction; excavation for the galleria and Columbus Avenue entrance would occur during months 6-8.

Comment 92: The Museum's parking facility should be closed during the entire period of construction to avoid conflicts with construction vehicles. Tour buses, school buses, and cars must drop off Museum visitors at a site other than West 81st Street. (Lipnick)

Response: The parking facility would be closed from the start of construction until the garage is completed and can be operated safely. During that time, buses and cars would be routed to drop off on Central Park West or on West 77th Street.

Comment 93: Will bathroom facilities be provided for workers on-site? How will they be maintained? Who can use them? (Lipnick)

Response: Portable and/or temporary (tied into existing water and sewer lines) toilets for construction workers would be maintained on-site within the construction fence throughout the construction period. Portable toilets would be serviced regularly on-site and would be removed promptly when they are no longer needed. These facilities would not be open to the public.

Comment 94: Air quality and noise levels during construction are seriously minimized in the DEIS. Dust emissions will naturally enter into neighboring apartment buildings and their windows during construction. What is the Museum prepared to do about it? The Museum should evaluate and assess air quality standards during the period of construction and report findings to neighboring buildings. If dust emissions are found to increase, the Museum should compensate those residents for cleaning their windows. (Lipnick)

Response: Regulations of the Department of Buildings require control of dust emissions. In considering the impact of dust that may escape the emission control efforts, it should be noted that the West 81st Street residences are more than 200 feet north of the construction site. This distance, along with dust control efforts, should minimize dust problems on the north side of West 81st Street.

Comment 95: The EIS should include a quantified discussion of noise increases during construction and specifically define when those would occur. (Lipnick, Baker)

Response: Chapter 16, "Construction Impacts," describes the sequencing and duration of the various construction activities and discusses noise impacts of construction. The FEIS notes that pile driving would be the most significant noise source and provides information on noise emission levels for pile drivers (101 dBA at 50 feet), as well as information on the number of piles for the project (85 caps ranging from 3 to 5 piles in each cap), the duration of pile driving (3 months), and noise control measures. The community will be kept informed of construction activities.

Comment 96: The Museum should secure a commitment from the Police Department to ticket any construction vehicle on or near the site that leaves its engine idling or that honks its horn in an excessive manner. (Lipnick)

Response: The construction manager for the project will instruct all waiting vehicles to turn off their engines. The Police Department will also be informed of this concern.

MITIGATION

HISTORIC AND ARCHAEOLOGICAL RESOURCES

Comment 97: Community Board 7 urges AMNH to identify and preserve the Hayden Planetarium's distinctive architectural design elements (such as Art Moderne louver panels, lobby glass windows, and signage) so that they may be reused creatively if and where appropriate. (CB7 Resolution/Response)

Response: The new Planetarium will open with an exhibit on the Hayden Planetarium and to the extent possible, artifacts from the Hayden will be included. The architects are considering ways to incorporate architectural elements from the old building in the new, but as yet have not identified specific locations. Community Board 7 will be kept informed of progress.

TRAFFIC AND PARKING

Comment 98: The Office of Project Analysis/CEQR has completed its review of the Planetarium and North Side Project DEIS, and supports in concept, the proposed mitigation measures. However, the specifics of the proposed mitigation measures, similar to all NYCDOT commitment to mitigation must be approved by our Signals and Borough Commissioner offices. The following requests for information are the only issues that remain outstanding:

- Please submit the left-turn signal warrant analysis and relevant documentation for the West 81st Street and Central Park West intersection.
- Please indicate the selected Mitigation Option for the proposed action.
- Written commitment from the American Museum of Natural History to fund the operation of its Bus Management Plan. (Rasheed, NYCDOT)

Response: The required documents are being prepared for submission to NYCDOT.

Comment 99: In several of the traffic impact studies, levels of service of "E" and "F" are noted for the Central Park West and West 81st Street intersection. If the proposed mitigating measures result in *still* unacceptable levels of service, what will the Museum do? (Albert for CB7)

Response: Under SEQR, the project is responsible only for mitigating its own impact. Mitigation for traffic conditions that would occur independent of the proposed project are not required. However, the Museum will implement a transportation management plan to address conflicts related to Museum traffic in the surrounding area (see response to Comment 34).

Comment 100: Community Board 7 is concerned that the traffic mitigation proposed in the DEIS may not be achievable, given the current resources of the New York City Department of Transportation, and may have unintended effects on the entire west side traffic grid. Any such impact must be fully reviewed in advance. (CB7 Resolution/Response)

Response: The traffic mitigation proposed for affected intersections has been approved by NYCDOT as being appropriate, and consists of low-cost mitigation options (signal retiming, lane restriping, etc.). The analysis of the proposed mitigation included simultaneous analysis of the entire network, to be sure that no unintended impacts would occur.

Comment 101: Community Board 7 is further concerned that proposed mitigation measures may be delayed; for example, there could be undue delay in the length of time it takes between requesting a signal change from NYCDOT and the time that it actually takes in getting such changes put in place. (Houston for CB7)

Response: NYCDOT is responsible for implementing the proposed traffic mitigation for intersection impacts. Since EIS predictions are generally very conservative (high), normally, the agency waits until a project is completed, then tests to see if such mitigation is warranted. The Museum will pursue implementation of mitigation.

Comment 102: We are concerned that the traffic mitigation measures be appropriate to the context of the historic district and not borrowed from the highway. What are "lane stripping"(sic) measures? Are these measures, and others like them, appropriate to a historic urban context? (Landmark West!)

Response: The mitigation measures proposed for the project are all common measures used throughout New York City, and would have no effect at all on the area's historic character. The measures proposed are changes to signal timing, which involve adjusting the amount of time that a traffic signal is green for a given approach (thereby increasing green time for a congested approach); creation of protected turning phases, which involve adjusting a traffic signal so that it provides a green phase specifically for turning vehicles; changes in parking regulations, to remove a limited number of curbside spaces to provide an additional turning lane for traffic; and lane striping, which involves changing the way the lines are painted onto the roadway at a given intersection, to create a new turning lane, for example.

Comment 103: The DEIS proposes several soft solutions to mitigate the impact of acknowledged traffic problems that will be created by the proposed garage, including retiming of traffic lights, eliminating approximately 20 parking spaces on West 81st Street and on Central Park West, and calling for increased traffic enforcement. These solutions are not acceptable to the West 81st Street Block Association. Retiming of lights does not address the central problem. Why should neighborhood residents who park their cars on the street be forced to give up their scarce parking spaces so that the Museum can build itself a new garage? We cannot rely on the police to consistently enforce traffic regulations. (Schein, Lipnick, Barton)

For the Museum to double the size of the garage while at the same time reducing bus parking and eliminating approximately 20 on-street parking spaces (for the purpose of traffic mitigation) is, to say the very least, insensitive to the concerns of its neighbors. (CB7 Resolution/Response, Cohen)

Response: Mitigation at intersections is required to address the anticipated impacts of project traffic. These impacts are created by new Museum visitors traveling by taxi or car, not necessarily parking at the garage. In short, the impacts would occur independent of the proposed garage. As noted in Chapter 18, "Alternatives," and in the response to Comment 145, traffic impacts would be worse were the garage not built and the need for mitigation (likely including removal of additional parking spaces) would be greater.

Comment 104: The traffic mitigation plan requires eliminating approximately 20 on-street parking spaces in a neighborhood where parking is already very difficult to find. Some kind of overnight parking should be made available to community residents. One possibility would be to award a free night or week to a neighbor by lottery. (Cohen)

Response: As described above in response to Comment 38, the Museum's policy for community parking cannot be finalized until the project is completed.

Comment 105: The EIS should consider prohibition to parking on the south side of West 81st Street (between Columbus Avenue and Central Park West) to allow cars waiting to enter the parking garage to queue there. (Sheffer, Needham)

Response: It is the Museum's policy to plan for changes in parking regulations only when no reasonable alternatives are available. With the project, the period of excess parking demand would be substantially diminished, with a corresponding reduction in the time in which queuing could occur. The transportation plan also anticipates more aggressive management of parking operations, with a vigorous effort to discourage the congestion caused by vehicles lining up, double-parked, on the south side of West 81st Street. Because of these factors, increased parking prohibition is not expected to be necessary at the entrance to the parking driveway on West 81st Street.

Comment 106: The FEIS should consider as possible mitigation relocating the existing bus stops on Central Park West so that no parking spaces need be eliminated; the bus stop could provide the additional capacity required. (Baker)

Response: The Museum would coordinate with New York City Transit (NYCT) and NYCDOT about consolidating bus stops as a means of reducing the parking loss associated with the mitigation plan. The analyses in the EIS conservatively represent the maximum number of parking spaces likely to be eliminated.

Comment 107: Why aren't the proposed mitigation measures (e.g., signal timing) implemented now to address the existing problem? Show that you can solve the problems this way by doing it now. (Grousman, Needham)

Permanent and realistic solutions are needed *before* you build the project. (Lipnick)

Response: As noted above in response to Comment 89, NYCDOT normally does not implement mitigation until a proposed project is completed. However, given the congestion at certain intersections under existing conditions, the information in the FEIS, and the interest on the part of the community board, it may be possible to work with NYCDOT to implement the mitigation now.

Comment 108: It is important that the Museum develop an effective system to notify visitors when the garage is full, to reduce queuing outside the garage. If there is a Columbus Avenue entrance, this system should be used to alert motorists to the existence of the secondary entrance. (Houston for CB7, Adler for CB7)

What measures will be taken to divert bus and car parking to other facilities when the Museum garage is full? Community Board 7 urges the Museum to develop an effective system to notify visitors when the garage is full to capacity, and recommends that appropriate signage be placed at 81st Street and Central Park West and elsewhere to alert motorists to the secondary entrance. (CB7 Resolution/Response)

Response: The precise details of the communication system will be worked out as part of the transportation management plan. This will include developing an orderly approach to the garage, including signage directing visitors to the appropriate driveway, and plans to eliminate queuing outside its entrances.

Comment 109: Community Board 7 would encourage the Museum to consider proper use of the newly constructed garage, so that the mitigation measures will be best implemented even at the expense of permitting parking for the Museum's own employees. (Houston for CB7)

Response: Priority in the garage is for visitor parking. Parking spaces, replacing those removed by the project, would be made available for employees on the lower level during the week, when the garage is not expected to be full. On weekends, demand for employee parking would be accommodated in the Museum's service area, not in the garage. See also response to Comment 44.

Comment 110: Community Board 7 proposes to form a Museum Transportation Planning Group (consisting of representatives of AMNH, Museum-neighboring block associations, CB7, appropriate government agencies, and elected officials) to assist AMNH in developing a comprehensive transportation plan, assist AMNH in evaluating proposed mitigation, assist AMNH in promoting Museum visits by mass transit, and continue analysis of local traffic patterns and problems. (CB7 Resolution/Response)

Response: The Museum has committed to working with CB7 and others, as appropriate, in formulating and maintaining a workable and effective transportation management system. The Museum will develop a transportation plan, as described in response to Comment 34, and will meet with CB7 regularly to evaluate and implement the plan.

Comment 111: What studies have been done to examine the impact on the mid-block of West 81st Street after the proposed signal changes at the West 81st Street intersections with Central Park West and Columbus Avenue? (CB7, West 81st Street Block Association)

Response: The signal and lane improvements at the intersections of West 81st Street at Central Park West and Columbus Avenue would improve the capacity, traffic flow, and circulation at the intersection approaches. However, these measures would not be altering the volume of traffic along West 81st Street and would not be expected to noticeably affect mid-block traffic conditions.

Comment 112: You should consider making West 81st Street one-way eastbound. (Futterman)

Response: Making West 81st Street one-way eastbound would have a major effect on traffic circulation and service conditions in the area as well as on bus operations, and is not necessary to mitigate the traffic impacts identified in the EIS. Given the level of planning and analysis required to assess this kind of change, it is not appropriate to analyze this proposal as part of the environmental review of the proposed project.

Comment 113: The DEIS states that the Columbus Avenue options would create significant traffic impacts on Columbus Avenue at West 77th and West 76th Streets. Impacts at these locations would only be created by departing cars leaving at staggered times, some traveling south, others east or west. Wouldn't the traffic impacts of a Columbus Avenue entrance to the garage be greater *north* of the entrance, due to queuing? (CB7 Resolution/Response) .

Response: The significant impacts on Columbus Avenue at West 77th and 76th Streets would be created both by vehicles exiting the garage and those that travel down Columbus Avenue seeking to park in the new garage using this second entrance, but that find the garage full and so move along to look for parking elsewhere. The traffic impact analyses indicate that north of West 77th Street, the increase in traffic associated with trips rerouted to the new Columbus Avenue driveway would not result in any new impacts. Because the transportation management plan anticipates stationing personnel to manage traffic at the driveway and direct vehicles away from the entrance at those times when the garage is full, queuing along Columbus Avenue is not expected to be a problem.

Comment 114: Community Board 7 insists that AMNH provide a second garage entrance/exit on Columbus Avenue and welcomes further study in this area. After considering the six alternatives for a second entrance presented in the DEIS; Community Board 7 finds that Option 4 most closely meets the following principles, which it endorses as criteria for deciding on an alternative entrance:

- a safe roadway
- improved traffic flow around the Museum
- minimal impact on Theodore Roosevelt Park
- tailored to meet the specific traffic problems in need of mitigation.

(CB7 Resolution/Response)

We are opposed to the construction of a new automobile garage at the Museum, unless a secondary means of ingress to and egress from the garage is made part of the plan. The Museum included six scenarios for a driveway to the garage from Columbus Avenue, one of which must be adopted, if the garage is going to be built. (Schein and Lipnick for West 81st Street Block Association, Barton, Stringer)

A secondary vehicular driveway from Columbus Avenue would be environmentally desirable for the neighborhood because: Columbus Avenue is a one-way street so that vehicles entering the garage would not have to turn into on-coming traffic; visitors arriving from the Henry Hudson Parkway and from points west of Manhattan would have a direct path to the garage from West 79th Street and would not have to enter West 81st Street; using both West 81st Street and Columbus Avenue to handle Museum traffic would spread it more evenly around the neighborhood, instead of concentrating it all in one block. (Schein, Lipnick, Barton)

Since the Museum has already acknowledged that West 81st Street is a traffic problem that will not be totally mitigated with the project, wouldn't it be prudent to plan for and build another garage entrance, in conjunction with the project, on Columbus Avenue, with the idea that it can only help and not hinder an already bad situation? (Adler for CB7)

We support Option 4. (Poma, Gissler)

We do not feel that consideration of entrances on Columbus Avenue are being given proper consideration by the Museum and would like to see these issues addressed before permission for construction is given. (Barton)

Response: As noted in the FEIS, a second entrance to the garage from Columbus Avenue through its service drive is proposed as additional mitigation. This second entrance was analyzed in the DEIS (Chapter 17) as Option 4.

Comment 115: We believe that the DEIS overstates the negative impacts associated with the garage entrance mitigation options, without highlighting the benefits associated with those options. Namely, such an option could greatly relieve congestion on West 81st Street by eliminating the illegal U turns and shortening or eliminating the queue on 81st Street, which is narrower than Columbus Avenue. (Schein)

Response: The FEIS presents an expanded assessment of the Columbus Avenue garage entrance options. Option 4, using the existing service driveway to provide weekend access, is being proposed in the FEIS as additional mitigation.

Comment 116: We recommend that the Museum undertake all necessary studies to determine the level of mitigation and the impact of each alternative for the addition of any secondary garage entrance on Columbus Avenue. Impact studies should include possible queuing on Columbus and/or West 79th Street, interruption of pedestrian flow on Columbus Avenue, effects on the Columbus Avenue streetscape, and impacts on Theodore Roosevelt Park. (Neuwelt, CB7 Resolution/Response)

Response: Chapter 17, "Mitigation," assesses the impacts of each of the options for garage access from Columbus Avenue. As noted in the response to Comment 114 the FEIS proposes implementation of Option 4, the only one of the mitigation options that would not remove any trees and would not require a new curb cut or disruption of existing parkland.

Comment 117: I am concerned that a new entrance to the garage will negatively impact on Theodore Roosevelt Park and may create new traffic impacts on Columbus Avenue. However, of the alternatives presented, Option 4 appears to have the least impact on the park. (Messinger)

Response: See response to Comments 114 and 116.

Comment 118: With Option 4, wouldn't there be a big conflict between Museum service vehicles and traffic bound for the parking garage? (Starkey for CB7)

Response: The Museum would establish restrictions on deliveries when the drive is in use by visitors and would dedicate staff to organize traffic flow in and out of the service drive at other times. The safety of its visitors is an important priority for the Museum.

Comment 119: The Museum should explore and alter its option list if possible to determine whether a new alignment of a secondary garage entrance could be formulated that would save the greatest number of trees possible thereby both mitigating the traffic problems on West 81st Street and creating the least impact on the park. (Houston for CB7, Schein)

Response: See response to Comment 116. One of the criteria used in developing the options considered was avoiding impacts to trees whenever possible.

Comment 120: The DEIS does not consider all possible options for a second entrance from Columbus Avenue. I do not believe that Option 4 is the best choice—the service drive is narrow, curved, and dangerous. Having this second driveway open only on weekends doesn't address the project traffic. The Planetarium would be open at night, and the restaurant would attract vehicles at night as well. Further, people would not know about the limited hours for this second entrance, and the signage would be confusing. The FEIS should not narrow the discussion of these options; rather it should explore other possibilities more. (Cohen for CB7)

Response: The studies supporting the EIS considered a broad number of locations for a secondary garage entrance; those presented in the DEIS were the most reasonable—i.e., feasible—and generally the least intrusive. Option 4 would, by far, create the fewest adverse impacts on the park and on Columbus Avenue. Although the plan now is to limit use of the driveway to weekends and holidays, when traffic is greatest and deliveries are fewest, it may be possible, with careful planning, to utilize the driveway on other peak attendance days (e.g., during school holidays). Plans for nighttime use of the garage entrances have not been formulated; if necessary, the service entrance could be used at that time. The EIS does assess the traffic and noise impacts of use of the West 81st Street garage entrance for people going to terrace events or the restaurant, and concludes that the traffic would create no noise impacts and that levels of service would be better than the peak conditions studied in the EIS.

Comment 121: Were other garage entrance options considered, such as an at-grade roadway through the park from Columbus Avenue, perhaps on line with West 79th Street? (Futterman, Baker)

Response: The studies supporting the EIS considered a broad number of locations for a secondary garage entrance; those presented in the DEIS were the most feasible and generally the least intrusive. Options given preliminary consideration included an at-grade roadway through the park, but this was deemed too intrusive to the park and was rejected.

Comment 122: With the project, traffic needs to be distributed around the Museum site and thus demands a second garage entrance on Columbus Avenue. I believe the best by far is Option 2, an entrance directly in line with West 79th Street. (Cohen)

Response: As noted in Chapter 17, this option would offer direct access from West 79th Street and control of garage traffic by a traffic light. However, it would have other adverse impacts, including the loss of trees, visual effect, and effect on the historic Museum plan that make it, on balance, less suitable than Option 4.

Comment 123: Of the options presented in the DEIS, the Museum recently chose to vigorously examine Option 4, using the Museum's existing service road entrance on Columbus Avenue as a weekend-only secondary garage entrance. This does not go far enough; it does not cover peak weekdays during vacation times. It is essential that the Museum utilize this service road as a full-time or virtually full-time secondary entrance. Perhaps one feasible solution might be for the Museum to limit deliveries to certain weekday afternoons and thereby open the secondary entrance during other weekday times when deliveries are not scheduled. (Stringer)

Have you considered having Option 4 open seven days a week? What about school vacations? If traffic conditions end up being terrible, would you consider that possibility? (Albert for CB7)

Response: As noted in the response to Comment 120, although the current plan is to limit use of the driveway to weekends and holidays, when traffic is greatest and deliveries are fewest, it may be possible, with careful planning, to utilize the driveway on other peak attendance days (e.g., during school holidays).

Comment 124: I understand that the Museum is planning to use its service road only as an entrance to the parking garage. While this will help to alleviate incoming traffic on West 81st Street, it will not solve the problem when the Museum closes and hundreds of vehicles exit onto West 81st Street in a short period of time. One alternative might be to use the service road as an entrance up until an hour or so before the Museum closes, and then utilize it as an exit for the last few hours of the day, with an attendant stationed to direct traffic and avoid confusion and accidents. (Stringer, Schein)

Response: Analysis of traffic at the Museum's West 81st Street driveway did not find a current problem with exiting traffic, nor did it predict an impact because of exiting traffic under future conditions with or without the project. Use of the service drive for exiting traffic poses serious hazards to pedestrian safety, because of the tight turn and limited visibility for drivers.

Comment 125: Currently, Option 4, which uses the current service entrance, is to me clearly the least intrusive, but even that alternative offers some real negatives for this wonderful new sense of pedestrian access (i.e., the possibility of queuing and the interruption of the pedestrian access up and down Columbus Avenue from cars entering there). (Neuwelt)

Response: As noted in the response to Comment 114, after weighing the competing concerns about an uninterrupted pedestrian walkway and traffic problems along West 81st Street, the FEIS proposes Option 4 as a second access drive for the new garage. As currently anticipated, the second drive would be used only on weekends and holidays, when traffic is greatest, so the pedestrian walkway along Columbus Avenue would at other times remain as it is today. Even when the second driveway is in use, cars turning into the new drive would be no more intrusive than cars turning into the existing drive from West 81st Street are today along that otherwise uninterrupted pedestrian walkway.

Comment 126: I am concerned about disruption to the park from those options that would require removal of trees and parkland. (Kearns, Hornos, Kohl, Malanga, Westenberger, Rizzo, B. Lerner, Kistler, Donahue, Hollander)

Response: As noted in the response to Comment 114, the Museum is now proposing to implement Option 4 as a second access drive for the new garage. This option would not require the removal of any trees or parkland.

Comment 127: I'm afraid that the potential second entrance would carry so many negatives for the park (including the loss of mature and irreplaceable American elms in five out of the six alternatives) that it might substantially detract from the very wonderful new aspect of the new Columbus Avenue facade of the Museum and pedestrian access to it, as well as the now-uninterrupted treed pedestrian boulevard along the east side of Columbus Avenue from 77th to 81st Street. (Neuwelt, Marks, B. Lerner, Gissler, Sherman, Budinger, Garfield, Malanga, Donahue)

Response: See responses to Comments 125 and 126.

Comment 128: The potential negative impacts of the driveway mitigation options are not presented fully enough in the DEIS. (Neuwelt)

Response: Chapter 17 of the EIS describes each of the mitigation options and its potential benefits and adverse impacts in detail. This analysis begins with a discussion of advantages and disadvantages of each option, and continues with an evaluation of the potential environmental impacts of these options on Theodore Roosevelt Park, as well as on historic and archaeological resources, visual character, air quality, noise, and construction impacts. This discussion has been revised in the FEIS to include concerns expressed about the effects on the otherwise-uninterrupted pedestrian boulevard along the east side of Columbus Avenue from West 77th Street to West 81st Street (see Chapter 17).

Comment 129: We and many of our neighbors in the Park Belvedere and along 79th Street are appalled at the possibility that expanded parking for the project might result in a new tree-destroying, traffic clogging auto entrance and exit off Columbus Avenue, which would also add new pedestrian hazards. If expanded parking is pursued, why cannot any traffic increase be handled through more effective traffic engineering and better use of existing entrances and exits? Our neighbors on 81st Street asked us to "equitably share" in the traffic problems and up to a point we sympathized. But Columbus Avenue already carries a very heavy traffic burden. While 81st Street residents must endure on-and-off traffic distress, the Columbus Avenue gash would be a permanent, round-the-clock scar. (Gissler, Gustav, Garfield, Wadia, Szymanski)

Response: As noted in the response to Comment 114, mitigation Option 4 is proposed in the FEIS as a second access drive for the new garage. This option would not require the removal of any trees or parkland, and would not create a new roadway through the park. At the same time, the Museum is committed to implementing ongoing transportation coordination to handle traffic at the existing entrance and exit drive as well as at the new entrance on Columbus Avenue. Chapter 17 includes a detailed analysis of the traffic impacts of use of the second entrance, and concludes that this would not result in any significant adverse traffic impacts that could not be mitigated. This option also would not adversely affect pedestrian safety. Adequate green time would remain for pedestrians at crosswalks, and cars entering the second driveway would have a full view of pedestrians, just as they do at the existing driveway at West 81st Street. The second driveway would not be used for exiting vehicles, to avoid potential safety problems for pedestrians.

Comment 130: If you implement one of the garage entrance mitigation options, people may sleep in the tunnels at night. (Hoser)

Response: The tunnels would be gated at night to avoid that problem. As noted in response to Comment 114, Option 4, proposed in the FEIS, would use the existing service drive from Columbus Avenue. Museum security is effective now in keeping the public from using this drive, and would continue to do so in the future.

Comment 131: The garage entrance mitigation options would cause considerable traffic problems on Columbus Avenue and West 79th Street. Traffic traveling east on West 79th Street and then turning right (south) onto Columbus and then immediately left to enter the second driveway entrance would cause backups. (Hoser)

The EIS did not consider the effects of the garage mitigation options on traffic on West 79th Street. (Gissler)

I am concerned that the mitigation options would result in additional queues, perhaps two queues—one on Columbus Avenue and another on West 79th Street. (Needham)

Response: The FEIS analyzes the traffic effects of each of these mitigation options, including the intersections on West 79th Street at Columbus and Amsterdam Avenues. None of the options would create impacts at these locations (see Appendix H). Chapter 17 has been revised to include more information on conditions on West 79th Street.

Comment 132: The Museum should forswear ANY steps that would kill mature tress and mutilate the priceless Columbus Avenue streetscape. (79th Street letters, Marks, 79th Street petitions, Rizzo, B. Lerner, Kaputa, Szymanski, Sherman, Favretti, Budinger, Groves, Hornos, Kohl, Ravenal, Hoser, Perrotta)

It has been our long-term goal to further extend the Central Park green ecosystem through West 79th Street, not destroy the connection as the project would do. The project would diminish the greening of our neighborhood. (S. Leff)

Response: As described in response to Comment 114, mitigation Option 4 is proposed in the FEIS as the second access drive for the park. This option would not require the removal of any trees or parkland, and would not create a new roadway through the park.

Comment 133: I believe the Museum should consider eliminating the West 81st Street driveway altogether and replacing it with a driveway from Columbus Avenue. (Futterman)

We believe the Columbus Avenue driveway should serve as the main driveway, instead of the 81st Street drive. (Greenes)

Response: Moving the driveway to Columbus Avenue would be impracticable, because of the impacts to the historic park not only from the new drive but also from removal of the existing one, and because it is infeasible to design a realistic driveway from Columbus Avenue that can be used by school buses to enter the new garage. Furthermore, as noted in Chapters 12 and 17, the project as proposed would not result in any significant adverse impacts on West 81st Street that cannot be mitigated.

Comment 134: Queuing [on Columbus Avenue outside the secondary garage entrance] could have an impact on neighborhood businesses on Columbus Avenue. (Marks)

Response: The proposed Columbus Avenue access plan using the service driveway would be open only on weekends and the potential queuing related to excess parking demand would occur for only a couple of hours during the midday, if at all. Also, the likely queuing location would be along the east side of Columbus Avenue and therefore would not front any businesses. In any case, the transportation plan proposed by the Museum anticipates effective enforcement to minimize queuing on Columbus Avenue, so adverse impacts on neighborhood character or local businesses are not expected to occur.

Comment 135: The DEIS discussion of garage entrance mitigation options does not describe the use of the driveway as a reservoir, so that on-street queues would be reduced. (Schein)

Response: None of the Columbus Avenue options' driveways could be used by queuing vehicles, because such use would block access for emergency vehicles. This is a particular issue for Options 4, 5, and 6, which make use of the Museum's existing service drive. In addition, visitors waiting in such queues would not be able to leave should they decide to park elsewhere.

Comment 136: Would an exclusive northbound lane on Columbus Avenue from 77th Street to the service entrance be feasible? (Jaff)

Response: Given the relatively small percentage of trips coming across westbound West 77th Street, it would not be practical to reverse a lane on Columbus Avenue and risk the potential traffic disruption, congestion, and safety concerns associated with a contra-flow lane on this major avenue.

Comment 137: There is work to be done in enforcing the regulations that we already have (e.g., double parking, illegal U-turns, queuing in a traffic lane). Spending $2 to $3 million and knocking down trees to spread part of the problem now on 81st Street to 79th Street doesn't seem to solve the problem. If people are illegally double parking, etc., perhaps we should properly ticket these people, discourage them, book them, do whatever we need to do to stop double parking. (Needham)

Response: As noted in the response to Comment 34, the Museum will implement an ongoing transportation management plan and work with the Police Department and Parks Enforcement Patrol in their enforcement of all applicable traffic regulations around the Museum. The proposal to adopt mitigation Option 4 would not require the loss of any trees.

Comment 138: Perhaps the price of parking should be raised so that supply will equal demand and people will not be queuing to get into the garage. (Needham)

Response: The EIS has demonstrated that, except for one to two peak hours on a weekend day, the parking supply equals or exceeds demand. The solution to queuing is to focus on eliminating the problem in the few hours of the week in which it occurs, rather than attempting to discourage parking overall.

Comment 139: I am the mother of two small children. This is not an issue of West 79th Street against West 81st Street. West 81st Street loves trees also, but we also want safer streets, traffic-wise. (Unidentified resident of West 81st Street)

Response: As noted in the response to Comment 114, mitigation Option 4 is proposed in the FEIS as a second access drive for the new garage. This option would not require the removal of any trees or parkland, and would address the concerns raised by residents of West 81st Street about traffic conditions on their block.

Comment 140: If you implement one of the garage entrance mitigation options, the construction impacts on the Columbus Avenue neighborhood will be unacceptable. (Hoser)

Response: The construction impacts associated with the garage entrance mitigation options are described in Chapter 17, "Mitigation." As stated there, the mitigation options that involve construction of a new curb cut and driveway from Columbus Avenue would result in the temporary loss of parkland while construction of the driveway is under way, pedestrian circulation would be blocked in this section of the park, and additional areas would be fenced nearby. Options 5 and 6 would also require the temporary closing of a section of the park. Option 4 would not result in any notable new construction activities. The FEIS proposes Option 4.

Comment 141: If the Museum or Planetarium Authority decides not to employ a second entrance along Columbus Avenue, I would urge the Museum to make a commitment as to what it would do if all of the mitigation efforts being proposed turn out not to work. (Neuwelt, Unidentified)

If the Planetarium Authority decides not to build a garage entrance on Columbus Avenue, and then determines after the new Planetarium opens that there is a major traffic problem, what is the Museum prepared to do at that point? (Adler for CB7)

Community Board 7 requests the opportunity to review now what the scope of work would be if a future construction project to add a secondary garage entrance were entered into after the construction of the planetarium project as proposed by the DEIS. (CB7 Resolution/Response)

Response: SEQR does not require the analysis of speculative impacts. Even so, the Planetarium Authority and the Museum expect the proposed mitigation to effectively address the identified impacts that are significant. As noted, the FEIS proposes to create a garage entrance on Columbus Avenue, as set forth in FEIS Chapter 17, "Mitigation."

Comment 142: Does the EIS consider the air quality effects of the garage entrance mitigation options? What are the effects of the queuing vehicles within the tunnels? (Baker)

Response: As noted in the EIS, mechanical ventilation for the covered portions of the driveway would be installed as necessary. Furthermore, it is unlikely that vehicles would queue in the driveways, since that would restrict potential access for emergency vehicles.

NOISE

Comment 143: The unavoidable noise impact from events on the terrace is largely avoidable if amplification of events is prohibited. AMNH should also commit to the development, with the community, of restrictions on hours for and numbers of events to be held on the terrace. (Stringer, Cohen, Houston for CB7)

Response: See response to Comment 78.

ALTERNATIVES

Comment 144: Why must 190 parking spaces be added in the middle of a landmark park serving a densely populated Upper West Side Historic District? Isn't there a more environmentally sound answer, such as greater reliance on mass transit and the use of shuttle buses from other kinds of remote parking areas? (Gissler, 79th Street letters, Kaputa, Favretti)

Response: As described in the FEIS, the new parking garage is already needed to meet the demands of existing visitors who drive to the Museum, and will be even more critical once the new Planetarium is in place, since it would attract more visitors than the existing one. Remote parking with shuttle buses would not address this problem. At the same time, the Museum will encourage the use of public transportation as part of its overall transportation coordination program.

Comment 145: Since the garage is probably the most controversial aspect of the project, the FEIS should fully consider a "No Build" option for the parking garage. This analysis would identify cost savings to the Museum and public agencies funding the project, how those dollars could be invested in mass transit enhancements adjacent to the Museum, and what the impact of reducing weekend automobile demand from visitors to weekday levels would do to traffic conditions around the Museum. (Strauss)

Eliminate or scale back the auto-attracting garage. (79th Street letters, 79th Street petitions, Rizzo, Levy, Kaputa, Mauser, Szymanski, Sherman, Budinger, Favretti, Levko)

Consideration should be given to the total elimination of private car parking within the Museum, naturally allowing parking for buses and for handicapped parking. (Needham, Schein)

Public funds can be put to better use than constructing the garage. (Baker)

The Museum should instead encourage its visitors to use some of the many parking garages that can be found off Amsterdam Avenue in the high 70s and low 80s. Perhaps the Museum and the independent garages could work together in arranging Museum visitor parking. The Museum could consider operating a shuttle bus. (Rizzo, Gissler)

Reconsider the garage size with the aim of minimizing capacity. Can a higher parking fee be charged to encourage bus or transit use, the resulting money being used to provide discounts to transit-riding visitors or to purchase an advertising campaign on the Long Island Rail Road and Metro-North? When more capacity is needed in peak conditions, can arrangements be made with local parking garages and valet service provided? (Harrison and Bauer)

Regarding the question of traffic, is visitor parking really necessary? The Upper West Side is well served by public transportation. (Landmark West)

Response: The EIS includes an analysis of a reduced-size garage that maintains the capacity of the existing Museum parking lot, which is the "No Build" condition for parking (see Chapter 18, "Alternatives"). As noted there, a smaller garage would be inadequate to meet existing or future demand, either with or without the project, and traffic conditions on West 81st Street and surrounding streets would be considerably worse.

Designing the project without an on-site parking structure or lot would not be a reasonable alternative to meet the objectives of the Museum. It would not only fail to provide parking for Museum visitors, but would result in a project that failed to meet the objective of improved and consolidated, safe bus unloading and loading for school groups. Without on-site parking, curbside bus loading and unloading would be significantly increased, creating greater traffic problems and worsening school bus operations. Without on-site loading and unloading positions, widespread changes in parking regulations would be required at the site to provide permanently cleared curb positions for bus operations.

Removal of all parking from the site would also increase overall traffic impacts from the project, and worsen traffic conditions on the streets bordering the site. Given that auto usage, particularly for weekends visitors coming from longer distances, is expected to remain the preferred mode for substantial portions of Museum visitors, the level of vehicular travel to the Museum is expected to remain similar with or without the parking garage. However, without the garage, visitors would spend more time traveling on local streets searching for either on-street spaces or nearby garages. Since many visitors first come to the site, either for drop-off or in search of parking, it is expected that these visitors would face increased vehicle miles traveled before finding a substitute parking location. For the incremental travelers to the proposed project, this would create a larger problem on West 81st Street, as a substantial percentage of the new drop-offs would occur on that block before proceeding to an alternative parking location. This would push more traffic through the intersections along West 81st Street at both Central Park West and Columbus Avenues and would increase delays and impacts at these two locations. Westbound traffic would then travel southbound on Columbus Avenue and then travel farther west before finding available off-street parking locations along Amsterdam Avenue. This would increase traffic along both these corridors and on the cross streets providing access to area garages. Those vehicles traveling eastbound along West 81st Street would then travel north- or southbound on Central Park West and then reverse direction, perhaps having to cross Columbus Avenue to find off-street parking. Without parking at the site, more travelers may be inclined to spend time "scouting" curb spaces before they find another garage or lot, further exacerbating the problem. Therefore, an alternative without any on-site parking is likely to result in increased traffic impacts compared with the proposed project and would trigger the need for additional mitigation.

As noted in the response to Comment 72, the Museum is committed to encouraging the use of public transportation. In addition, when the garage is full, the dedicated Museum staff will direct visitors to other garages so that they do not queue up outside the garage entrances.

Comment 146: It is the unanimous opinion of the Beresford Board that the construction of the proposed three-story garage and open terrace restaurant is quite simply a mistake. It can only exacerbate an already untenable situation. (Baker)

Response: See response to Comment 145. As described in the EIS, the proposed project would create traffic impacts that could be mitigated through typical traffic mitigation measures.

Comment 147: Useful changes to the Museum and planetarium (a Columbus Avenue entrance, better parking, improved park landscaping) could probably be accomplished with less than 25 percent of the projected costs of the proposed "Mall Complex." (S. Leff)

Response: It is always possible to spend less, but, in this instance, spending less would also achieve less and would result in a project that falls short of meeting the Museum's objectives and needs for the project.

Comment 148: I believe a compromise is in order. The Museum should scale back its plans. Traffic is congested even today. (Silva)

The answer to the Museum's problems is not massive construction, glitzy merchandising, and many more people, it is using what you've got well. (Gershon)

Response: As described in the EIS, the new Planetarium is needed to further its educational mission; the new parking garage is already needed to meet the demands of existing visitors who drive to the Museum, and will be even more critical once the new Planetarium is in place, since it would attract more visitors than the existing one. Providing an enlarged parking facility would improve the traffic situation. The restaurant is intended as a service to Museum visitors, and the terrace is an important new public amenity. A smaller Planetarium would not accommodate the new state-of-the art exhibition space necessary adequately to explain the workings of the universe. The analysis of a reduced-size garage in the EIS (see Chapter 18, "Alternatives") demonstrates that a smaller garage would be inadequate to handle existing and future demand, and traffic conditions would be considerably worse on West 81st Street and the surrounding streets. ❖

APPENDIX A

HISTORIC RESOURCES

Table A-1
Buildings on West 81st Street and Columbus Avenue Facing the American Museum of Natural History

Map No.	Year	Name/Address	Style	Height (stories)	Facade Material	Architect
1	1928-1929	The Beresford 211 Central Park West	Neo-Renaissance with Baroque elements	20	Brick, limestone, terra-cotta, granite, and ironwork	Emery Roth
2	1906-1908	Hayden House 11 West 81st Street	Beaux-Arts	11	Brick, terra-cotta, and stone; galvanized, cast, and wrought iron	Schickel & Ditmars
3	1929-1930	15-23 West 81st Street	Neo-Renaissance	16	Brick, stone, terra-cotta, cast stone, and ironwork	Emery Roth
4	1926-1927	25-31 West 81st Street	Neo-Renaissance/ Neo-Romanesque	15	Brick, stone, and terra-cotta	Gronenberg & Guchtag
5	1885-1886	33 West 81st Street	Undetermined; features removed	4	Stucco over brick and stone	Henry L. Harris
6	1913-1914	35-39 West 81st Street	Neo-Renaissance	12	Brick, stone, terra-cotta, and ironwork	Neville & Bogge
7	1922	Standish Hall, now Excelsior Hotel 41-49 West 81st Street	Neo-Moorish with Spanish Renaissance elements	15	Brick, stone, and terra-cotta	Sugarman & Hess
8	1903-1905	Hotel Colonial 441-449 Columbus Avenue (aka 51-57 West 81st Street)	Beaux-Arts	12	Brick, stone, terra-cotta, and ironwork	Frederick L. Browne
9	1889-1891	Hotel Endicott 440-444 and 446-456 Columbus Avenue	Romanesque Revival	7	Brick, stone, and terra-cotta	Edward L. Angell
10	1978-1982	432-436 Columbus Avenue	Modern	6	Brick and concrete	Fred C. Lary and Marvin H. Meltzer
11	1890-1891	430 Columbus Avenue	Renaissance Revival	5	Brownstone	John C. Rume
12	1900	428 Columbus Avenue	Early 20th Century Commercial	4	Cast iron	Charles J. Perry
13	1892-1893	426 Columbus Avenue	Elizabethan Renaissance Revival	2	Brick and stone	Alexander D. Duff
14	1899-1900	424 Columbus Avenue	Commercial Building with Flat	2	Sheet metal	Julius F. Munckwitz
15	1898	The Warwick Arms 418-422 Columbus Avenue	Beaux-Arts	10	Stone and brick	Henry F. Cook
16	1898-1900	The Orleans 410-416 Columbus Avenue	Beaux-Arts	10	Brick, stone, and ironwork	Buchman & Deisler
17	1983-1986	Park Belvedere 402-408 Columbus Avenue	Modern	28	Brick and pre-cast concrete	Frank Williams
18	1881	392-396 Columbus Avenue/100 West 79th Street	Stripped	4	Brownstone	Christian Blimn
19	1981-1985	386-390 Columbus Avenue	Modern	18	Brick	David M. Lewis

Table A-1 (Continued)

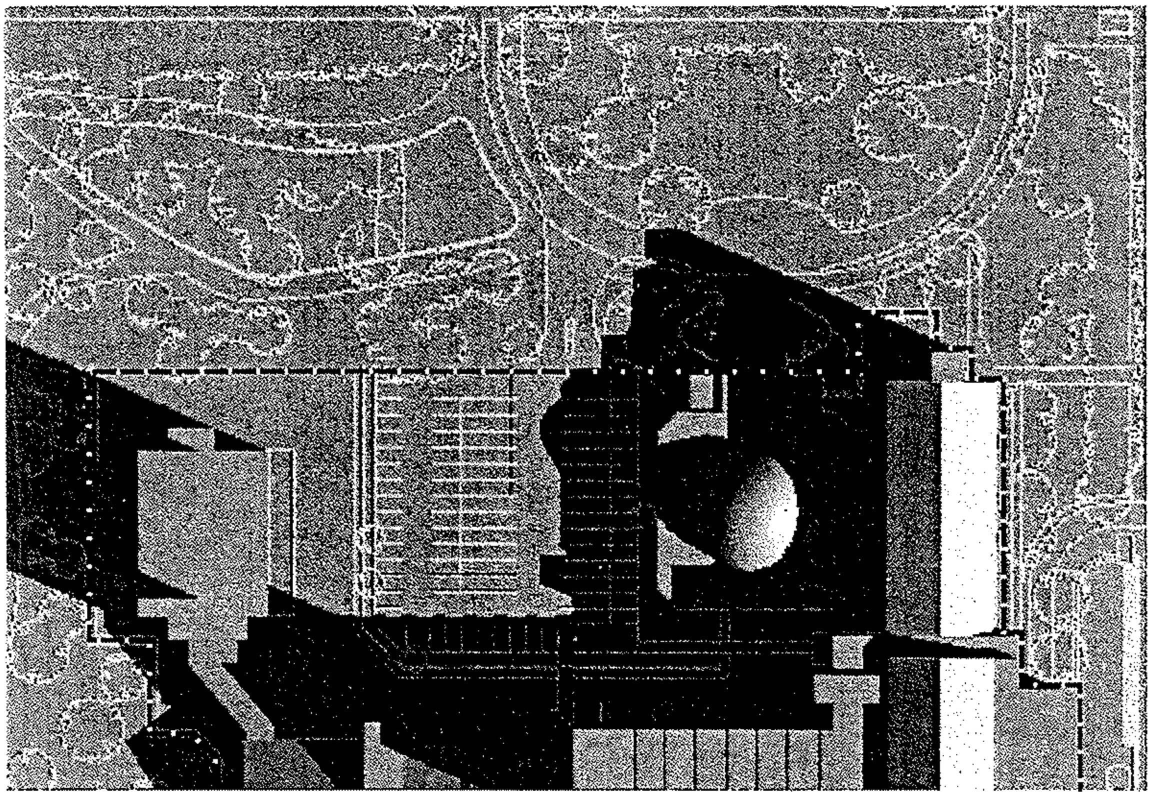
Buildings on West 81st Street and Columbus Avenue Facing the American Museum of Natural History

Map No.	Year	Name/Address	Style	Height (stories)	Facade Material	Architect
20	1882-1886	The Evelyn (former) 380-384 Columbus Avenue	Renaissance Revival	7	Brick, stone, terra-cotta, and iron	Emil Gruwe
21	1886	The Volunteer (former) 376 Columbus Avenue	Queen Anne	5	Brick	Thom & Wilson
22	1939-1940	The Grandview (former) 370-374 Columbus Avenue	Modern	5	Brick	Joseph M. Berlinger
23	1891-1892	The Kenmar 360-368 Columbus Avenue	Renaissance Revival	5	Brick and brownstone	Thom & Wilson

APPENDIX B

SHADOW DIAGRAMS*

* *This appendix is new to the FEIS.*



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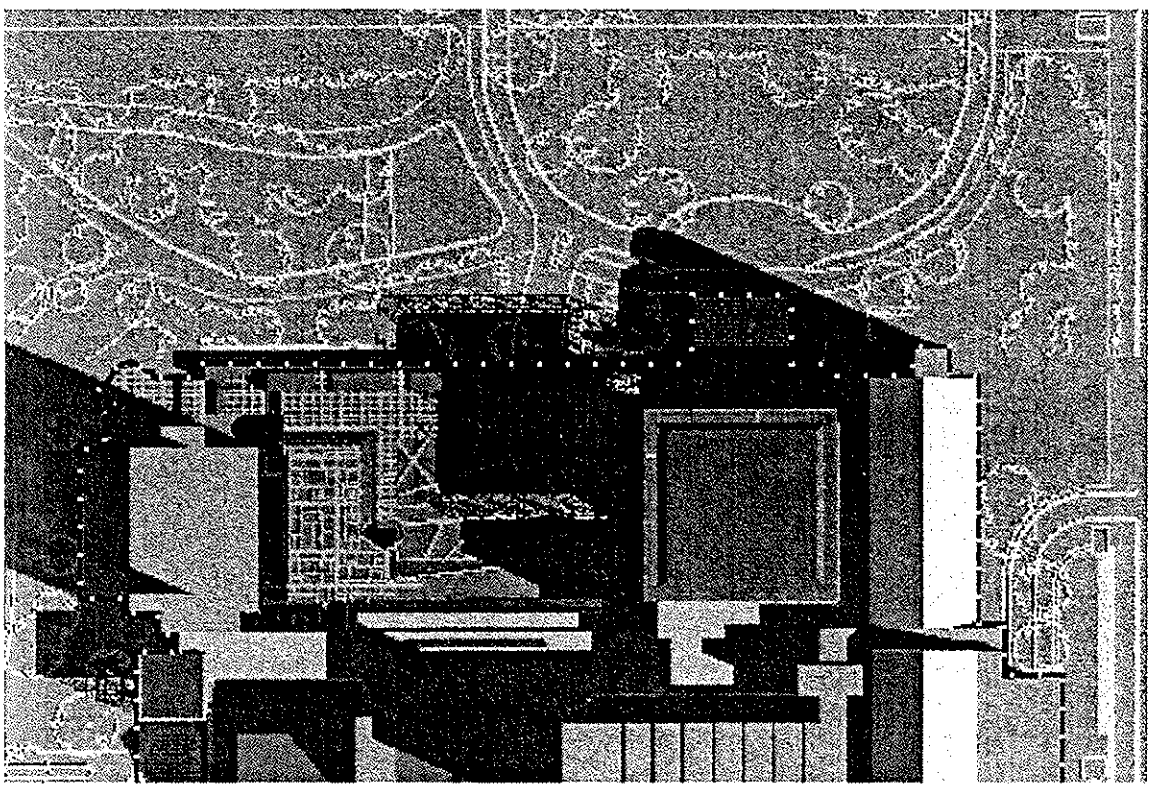
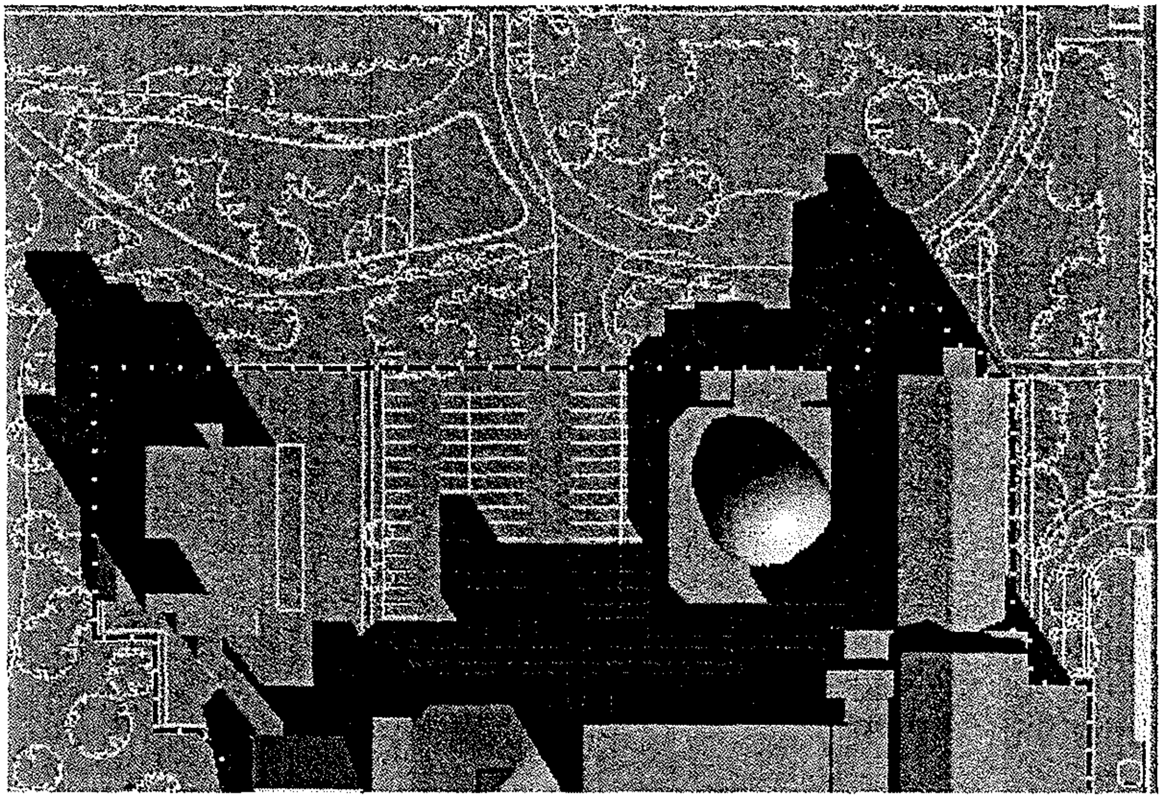


Proposed

– – – – Boundary of Planetarium and Museum Facilities

Shadow Diagrams
March 21 • 10 AM

Figure B-1



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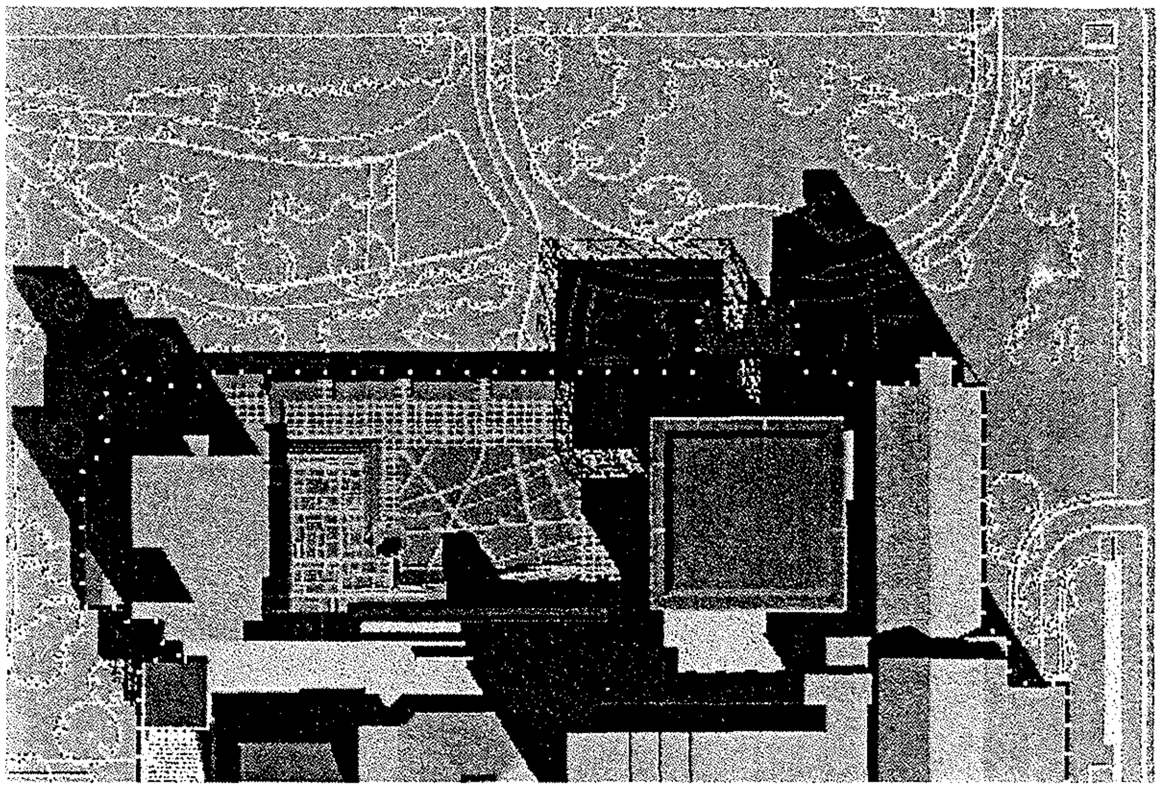


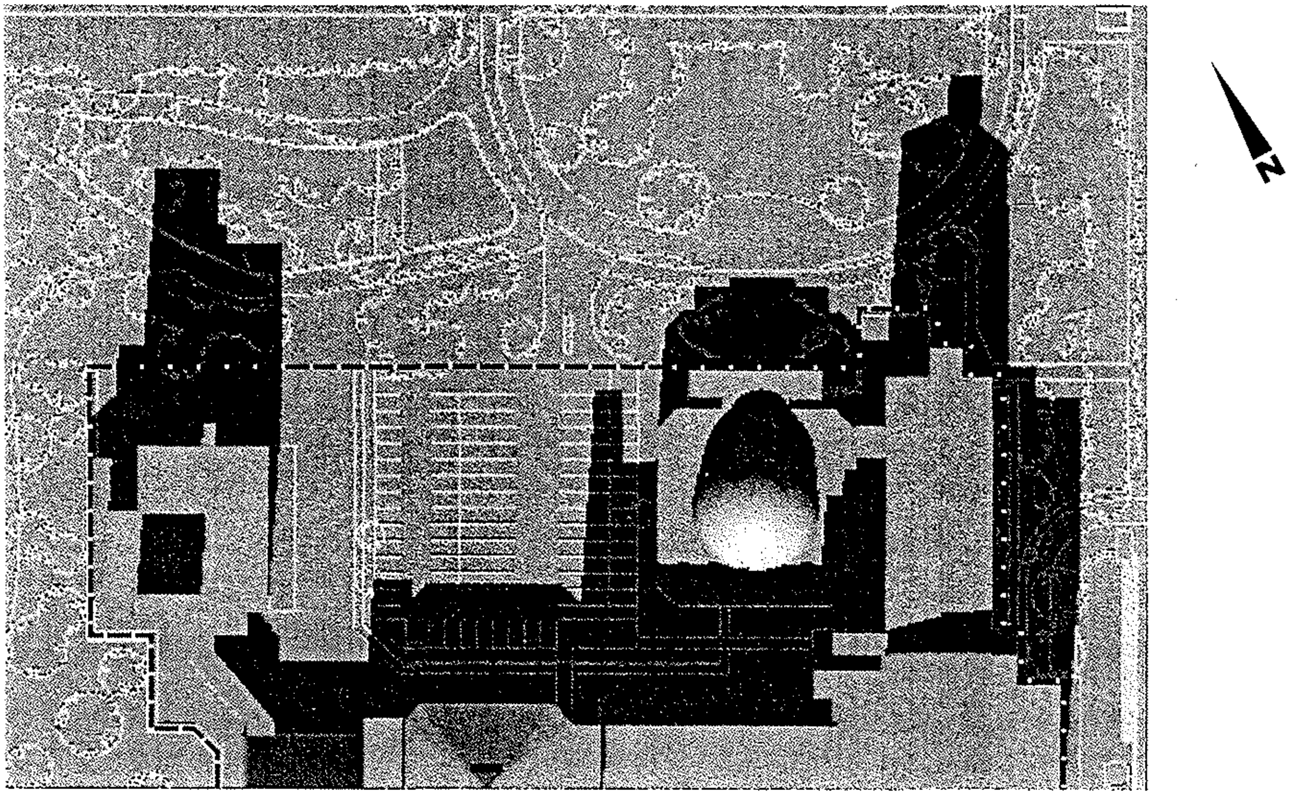
Proposed

---- Boundary of Planetarium and Museum Facilities

Shadow Diagrams
March 21 • 12 Noon

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Figure B-2



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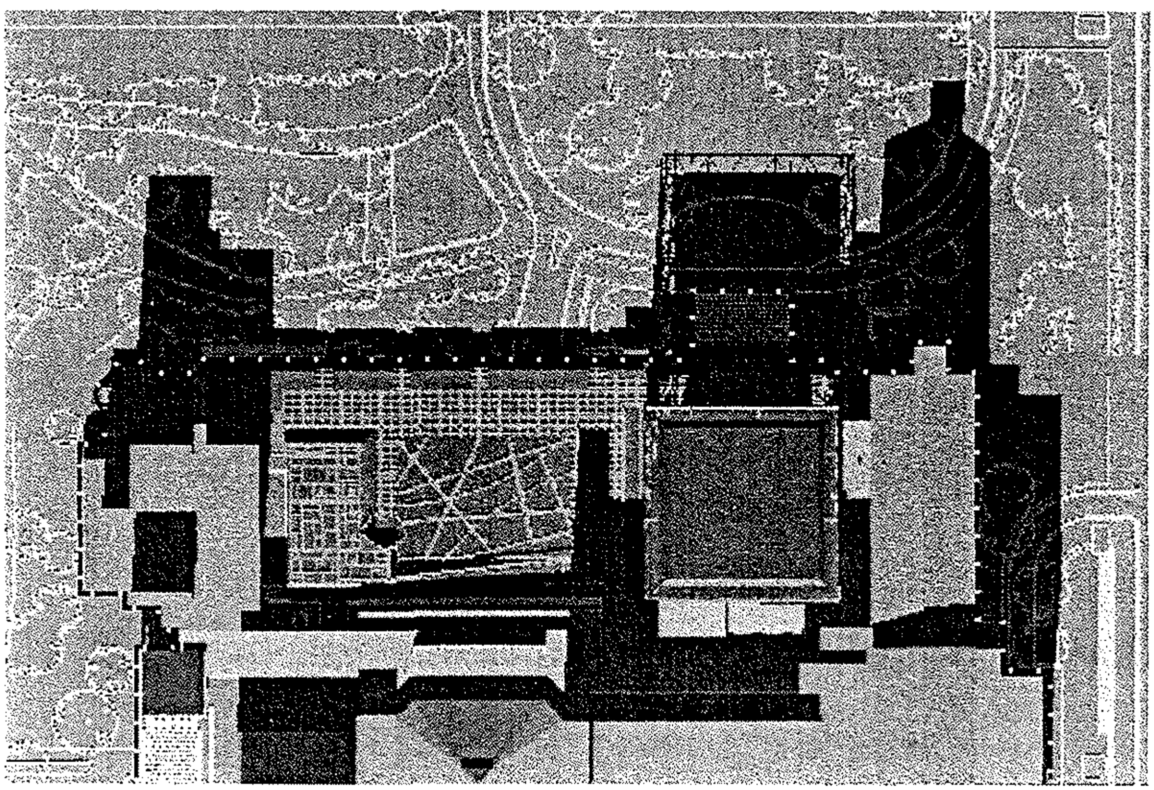
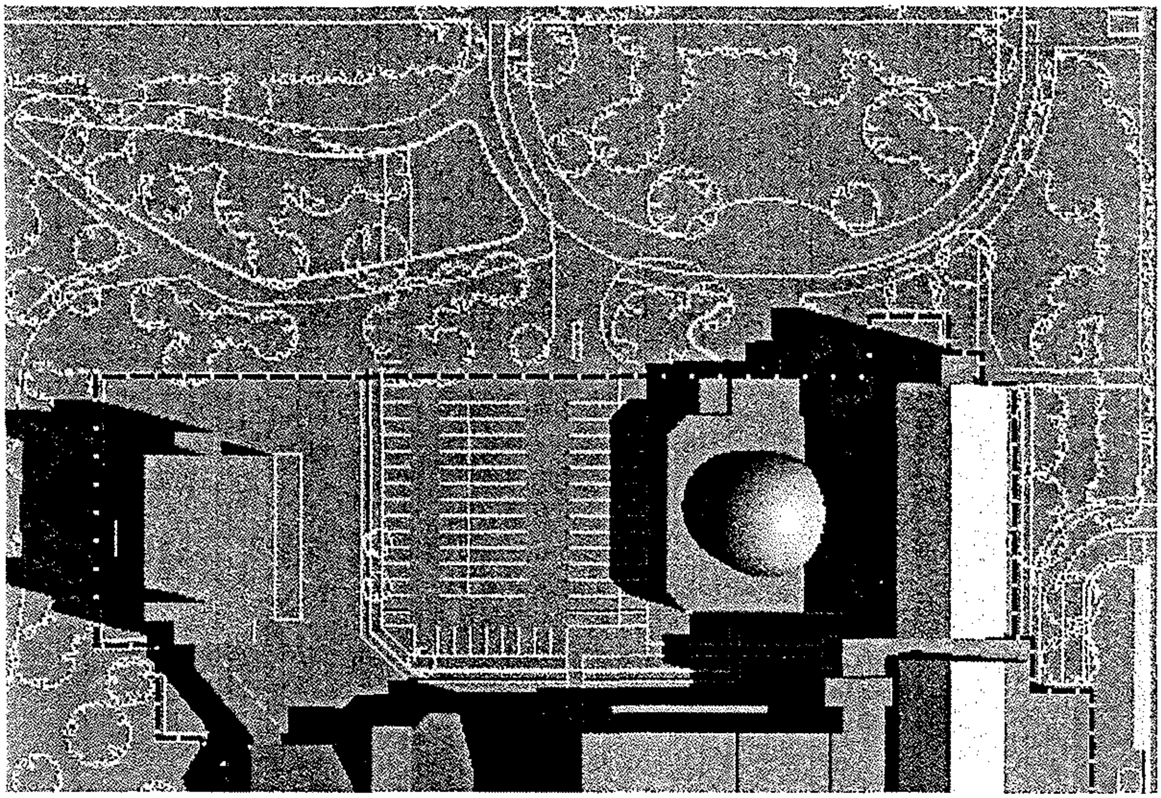


Proposed

- - - - Boundary of Planetarium and Museum Facilities

Shadow Diagrams
March 21 • 2 PM
Figure B-3



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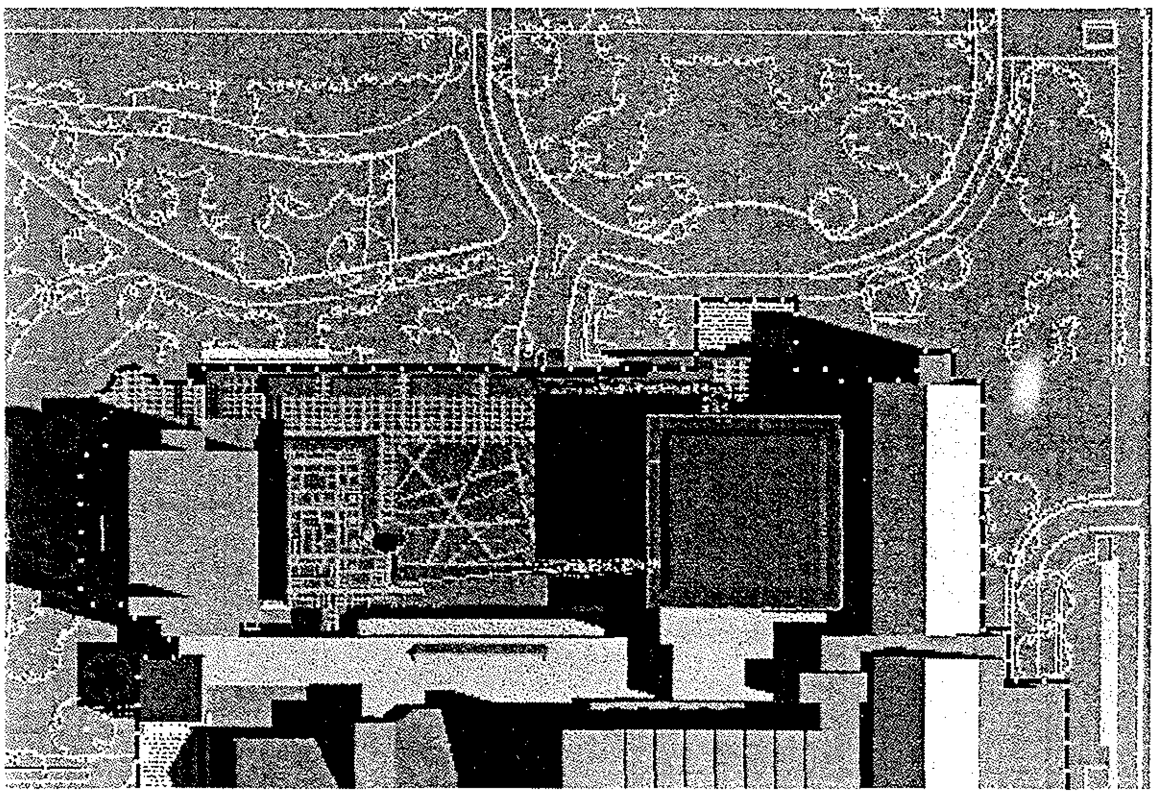
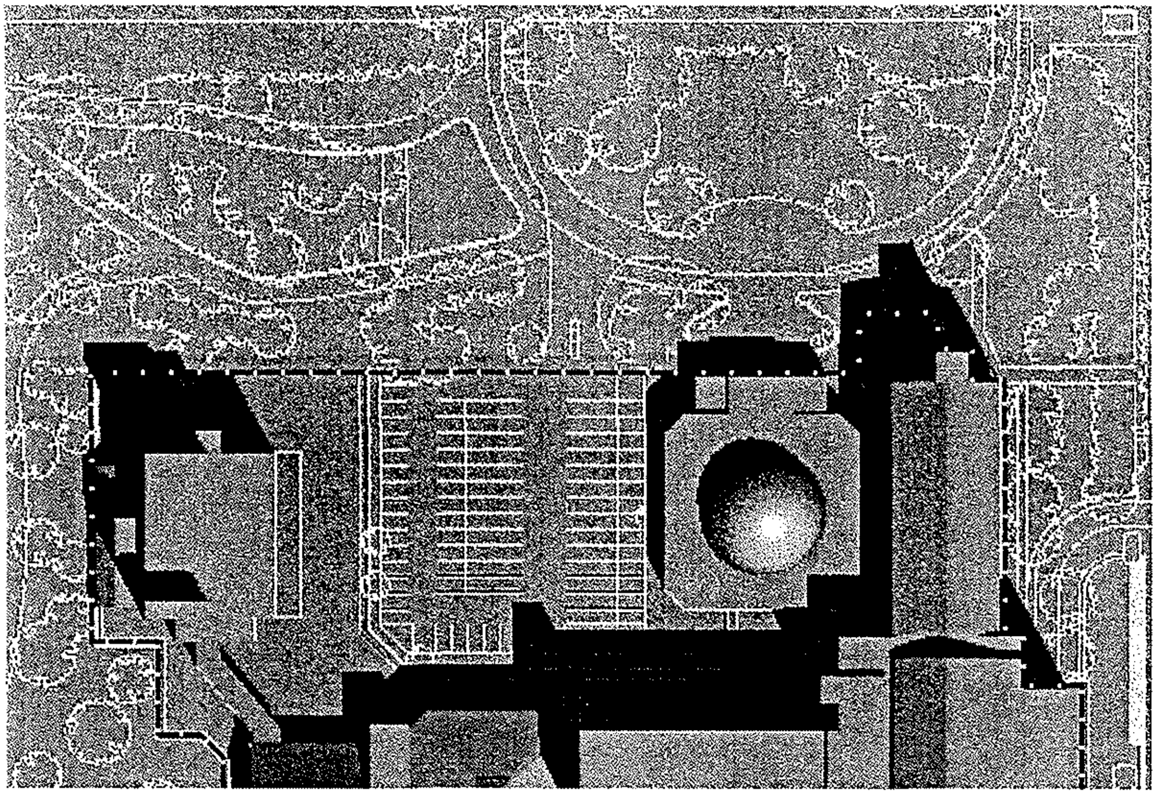


Proposed

- - - - Boundary of Planetarium and Museum Facilities

Shadow Diagrams
May 6 • 10 AM

Figure B-4



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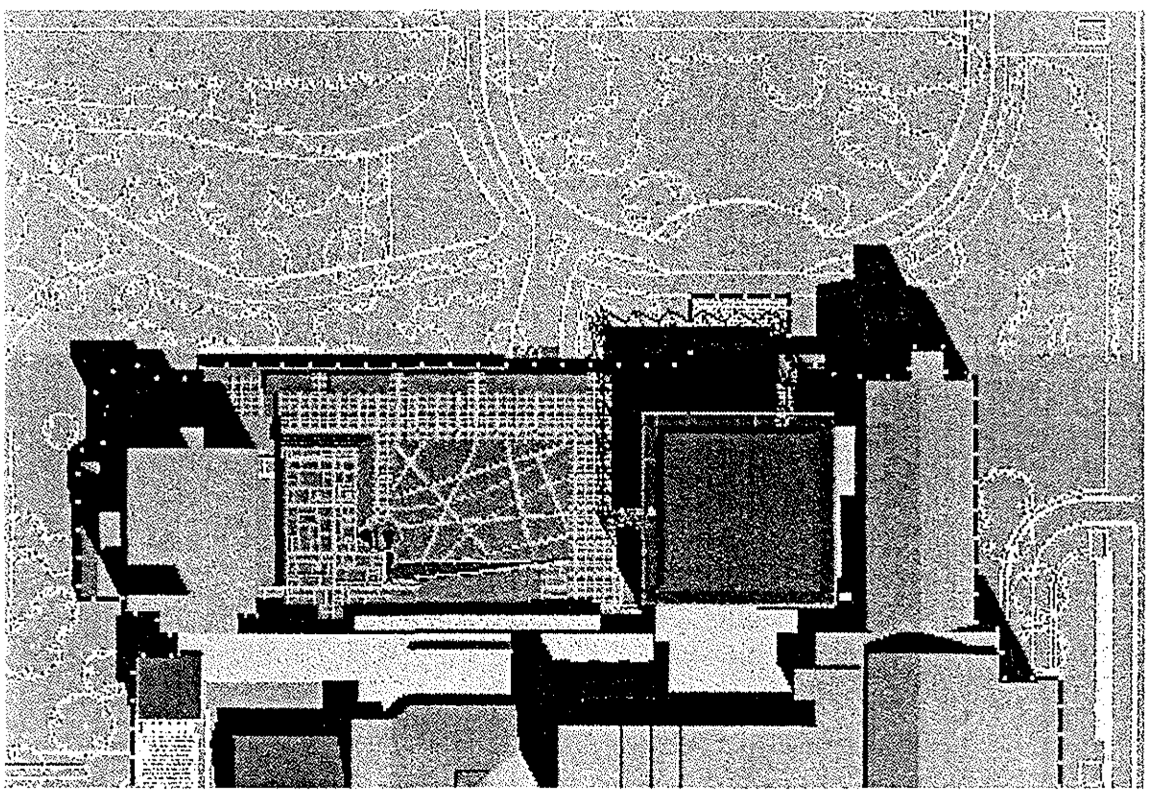
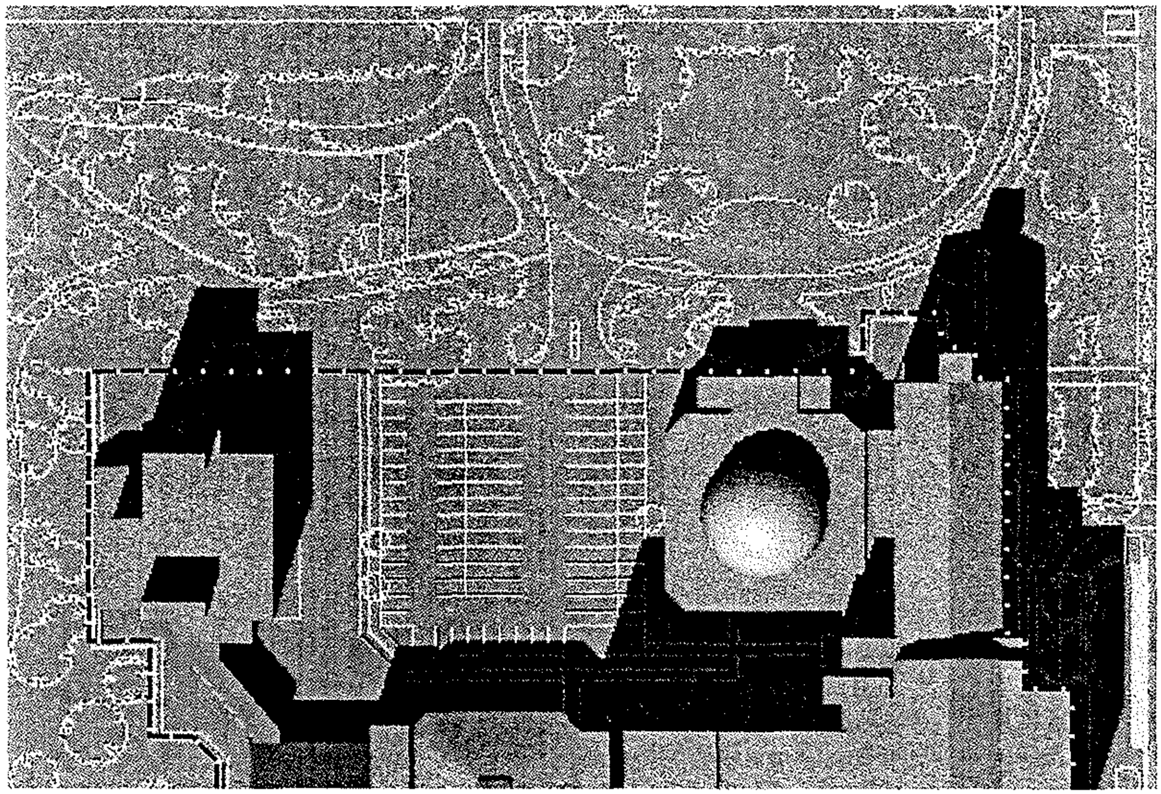


Proposed

---- Boundary of Planetarium and Museum Facilities

Shadow Diagrams
May 6 • 12 Noon
Figure B-5

American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT



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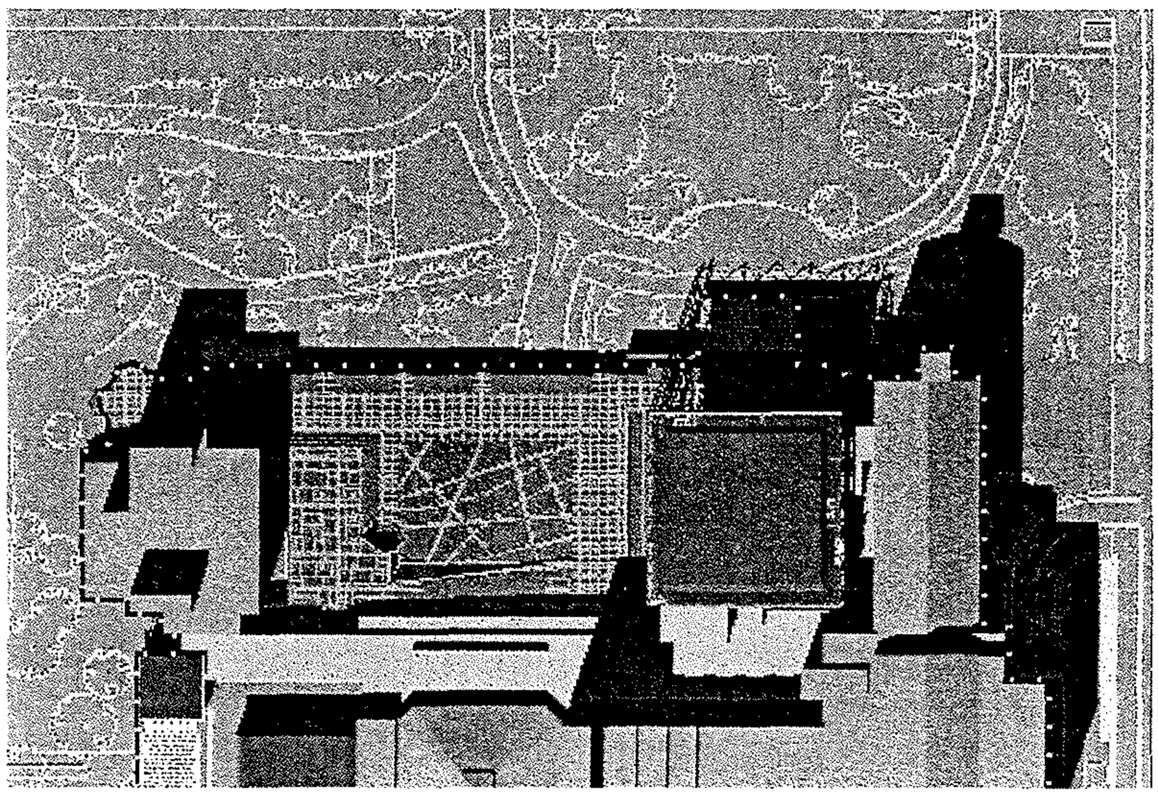
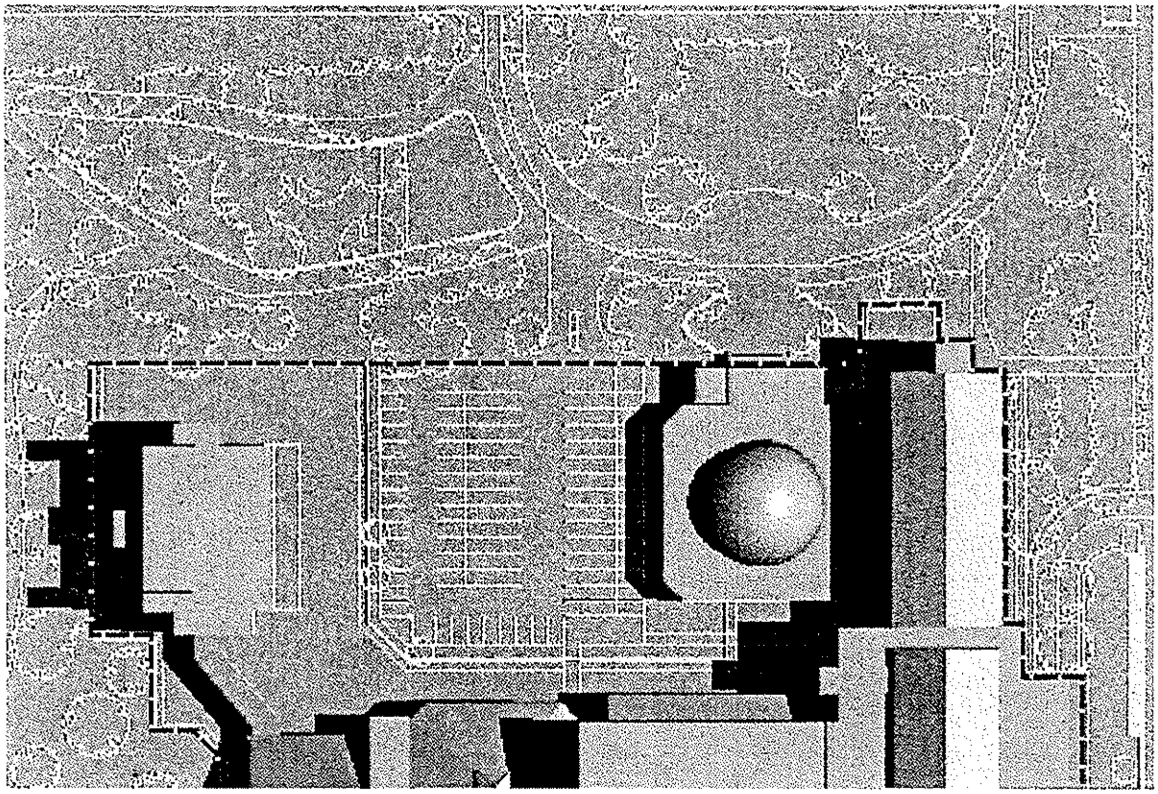


---- Boundary of Planetarium
and Museum Facilities

Proposed

Shadow Diagrams
May 6 • 2 PM

Figure B-6



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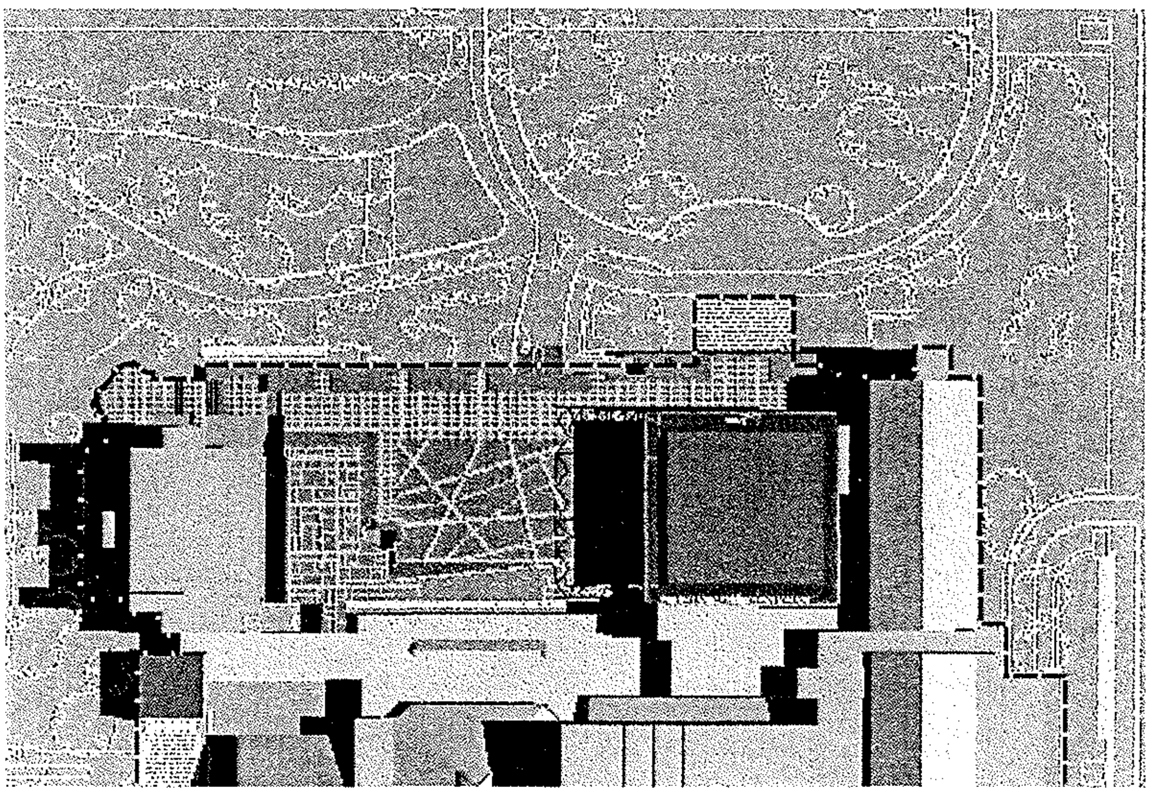
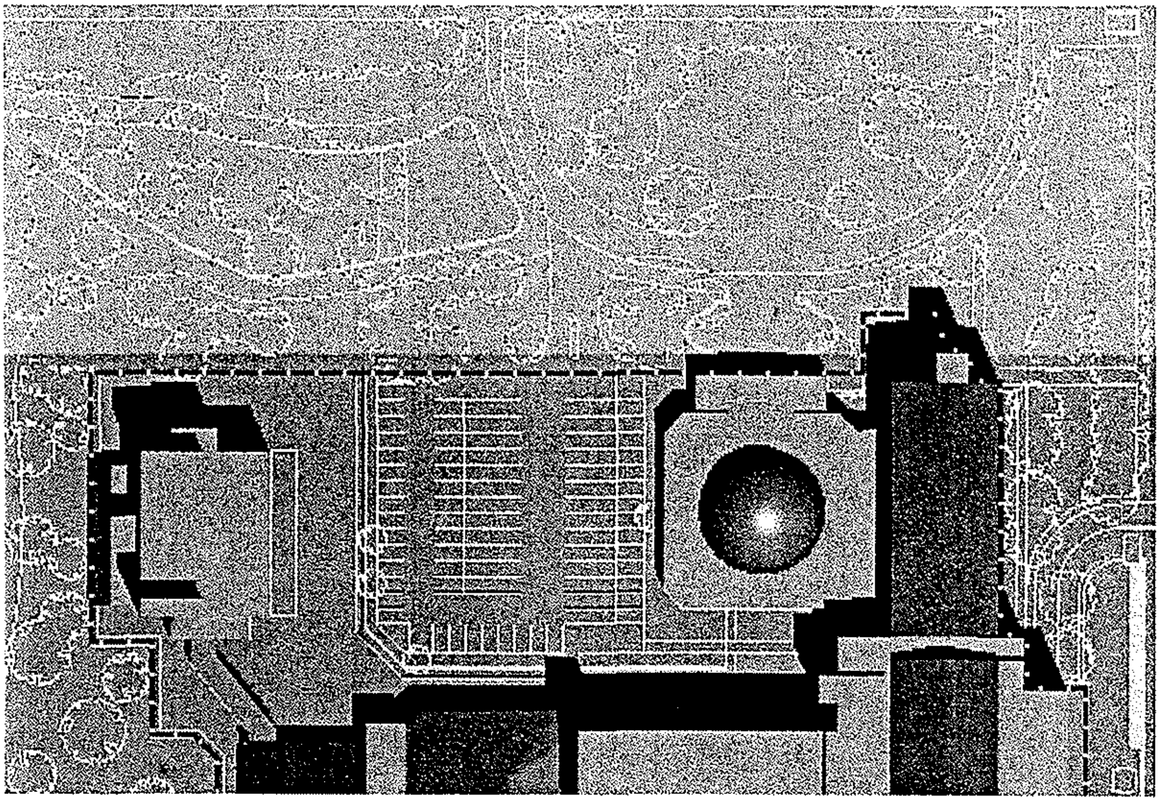


Proposed

Boundary of Planetarium and Museum Facilities

Shadow Diagrams
June 21 • 10 AM

Figure B-7



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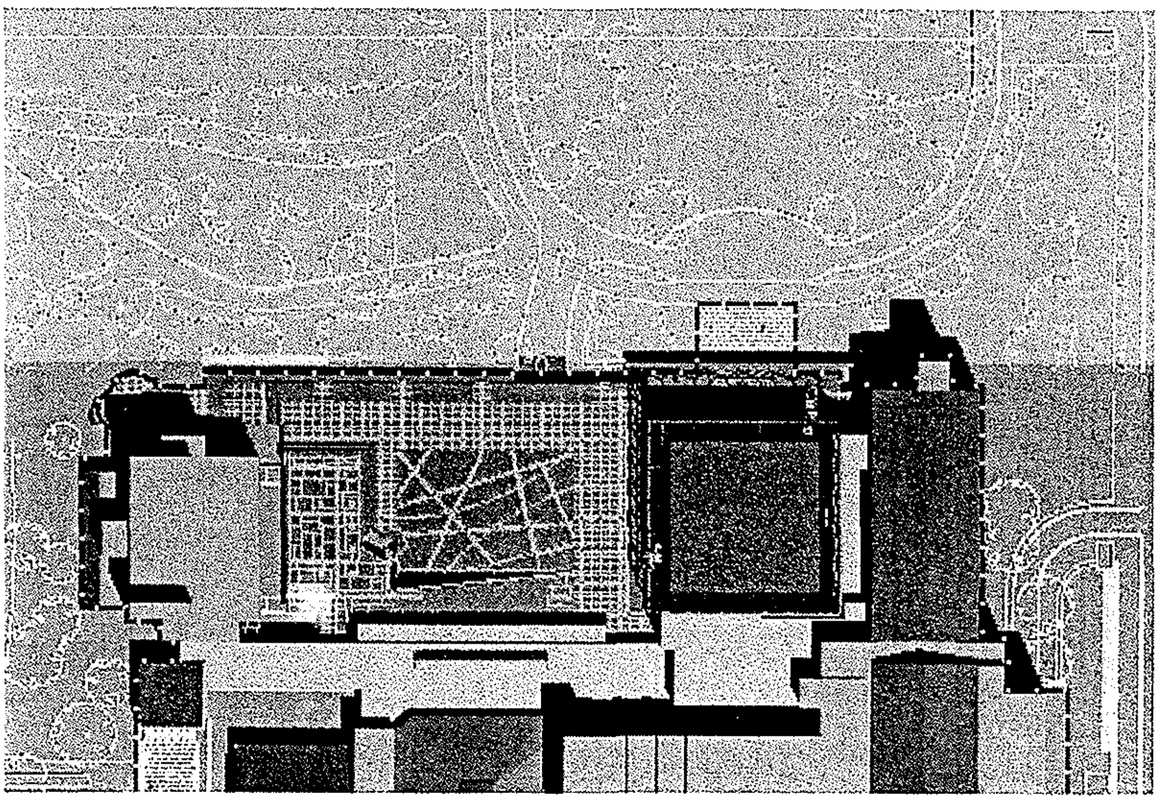
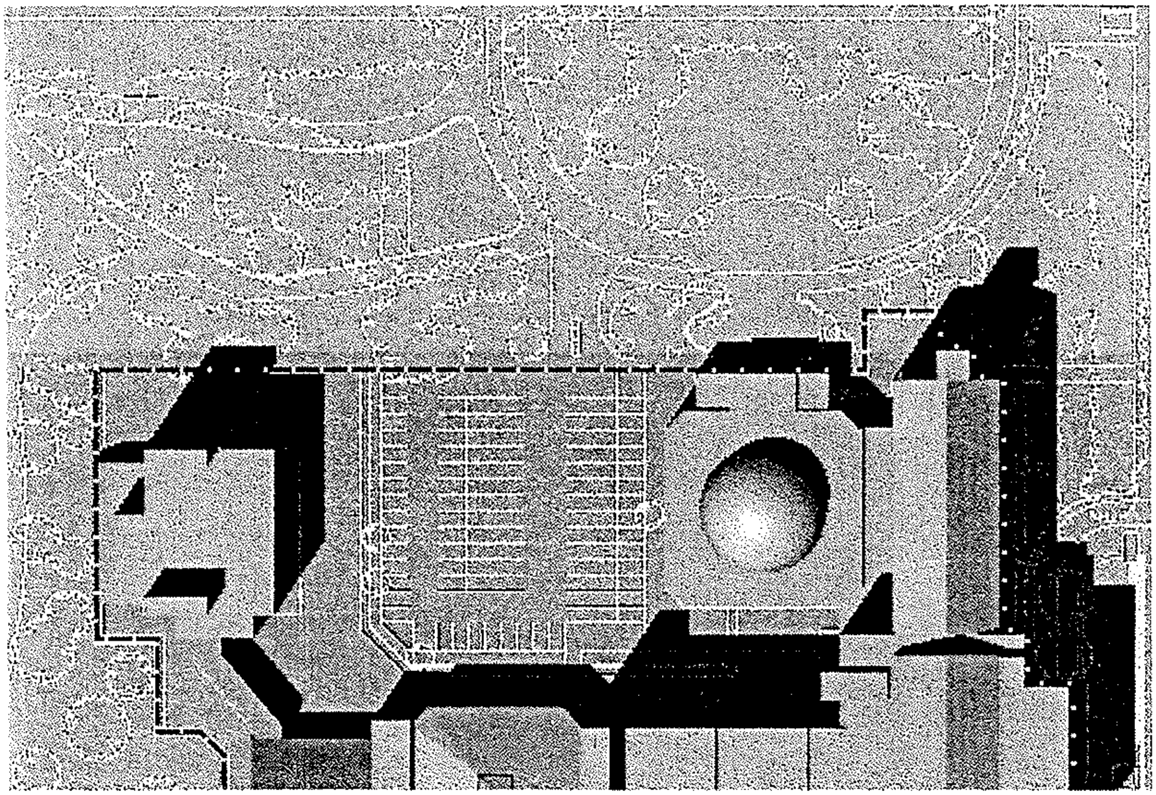


Proposed

- - - - Boundary of Planetarium and Museum Facilities

Shadow Diagrams
June 21 • 12 Noon

Figure B-8



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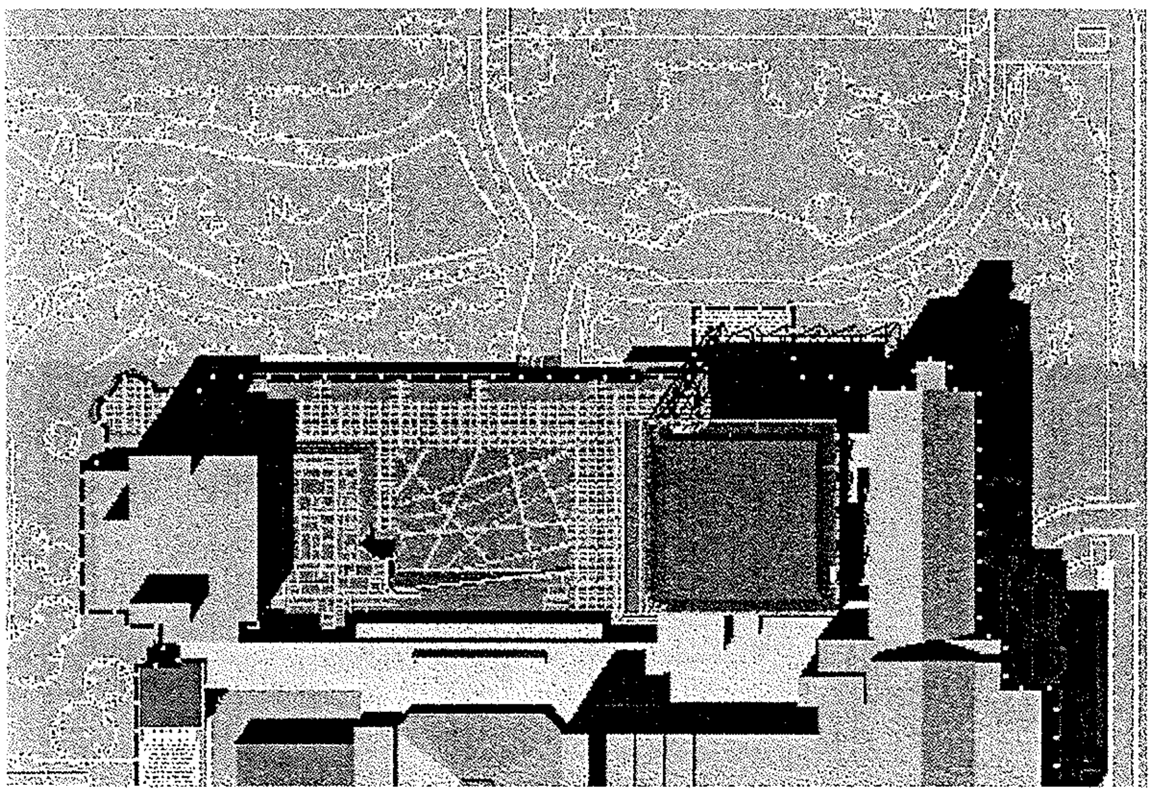
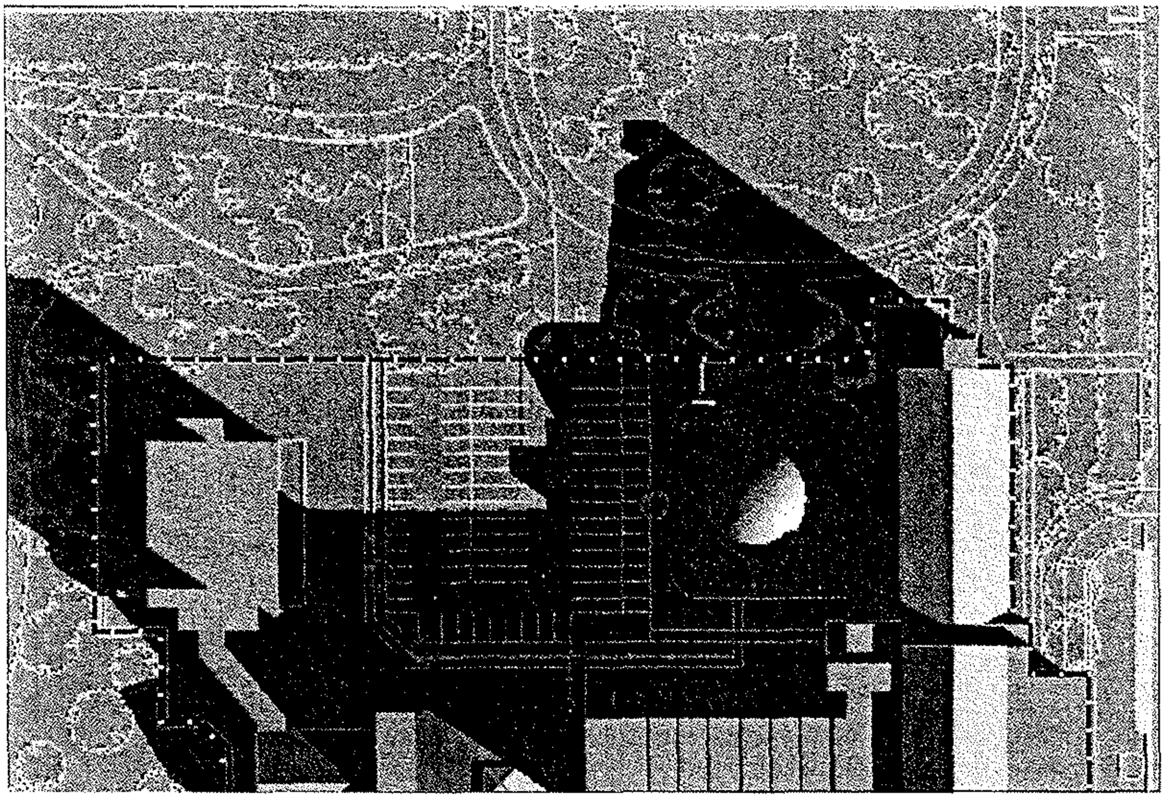


Proposed

- - - - Boundary of Planetarium and Museum Facilities

Shadow Diagrams
June 21 • 2 PM

Figure B-9



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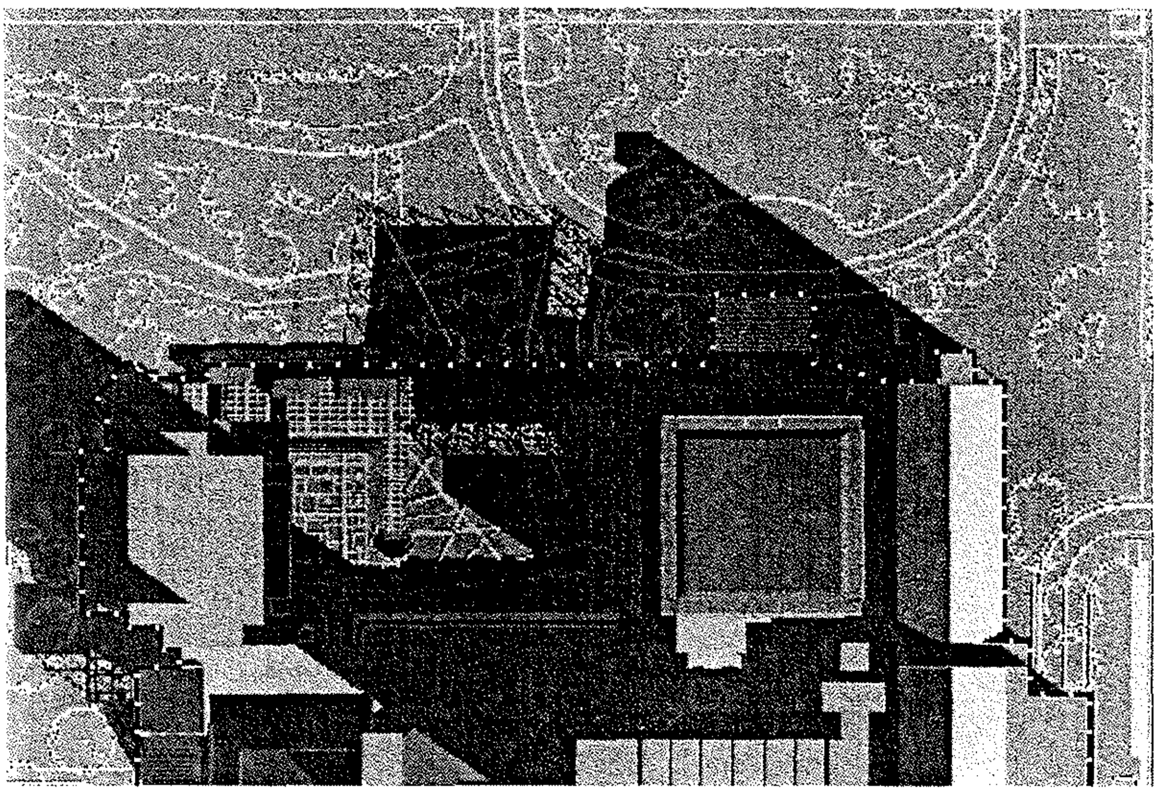
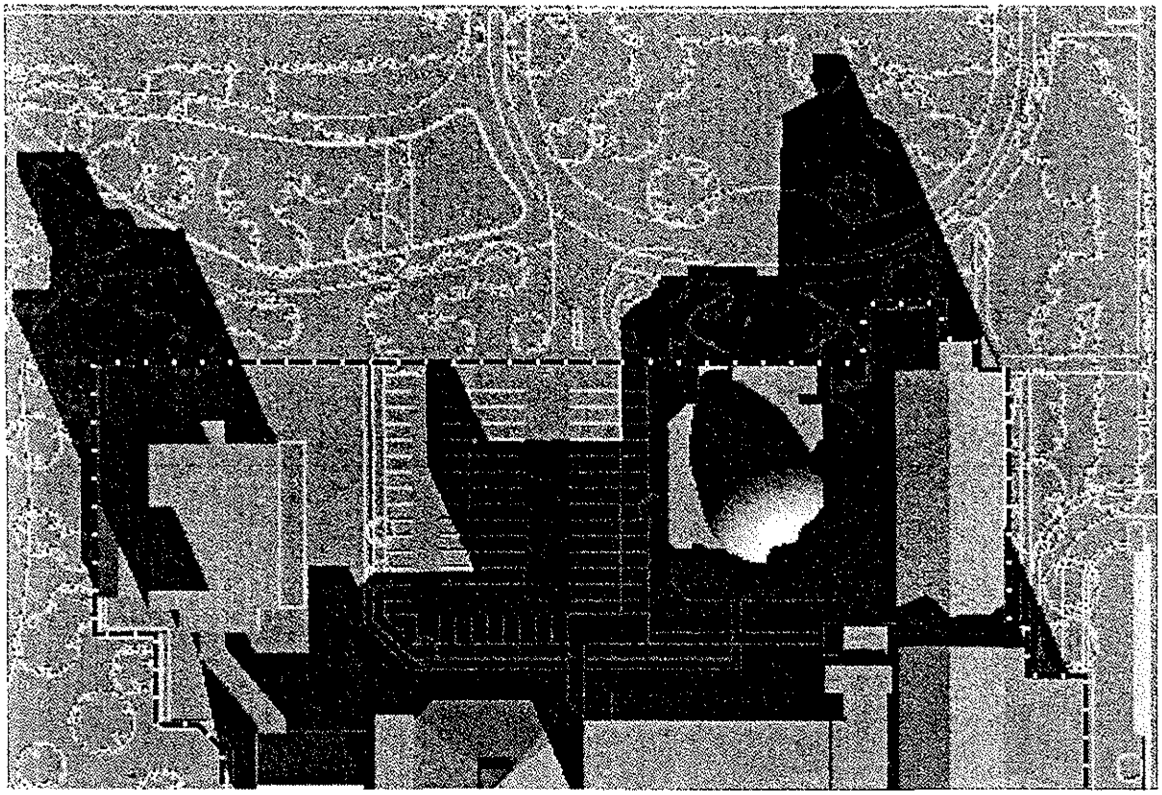


Proposed

- - - - Boundary of Planetarium and Museum Facilities

Shadow Diagrams
December 21 • 10 AM

Figure B-10



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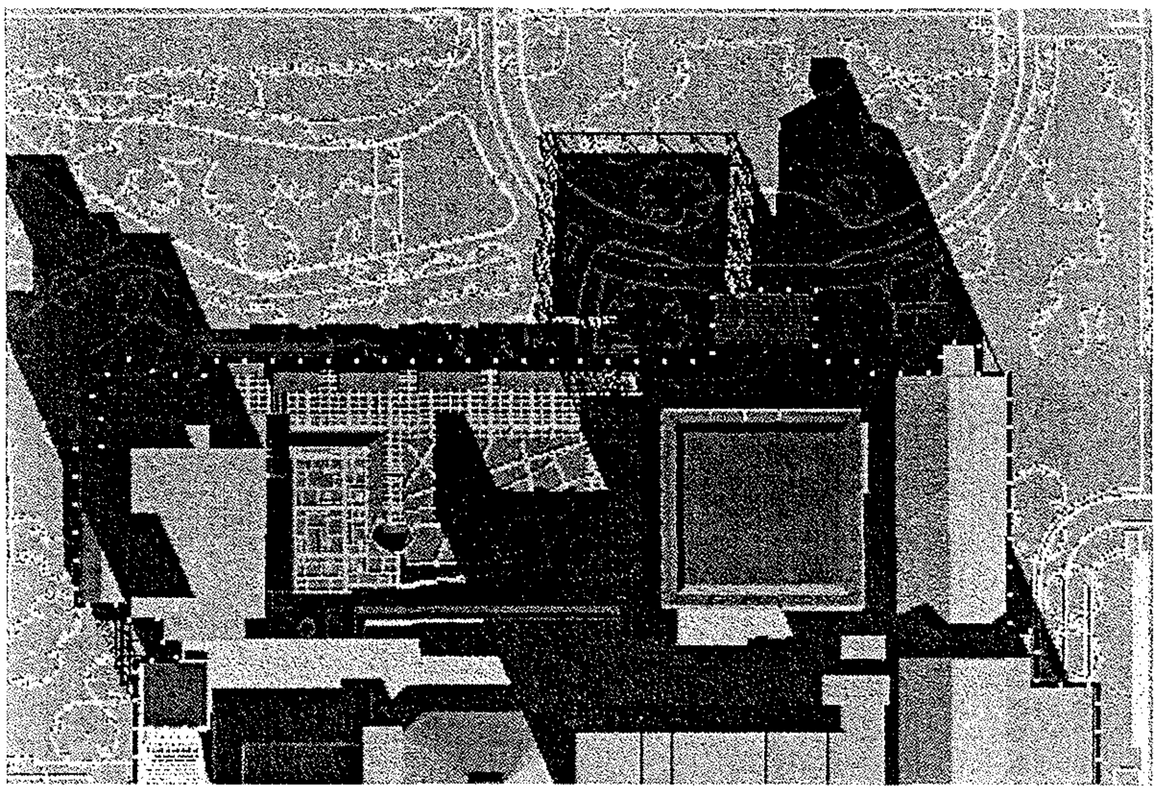


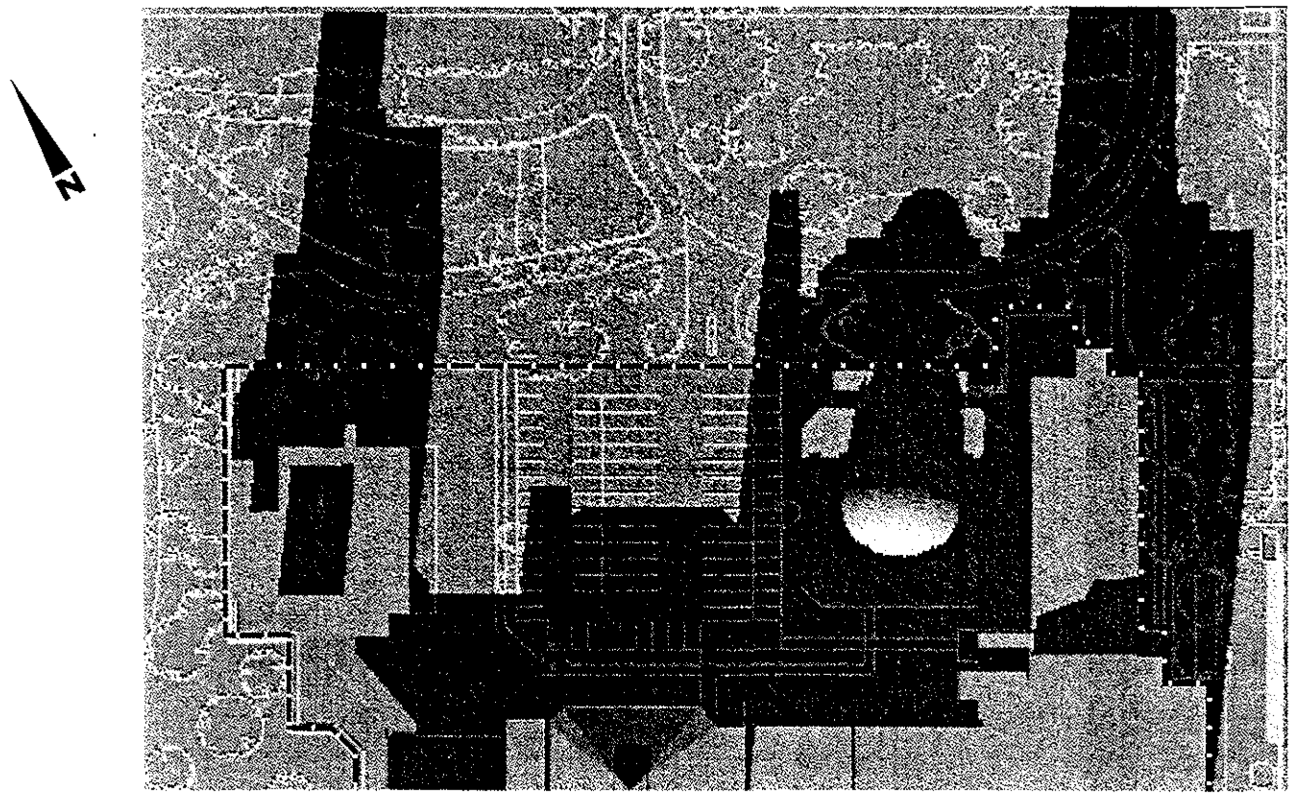
Proposed

- - - - Boundary of Planetarium and Museum Facilities

Shadow Diagrams

December 21 • 12 Noon

Figure B-11



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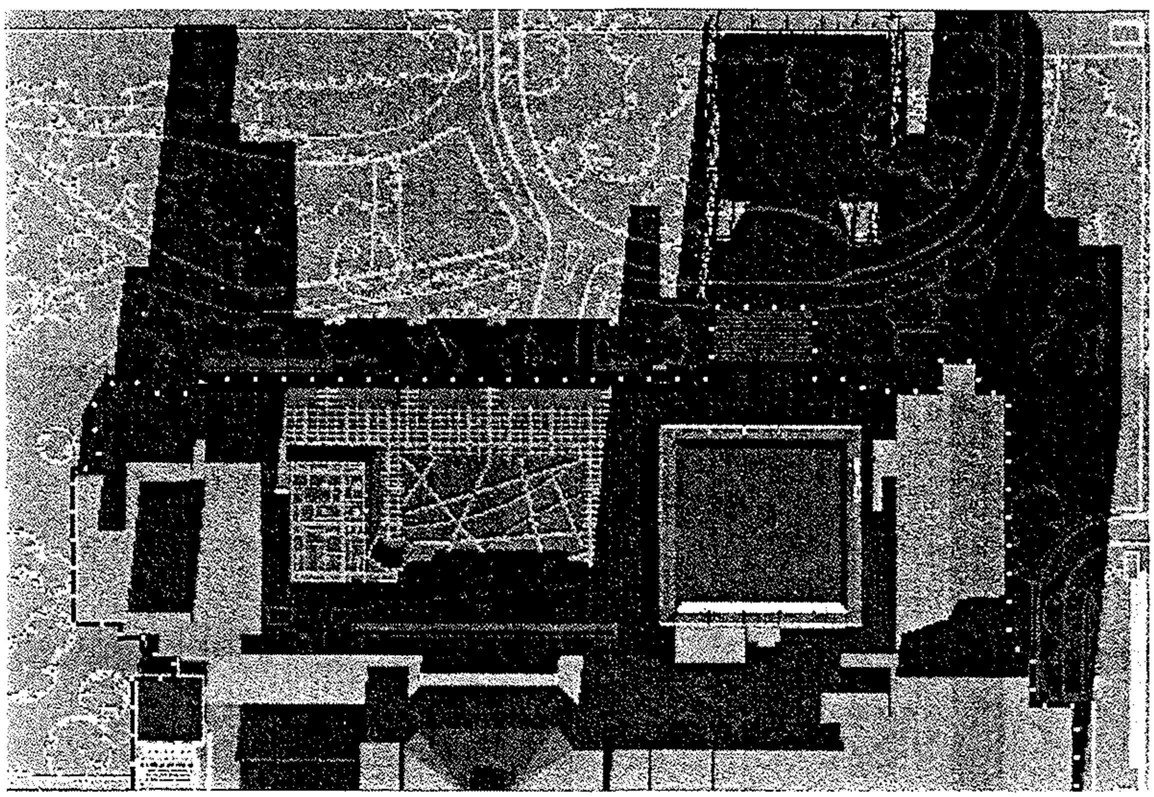

---- Boundary of Planetarium and Museum Facilities

Proposed

Shadow Diagrams
December 21 • 2 PM

Figure B-12

APPENDIX C
HAZARDOUS MATERIALS

A. INTRODUCTION

Construction of the Planetarium and North Side project would entail demolition and renovation work on several Museum structures. Four distinct structures would be directly affected by this project: the Power House building, the Ichthyology Building and connecting bridge, the Whitney Wing, and the Hayden Planetarium. The project would also involve substantial excavation of soils at the project site. If hazardous materials are present in the buildings or soils to be affected by construction, workers, visitors, and nearby residents could be exposed to them during construction. To determine whether hazardous materials at the Museum could pose a problem, an investigation was conducted in March 1996 of the area to be affected by project construction.

The investigation considered past and present uses on the project site, reported spills, waste storage and disposal activity, and the presence of fuel oil tanks. The work included an on-site investigation on March 1, 1996, and research using government agency records, historic maps, and Museum archival material. Logs from borings made on the site in March and April 1996 were also examined. In addition, a detailed evaluation of lead-based paint surfaces and asbestos in the buildings to be affected was conducted by GCI Environmental Advisory, Inc., for the Museum; the results of that investigation were examined.

The results of the investigation are summarized below.

B. ON-SITE INVESTIGATION

The structures to be affected by the project, as well as the parking lot and Theodore Roosevelt Park, were inspected on Friday, March 1, 1996 by Colleen Armstrong and Daniel Yohannes of AKRF, Inc. who were accompanied by Klaus Wolters, Assistant Manager in the Construction Department at the Museum. At the time of the inspection, the weather was clear, the visibility was good, and the premises were adequately illuminated. Some of the buildings' floors were illuminated by natural and/or artificial light; non-illuminated areas were accessed by flashlight. The site was inspected for the presence of stained surfaces and soils, stressed vegetation, storage tanks, drums, leaking pipes, transformers, suspect asbestos-containing materials, suspect lead-containing paint, or any other evidence of hazardous material usage and storage on-site that had the potential to expose workers and nearby residents to hazardous materials during the proposed construction and renovation.

OBSERVED BUILDING CONDITIONS

The investigation revealed that chemicals are used throughout the Museum and in the Power House, Ichthyology Building, the bridge between the two, and the Whitney Wing, as discussed below.

POWER HOUSE

The six-story Power House, also designated by the Museum as Building 17, is occupied by the Exhibition Department offices and workshop, the Construction Department, Ichthyology Department storage and office spaces, Mammalogy Storage, and several building mechanical spaces.

The fifth floor of the Power House is occupied by the Exhibition Preparation workshops, where major Museum displays and signs are constructed. Both plaster and plastic molding materials are located on this floor for the creation of these displays, as are containers of talcum, cellulose, and soil. This floor has three exhaust hoods associated with the silk screening operation, a silver soldering booth, and a spray painting booth. Exhaust hoods are enclosures that are maintained under a negative pressure and vented to the outdoors, to protect workers from potentially harmful chemical fumes and to prevent the fumes from traveling into other areas of the building. All of the exhaust hoods located at the Museum are equipped with scrubbers, and are registered with the New York City Department of Environmental Protection (DEP), Bureau of Air Resources. Scrubbers are devices that control acid gases in the exhaust by the injection of either a wet or dry neutralizing agent.

Cans of spray paint and gallons of paint are stored on wooden shelves and the concrete floor in the paint spraying booth. One-gallon metal containers of acetone and five-gallon metal containers of paint and lacquer thinner were observed by the painting spraying booth and the silk screening operation. No spills were observed at the time of inspection.

Chemicals were also stored and utilized in the basement of the Power House. Located behind the plumbing workshop and office space was a "forgotten" chemical store room. The containers of chemicals observed in this room were covered with a thick layer of dust and included muriatic acid stored in several five-gallon plastic containers lined up against the wall. Containers of hydrochloric acid and monochloracetate were being stored in glass bottles situated on table tops. Several other unidentifiable containers of chemicals were also present. No fresh spills were observed at the time of inspection, but the cardboard debris on the floor had disintegrated substantially, indicating past leaks or spills.

Several five-gallon metal canisters of specially inhibited ethylene glycol with potassium phosphate were situated on the concrete slab floor outside of the "forgotten" chemical store room. In addition, several five-gallon plastic containers labeled as storing "acid waste" associated with water services, were also observed at this location. No leaks or spills were observed at the time of inspection. Other chemicals observed in the basement of the Power House included 1-gallon containers of liquid plastic, a 1-gallon glass container of nitric acid, and 55-gallon drums of water treatment chemicals; no leaks or spills were observed in association with these containers.

ICHTHYOLOGY BUILDING

The three-story Ichthyology Building, also designated by the Museum as Building 15, is occupied by the Museum Reproduction Department, Ichthyology Department storage and office space, and Mammalogy Storage.

The Museum Reproduction Department, located on the ground-level of Building 15, recreates specimens by using whole portions or pieces of a subject to construct a fiberglass replica of the original specimen. Significant amounts of fiberglass resin are used to accomplish this task. The various types of flammable resins are stored in 55-, 5-, and 1-gallon metal containers that are kept neatly arranged in a room registered with the New York City Fire Department. No significant leaks or spills were observed in this room, which is defined by concrete slab floors and block walls. Several canisters of non-flammable pigments were stored neatly on metal shelving units in the main work area, and, similarly, no spills or leaks were apparent.

The fuel storage area for the Museum's gasoline and diesel powered equipment is also located on the ground-level of Building 15. Diesel is stored in one 55-gallon, one 35-gallon, and two 5-gallon plastic containers situated on wooden pallets. Evidence of spills were observed on the side of the 55-gallon container and on the floor. Spills occurring in this area do not pose a significant environmental hazard to the subject property due to relatively small quantity of material likely to be spilled and the surface on which the spill is likely to occur. However, these spills do pose a fire hazard if they are not cleaned up properly and quickly. Gasoline is stored in five-gallon metal canisters arranged neatly on shelves in a flammable containment cabinet. No leaks associated with these gasoline containers were observed.

The first and second floors and the two mezzanines of Building 15 are occupied by the Ichthyology Department storage spaces, library, and work areas. Many ichthyology specimens are stored in glass jars filled with ethyl alcohol, a flammable preservative. Metal shelves filled with specimens prepared in this manner occupy the first and second mezzanine levels, as well as much of the first and part of the second floors. These rooms are registered with the New York City Fire Department as storage areas for combustible chemicals.

BRIDGE

A two-story bridge connects the Power House and the Ichthyology Building. The eastern side functions solely as a walkway, and the western part is utilized as additional storage for ichthyology specimens. This western portion was inaccessible at the time of inspection, but the specimens were reportedly stored in ethyl alcohol.

WHITNEY WING

The Whitney Wing, also designated as Building 19, is six stories in height. Two floors of this structure are utilized as exhibition space, and the remaining four floors are occupied by research laboratories, offices, and specimen storage areas. The use of chemicals was only observed on the ground level and sixth floor.

The sixth floor is the most recent addition to the structure and is occupied by ornithology laboratories. This level was built with epoxy floors and floor boards to prevent any chemical spills from leaking to the floors below. The laboratories on these floors stored small quantities of various chemicals to facilitate the researchers in their studies. In addition, ventilation fume hoods were present in many of the laboratories; each of these hood exhausts are properly registered with DEP and equipped with exhaust scrubbers.

An anatomical laboratory and preparation room is located in the basement of this structure; this room is utilized to prepare ornithology specimens for dissection and study. Several one-gallon glass containers of concentrated formaldehyde were stored neatly on shelves within locked cabinets. Formaldehyde is used at this location for the preservation of bird specimens. A plastic dispenser of diluted formaldehyde was situated atop a counter. No leaks or spills were observed at the time of inspection.

Large stainless steel tanks, approximately 100 gallons in size, lined the basement hallway. Large anatomically complete ornithology specimens, too large to fit in traditional storage containers—i.e., glass jars—were stored in these air-tight containers filled with ethyl alcohol. The containers were labeled as flammable. No leaks were observed at the time of inspection, and Museum staff indicated that these tanks are closely monitored.

ASBESTOS AND LEAD

A detailed evaluation of lead-based paint surfaces and asbestos in the buildings to be affected was conducted in 1995 by GCI Environmental Advisory, Inc., for the Museum. The results are summarized below.

Asbestos

Asbestos-containing materials were identified in the Hayden Planetarium in the form of acoustical ceiling plaster, duct insulation, pipe insulation/connections, and 9"x9" and 12"x12" vinyl floor tile. The pipe insulation was found to contain asbestos in the Bridge, and asbestos-containing material was identified in the Power House's 12"x12" vinyl floor tiles, pipe insulation, and south boiler stack chase. Suspect asbestos containing materials were also observed in the air handling room in the basement of Building 19, and in the basement of Building 15. Neither of these areas will be affected by the proposed project, but plans have been made to abate the asbestos in these areas and other areas of the Museum.

Lead

The evaluation by GCI Environmental Advisory, Inc., identified lead-based paint on the original painted ceilings in the bridge and in the Power House. Lead-based paint was also discovered on the painted metal doors in the Power House and in the Planetarium. Although chipped and broken paint was observed within the structures during the site inspection, Museum staff indicated that the Museum enforces and operations and maintenance plan to minimize exposure to lead dust.

CONCERNS RELATED TO POWER PLANTS AT THE MUSEUM

A coal-fired electric power plant was located in the Power House. The present day whale storage and switch rooms were originally occupied by the dynamo room when the Power House opened in 1931. A dynamo is a electric generator for a direct current system. The generators were removed in 1960's when the Museum converted to alternating current. No evidence of this electrical equipment was observed during the inspection. The current boiler room in the basement was also the location of the original coal fired boilers. The exhaust stacks for these boiler units were on the north and south ends of the building. The flues in these stacks are still visible from the second floor. Directly above these boiler units were coal storage bins on the second floor and above. The ash and cinder basins were located in the sub-basement directly below the boiler units. The ash basins are defined by concrete slab floors and block walls.

Coal Residue and Coal Ash

Because the Power House building was once a coal-fired power plant, the building was inspected for the presence of coal residue and coal ash. The former ash basins in the subbasement of the Power House were observed to be covered with ash residue; a pile of ash was also observed in this room at the time of inspection. Coal ash is typically associated with metals and polycyclic aromatic hydrocarbons (PAHs).

Polychlorinated Biphenyls (PCBs)

Electrical transformers can be a concern, because older transformers used oils that contained polychlorinated biphenyls, or PCBs. The coal-fired electric power plant once located in Building 17 generated direct current electricity, and as such did not require the use of transformers.

Consolidated Edison owns three vaulted transformers on the project site, adjacent to and east of the Power House. Transformers are frequently used in modern-day power plants to either step-up or step-down the alternating current produced by an electric generator. Consolidated Edison stated in a letter dated October 31, 1985, that all three of the transformers had a die-electric fluid PCB content of less than 50 parts per million, and are well within the Federal regulations for the use of PCBs. Several other transformers, owned by the American Museum of Natural History, are located throughout the subject property. However, all of the transformers are dry-type, and do not contain PCBs.

MUSEUM OPERATIONS

WASTE MANAGEMENT

Waste is collected daily by the maintenance staff and deposited into a compactor located in the below-grade Museum service yard. The waste is removed by a private carter on an as needed basis. Recyclable materials, including magazines, cardboard, metals, glass, plastic, and paper, are also collected by the maintenance staff and removed by a private carter.

Two open dumpsters were in place at the time of inspection for the collection of waste generated by private contractors working for the Museum. The contractors are responsible for the removal of their own waste, including hiring a carter.

UNDERGROUND STORAGE TANKS

One 1,000-gallon underground diesel fuel storage tank was present on the Museum grounds for the operation of the emergency generator. This tank is not included in the New York State Petroleum Bulk Storage database, as current state regulations do not require the registration of tanks that are less than 1,100 gallons in size. Records of this installation were not available at either the New York City Buildings Department, nor the New York City Fire Department. Mr. Vohra, Manager of Engineering and Maintenance, stated that the Fire Department was aware of the tank, but they made an error in the registration process by stating that the tank contained No. 2 fuel oil and not diesel. This issue is in the process of being resolved.

Engineering site plans from 1962 detailed the installation of a 30,000-gallon underground storage tank at the Power House. It was proposed that oil should replace coal as the fuel for the power plant. No indication that this tank was installed could be found from the site inspection and discussions with Museum representatives. The date of this site plan corresponds to the period in which the Museum closed the power plant and began using Con Ed pressurized steam.

UTILITIES

Consolidated Edison provides natural gas and electricity to the American Museum of Natural History, as well as pressurized steam. Municipal water and sewage services are provided to the property.

Several sumps are located on the project site, primarily in the subbasement of the Power House, where it frequently floods from rain. All of these sumps reportedly terminate into the municipal sewer.

CHEMICAL STORAGE AND DISPOSAL

Storage, transport, and disposal of hazardous chemical waste is regulated under the Federal Resource Conservation and Recovery Act (RCRA) and the New York State hazardous waste regulations (6NYCRR Parts 370-374). All generators of hazardous waste must register with the New York State Department of Environmental Conservation (DEC) and receive a generator's license number. Generators must file manifest forms with the DEC each time hazardous wastes are picked up from the site, and they must also file quarterly and annual reports with this agency.

The American Museum of Natural History complies with the above regulations, and is considered to be a small quantity generator by DEC. Two surveys are distributed yearly to each department within the Museum by the Maintenance and Engineering Department. One survey requests information regarding the type and location of each chemical stored within a particular department, and the second survey requests a listing of the chemicals that the department would like to discard. Chemicals intended for disposal are collected once a year by a licensed waste hauler and treated off-site. To be in compliance with RCRA, a waste manifest is submitted to DEC at the time of the waste removal. No chemicals are disposed of on the Museum property nor introduced to the municipal sewer system.

In addition, all combustible chemical and non-combustible chemical storage areas are registered with the New York City Fire Department. This registration includes all of the specimen storage areas where the samples are stored and preserved in jars containing combustible ethyl alcohol.

The Museum currently has a 24-hour spill response program in place in the event that a major spill occurs on the subject property. An outside consultant trained employees how to safely handle chemicals and deal with minor spills on March 26 and 28, 1996, as part of the implementation of a lab hygiene plan and hazardous education program.

C. REGULATORY REVIEW

FEDERAL AND STATE DATABASES

As part of the investigation of the potential for hazardous materials on the project site, various regulatory databases were examined to determine whether any sites listed on those databases are located near the Museum. No sites were listed within a 1-mile radius of the Museum on the following databases: National Priority List; Comprehensive Environmental Response, Compensation and Liability Information System; Hazardous Substance Waste Disposal Sites; New York State Inactive Hazardous Waste Disposal Sites; New York State Solid Waste Facilities; New York State Major Oil Storage Facilities; and Resource Conservation and Recovery Act (RCRA) Treatment, Storage, Disposal Sites. In addition, no sites within a ¼-mile radius of the Museum of Natural History were listed in the following databases: New York State Chemical Bulk Storage Sites; Toxic Release Inventory Sites; New York State Air Discharge facilities; and Permit Compliance System Toxic Wastewater Discharges. The project site was not listed in the U.S. Environmental Protection Agency (EPA) Emergency Response Notification System nor the EPA Civil Enforcement Docket. All applicable regulatory databases meet the ASTM guidelines requesting utilization of information within 90 days' receipt from the appropriate agency. Most of the recently received databases submitted by these agencies have information that is current to 1994.

Five toxic spills were reported within ⅛ of a mile of the subject property, four of which involved a release of less than one gallon of material and were cleaned-up. A report of a less than one gallon on-land fuel oil release generally indicates that a tank test failure occurred for an above-ground fuel oil storage tank, and an insignificant amount of product (if any) was released during the pressure test. The fifth spill, considered to be active, involved the release of five gallons of No. 2 Fuel Oil on land at West 82nd Street; it is unlikely that the spill negatively affected the subject property because of the small amount of material released and the fact that groundwater was not affected. Three larger No. 6 fuel oil spills, 1,000 gallons or greater, occurred within ½ mile of the subject property and are still considered to be active. However, these spills located at 201 West 77th Street, 135 Central Park West, and 160 West 73rd Street are unlikely to have affected the subject property due to the viscosity and relative immobility of No. 6 fuel oil in soil.

Five Resource Conservation, Recovery Act (RCRA) Generators, including two at the project site, were listed within a ⅛-mile radius of the subject property. The subject property is listed as a small quantity generator at both West 78th Street and Columbus Avenue, and West 79th Street and Columbus Avenue. Reportedly, the site has been listed as generating organic and inorganic solvents and heavy metals prior to 1989 and from 1992 to 1994, with no violations incurred. The three other RCRA generators within ⅛ of a mile of the subject property are dry cleaning facilities, only one of which has reported the generation of spent halogenated solvents since 1989.

Sixteen Petroleum Bulk Storage sites were listed within ⅛ mile of the project site. Only three sites had underground storage tanks in place, while the remainder had either above-ground or vaulted underground storage tanks. Spills occurring in the latter two types of tanks are more likely to be detected and cleaned-up, thus less likely to affect the surrounding properties.

NEW YORK CITY BUILDINGS DEPARTMENT AND FIRE DEPARTMENT

Records maintained by the New York City Fire and Buildings Departments were also investigated to determine the potential presence of hazardous materials. These records typically include fuel oil, gasoline and waste oil tank installation applications and permits, and records of prior uses.

No records were available concerning the Museum of Natural History at the New York City Fire Department. Records at the New York City Buildings Department were accessed, but little information of environmental significance was uncovered in the two folders provided by the department. However, the computerized records indicate an application for a fuel oil storage tank in 1974, most likely the 1,000-gallon diesel tank associated with the Museum's emergency generator.

D. BORINGS

A review of the site boring logs (March and April 1996) found similar fill material throughout the site. There was no evidence of ash or any potentially hazardous materials. Groundwater was encountered between 20 and 30 feet below the surface.

E. LAND USE HISTORY

The large block on which the Museum is located was set aside and designated as Manhattan Square, one of several park squares, by the Commissioner's Plan of 1811, which also laid out the

City's street grid. Despite this designation, the Museum site and surrounding area remained undeveloped until the mid-1800's. Historical images show gradual improvement of the square, with areas of open water and piles of stone rubble giving way to plantings and paths. The site's topography varied greatly, and a large amount of mixed fill was used to partially level the area.

The Bickmore Wing, completed in 1877, was the first structure built for the American Museum of Natural History. The Memorial, North American, South American, North Asiatic, Polynesian, and Lecture halls were built between 1890 and 1899. The first Power House, now the Ichthyology Building, was constructed in 1904. Historical real estate atlases indicate that this structure had four boilers in place in 1912. The European, Asiatic, Oceanic, and Education Wings, as well as the Roosevelt Memorial, were constructed by 1931. The Power and Service House was constructed in 1931, and began operation as a coal-fired electric plant. The Whitney Wing and Hayden Planetarium were completed in 1933 and 1935, respectively.

Development of the surrounding area consisted largely of speculatively built three-, four-, and five-story row houses constructed from the 1880's to 1910. Five- and six-story store-fronted tenements and flats, interspersed with the apartment hotels and small commercial buildings, were built along Columbus and Amsterdam Avenues. A boom in the construction of taller apartment buildings with larger footprints between occurred between 1919 and 1930, and was spurred by the economic expansion of the period and the construction of the Independent subway along Central Park West. The area surrounding Manhattan Square, West 77th Street and West 81st Street, was among the areas most affected by this boom.

Changes in zoning allowed commercial development along West 79th Street in the block west of Manhattan Square in the 1930's and 1940's. Redevelopment generally took the form of one- and two-story alterations and additions to row houses. The area has seen few changes since this period, the most notable change being the construction of a high-rise apartment building on the corner of West 79th Street and Columbus Avenue.

The area has maintained it mixed-use commercial and residential character for more than 100 years. No indications of establishments posing an environmental hazard to the Museum were reported. Portions of the Museum were once occupied by bodies of water that are not evident today, and as such the area has been filled. Early photographs of the site indicate that some of the fill consisted of stone rubble, which is unlikely to have posed an environmental hazard to the subject property.

F. SUMMARY AND RECOMMENDATIONS

Based on the results of the investigation, there appears to be a low potential for environmental impairments. The following concerns were noted:

- Asbestos. The areas to be disturbed by the Planetarium and North Side project are scheduled to have all of the asbestos abated prior to construction in those areas. An asbestos abatement plan is being developed that will detail the specifications for keeping the environmental impact of this abatement project to a minimum. This plan will include containment of the work area; containment involves sealing off an area to prevent airborne asbestos fibers from migrating and contaminating other areas. Air monitoring, a process of measuring the fiber content in a specific quantity of air over a given amount of time, will also be included in the asbestos abatement plan. These measures will minimize the risk posed to the environment and the neighboring residents during the abatement project. The asbestos abatement plan must be approved by DEP and the U.S. Labor Department must be notified.

- Lead. Lead paint does not pose a hazard to the environment when it is well fixed to a wall or other structural element and, as such, can be disposed of as construction and demolition debris. Current New York State regulations permit the disposal of construction and demolition debris that may include lead-based paint into an approved landfill. Any construction activities involving lead-based paint must be performed in accordance with the applicable Occupational Safety and Health Administration (OSHA) regulations, OSHA 29 CFR 1926.62, "Lead Exposure in Construction."
- Coal ash residue. Since the discovery of the coal ash residue at the Power House, the Museum is developing plans for its cleanup. Once the residue has been removed, the affected areas will be covered with a sealant to prevent the future release of the ash residue.
- Chemical storeroom. To avoid potential hazards from leaks or spills in the now-unused storeroom in the basement of the Power House, the Museum will have these areas cleaned up properly before construction activities for the project begin.
- Chemicals used in buildings to be affected. In portions of the buildings to be used for project elements, chemicals and all other materials used by Museum staff will be carefully relocated to other areas in the Museum or properly disposed of before construction begins.
- Groundwater. During construction, dewatering would be necessary. The project would comply with DEP regulations by ensuring that the groundwater meets DEP's pretreatment requirements before discharging it to the municipal sewer system.

APPENDIX D
PARKING REGULATIONS*

* *This appendix is new to the FEIS.*

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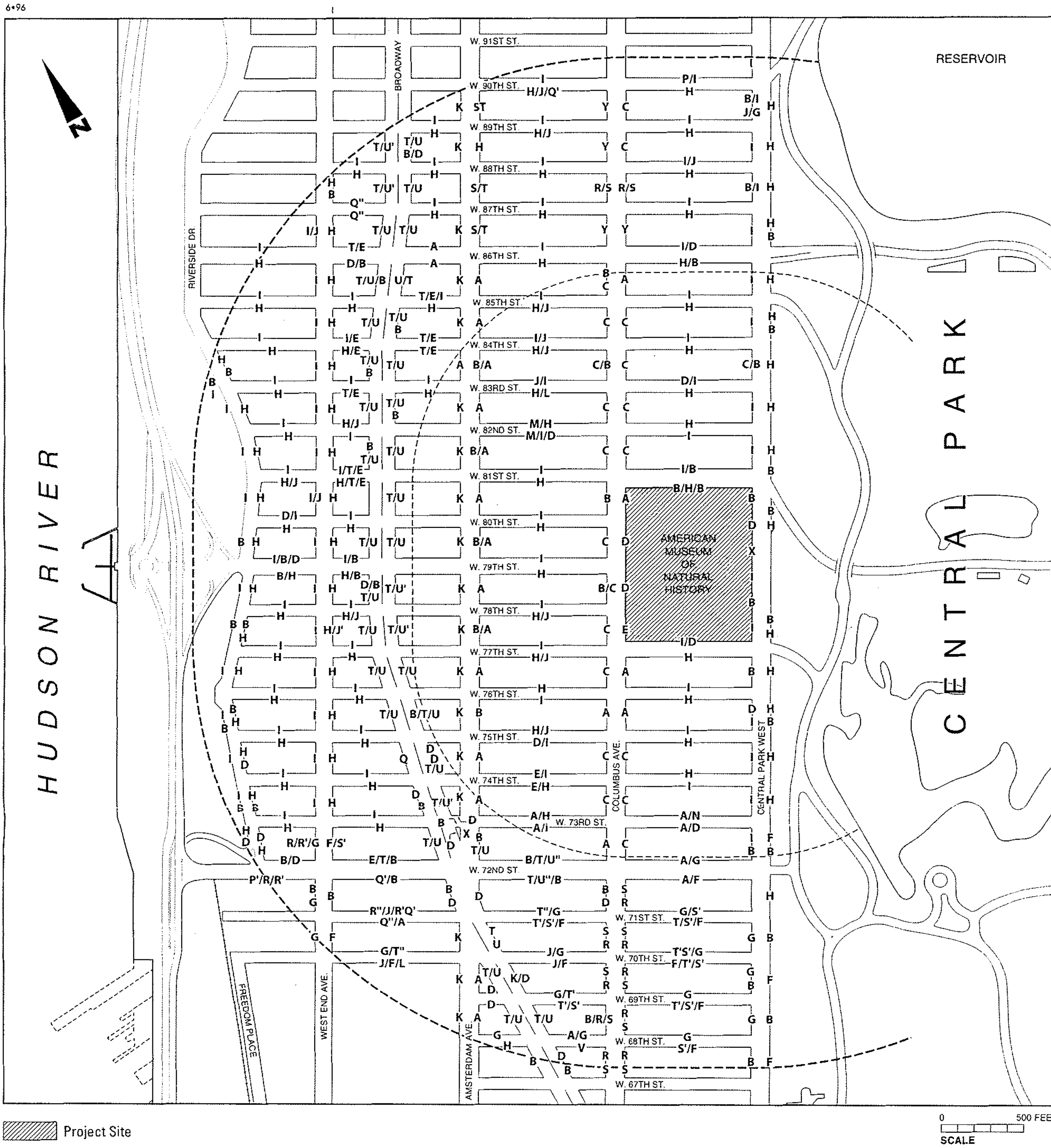

Project Site

1/2-Mile Perimeter

1/4-Mile Perimeter

On-Street Parking Regulations

A	*1-Hour Metered Parking 9am-7pm Except Sunday No Parking 8am-9am*
B	*Bus Stop*
C	*No Sign Posted*
D	*No Parking Anytime*
E	*2-Hour Parking 9am-7pm Except Sunday*
F	*No Parking 8-11am Tuesday, Thursday, Saturday*
G	*No Parking 8-11am Monday, Wednesday, Friday*
H	*No Parking 11am-2pm Tuesday, Thursday, Saturday*
I	*No Parking 11am-2pm Monday, Wednesday, Friday*
J	*No Parking 7am-4pm School Days*
J'	*No Parking 7am-6pm School Days*
K	*1-Hour Metered Parking 9am-4pm No Parking 4pm-7pm*
L	*No Parking 8am-6pm School Days*
M	*Police Parking*
N	*No Parking 8am-6pm Monday, Wednesday, Friday*
O	*No Parking 8am-6pm Tuesday, Thursday, Saturday*
P	*No Parking 6am-4pm Monday-Friday*
P'	*No Parking 10am-4pm Monday-Friday*
Q	*No Parking Except Trucks 7am-7pm Monday-Friday*
Q'	*No Parking Except Trucks 8am-6pm Monday-Friday*
Q"	*No Parking Except Trucks 7am-7pm Except Sunday*
R	*No Parking 7am-10am Monday-Friday*
R'	*No Parking 4pm-7pm Monday-Friday*
R"	*No Parking 4pm-7pm Except Sunday*
S	*1-Hour Meter Parking 10am-7pm Except Sunday*
S'	*1-Hour Meter Parking 9am-7pm Except Sunday*
T	*No Parking 8am-9am Except Sunday*
T'	*No Parking 8am-9am Tuesday, Thursday, Saturday*
T"	*No Parking 8am-9am Monday, Wednesday, Friday*
U	*1-Hour Meter Parking 9am-10pm Including Sunday*
U'	*1-Hour Meter Parking 9am-10pm Except Sunday*
U"	*2-Hour Meter Parking 9am-10pm Including Sunday*
V	*No Parking Except Trucks*
X	*Taxi Stand*
Y	*Construction*

On-Street Parking Regulations

Figure D-1

APPENDIX E*

BUS MANAGEMENT PLAN

* *This appendix is new to the FEIS.*
Italics in this chapter are used to indicate changes since the Draft Bus Management Plan of June 27, 1996.

A. INTRODUCTION

The American Museum of Natural History and Hayden Planetarium, located on a block extending from West 77th to West 81st Street, from Central Park West to Columbus Avenue in Manhattan, accommodates visits from large numbers of *schoolchildren's* groups from city and suburban schools throughout the school year and from camp groups during the summer. Most of these groups arrive by bus—primarily in yellow school buses and some in chartered coach buses. The activities of these buses as they unload, park, and reload have created increasingly difficult conditions in the streets surrounding the Museum. Considering the current situation and possibilities for the future, the Museum has developed a bus management plan, as described below. *The plan for bus management is a component of the Museum's overall transportation management policy (see 12), and* the *bus* plan addresses current conditions and conditions if the Planetarium and North Side project is implemented.

B. EXISTING CONDITIONS

BUS CHARACTERISTICS

Two types of buses deliver school and camp groups to the Museum: the majority are yellow school buses, which are 35 feet long and 9 to 10 feet high, and some are coach-type buses, which are 40 to 45 feet long and nearly 12 feet high. The coach-type bus brings *schoolchildren* from longer distances, and these vehicles make up approximately 25 to 35 percent of all buses bringing children to the Museum. The buses arrive throughout the school year (in 1995-1996, this ran from September 7 through June 27 with 10 holidays and 17 vacation days, for a total of 180 weekdays) and during the summer when day camps are open (approximately 40 weekdays). The number of buses coming to the Museum can vary from fewer than 25 to more than 100 in a day. The heaviest volume of buses occurs on Wednesday through Friday, although buses come to the Museum on all five weekdays. The volume of buses from July 1995 through June 1996 ranged considerably, as shown in the following table. On approximately half of the non-holiday weekdays in the year, fewer than 26 buses came to the Museum. On nearly 60 percent of the days, no more than 40 buses arrived at the Museum. "Heavy" bus days (more than 65 buses) occurred on 18 percent of non-holiday weekdays.

Bus Volume Patterns at the Museum

	Weekdays Per Year*	
Number of buses	Number	Percent
Less than 26	121	48
26 to 40	28	11
41 to 65	58	23
More than 65	46	18
Total weekdays	253	100

Note: * Excludes holidays
Source: American Museum of Natural History, June 1996.

Arrivals are highly concentrated. Most of the buses (75 percent) arrive in the 1½-hour period between 9:45-11:15 AM. Half of the buses arrive in the peak 30-minute period from 10:00-10:30 AM. Departures are concentrated, but less so than arrivals. Most buses (75 percent) depart over a 2-hour period between 12:15-2:15 PM. During the peak 30 minutes, between 12:30-1:00 PM, 30 percent depart.*

BUS OPERATIONS

Bus operations consist of three functions, each with its own characteristics: unloading, loading, and parking, as described below.

UNLOADING

Buses unload and groups enter the Museum at three locations:

- West 81st Street, usually in the parking lot or on the driveway in front of the Planetarium, but occasionally on West 81st Street itself;
- Central Park West southbound; and
- West 77th Street westbound.

There is no curb space on West 81st Street for bus unloading; the driveway directly in front of the Planetarium can accommodate two buses for simultaneous unloading and one bus at a time unloads in the parking lot. There is curb space for three buses on Central Park West, although part of the space is in a transit bus stop. The remaining curb space along Central Park West is signed for no parking or alternate-side-of-the-street parking. West 77th Street provides two unloading spots on the north side (westbound) in front of the Museum entrance. The rest of the street is signed for no parking or alternate-side-of-the-street parking.

The Museum has recently instituted a reservation system for school and camp groups to better organize arrivals and the flow of schoolchildren. However, this system is not yet fully operational, and, therefore, selection of a place to unload is still evolving. The group leader may select the unloading location based on information from the Museum about which entrance to use and where tickets would be waiting, or the driver may select the location based on his/her observation of traffic conditions upon arrival. Very often, arriving buses must wait for a spot to unload. At these times, the waiting bus may block a traffic lane.

The largest proportion of buses arrives on West 81st Street (approximately 60 to 80 percent). These buses come to park in the lot or bring schoolchildren to the Sky Show theater. The parking lot attendant holds buses at the lot entrance until the previous bus has parked and unloaded, a procedure that generally takes 5 minutes. Waiting buses back up on the driveway and onto West 81st Street. Sometimes a waiting driver would discharge his/her passengers on the driveway, which means that this bus would stand and block the driveway while it is unloading, even when the buses in front of it are moving forward, thus extending the period of delay and backup. Since there are no curbside lanes for waiting buses on West 81st Street, they stand in a traffic lane when the driveway is backed-up, creating traffic friction on this busy crosstown street.

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* This information is based on surveys performed by Peter Snell Associates at the Museum in May and June of 1996.

LOADING

The process is repeated in reverse when *schoolchildren* leave the Museum. Although the departure procedure is less congested (as described above, buses depart over a longer period than arrivals and are more evenly distributed during that time), the time for loading (10 minutes) is double that for unloading. Drivers typically make an agreement with the group leader for a pick-up location and time. Departing groups use more locations for pick-up than do arriving groups, including:

- Parking lot;
- West 81st Street driveway;
- West 81st Street eastbound;
- West 81st Street westbound;
- Central Park West southbound;
- Central Park West northbound;
- West 77th Street westbound;
- West 77th Street eastbound; and
- Columbus Avenue.

Bus loading does not usually cause as much traffic friction as bus unloading. For example, although unloading in the parking lot is restricted to one bus at a time, with the others waiting outside, loading of more than one bus at a time can take place in the lot and any back-up occurs only within the lot and not on the street. However, the loading of buses off-site is complicated by the fact that buses often do not find a curbside position, so that school and camp groups are crossing out to a double-parked vehicle or to an opposing blockface to enter their buses. The arrangement for loading made between a group leader and driver, independent of arrangements that other group leaders and drivers are making, can create occasional traffic back-ups as more than one group seeks to load in the same spot.

PARKING

Parking is provided for buses at the Museum's parking lot. Generally between 20 and 25 spaces are made available for buses, although the lot sometimes takes more, depending on passenger car parking demand. The potential demand for bus spaces in the lot is always somewhat lower than the total number of buses, primarily because some bus companies provide daytime parking at their own facilities. Thus, on 59 percent of weekdays, when arrivals are fewer than 41 buses, all buses could be parked legally in the lot and at designated curb positions. However, some drivers prefer to park for free on the street; for this reason, even on light days buses can be found double-parked on the street.

The lot fills quickly on busy days. Buses that are unable to park in the lot but need space either depart to other facilities or remain in the area, standing in the loading spots or double-parking in traffic lanes surrounding the Museum. The number of buses needing parking at or near the site depends on the mix of carriers and the volume of buses, but generally the majority of buses arriving at the Museum stay to park, either legally or illegally, around the site.

C. BUS MANAGEMENT PLANS

The current and anticipated bus situations lead to the need for two related bus management plans. The first, called the Immediate Plan, would address problems today and plan for the future. The second would accommodate the Planetarium and North Side Project, making use of the proposed garage for the management of buses at the Museum. Components of the plan would be evaluated as they are implemented or, perhaps, tested in advance and, when appropriate, modified to reflect actual operating conditions.

IMMEDIATE BUS MANAGEMENT PLAN

The current problems can be addressed by focusing on four areas: 1) institute stronger control of bus operations through a reservation system; 2) engage a Transportation Coordinator with the authority and support to control bus operations; 3) reorganize loading operations in the lot, on the driveway, and on the street; and 4) implement a bus parking plan. These plan elements, which are currently in process, are described below.

COMPREHENSIVE RESERVATION AND SCHEDULING SYSTEM

As noted above, the Museum has recently initiated a reservation system for school and camp groups. Some groups now apply in advance for a date and time, and the Museum is able to send these groups a variety of details on the trip, including information on bus operations. This system would be extended to cover all school and camp groups, so that no group arrives without a reservation. The Museum can then schedule arrivals and departures to reduce to the extent possible the heavy peaking, particularly of arrivals. This system would assign the location of unloading and loading for each bus. It would also be possible to reserve an on-site parking space, paid by voucher.

TRANSPORTATION COORDINATOR

A transportation coordinator would be engaged as part of the Museum's overall transportation management plan. The coordinator, *with the aid of managerial and support staff at the Museum, would implement the transportation plan. These duties* would encompass bus management, including advance scheduling for orderly arrival, parking, and departure of buses and onsite and curbside management to see that the plan is implemented. The transportation coordinator would work with the Museum booking staff and the group leaders and bus drivers bringing groups to the Museum to effectively utilize the advance booking system as part of the plan. The role and responsibilities of the transportation coordinator for bus management would include:

- Obtain computer-generated lists of expected bus groups, which include the number and size of the groups, number and types of buses sorted by time of arrival, assigned location of arrival, and time and location of departure;
- Review the scheduled booking sufficiently in advance to determine which general plan is to be used for the upcoming day;
- Notify staff at lot and at curbside locations of daily plan in effect; and
- Supervise daily bus operations at the site.

Supporting the transportation coordinator, other Museum staff would provide information regarding expected bus activity and provide advance coordination with school and camp groups. Specific activities would include:

- Determine group size, arrival and departure times, mode of travel, number and type of buses, and assigned arrival and departure location.
- Fax or mail a confirmation of all of the above information to the group leader, including instructions for the group leader, instructions and a map for the bus driver, and a parking

voucher. The group leader would be instructed to review and verify the enclosed material regarding group size, number and type of buses expected, scheduled arrival and departure times, and assigned entry and departure location.

The transportation coordinator, supported by additional staff as necessary at peak times, would work with the parking lot operator to expedite the entry and parking of buses, would direct buses to unload in the driveway or at alternative locations on Central Park West or West 77th Street, with a view to minimizing bus congestion on West 81st Street and discouraging illegal parking on the blocks bordering the site. The transportation coordinator would work with Visitor Services at the Museum to be sure that groups and drivers received appropriate instructions in advance about lot parking, locations for pick-up and drop-off, other Museum procedures and suggestions for remote parking, when necessary, and would also coordinate with the Parks Enforcement Patrol and the Police Department to ensure enforcement of parking and traffic regulations. An experienced transportation coordinator can make a substantial difference in maximizing the use of the available space, and minimizing bus congestion.

REORGANIZE LOADING OPERATIONS

Providing More Loading Space

The current situation does not provide enough appropriate space for all buses seeking to unload or load. Use of the lot for unloading should be improved and an additional four spaces should be provided, as follows:

- The current arrangement for filling the lot permits only one bus to unload at a time, although there are more than 20 spaces usually available. The transportation coordinator should work with the lot operator to devise a more efficient scheme that permits unloading of several buses at once, while protecting *schoolchildren* from incoming buses. Observations of parking lot operations indicate that such an improvement is possible.
- A portion of the West 81st Street driveway in front of the Planetarium could be widened by about 6 to 9 feet, which would permit a moving bus to pass a stopped bus (loading or unloading) to reach its assigned berth either on the driveway or in the parking lot, or to depart. Currently, the driveway is only wide enough in front of the Planetarium to permit two berths with room for passing buses. Widening the driveway would add six loading spaces (see Figure *E-1*). This action would require approval from the New York City Department of Parks and Recreation and the New York City Art Commission, and New York City Landmarks Preservation Commission review and could be coordinated with the planned renovation of Museum Park. *With these approvals, the driveway widening could be done immediately. However, if the Planetarium and North Side project is approved for implementation, widening the driveway would have to await project construction.*
- If the driveway were not to be widened, four additional curb spaces on Central Park West southbound or on West 77th Street could be designated for drop-off and pick-up Monday through Friday, 9 AM to 3 PM (see Figure *E-2*). Approximately two or three passenger car parking spaces would be removed for each dedicated bus drop-off area at curbside.

Controlling Arrivals, Departures, and Unloading/Loading

As discussed above, the comprehensive reservation and scheduling system would be instituted to give each school and camp group an arrival and departure time. The arrivals would be timed to allow for the variability of traffic conditions en route to the Museum. Each group would be assigned an entrance and a loading space near that entrance. Based on information from Visitor

Services and its reservation system, the group leader would instruct the bus driver regarding expected time of arrival; location for unloading; location of supervision; parking policy and appropriate parking location; time, location, and procedures for pick-up; map of the Museum area; map and directions for off-site parking; and description of facilities for drivers at off-site parking locations.

The transportation coordinator would seek to provide each group with the same space for unloading and loading, but this may not always be possible. For buses that unload and park in the lot, the arrangement for loading and parking can be improved to allow more than one bus to unload at a time. At a minimum, if the lot were to be filled from south to north, it would be possible for a bus to maneuver into a space while the previous bus is still unloading. With this scenario, the Museum should consider permitting some school and camp groups to enter the Museum through the handicapped entrance at the southeast end of the lot.

During unloading, the transportation coordinator and staff would enforce the unloading plan, keeping buses from unloading in inappropriate places or from blocking the driveway, entrance to the parking lot, or moving traffic. It may be necessary for the transportation coordinator to make changes in unloading on the spot, if trouble arises. The plan assumes that 10 minutes would be required for a bus to pull up, unload, and depart from an unloading location.

The first buses to return and load may possibly be permitted to return after 11 AM and park in the loading spaces along the curb and in the driveway. Buses with later pick-up times would be instructed to return no sooner than 10 minutes before scheduled departure. The plan assumes that 15 minutes would be required for a bus to pull up to the designated spot, load, and depart.

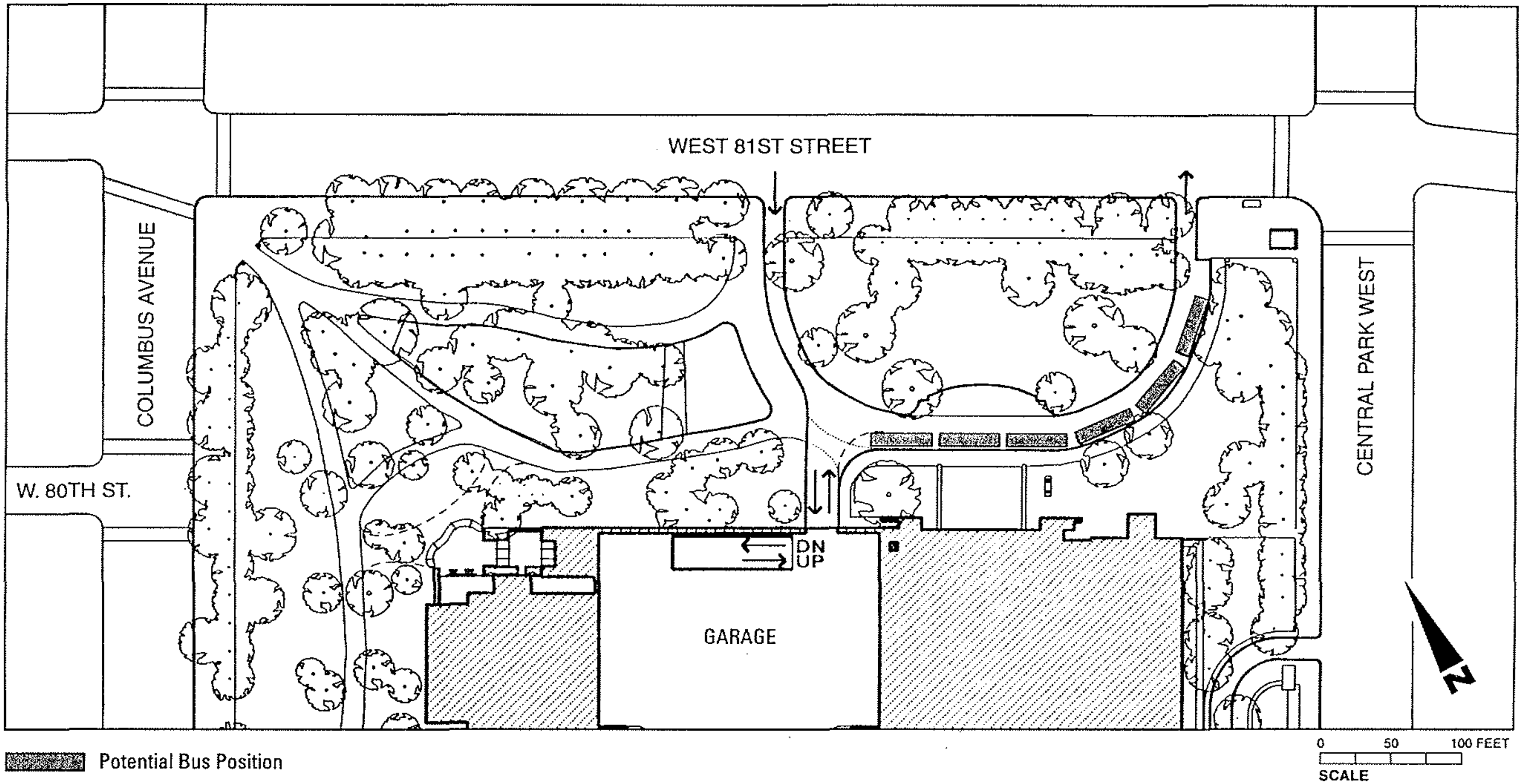
PARKING PLAN

The goal of the parking plan is to eliminate double-parking and idling by buses on streets surrounding the Museum. Drivers would be encouraged to park in the lot by institution of a prepaid voucher system, giving no financial incentive for on-street parking or illegal double parking. In addition, the Museum can arrange to have the parking lot operator allot more of the parking lot for buses on heavy bus days, sending passenger cars to other garages in the area, where there is available space. Bus companies based in New York City (except Staten Island) would be encouraged to have their drivers return to home base to park. Using the transportation coordinator, once the parking lot is filled, buses would be instructed to leave the area. The Museum has identified candidate lots within a ½-hour drive of the Museum that could be used for bus layover and parking, and is now in discussion with the Parks Department for use of one of three Yankee Stadium lots. Information about the off-site parking lot would be given to the group leaders and bus drivers in the reservation materials and at the site. The information would also be sent to the bus companies serving the groups.

It is anticipated that most buses that cannot park on site or in their home lots would travel to designated off-site lots. On light days, all buses would be able to be accommodated on site. On other days, up to 50 buses may travel to other locations. These buses would be dispersed over a 1½-hour period and may take one of several routes to their destination. Therefore, it is unlikely that the buses would contribute to traffic congestion as they make their way to and from the off-site parking area.

BUS MANAGEMENT WITH THE PLANETARIUM AND NORTH SIDE PROJECT

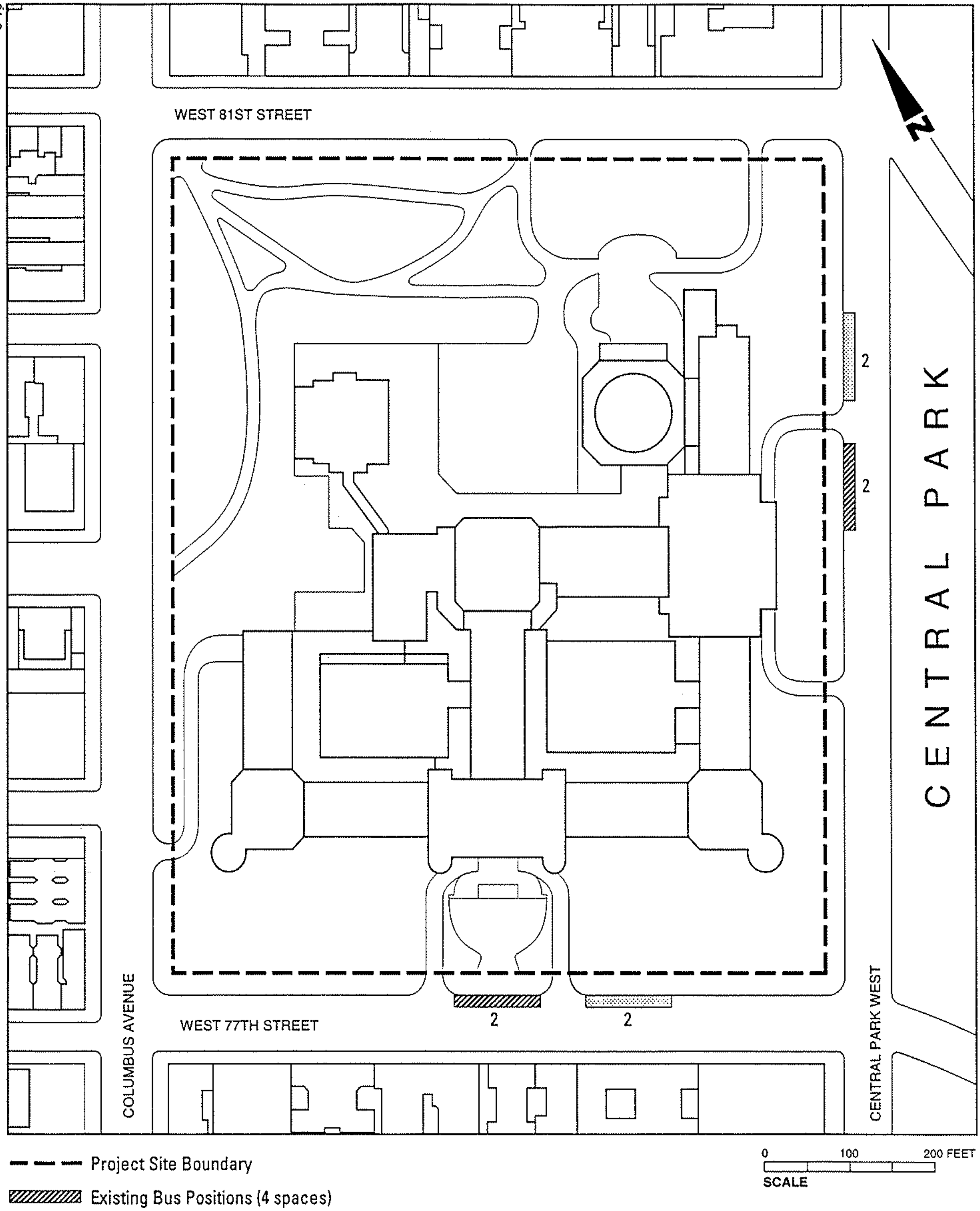
If the Planetarium and North Side project is built, the parking lot would be replaced with a three-story garage with its entrance from the existing driveway. *School buses would be accommo-*



American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Potential Bus Positions Along Widened Driveway

Figure E-1



Project Site Boundary

Existing Bus Positions (4 spaces)

Potential New Bus Positions

Potential Curb-Side Bus Positions for Immediate Plan

Figure E-2

dated on the top level only. Although the garage would be built on approximately the same footprint as the existing lot, several structural and program elements would restrict the area available for parking on each floor. These elements include the schoolchildren's entrance designed to accommodate large groups safely, elevators, fire stairs, garage service area, columns, and ramps. As described in Attachment E.1, several options for accommodating more school buses and the larger tour buses were considered in detail. None of these options provided the capability of both parking and unloading/loading buses in the garage, except on days with 40 or fewer buses.

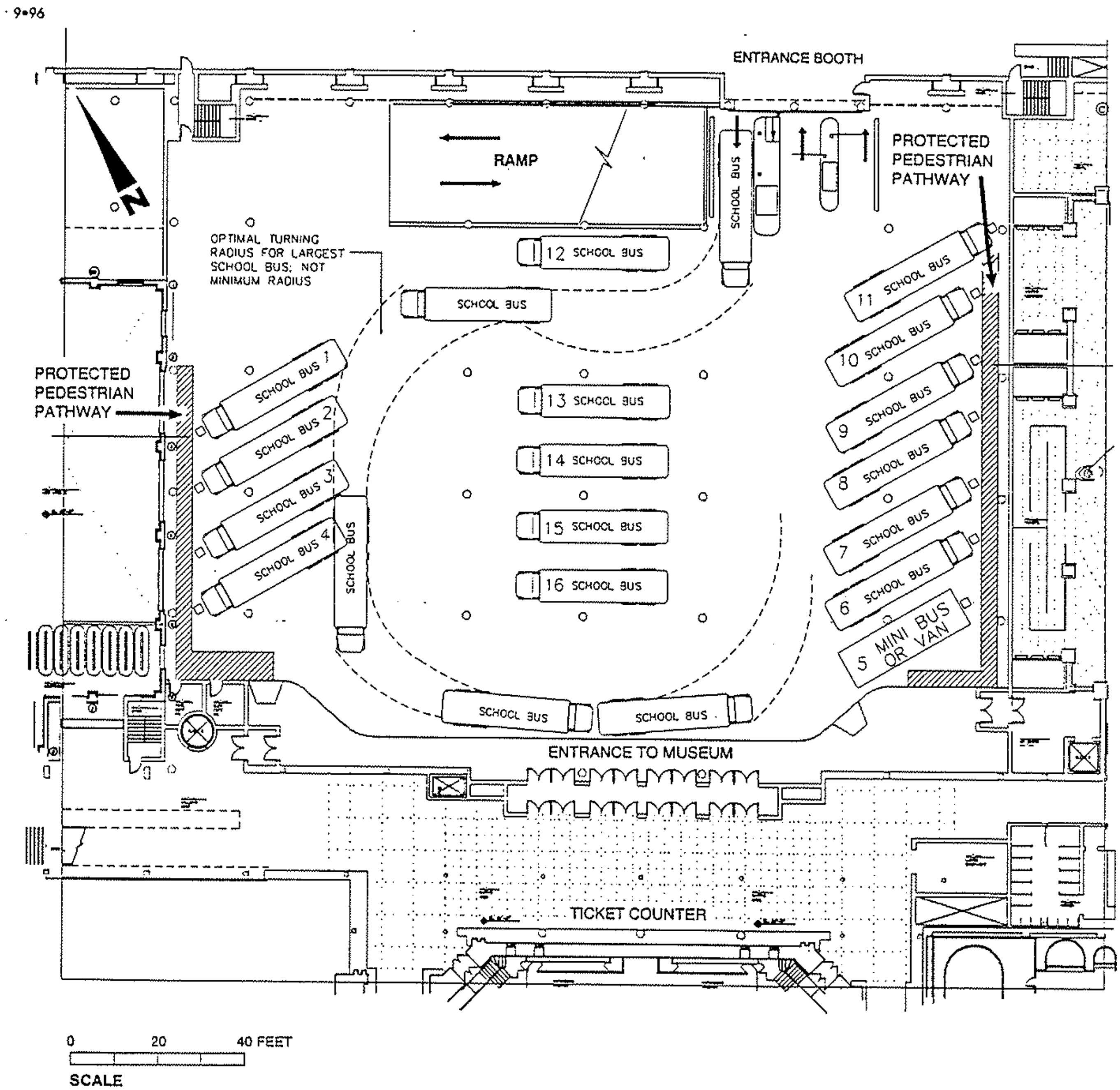
In considering whether to use the top level for parking or loading and unloading, *the Museum determined* that providing a protected entrance/exit for *schoolchildren* would receive priority. Safety of *schoolchildren* was the primary consideration. Also, as described on page E-2, unloading of buses causes substantial traffic friction. Therefore, on heavier days, the garage would be used primarily for school bus discharge and pick-up in 10 berths as shown on Figure *E-3*. It is expected that the garage could easily process 60 school buses per hour. Given this capacity, on most days all school bus loading would take place within the garage.

Coach-type buses bringing school and camp groups would discharge in the West 81st Street driveway and/or on West 77th Street. If, as discussed earlier, the driveway is widened, it could accommodate all coach-type school buses and thus permit all school and camp groups to load/ unload on site and to enter through the *schoolchildren* or Planetarium entrance. Adult groups, which come exclusively in coach-type buses, would be handled on Central Park West in the two existing loading spaces.

After most arrivals have occurred, the school buses with the earliest pick-up times would be permitted to return to the garage (and driveway) and fill the loading berths and parking spots. Buses with later pick-up times would be instructed to return no sooner than 10 minutes before scheduled departure. Garage berths would be used in 15-minute intervals, allowing approximately 40 school bus pick-ups per hour. This would clear 80 buses in 2 hours, which meets current "heavy" day demand for school buses. Using an optional 11th berth and expediting departures would allow 100 buses to clear in 2 hours.

Using the garage for unloading and loading would place greater emphasis on the use of the off-site lot for bus parking. After discharging their passengers, drivers would be told to leave the garage to allow for other arriving buses, would be informed that double-parking is not permitted on the blocks bordering the Museum, and would also be directed to the off-site parking lot. Except on light days when the garage could be used for parking as well as loading, use of the garage only for unloading and loading would increase the number of buses utilizing off-site parking. The approximately 20 to 25 vehicles per day that would park on site under the Immediate Plan would also have to park off site.

As with the Immediate Plan, this plan requires a transportation coordinator, supported by additional staff as necessary.



American Museum of Natural History
PLANETARIUM AND NORTH SIDE PROJECT

Proposed Garage Plan, Upper Level

Figure E-3

Attachment E.1: Alternate Bus Parking and Loading/Unloading Studies

Attachment E.1: Alternate Bus Parking and Loading/Unloading Studies

In developing the bus management plan, several options were studied for allowing coach-type buses in the garage, and for using a second level of the garage for bus parking. These scenarios proved to be infeasible. Each of the scenarios is described below.

A. COACH-CAPABLE GARAGE: TOP LEVEL

This scenario would modify the proposed garage to accommodate the additional height and wider turning radius of coach-type buses. To provide the additional height on the top parking level of the garage, this scheme would lower the top parking level floor slab by 1½ feet. (Increasing the height of the top level by raising the level of the terrace is not possible because of the need for the terrace to be at the same height as the main level of the Museum.) With this arrangement, the other levels of the garage would be lowered by 1½ feet to maintain the floor-to-floor heights on those levels. Therefore, the parking levels would no longer by aligned with the Museum floors, and internal ramps would be required to make up this difference. The loading and unloading of school and camp groups on the top parking level would thus occur slightly below the first floor of the Museum, requiring the use of an internal ramp for *schoolchildren* entering the Museum.

Changes would also be required to accommodate the larger turning radius of the coach-type buses. The structural grid in two portions of the top parking level of the garage would be extended from 55 to just under 70 feet, allowing columns to be placed farther apart, and the garage entrance would need to be approximately 2 feet wider than shown in the proposed plan.

*As shown in Figure E-4, w*ith the longer coach-type buses maneuvering and stopping in the garage, the number of loading and unloading berths would be reduced to 6 *for school buses or 3 for larger buses*, from the 10 *available* with the project. Only *five* parking spaces would be available for *school buses, or three parking spaces for* larger buses. *With coach buses in the parking spaces, no additional space would be available for school buses. The floor could fit only seven spaces to park mini-buses, vans, or other vehicles 32 feet or shorter in length. The net result of this option would be that on light days, if coach buses were allowed into the garage, it would not be possible to conduct all school bus unloading/loading inside the garage or to park all school buses on site. A greater number of buses would unload/load in the driveway and on the street, and more buses would have to go to the off-site parking lot.* On high-volume days, the transportation coordinator would likely choose to operate the garage without allowing coach-type buses into the garage so as to maintain the higher number of loading and unloading berths. Together, lowering the floor levels and increasing the structural spans would add approximately $2 million to the cost of the garage.

B. BUS PARKING ON THE SECOND LEVEL VIA INTERNAL RAMP

This *option* would introduce yellow school bus parking to the middle level as well as the upper level of the garage *(see Figures E-5 and E-6)*. An internal ramp would provide access to the middle level for buses as well as automobiles. To provide the additional height clearance for the buses *on the ramp and* the middle level, the floors of the middle level (and therefore the lower level as well) would be lowered by 7 feet and the structural spans on the middle level would be increased to provide the necessary turning and maneuvering clearances for buses.

A combination of factors *make this option unworkable. As shown in Figure E-5, to give buses clearance and an 8 percent grade, the internal ramp would be longer, extending along both the west and north sides of the floor. To allow adequate maneuvering from* the garage entrance, *the location of which is set by the driveway in the northeast corner of the garage to the ramp, buses would circulate in a clockwise traffic pattern that* would reduce the *space in and* efficiency of the garage for school bus loading and unloading. *To keep the maneuvering area clear, buses would have to park at a different angle than in the proposed garage plan, prohibiting the use of these spaces for loading and unloading. Therefore, this layout could only accommodate a small portion of the school buses inside the garage for drop-off and pick-up: only 1 loading/unloading position could be provided, compared with 10 with the proposed garage.* More school buses would have to unload and load at curbside. However, *this option would provide* a total of *31* bus parking spaces, compared with 16 with the proposed garage layout. *This would improve the parking shortfall, but except on light days, many buses would still have to travel to an off-site lot to park.*

Lowering the two lower levels of the garage would result in substantial additional costs related to additional excavation as well as special construction necessitated by extending below the groundwater level and below the existing sewer level. The additional costs of this work together with the additional costs of a long-span structure at the middle level would be approximately $8 million.

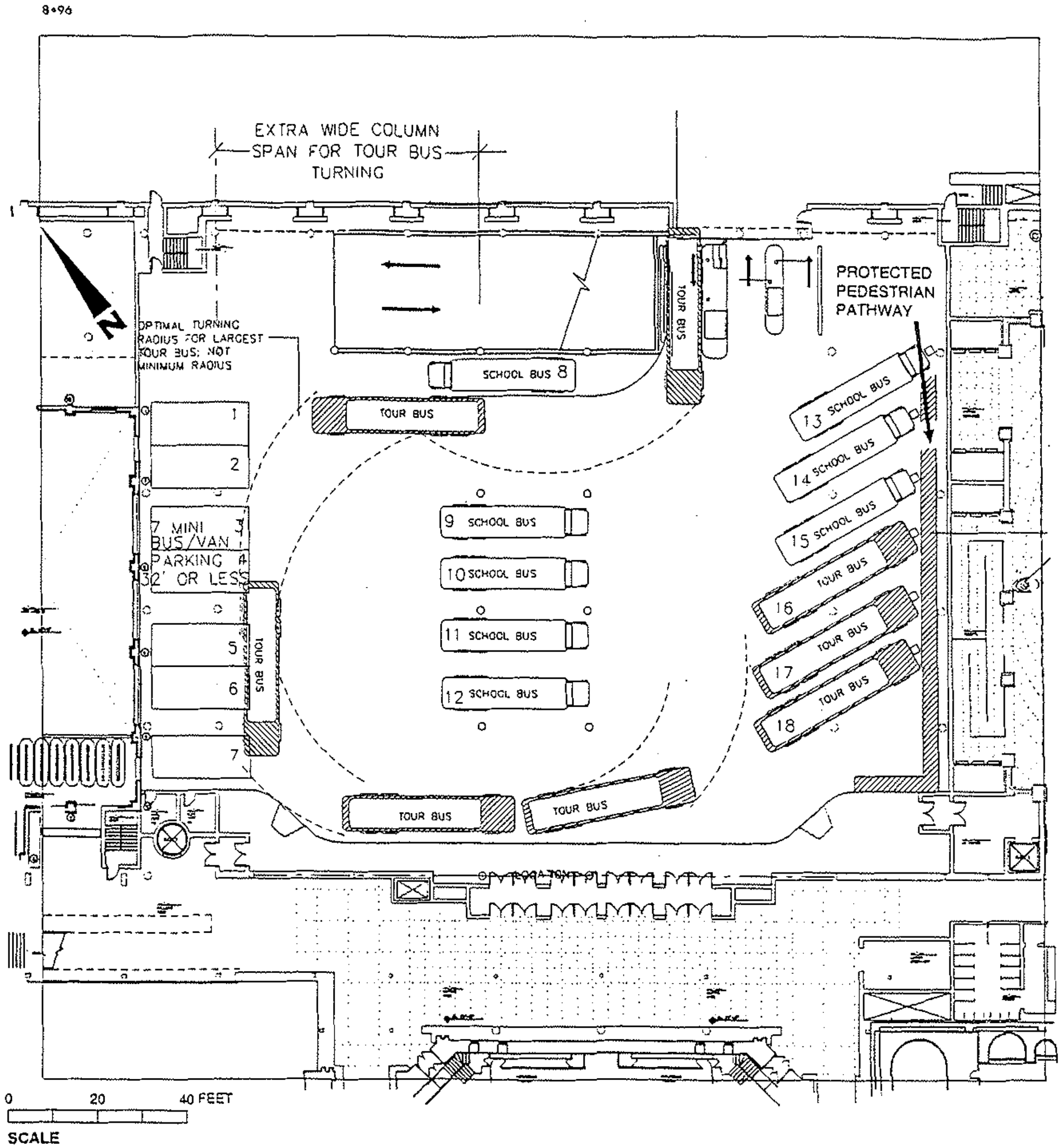
C. BUS PARKING ON THE SECOND LEVEL VIA EXTERNAL RAMP

Like the scenario described above, this scenario would revise the garage floor levels and structural layout to provide yellow school bus parking on the middle level of the garage. Instead of an internal ramp connecting the upper and middle levels of the garage, an external ramp would be provided to the middle level *at one of two locations:* from West 81st Street *to a new ramp in Theodore Roosevelt Park parallel to the existing driveway entrance,* or from *a new driveway curb cut and ramp creating an open cut through the park from* Columbus Avenue. *To save space,* the internal ramp between the upper and middle levels would be eliminated altogether. This would effectively split the garage into two facilities, with the upper level accessible from *the existing driveway on* West 81st Street and the middle and lower levels accessible only from the new external ramp. *The garage floor plans under this scenario are shown in Figures E-7 through E-9.*

This *option* would provide 11 loading/unloading positions, 1 more than the proposed garage. It would have 24 bus parking spaces if the new ramp *were to* extend from the West 81st Street driveway, and 27 if the ramp *were to* extend from Columbus Avenue. *Although this option could accommodate both loading and parking, it* would result in considerable inefficiencies for school bus loading and unloading, since school buses would have to exit the upper level of the garage after unloading, reenter the garage to park on its middle level, and leave the middle level again to enter the top level for loading, *thus circulating through local streets around the site. Like all options for the garage, not all buses could be parked on site and, except on light days, many buses would have to travel off site to park.*

This option would also *create* substantial *adverse* impacts on Theodore Roosevelt Park. To provide an acceptable grade for school buses, any ramp from Columbus Avenue would have to be substantially longer than those for automobile use. Also, because of the height of the school buses, these ramps could not be covered as could automobile ramps. Therefore, a bus-compatible ramp from Columbus Avenue to the middle level of the garage would sever the park with an open cut and would require the removal of five or more mature trees. *From the West 81st Street side, the ramp to the middle level would extend from the circular drive generally westward, cutting through the lawn area there, to enter the garage at its northwest corner. This approach, too, would create an open cut, severing and effectively isolating the area of lawn from the rest of the park and removing an existing footpath.*

This *option's* longer structural spans and higher floor-to-floor height at the middle level would add approximately $8 million to the cost of the garage, and the creation of the external ramps would drive the costs still higher. The exact cost would depend on the location chosen for the ramp.



Coach-Capable Garage Plan, Upper Level

Figure E-4

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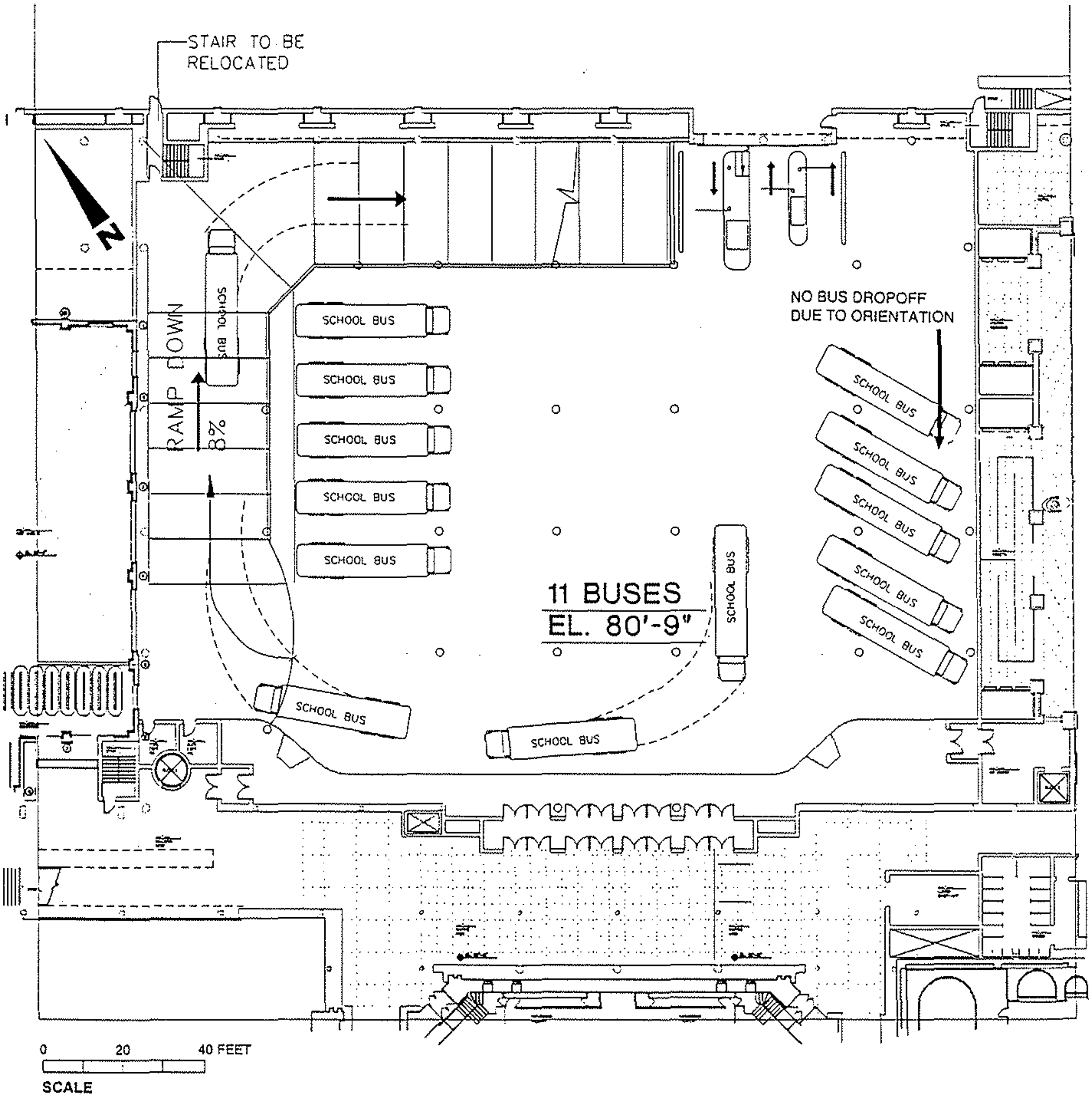
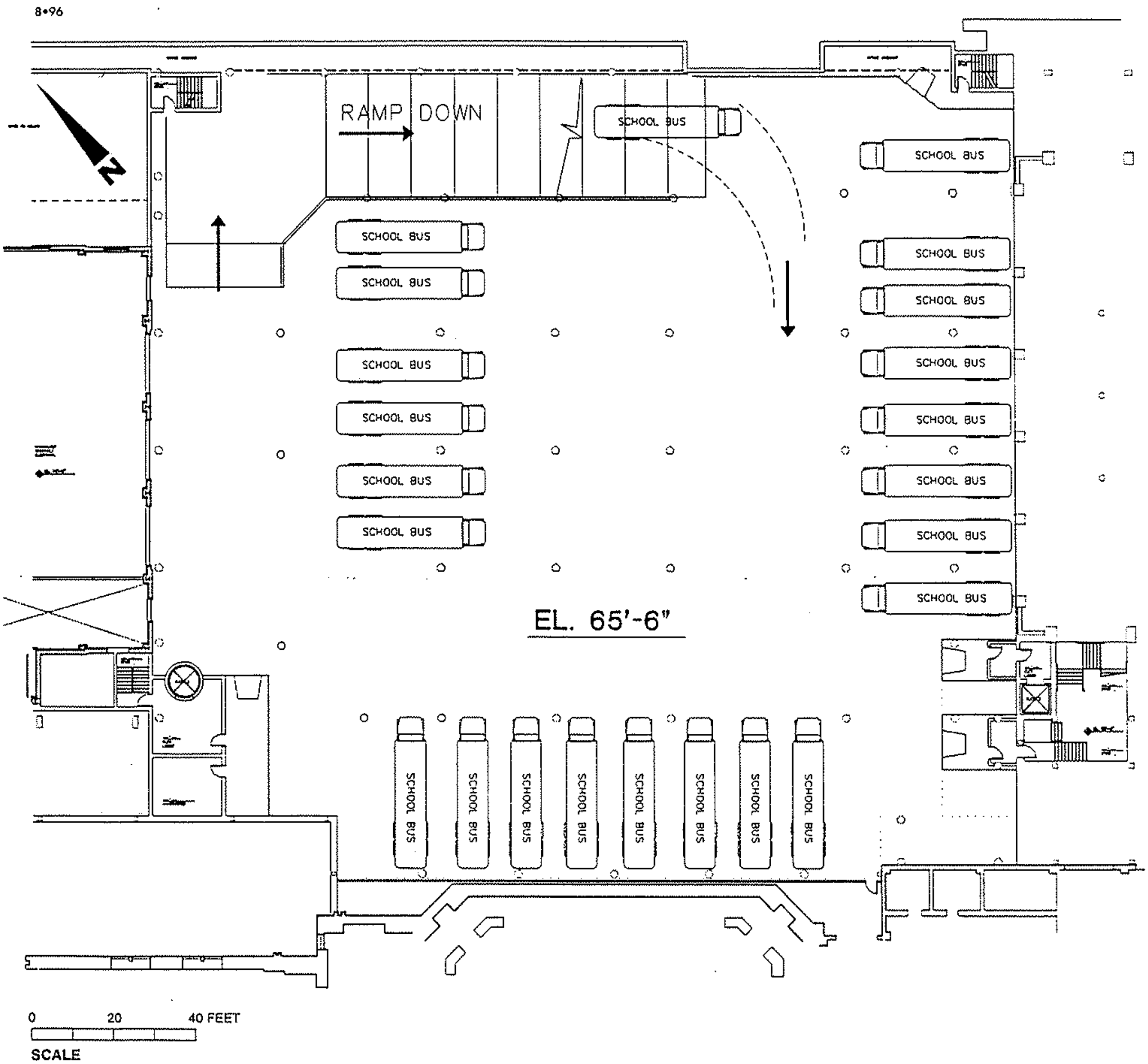


Garage with Internal Bus Ramp, Upper Level

Figure E-5



Garage with Internal Bus Ramp, Middle Level

Figure E-6

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PLANETARIUM AND NORTH SIDE PROJECT

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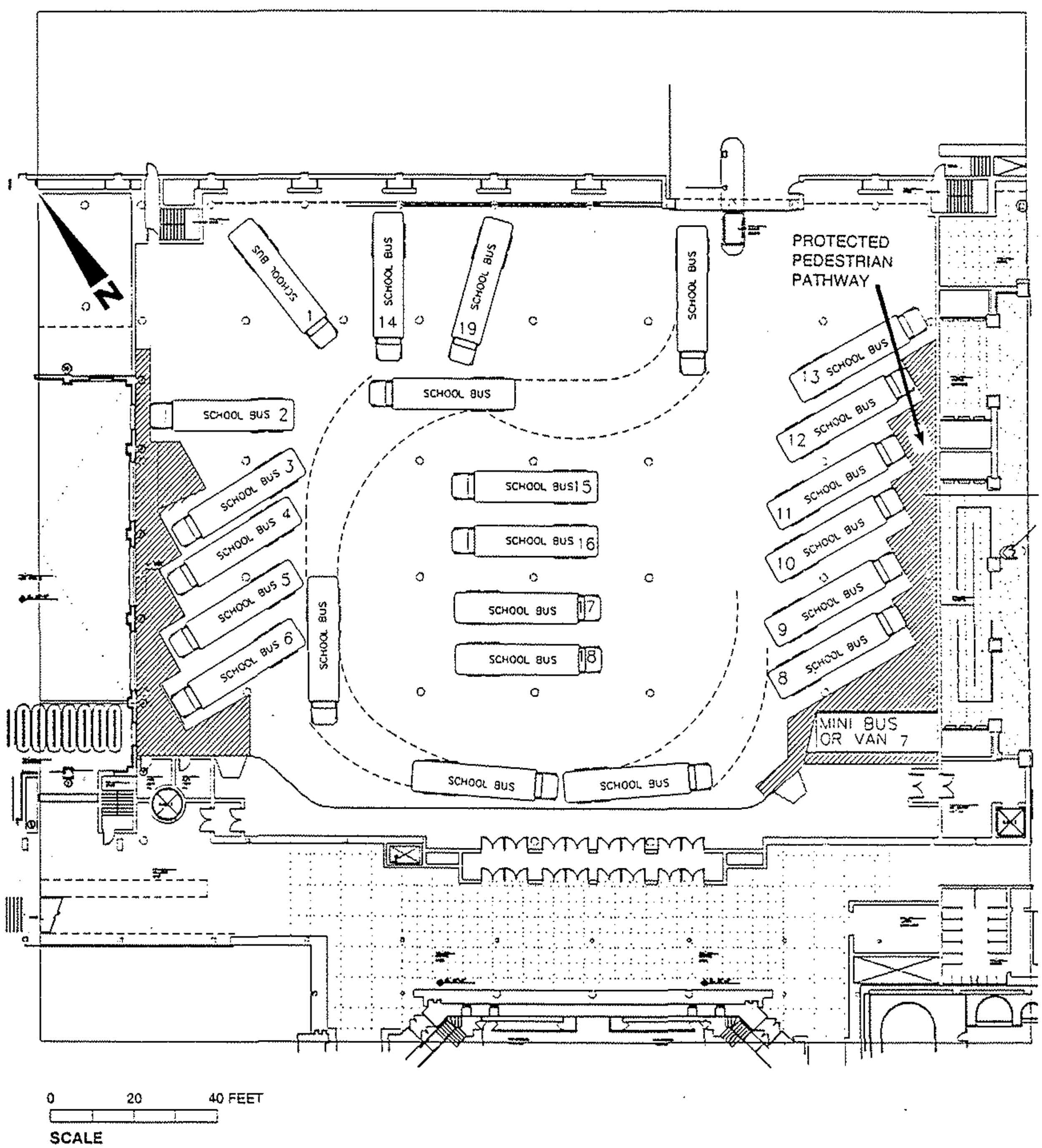

Garage with External Bus Ramp, Upper Level

American Museum of Natural History
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Figure E-7

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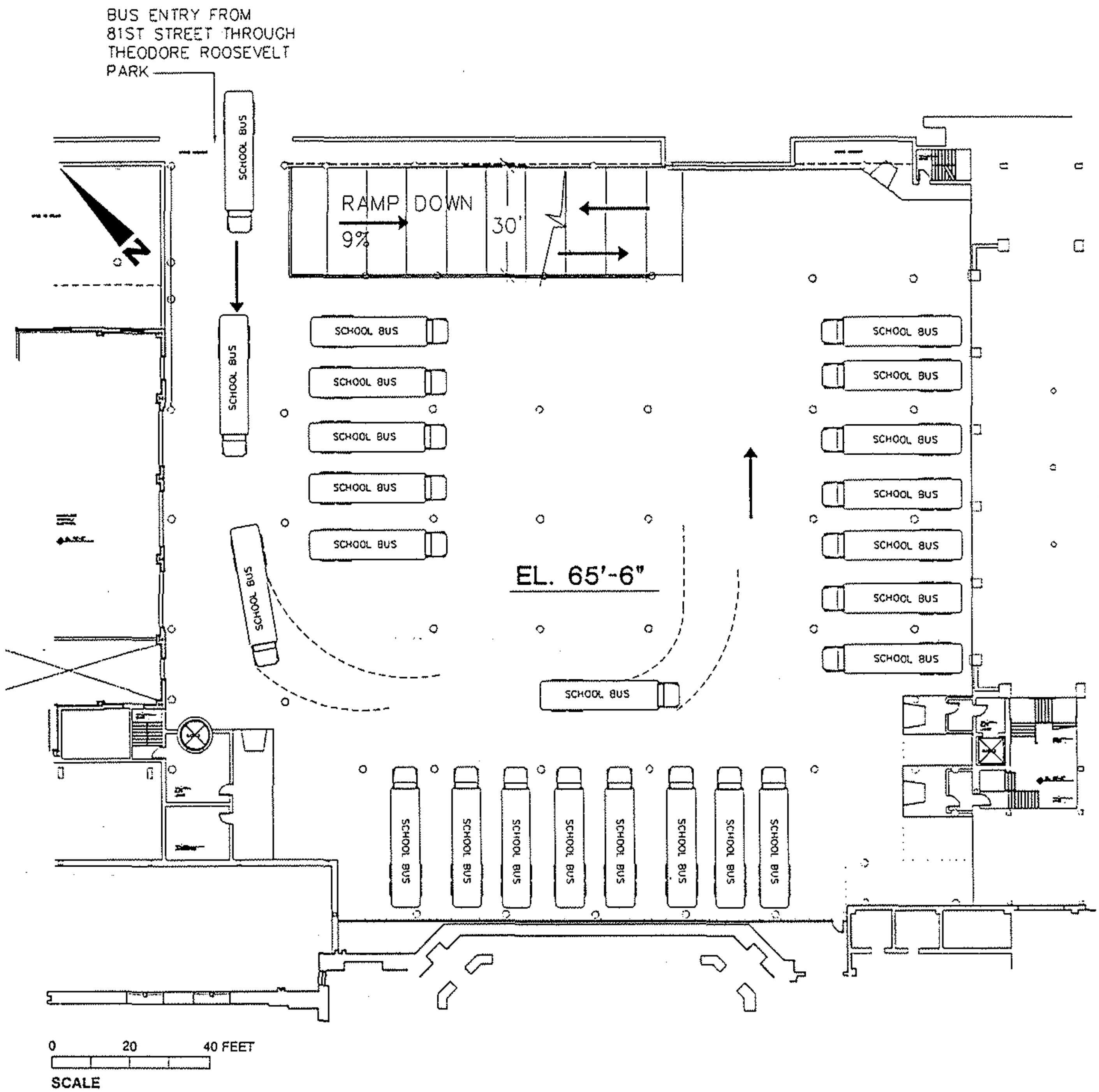
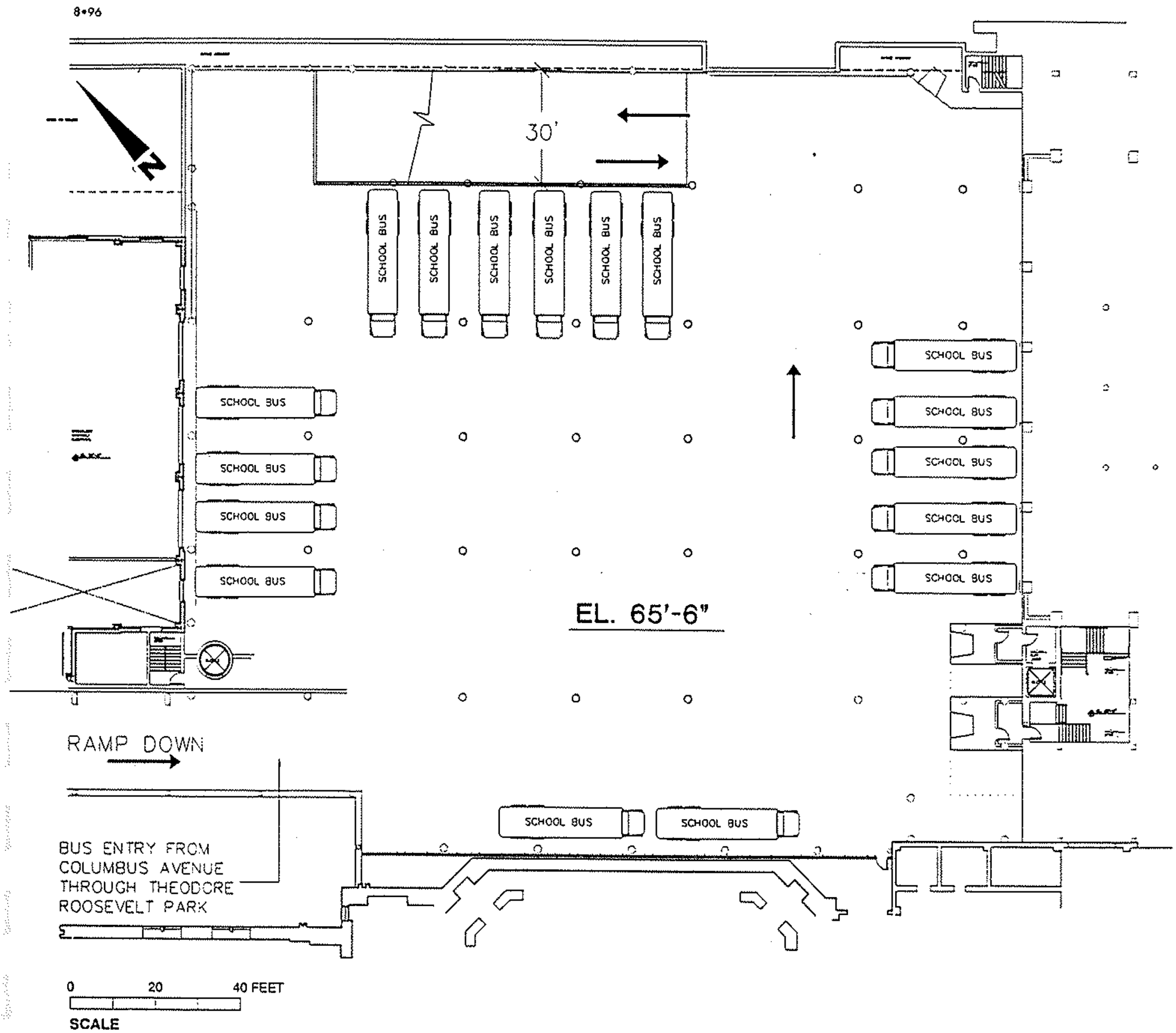


Garage with External Bus Ramp from North, Middle Level

Figure E-8



Garage with External Bus Ramp from West, Upper Level

Figure E-9

APPENDIX F

NOISE

Table F-1
Site 1: Central Park West between West 81st and 82nd Streets
Weekday

Hour Ending	Tempora Distrib.	% Medium Truck	% Heavy Truck	1996 Noise Analysis-Existing Conditio Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Noise Analysis--No Build Condition Traffic Volumes	PCEs	Calcul Levels	Noise Chang	Noise Analysis-Build Conditions Project Generated Traffic Volu Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.427	0.0	0.2	647	731		64.5	668	755	64.7	0.1	8	8	0	0	763	64.7	0.0
02:00am	0.240	0.0	0.3	362	446		62.3	374	461	62.4	0.1	4	4	0	0	466	62.4	0.0
03:00am	0.133	0.0	0.5	201	285		60.2	208	295	60.3	0.1	2	2	0	0	298	60.4	0.0
04:00am	0.088	0.0	0.8	133	217		58.8	137	224	59.0	0.1	2	2	0	0	226	59.0	0.0
05:00am	0.079	0.0	0.9	119	207		58.5	123	213	58.6	0.1	1	1	0	0	216	58.7	0.0
06:00am	0.120	0.0	1.0	182	335		60.4	188	346	60.6	0.1	2	2	0	0	350	60.6	0.0
07:00am	0.255	0.5	1.1	386	780		63.9	398	806	64.1	0.1	5	4	0	0	815	64.1	0.0
08:00am	0.480	1.0	1.3	727	1,600		66.9	751	1,653	67.1	0.1	8	8	0	0	1,672	67.1	0.0
09:00am	0.779	1.0	1.4	1,179	2,719		69.1	1,218	2,809	69.2	0.1	14	13	0	0	2,840	69.3	0.0
10:00am	0.710	0.9	1.5	1,074	2,575		68.7	1,110	2,660	68.8	0.1	13	12	0	0	2,690	68.9	0.0
11:00am	0.950	0.8	1.5	1,438	3,422		69.8	1,485	3,535	69.9	0.1	17	16	0	0	3,575	70.0	0.0
noon	0.962	0.7	1.7	1,455	3,645	69.9	69.9	1,503	3,765	70.0	0.1	19	19	0	0	3,810	70.1	0.1
01:00pm	0.934	0.6	1.8	1,426	3,750		69.6	1,472	3,871	69.7	0.1	26	25	0	0	3,924	69.8	0.1
02:00pm	0.956	0.5	2.0	1,459	4,019		69.4	1,506	4,149	69.5	0.1	27	27	0	0	4,206	69.6	0.1
03:00pm	0.968	0.3	3.0	1,477	5,266		70.1	1,525	5,436	70.2	0.1	22	22	0	1	5,503	70.3	0.1
04:00pm	0.965	0.1	5.0	1,473	7,681		71.3	1,520	7,929	71.4	0.1	22	21	0	1	8,024	71.5	0.1
05:00pm	0.876	0.0	3.0	1,338	4,710	68.7	68.7	1,381	4,862	68.8	0.1	25	22	2	0	4,956	68.9	0.1
06:00pm	0.883	0.0	1.0	1,360	2,502		66.7	1,403	2,582	66.8	0.1	28	28	0	0	2,623	66.9	0.1
07:00pm	0.967	0.0	1.0	1,490	2,741		67.8	1,537	2,828	67.9	0.1	86	84	0	1	3,012	68.2	0.3
08:00pm	1.000	0.0	0.9	1,541	2,652		68.3	1,589	2,736	68.5	0.1	123	122	0	1	2,957	68.8	0.3
09:00pm	0.880	0.0	0.7	1,356	2,175		68.2	1,399	2,244	68.3	0.1	85	84	0	1	2,422	68.6	0.3
10:00pm	0.747	0.0	0.6	1,151	1,710		67.8	1,188	1,764	68.0	0.1	96	94	0	1	1,950	68.4	0.4
11:00pm	0.687	0.0	0.4	1,058	1,446	67.8	67.8	1,092	1,492	67.9	0.1	90	89	0	1	1,671	68.4	0.5
midnight	0.645	0.0	0.3	994	1,241		67.0	1,026	1,280	67.1	0.1	19	19	0	0	1,302	67.2	0.1
Leq(24)							67.7			67.8	0.1						67.9	0.1
Ldn							72.1			72.2	0.1						72.4	0.2

Table F-2
Site 2: West 81st Street between Central Park West and Columbus Avenue—Weekday

Hour Ending	Tempora Distrib.	% Medium Truck	% Heavy Truck	1996 Noise Analysis-Existing Conditi Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Noise Analysis--No Build Conditions Traffic Volumes	PCEs	Calcul Levels	Noise Change	Noise Analysis-Build Conditions Project Generated Traffic Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.276	0.0	0.4	246	330		57.0	257	344	57.1	0.2	16	16	0	0	366	57.4	0.3
02:00am	0.178	0.0	0.6	159	243		55.6	166	253	55.7	0.2	11	10	0	0	270	56.0	0.3
03:00am	0.109	0.0	1.0	97	181		54.2	101	189	54.4	0.2	6	6	0	0	201	54.6	0.3
04:00am	0.072	0.0	1.5	65	149		53.2	67	155	53.4	0.2	4	4	0	0	165	53.7	0.3
05:00am	0.076	0.0	1.8	68	171		53.8	71	178	53.9	0.2	5	4	0	0	189	54.2	0.3
06:00am	0.153	0.0	2.0	137	372		57.1	143	387	57.2	0.2	9	9	0	0	411	57.5	0.3
07:00am	0.356	0.3	2.3	319	945		61.0	332	984	61.2	0.2	21	21	0	0	1,047	61.5	0.3
08:00am	0.605	0.6	2.5	541	1,736		63.6	564	1,807	63.8	0.2	36	35	0	1	1,922	64.0	0.3
09:00am	0.786	0.4	2.8	703	2,387		64.9	732	2,485	65.1	0.2	47	45	0	1	2,643	65.3	0.3
10:00am	0.641	0.5	3.0	573	2,071		64.2	597	2,157	64.4	0.2	38	37	0	1	2,294	64.6	0.3
11:00am	0.750	0.4	3.3	671	2,554		65.0	698	2,659	65.2	0.2	44	43	0	1	2,828	65.5	0.3
noon	0.760	0.4	3.5	680	2,730		65.2	708	2,842	65.4	0.2	48	46	0	2	3,026	65.7	0.3
01:00pm	0.708	0.5	3.8	597	2,524	64.8	64.8	619	2,616	65.0	0.2	58	56	0	2	2,806	65.3	0.3
02:00pm	0.751	0.5	4.0	633	2,809		65.9	656	2,911	66.1	0.2	63	61	0	2	3,124	66.4	0.3
03:00pm	0.809	0.8	3.5	682	2,764		66.5	707	2,865	66.6	0.2	57	55	0	2	3,064	66.9	0.3
04:00pm	0.890	1.0	3.0	750	2,753		67.1	778	2,854	67.2	0.2	59	57	1	2	3,051	67.5	0.3
05:00pm	0.797	0.8	4.5	671	3,285		68.5	696	3,405	68.6	0.2	64	58	4	2	3,708	69.0	0.4
06:00pm	0.765	0.5	2.5	605	1,921	66.8	66.8	624	1,981	66.9	0.1	65	64	0	1	2,140	67.3	0.3
07:00pm	0.818	0.2	1.5	647	1,477		65.2	667	1,523	65.3	0.1	180	178	0	2	1,846	66.1	0.8
08:00pm	0.838	0.0	2.5	663	2,055		66.1	684	2,120	66.3	0.1	255	252	0	3	2,642	67.2	1.0
09:00pm	0.795	0.0	2.1	629	1,728		64.9	648	1,782	65.0	0.1	180	178	0	2	2,124	65.8	0.8
10:00pm	1.000	0.0	1.7	791	1,895	64.8	64.8	816	1,955	64.9	0.1	218	215	0	3	2,420	65.9	0.9
11:00pm	0.649	0.0	1.2	514	1,050		62.2	530	1,083	62.3	0.1	192	189	0	2	1,481	63.6	1.4
midnight	0.559	0.0	0.8	442	748		60.6	456	772	60.7	0.1	45	45	0	0	839	61.1	0.4
Leq(24)							64.2			64.3	0.2						64.8	0.5
Ldn							67.8			68.0	0.2						68.6	0.6

Table F-3
Site 3: Columbus Avenue between West 80th and 79th Streets
Weekday

Hour Ending	Temporal Distrib.	% Medium Truck	% Heavy Truck	1996 Noise Analysis-Existing Condit Traffic Volumes	PCEs	Measur Levels	Calcul Levels	Noise Analysis--No Build Conditio Traffic Volumes	PCEs	Calcul Levels	Noise Change	Noise Analysis-Build Conditions Project Generated Traffic Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.427	0.0	0.1	769	853		63.0	790	876	63.1	0.1	10	10	0	0	887	63.1	0.1
02:00am	0.240	0.0	0.2	431	515		60.7	443	529	60.9	0.1	5	5	0	0	536	60.9	0.1
03:00am	0.133	0.0	0.4	240	324		58.7	246	333	58.8	0.1	3	3	0	0	337	58.9	0.1
04:00am	0.088	0.0	0.6	158	242		57.4	162	248	57.5	0.1	2	2	0	0	251	57.5	0.1
05:00am	0.079	0.0	0.8	141	233		57.2	145	239	57.3	0.1	2	2	0	0	242	57.3	0.1
06:00am	0.120	0.0	0.9	216	381		59.3	222	391	59.4	0.1	3	3	0	0	396	59.4	0.1
07:00am	0.255	0.5	1.0	459	895		62.9	471	920	63.1	0.1	6	6	0	0	931	63.1	0.1
08:00am	0.480	1.0	1.2	864	1,850		66.1	888	1,902	66.2	0.1	11	11	0	0	1,925	66.2	0.1
09:00am	0.779	1.0	1.3	1,401	3,162		68.3	1,440	3,250	68.5	0.1	18	17	0	0	3,290	68.5	0.1
10:00am	0.710	0.9	1.5	1,278	3,010		68.1	1,313	3,094	68.2	0.1	16	16	0	0	3,132	68.3	0.1
11:00am	0.950	0.8	1.5	1,710	4,069		69.4	1,757	4,182	69.5	0.1	22	21	0	0	4,233	69.5	0.1
noon	0.962	0.7	1.7	1,730	4,334		69.6	1,778	4,454	69.7	0.1	23	22	0	0	4,510	69.8	0.1
01:00pm	0.934	0.6	1.8	1,708	4,491	69.7	69.7	1,754	4,612	69.8	0.1	29	29	0	0	4,676	69.9	0.1
02:00pm	0.956	0.5	2.0	1,747	4,813		70.0	1,794	4,943	70.1	0.1	32	31	0	0	5,013	70.2	0.1
03:00pm	0.968	0.3	3.0	1,769	6,306		71.2	1,817	6,476	71.4	0.1	27	26	0	1	6,560	71.4	0.1
04:00pm	0.965	0.1	5.0	1,764	9,198		72.9	1,811	9,446	73.0	0.1	25	24	0	1	9,563	73.1	0.1
05:00pm	0.876	0.0	3.0	1,602	5,640		70.8	1,646	5,793	70.9	0.1	29	26	2	1	5,902	71.0	0.1
06:00pm	0.883	0.0	1.0	1,640	3,018	68.1	68.1	1,683	3,097	68.2	0.1	30	30	0	0	3,144	68.3	0.1
07:00pm	0.967	0.0	1.0	1,796	3,306		68.6	1,844	3,392	68.7	0.1	88	88	0	0	3,499	68.9	0.1
08:00pm	1.000	0.0	0.9	1,858	3,192		68.6	1,907	3,276	68.7	0.1	126	124	0	1	3,502	69.0	0.3
09:00pm	0.880	0.0	0.7	1,636	2,611		67.8	1,679	2,680	67.9	0.1	86	86	0	0	2,778	68.1	0.2
10:00pm	0.747	0.0	0.6	1,388	2,047	66.9	66.9	1,425	2,101	67.0	0.1	97	96	0	1	2,290	67.4	0.4
11:00pm	0.687	0.0	0.4	1,276	1,727		66.1	1,310	1,772	66.2	0.1	93	91	0	1	1,954	66.7	0.4
midnight	0.645	0.0	0.3	1,199	1,476		65.4	1,231	1,515	65.5	0.1	22	22	0	0	1,540	65.6	0.1
Leq(24)							67.9			68.0	0.1						68.1	0.1
Ldn							71.4			71.5	0.1						71.6	0.2

Table F-4
Site 4: Central Park West between West 81st and 82nd Streets
Weekday

Hour Ending	Tempora Distrib.	% Medium Truck	% Heavy Truck	1996 Noise Analysis-Existing Conditio: Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Noise Analysis--No Build Condition: Traffic Volumes	PCEs	Calcul Levels	Noise Chang	Noise Analysis-Build Conditions: Project Generated Traffic Volu Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.685	0.0	0.1	1,022	1,106		65.0	1,090	1,179	65.3	0.3	32	32	0	0	1,213	65.4	0.1
02:00am	0.513	0.0	0.1	765	849		63.7	816	906	64.0	0.3	24	24	0	0	932	64.1	0.1
03:00am	0.277	0.0	0.2	413	497		61.2	441	530	61.4	0.3	13	13	0	0	545	61.6	0.1
04:00am	0.204	0.0	0.3	304	388		59.9	324	414	60.2	0.3	9	9	0	0	426	60.3	0.1
05:00am	0.130	0.0	0.7	194	302		58.6	207	322	58.9	0.3	6	6	0	0	331	59.0	0.1
06:00am	0.111	0.0	1.0	166	304		58.5	177	324	58.7	0.3	5	5	0	0	334	58.9	0.1
07:00am	0.207	0.0	1.3	309	654		61.6	329	697	61.9	0.3	10	9	0	0	717	62.0	0.1
08:00am	0.415	0.1	1.7	619	1,494		65.0	660	1,593	65.2	0.3	19	19	0	0	1,639	65.4	0.1
09:00am	0.606	0.2	2.0	904	2,449		66.9	964	2,611	67.2	0.3	28	27	0	1	2,686	67.3	0.1
10:00am	0.754	0.3	2.3	1,125	3,380		68.1	1,199	3,603	68.4	0.3	35	34	0	1	3,707	68.5	0.1
11:00am	0.816	0.4	2.7	1,218	4,017		68.7	1,298	4,282	69.0	0.3	38	36	0	1	4,406	69.1	0.1
noon	0.863	0.5	3.0	1,288	4,629	69.1	69.1	1,373	4,935	69.4	0.3	44	42	0	1	5,082	69.5	0.1
01:00pm	0.955	1.0	6.0	1,425	8,821		71.9	1,519	9,403	72.2	0.3	61	58	0	3	9,692	72.3	0.1
02:00pm	1.000	1.0	10.5	1,492	14,877		74.1	1,591	15,858	74.4	0.3	63	58	0	5	16,334	74.5	0.1
03:00pm	0.946	0.5	8.0	1,412	11,003		72.8	1,505	11,729	73.1	0.3	61	57	0	3	12,086	73.2	0.1
04:00pm	0.886	0.0	3.0	1,322	4,654		69.0	1,409	4,961	69.3	0.3	55	54	0	1	5,118	69.4	0.1
05:00pm	0.891	0.0	2.6	1,330	4,277		68.6	1,417	4,559	68.9	0.3	50	47	2	1	4,730	69.1	0.2
06:00pm	0.917	0.0	2.3	1,368	3,988	68.3	68.3	1,459	4,251	68.6	0.3	54	53	0	1	4,386	68.7	0.1
07:00pm	0.846	0.0	1.9	1,262	3,296		68.5	1,346	3,514	68.8	0.3	107	105	0	2	3,768	69.1	0.3
08:00pm	0.858	0.0	1.6	1,280	2,955		68.8	1,365	3,150	69.0	0.3	145	143	0	2	3,431	69.4	0.4
09:00pm	0.670	0.0	1.2	1,000	2,005	68.4	68.4	1,066	2,137	68.7	0.3	100	98	0	1	2,352	69.1	0.4
10:00pm	0.595	0.0	0.8	888	1,512		67.0	946	1,611	67.3	0.3	109	108	0	1	1,824	67.8	0.5
11:00pm	0.567	0.0	0.5	846	1,184		65.7	902	1,262	66.0	0.3	104	103	0	1	1,461	66.6	0.6
midnight	0.581	0.0	0.1	867	951		64.6	924	1,014	64.9	0.3	34	34	0	0	1,050	65.0	0.2
Leq(24)							68.1			68.4	0.3						68.6	0.2
Ldn							71.7			72.0	0.3						72.3	0.3

Table F-5
Site 2: West 81st Street between Central Park West and Columbus Avenue—Saturday

Hour Ending	Tempora Distrib.	% Medium Truck	% Heavy Truck	1996 Noise Analysis-Existing Conditi Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Noise Analysis--No Build Conditions Traffic Volumes	PCEs	Calcul Levels	Noise Change	Noise Analysis-Build Conditions Project Generated Traffic Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.623	0.0	0.2	476	560		58.6	500	588	58.8	0.2	79	79	0	0	681	59.4	0.6
02:00am	0.423	0.0	0.3	323	407		57.1	339	428	57.3	0.2	54	53	0	0	495	57.9	0.6
03:00am	0.347	0.0	0.4	265	349		56.3	278	367	56.5	0.2	44	44	0	0	424	57.2	0.6
04:00am	0.247	0.0	0.5	189	273		55.2	198	286	55.4	0.2	31	31	0	0	332	56.0	0.6
05:00am	0.122	0.0	1.0	93	169		53.0	98	177	53.2	0.2	15	15	0	0	205	53.9	0.6
06:00am	0.127	0.0	1.4	97	211		53.9	102	222	54.1	0.2	16	16	0	0	256	54.7	0.6
07:00am	0.179	0.0	1.8	137	347		56.0	144	365	56.2	0.2	23	22	0	0	422	56.8	0.6
08:00am	0.355	0.0	2.3	271	787		59.4	285	827	59.6	0.2	45	44	0	1	957	60.3	0.6
09:00am	0.512	0.0	2.7	391	1,278		61.5	411	1,342	61.7	0.2	65	63	0	2	1,554	62.3	0.6
10:00am	0.593	0.0	3.1	453	1,646		62.5	476	1,728	62.7	0.2	75	73	0	2	2,001	63.3	0.6
11:00am	0.861	0.0	3.6	658	2,629		64.4	691	2,760	64.6	0.2	109	105	0	4	3,196	65.3	0.6
noon	0.841	0.0	4.0	643	2,802	64.6	64.6	675	2,942	64.8	0.2	115	110	0	4	3,415	65.5	0.6
01:00pm	0.916	0.5	4.5	700	3,399		65.6	735	3,568	65.8	0.2	150	144	1	5	4,166	66.5	0.7
02:00pm	0.995	1.0	9.5	760	6,942		68.8	798	7,289	69.0	0.2	160	147	1	12	8,474	69.7	0.7
03:00pm	1.000	0.5	6.5	764	4,994		67.5	802	5,244	67.7	0.2	161	152	1	8	6,105	68.4	0.7
04:00pm	0.958	0.0	12.5	732	8,419		69.9	769	8,840	70.1	0.2	147	132	0	15	10,261	70.7	0.6
05:00pm	0.879	0.0	11.0	672	6,855		69.1	705	7,198	69.3	0.2	129	113	4	12	8,411	70.0	0.7
06:00pm	0.827	0.0	9.4	632	5,631	68.4	68.4	664	5,912	68.6	0.2	127	117	0	10	6,867	69.3	0.7
07:00pm	0.871	0.0	7.9	666	5,068		68.1	699	5,322	68.3	0.2	244	235	0	10	6,379	69.1	0.8
08:00pm	0.819	0.0	6.3	626	3,955		67.1	657	4,153	67.3	0.2	312	303	0	9	5,184	68.3	1.0
09:00pm	0.840	0.0	4.8	642	3,225		66.3	674	3,386	66.5	0.2	241	235	0	6	4,140	67.4	0.9
10:00pm	0.779	0.0	3.2	595	2,220	64.8	64.8	625	2,331	65.0	0.2	261	255	0	5	3,028	66.1	1.1
11:00pm	0.728	0.0	1.7	556	1,354		62.6	584	1,421	62.8	0.2	247	244	0	4	1,969	64.2	1.4
midnight	0.796	0.0	0.2	608	692		59.6	639	727	59.8	0.2	115	115	0	0	856	60.5	0.7
Leq(24)							65.0			65.2	0.2						65.9	0.7
Ldn							68.0			68.2	0.2						69.1	0.9

Table F-6
Site 3: Columbus Avenue between West 80th and 79th Streets
Saturday

				1996 Noise Analysis-Existing Conditio				Noise Analysis--No Build Conditions				Noise Analysis-Build Conditions						
Hour Ending	Temporal Distrib.	% Medium Truck	% Heavy Truck	Traffic Volumes	PCEs	Measur Levels	Calcul Levels	Traffic Volumes	PCEs	Calcul Levels	Noise Change	Project Generated Traffic Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.223	0.0	0.2	528	612		63.8	544	630	63.9	0.1	10	10	0	0	642	64.0	0.1
02:00am	0.522	0.0	0.1	1,236	1,320		66.4	1,273	1,360	66.5	0.1	23	23	0	0	1,385	66.6	0.1
03:00am	0.733	0.0	0.1	1,736	1,820		67.1	1,788	1,874	67.2	0.1	33	33	0	0	1,909	67.3	0.1
04:00am	0.840	0.0	0.1	1,989	2,073		66.9	2,049	2,135	67.1	0.1	38	38	0	0	2,175	67.1	0.1
05:00am	0.793	0.0	0.4	1,878	2,539		67.1	1,934	2,615	67.2	0.1	36	35	0	0	2,663	67.3	0.1
06:00am	0.805	0.0	0.8	1,906	3,167		67.3	1,963	3,263	67.5	0.1	36	36	0	0	3,323	67.5	0.1
07:00am	0.820	0.0	1.2	1,942	3,828		67.4	2,000	3,943	67.6	0.1	37	36	0	0	4,015	67.6	0.1
08:00am	0.842	0.1	1.5	1,994	4,578		67.5	2,054	4,716	67.6	0.1	38	37	0	1	4,802	67.7	0.1
09:00am	0.917	0.2	1.9	2,171	5,691		67.7	2,237	5,862	67.8	0.1	41	40	0	1	5,970	67.9	0.1
10:00am	0.866	0.3	2.3	2,051	6,040		67.2	2,112	6,222	67.4	0.1	39	38	0	1	6,336	67.4	0.1
11:00am	0.822	0.4	2.6	1,946	6,365		66.7	2,005	6,557	66.9	0.1	37	36	0	1	6,677	66.9	0.1
noon	0.761	0.5	3.0	1,802	6,478		66.1	1,856	6,673	66.2	0.1	42	41	0	1	6,803	66.3	0.1
01:00pm	0.870	1.0	6.0	2,060	12,751	68.3	68.3	2,122	13,135	68.4	0.1	73	70	0	2	13,411	68.5	0.1
02:00pm	0.960	1.0	10.5	2,273	22,663		71.5	2,342	23,345	71.6	0.1	77	72	0	5	23,808	71.7	0.1
03:00pm	0.911	0.5	8.0	2,157	16,814		70.8	2,222	17,321	71.0	0.1	75	71	0	3	17,673	71.0	0.1
04:00pm	0.969	0.0	3.0	2,294	8,076		68.3	2,363	8,319	68.4	0.1	68	67	0	1	8,497	68.5	0.1
05:00pm	1.000	0.0	2.7	2,368	7,668		68.8	2,439	7,899	68.9	0.1	61	58	2	1	8,090	69.0	0.1
06:00pm	0.907	0.0	2.3	2,148	6,350	68.6	68.6	2,212	6,541	68.7	0.1	62	61	0	1	6,682	68.8	0.1
07:00pm	0.624	0.0	2.0	1,478	3,952		68.4	1,522	4,071	68.6	0.1	115	114	0	1	4,233	68.7	0.2
08:00pm	0.441	0.0	1.7	1,044	2,499		68.3	1,076	2,574	68.4	0.1	161	159	0	1	2,847	68.9	0.4
09:00pm	0.326	0.0	1.3	772	1,630		68.4	795	1,679	68.5	0.1	116	115	0	0	1,811	68.8	0.3
10:00pm	0.187	0.0	1.0	443	810	67.2	67.2	456	835	67.3	0.1	116	115	0	1	1,042	68.3	1.0
11:00pm	0.109	0.0	0.7	258	400		63.4	266	412	63.5	0.1	99	98	0	1	597	65.2	1.6
midnight	0.133	0.0	0.3	315	399		62.7	324	411	62.8	0.1	13	13	0	0	425	63.0	0.2
Leq(24)							67.7			67.9	0.1						68.1	0.2
Ldn							73.4			73.5	0.1						73.8	0.3

Table F-7
Existing Statistical Noise Levels

Location/Time Period	$L_{eq(1)}$	$L_{90(1)}$	$L_{50(1)}$	$L_{10(1)}$	$L_{(1)}$
SITE 1: Central Park West between West 81st and 82nd Streets					
Weekday Midday Peak	69.9	61.5	67.5	73.0	78.0
Weekday PM Peak	68.7	61.5	66.5	71.5	78.0
Weekday Late Evening	67.8	59.5	66.0	71.0	76.0
Saturday Midday	69.1	61.5	67.5	71.5	78.0
Saturday PM	68.3	61.5	67.0	70.5	76.5
Saturday Late Evening	68.4	59.5	66.0	71.0	76.5
SITE 2: West 81st Street, directly across from the existing Planetarium Site					
Weekday Midday Peak	64.8	58.0	62.0	67.5	74.0
Weekday PM Peak	66.8	57.5	62.5	69.0	78.0
Weekday Late Evening	64.8	57.0	62.5	68.0	72.0
Saturday Midday	64.6	59.5	62.5	67.0	72.5
Saturday PM	68.4	58.0	63.0	68.5	79.5
Saturday Late Evening	64.8	56.5	62.5	68.0	73.5
SITE 3: Columbus Ave, between West 79th and 80th Streets					
Weekday Midday Peak	69.7	59.5	66.5	73.5	78.5
Weekday PM Peak	68.1	59.0	65.5	71.0	78.5
Weekday Late Evening	66.9	56.5	64.5	70.0	75.5
Saturday Midday	68.3	59.5	65.5	71.5	77.5
Saturday PM	68.6	59.5	66.5	71.5	77.0
Saturday Late Evening	67.2	58.0	65.0	70.5	76.0

APPENDIX G

TERRACE NOISE ANALYSIS*

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* *This appendix is new to the FEIS.*

INTRODUCTION

Proposed renovations to the American Museum of Natural History include the construction of an outdoor terrace, located on the rooftop of the proposed parking garage. Part of this terrace would be used by the proposed new restaurant for outdoor dining; the rest of the terrace would generally be available for use by the public during Museum operating hours, and could be used for occasional outdoor events, including parties and receptions. The noise study conducted by Allee King Rosen & Fleming, Inc. as part of the Museum's Draft Environmental Impact Statement (DEIS) indicated that operation of the proposed outdoor terrace may produce intrusive noise levels when special events with music take place. The intrusive noise levels would occur both in the nearby Theodore Roosevelt Park, and at residences along West 81st Street.

To further evaluate this issue, particularly the effects on residents along West 81st Street, the American Museum of Natural History retained Shen Milsom and Wilke, Inc. and Allee King Rosen & Fleming, Inc. to conduct additional noise studies and to develop a Noise Control Plan (NCP) to examine the feasibility of implementing controls to reduce noise levels. (Resumes for key staff of those firms are appended as Attachment G.2.) The following is a summary of the work involved with the NCP:

- Additional noise measurements were made between the hours of 10 AM and midnight, for both a weekday and a Saturday, in the park and on the rooftop of the residential building located at 15 West 81st Street;
- Noise data and measurements were collected for an existing outdoor restaurant and a range of events considered typical of operations of the terrace;
- Future noise levels were predicted in the park and at residences along 81st Street without the proposed project;
- Future noise levels were predicted in the park and at residences along 81st Street with the proposed project for the operation of the proposed outdoor restaurant and for three categories of terrace events—Group 1 (unamplified light music, including small string assemblies, piano duets, and light jazz music without heavy percussion instruments), Group 2 (larger unamplified musical groups, partly amplified musical performances, amplified speech associated with oral presentations), and Group 3 (amplified music, unamplified groups with heavy percussion instruments including drums without any noise control measures); and
- Where necessary, noise control measures were investigated to reduce the intrusive noise effects resulting from operations of the proposed outdoor terrace.

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* **This entire appendix and its attachments are new in this FEIS.**

EXECUTIVE SUMMARY

- Restaurant activities on the terrace without any music will produce a maximum increase in future noise levels, when compared with future noise levels without the project, of less than 3.0 dBA in the park and at residences along West 81st Street. These increases in noise levels will be barely perceptible and restaurant activities will not significantly change noise levels in the park or at residences along West 81st Street.
- Unamplified light music—including small string assemblies, piano duets, and light jazz music without heavy percussion instruments—would be inaudible to residents along West 81st Street. However, they would be audible in some locations within Theodore Roosevelt Park.
- Larger unamplified musical groups, partly amplified musical performances, and amplified speech associated with oral presentations that conclude by 11 PM and utilize the control measures recommended in this report (i.e., scheduling, dedicated sound system) would not be expected to produce intrusive noise levels at residences along West 81st Street.
- Amplified music and unamplified groups with heavy percussion instruments including drums would be clearly audible, would be expected to be discernable, and may be intrusive to both residents along West 81st Street and people in the park. There are no practicable mitigation measures that would fully eliminate this impact. Limiting the number of these types of events would minimize the number of intrusive events experienced by nearby residents.

MEASUREMENTS IN THEODORE ROOSEVELT PARK AND AT RESIDENCES ON WEST 81ST STREET

Additional noise monitoring was performed at two locations: in the park and on the rooftop of residences located at 15 West 81st Street. The proposed hours of operations for the outdoor terrace are between 10 AM and midnight, for both weekdays and weekends. Weekend-related measurements were made between 10 AM and midnight on Saturday, July 27, 1996. Weekday measurements were made between 2:30 PM and midnight on Tuesday, July 30, 1996. The time period for weekday measurements between 10:00 AM and 2:30 PM was not measured on July 30 due to weather conditions. Measurements for the weekday time period between 10:00 AM and 2:30 PM were made on Thursday, August 1, 1996. However, these data were omitted from the analysis because of unusually high noise levels in the area and comments from residents in the area of the Museum concerning the unusually high noise levels on Thursday, August 1, 1996. Continuous measurements were made at both locations and included noise generated from street traffic, aircraft, mechanical equipment, and other event-oriented occurrences, which were excluded from the original EIS measurements.

Noise monitoring in the park was conducted using a Brüel & Kjær Noise Level Analyzer Type 4427, Brüel & Kjær Sound Level Calibrator Type 4230, Brüel & Kjær ½-inch microphone Type 9133, and Brüel & Kjær microphone preamplifier Type 2619. Measurements were made on the A-scale (dBA) for a sampling period of 1 hour. During each hour, the slow-response sound level was plotted versus time approximately every 5 seconds. The noise level data were digitally recorded by the noise analyzer and displayed at the end of the hour in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. A windscreen was used during all sound measurements except for calibration. All measurement procedures conformed with the requirements of ANSI Standard S1.13-1971 (R1976). Any significant noise events that were considered to influence the measurements (i.e., dogs barking in close proximity to the microphone, helicopters overhead, etc.) were logged, along with the time of the event.

Noise monitoring at the rooftop of residences at 15 West 81st Street was performed using a Brüel & Kjær Type 2231 Sound Level Meter. Hourly measurements were taken on the rooftop yielding results for the same measured quantities as measured in the park itself.

A Brüel & Kjær Type 2144 Real Time Frequency Analyzer was also setup on the roof at 15 West 81st Street to measure the octave band component of the ambient, or background noise, over a 5-minute averaging period once an hour. The noise spectra measured were used in evaluating the effectiveness of mitigation measures for terrace events.

Existing hourly $L_{eq(1)}$ noise levels range from 50.8 dBA to 69.0 dBA in the park and from 50.0 dBA to 65.4 dBA on the rooftop of residences along 81st Street. Complete noise data are summarized in Attachment G.1 of this report.

NOISE FROM TYPICAL OUTDOOR EVENTS

Noise measurements were made for a variety of outdoor events that were considered comparable to the events expected to take place on the proposed terrace. In addition, measurements were made for "typical" outdoor restaurant operations.

For restaurant operations, measurements were made at the outdoor seating area of a restaurant at the World Financial Center North Cove in Battery Park City. This restaurant is located adjacent to the World Financial Center at North Cove, and faces the waterfront area of the Hudson River. The area is well isolated from traffic noise in the area, and has 36 outdoor tables of approximately three people each, with waiter service. Measurements were made on a sunny afternoon on July 28, 1996, with all tables occupied, at a distance of 20 feet from the table area. Measurements were paused during non-restaurant event noises (such as aircraft fly-overs) to isolate and measure restaurant-only noises. Restaurant noise was as follows:

- RESTAURANT NOISE: 36 Tables of with a total of approximately 108 people. Measured $L_{eq(1)}$ level: 62.4 dBA @ 20 feet.

For the variety of outdoor terrace events, noise data were measured during various outdoor amplified performances such as those held at Central Park Summer Stage, as well as non-amplified events. Due to the wide variety of terrace events and the noise levels associated with them, terrace events have been divided into three categories. The estimated dBA ranges are stated as maximum A-weighted noise levels and indicate instantaneous noise levels associated with the various events, referenced at 100 feet from the sound source and adjusted for the associated size of the terrace event. The three categories of outdoor terrace events and the noise levels associated with them are presented as follows:

- GROUP 1: Unamplified light music, including small string assemblies, piano duets, and light jazz music without heavy percussion instruments. Group 1 type activities are envisioned as background music played at a level of intensity acceptable to a brunch or lunchtime event.

  Estimated dBA range: Instantaneous noise levels less than 65 dBA @ 100 feet.

- GROUP 2: Larger unamplified musical groups, partly amplified musical performances, amplified speech associated with oral presentations.

Estimated dBA range: Instantaneous noise levels from 65 dBA to 75 dBA @ 100 feet.

- GROUP 3: Amplified music, unamplified groups with heavy percussion instruments including drums.

  Estimated dBA range: Instantaneous noise levels greater than 75 dBA @ 100 feet.

FUTURE NOISE LEVELS WITHOUT THE PROJECT

An analysis of future noise levels without the project (No Build) was performed in the study area. The No Build noise levels are based on traffic increases in the area that result from other construction, traffic improvements, and general growth of traffic volumes, for the future Build year.

A proportional modeling technique was used to determine approximate increases in noise levels due to changes in traffic volumes. The proportional modeling technique was identical to the model described in the methodology section of Chapter 15 ("Noise") of the EIS.

Future noise levels without the proposed expansion are expected to increase by less than 0.3 dBA when compared with existing noise levels. Changes of this magnitude would be imperceptible, and not significantly different from existing noise levels.

INTRUSIVENESS CRITERIA

For purposes of assessing whether terrace noise may be intrusive, the analysis utilizes the following criterion: an increase of 3 dBA or more in noise levels at residences due to outdoor terrace events from those calculated for Build traffic-generated noise levels. For the 3 dBA threshold to occur, terrace activities would have to generate noise levels that equal or exceed the ambient noise levels, where traffic is the dominant source of noise. Noise levels produced by the terrace events that produce a 3 dBA instantaneous increase over the constant ambient noise levels would be audible at residences and may be considered intrusive. This increase would be calculated based on the difference in noise levels without any activities on the terrace (the ambient), and the same ambient noise level combined with noise levels from terrace activity.

Noise levels produced by terrace events and restaurant activities were examined at residences mid-height in the residential buildings along West 81st Street and in Theodore Roosevelt Park.

FUTURE NOISE LEVELS WITH THE TERRACE OPERATIONS WITHOUT NOISE CONTROL MEASURES

An analysis was performed to determine future noise levels with the proposed project (Build), including operations of the outdoor terrace. The Build noise levels include the effects of traffic increases in the area that result from operations of the proposed terrace events, changes in traffic due to operations of the proposed restaurant, changes in traffic due to the proposed Museum expansion, and noise generated from the events themselves. Traffic-related noise levels were predicted using the proportional modeling methodology described in Chapter 15, "Noise." Noise levels resulting from the actual events are based on measurements made during similar events, as described in the "Noise from Typical Outdoor Events" section of this report, adjusted for location and size of these events with respect to the proposed terrace.

ATTENUATION

The propagation path influences the receptor sound level by the attenuation of sound from various causes. To estimate sound levels, two types of sound attenuation were considered—distance and shielding.

- Distance Attenuation—Sound traveling from a noise source diminishes in intensity as it propagates from the source (much like ripples on the surface of a pond resulting from a disturbance). Sound emanating from a point source of noise spreads spherically and decreases in intensity with distance, such that a reduction of 6 dBA per doubling of distance from the source occurs. For example, a source that emits 85 dBA at 100 feet will result in 79 dBA at 200 feet.
- Shielding Attenuation—Sound is shielded by any obstacle that blocks the path of sound such that the sound traveling through the barrier would travel a distance that is significantly less than that of sound forced to travel above or around the obstacle. In the case of this project, the proposed parking garage would create a shielding effect between the terrace and certain locations within the park where the "line-of-sight" is affected by the height of the parking garage and the low elevations within the park. A tent erected for an event would not create a shield attenuation for noise.

Future noise levels in the park and at residences account for any distance and/or any natural shielding or barrier effects due to the geometry of the proposed terrace, and other buildings associated with the proposed project.

Predicted noise levels for residences along West 81st Street were calculated at the mid-height region of the building (approximately the eighth floor). Spot measurements were made at the street level during various measurement periods, and compared with the corresponding rooftop measurements. The difference in noise levels between those at street level and on the rooftop average 5.6 dBA. A value of 2.8 dBA was calculated to be the difference between rooftop noise levels and those at the mid-height region of residences along West 81st Street. A level of 2.8 dBA was added to the rooftop hourly measurements, to compensate for the difference in elevation from the rooftop to the eighth floor region.

Changes in future $L_{eq(1)}$ noise levels due to changes in traffic volumes as a result of the proposed project with terrace events and restaurant activities, when compared with noise levels calculated for No Build conditions, would be less than 1.6 dBA in the park and residences. Changes of this magnitude would be imperceptible, and therefore not intrusive. Future ambient noise levels, during hours of the proposed terrace events, resulting from traffic generated by the proposed expansion and the proposed outdoor terrace were determined to be a minimum of 60 dBA at the mid-rise level residences along West 81st Street and in the park.

RESTAURANT ACTIVITIES ALONE

Future noise levels in the park and along residences on West 81st Street resulting from proposed outdoor restaurant activities were based on measurements made at the World Financial Center North Cove outdoor restaurant and adjusted for three factors as follows:

- Based on an outdoor dining space of 1,150 square feet and 4,000 square feet for additional tables and chairs, the outdoor restaurant measurements were conservatively adjusted to a size of 450 people for hours when the Museum is open and the 4,000-square-foot area is in use, and 100 people after Museum hours, when that area is closed to the public.

- Distance and elevation data were used to adjust the outdoor restaurant measurements due to the geometry between the outdoor dining space, and areas in the park or along West 81st Street.
- Shielding effects of the slope of the park with respect to the north facade of the proposed garage would create a partial noise shielding effect in the park. The garage on top of which the proposed terrace is to be located would behave as a noise barrier at locations in close proximity to the parking facilities. These shielding effects were used to adjust predicted noise levels in the park.

Restaurant activity noise levels for the worst-case scenario (a position where attenuation due to shielding and distance are minimal) were combined with Build traffic noise levels (see Attachment G-1) for restaurant activities only (no terrace event traffic). A typical temporal distribution of restaurant activities was assumed for restaurant activities on the terrace. Changes in future $L_{eq(1)}$ noise levels as a result of the proposed restaurant activities, when compared with noise levels calculated for No Build conditions, would be less than 3.0 dBA in the park and at residences along West 81st Street. The maximum noise levels due to restaurant activities would be 70.1 dBA depending on the location within the park, and 68.8 dBA outside residences along West 81st Street.

TERRACE ACTIVITIES

NOISE LEVELS AT RESIDENCES ON WEST 81ST STREET

Noise levels due to the three categories of possible terrace event noise were calculated at the mid-rise level of residences along West 81st Street. The possible noise levels at these locations for the corresponding terrace events are as follows:

- GROUP 1: Maximum instantaneous noise levels would be less than 55 dBA at residences along West 81st Street. These types of terrace events (unamplified light music, including small string assemblies, piano duets, and light jazz music without heavy percussion instruments) should not produce noise levels that would be audible to residents along West 81st Street between the hours of 10 AM and midnight.
- GROUP 2: Maximum instantaneous noise levels would range from 55 dBA to 65 dBA at residences along West 81st Street. These types of terrace events (larger unamplified musical groups, partly amplified musical performances, amplified speech associated with oral presentations), without any mitigative measures, may produce noise levels above future ambient levels, may result in an increase of 3 dBA or more, and may therefore be audible and intrusive to residents along West 81st Street.
- GROUP 3: Maximum instantaneous noise levels would be greater than 65 dBA at residences along West 81st Street. These types of terrace events (amplified music, unamplified groups with heavy percussion instruments including drums), without any mitigative measures, would produce noise levels that would be clearly audible, above future ambient levels, would result in an increase of 3 dBA or more, and would be considered intrusive by many residents along West 81st Street.

NOISE LEVELS IN THEODORE ROOSEVELT PARK

Noise levels due to the three categories of possible terrace event noise were calculated in Theodore Roosevelt Park. The possible noise levels at these locations for the corresponding terrace events are as follows:

- GROUP 1: Maximum instantaneous noise levels would be less than 69 dBA in the park. These types of terrace events (unamplified light music, including small string assemblies, piano duets, and light jazz music without heavy percussion instruments), without any mitigative measures, would produce noise levels that would be clearly audible, above the 60 dBA future ambient criteria, and may be considered intrusive to people in Theodore Roosevelt Park. Noise levels of this magnitude would only be observed in locations in the park where attenuation characteristics are minimal. Depending on the location with the park, noise levels as a result of these types of terrace events may be lower than 58 dBA, and therefore, inaudible.
- GROUP 2: Maximum instantaneous noise levels would range from 69 dBA to 79 dBA when measured in the park. These types of terrace events (larger unamplified musical groups, partly amplified musical performances, amplified speech associated with oral presentations), without any mitigative measures, would produce noise levels that would be clearly audible, above future ambient levels, would result in an increase of 3 dBA or more, and may be considered intrusive to people in Theodore Roosevelt Park. Noise levels of this magnitude would only occur in locations in the park where attenuation characteristics are minimal. Depending on the location within the park, noise levels as a result of these types of terrace events may be as low as 58 dBA, and therefore inaudible.
- GROUP 3: Maximum instantaneous noise levels would be greater than 79 dBA when measured in the park. These types of terrace events (amplified music, unamplified groups with heavy percussion instruments including drums), without any mitigative measures, will produce noise levels that would be clearly audible, above future ambient levels, would result in an increase of 3 dBA or more, and may be considered intrusive to people in Theodore Roosevelt Park.

CONTROL MEASURES

Measures to control noise include those that reduce noise after it has been created and those that will limit noise production.

Examples of noise control measures that reduce noise after it has been created include noise barriers and absorptive wall treatments, and electronic limiting devices, which cut off power supply to any amplified system when a predetermined noise level is exceeded. Noise barriers and wall treatments are not feasible for an open terrace or tented event, and electronic limiting devices only prevent a second occurrence of an unacceptable noise level and are therefore not suitable noise control measures.

Examples of noise control measures that limit noise production include a dedicated sound system, which would be required for all instruments that use amplification (including voice) and used for oral presentations, scheduling of events to avoid noise-sensitive times, and an ongoing noise monitoring with on-the-spot action. A noise monitoring program would be difficult to implement, would require constant noise mitigation action by terrace management during terrace events if predetermined levels were exceeded, and is therefore not feasible. The proposed noise control measures are as follows:

SCHEDULING

Monitoring of noise levels along West 81st Street show a drop in ambient levels at approximately 11 PM. Until that time, the ambient noise would mask noise from most Group 2 terrace events, so that they would not be audible at residences. It is therefore proposed that amplified sound and other potentially intrusive noise at terrace events conclude by 11 PM.

DEDICATED SOUND SYSTEM

With this measure, the Museum would install a sound system and require that it be used at all events requiring amplification. This system would control speaker type, orientation, layout, and sound emissions so as to control noise levels at sensitive receptors, particularly at residences along West 81st Street. Based on a detailed analysis of noise levels at the sensitive receptors, the maximum emissions from the dedicated system would be set to a predetermined level that would ensure that the sound produced by voice amplification and instruments requiring amplification would not be audible at those receptors. This system would provide a long-term solution to a potential noise problem of Group 2 events, and would offer limited noise control for Group 3 events. Noise levels from all three groups would remain clearly discernable in some locations within the park. Octave band measurements required for the design of this system were made during the time periods reflected in the section describing measurements at residences on West 81st Street.

LIMITING THE NUMBER OF EVENTS

The two measures described above would mitigate problems from Group 1 or Group 2 events and would provide some relief from Group 3 events. However, they would not entirely eliminate the intrusive noise levels that are likely to occur for Group 3 events. Such noise levels could only be completely mitigated by bringing the event indoors in an enclosed portion of a building. At a minimum, these terrace events would be limited in number to minimize noise intrusion at nearby residences and Theodore Roosevelt Park.

Attachment G.1: **Terrace Noise Analysis**

TRAFFIC BASED PROPORTIONAL NOISE ANALYSIS MUSEUM OF NATURAL HISTORY

Site:

Location: In Theodore Roosevelt Park between Central Park West and Columbus Ave.

Conditio Supplementary Noise Study Analysis with Measured hourly levels and 1000-person Terrace Events

		%	%	1996 Noise Analysis-Existing Conditions				Noise Analysis--No Build Condition				Noise Analysis-Build Conditions						
Hour Ending	Temporal Distrib.	Medium Truck	Heavy Truck	Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Traffic Volumes	PCEs	Calcul Levels	Noise Change	Project Generated Traffic Volume Total	Autos	MT	HT	Total PCEs	Calcul Levels	Chang
01:00am	0.276	0.0	0.4	246	330		54.9	257	344	55.0	0.2	16	16	0	0	366	55.3	0.3
02:00am	0.178	0.0	0.6	159	243		53.4	166	253	53.5	0.2	11	10	0	0	270	53.8	0.3
03:00am	0.109	0.0	1.0	97	181		51.9	101	189	52.1	0.2	6	6	0	0	201	52.3	0.3
04:00am	0.072	0.0	1.5	65	149		50.8	67	155	51.0	0.2	4	4	0	0	165	51.3	0.3
05:00am	0.076	0.0	1.8	68	171		51.3	71	178	51.4	0.2	5	4	0	0	189	51.7	0.3
06:00am	0.153	0.0	2.0	137	372		54.5	143	387	54.6	0.2	9	9	0	0	411	54.9	0.3
07:00am	0.356	0.3	2.3	319	945		58.3	332	984	58.5	0.2	21	21	0	0	1,047	58.8	0.3
08:00am	0.605	0.6	2.5	541	1,736		60.8	564	1,807	61.0	0.2	36	35	0	1	1,922	61.2	0.3
09:00am	0.786	0.4	2.8	703	2,387		62.0	732	2,485	62.1	0.2	47	45	0	1	2,643	62.4	0.3
10:00am	0.641	0.5	3.0	573	2,071		61.2	597	2,157	61.3	0.2	38	37	0	1	2,294	61.6	0.3
11:00am	0.750	0.4	3.3	671	2,554		61.9	698	2,659	62.1	0.2	44	43	0	1	2,828	62.3	0.3
noon	0.760	0.4	3.5	680	2,730		62.0	708	2,842	62.2	0.2	48	46	0	2	3,026	62.4	0.3
01:00pm	0.708	0.5	3.8	597	2,524		61.5	619	2,616	61.6	0.2	59	57	0	2	2,811	61.9	0.3
02:00pm	0.751	0.5	4.0	633	2,809		61.8	656	2,911	61.9	0.2	64	62	0	2	3,129	62.2	0.3
03:00pm	0.809	0.8	3.5	682	2,764	61.5	61.5	707	2,865	61.7	0.2	58	56	0	2	3,069	62.0	0.3
04:00pm	0.890	1.0	3.0	750	2,753	64.4	64.4	778	2,854	64.6	0.2	61	59	1	2	3,055	64.9	0.3
05:00pm	0.797	0.8	4.5	671	3,285	62.2	62.2	696	3,405	62.4	0.2	65	59	4	2	3,714	62.7	0.4
06:00pm	0.765	0.5	2.5	605	1,921	66.3	66.3	624	1,981	66.4	0.1	67	66	0	1	2,147	66.8	0.3
07:00pm	0.818	0.2	1.5	647	1,477	62.6	62.6	667	1,523	62.7	0.1	206	204	0	3	1,960	63.8	1.1
08:00pm	0.838	0.0	2.5	663	2,055	65.2	65.2	684	2,120	65.3	0.1	292	287	0	4	2,767	66.5	1.2
09:00pm	0.795	0.0	2.1	629	1,728	62.4	62.4	648	1,782	62.5	0.1	199	196	0	3	2,231	63.5	1.0
10:00pm	1.000	0.0	1.7	791	1,895	59.4	59.4	816	1,955	59.5	0.1	221	218	0	3	2,427	60.5	0.9
11:00pm	0.649	0.0	1.2	514	1,050	58.0	58.0	530	1,083	58.1	0.1	222	220	0	2	1,514	59.6	1.5
midnight	0.559	0.0	0.8	442	748	58.6	58.6	456	772	58.7	0.1	51	51	0	0	846	59.1	0.4
Leq(24)							61.1			61.3	0.2						61.8	0.5
Ldn							64.5			64.7	0.2						65.3	0.6

TRAFFIC BASED PROPORTIONAL NOISE ANALYSIS MUSEUM OF NATURAL HISTORY SATURDAY

Site:

Location: In Theodore Roosevelt Park between Central Park West and Columbus Ave.

Conditio Supplementary Noise Study Analysis with Measured hourly levels and 1000-person Terrace Events SATURDAY

		%	%	1996 Noise Analysis-Existing Condit				Noise Analysis--No Build Condition				Noise Analysis-Build Conditions						
Hour Ending	Temporal Distrib.	Mediu Truck	Heavy Truck	Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Traffic Volumes	PCEs	Calcul Levels	Noise Change	Project Generated Traffic Volu Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.623	0.0	0.2	476	560		59.8	500	588	60.0	0.2	79	79	0	0	681	60.7	0.6
02:00am	0.423	0.0	0.3	323	407		58.4	339	428	58.6	0.2	54	53	0	0	495	59.2	0.6
03:00am	0.347	0.0	0.4	265	349		57.7	278	367	57.9	0.2	44	44	0	0	424	58.5	0.6
04:00am	0.247	0.0	0.5	189	273		56.5	198	286	56.7	0.2	31	31	0	0	332	57.4	0.6
05:00am	0.122	0.0	1.0	93	169		54.4	98	177	54.6	0.2	15	15	0	0	205	55.2	0.6
06:00am	0.127	0.0	1.4	97	211		55.3	102	222	55.5	0.2	16	16	0	0	256	56.2	0.6
07:00am	0.179	0.0	1.8	137	347		57.4	144	365	57.6	0.2	23	22	0	0	422	58.3	0.6
08:00am	0.355	0.0	2.3	271	787		60.9	285	827	61.1	0.2	45	44	0	1	957	61.8	0.6
09:00am	0.512	0.0	2.7	391	1,278		63.0	411	1,342	63.2	0.2	65	63	0	2	1,554	63.8	0.6
10:00am	0.593	0.0	3.1	453	1,646	64.0	64.0	476	1,728	64.2	0.2	75	73	0	2	2,001	64.8	0.6
11:00am	0.861	0.0	3.6	658	2,629	65.1	65.1	691	2,760	65.3	0.2	109	105	0	4	3,196	65.9	0.6
noon	0.841	0.0	4.0	643	2,802	62.1	62.1	675	2,942	62.3	0.2	115	110	0	4	3,415	63.0	0.6
01:00pm	0.916	0.5	4.5	700	3,399	65.1	65.1	735	3,568	65.3	0.2	150	144	1	5	4,166	66.0	0.7
02:00pm	0.995	1.0	9.5	760	6,942	62.3	62.3	798	7,289	62.5	0.2	160	147	1	12	8,474	63.2	0.7
03:00pm	1.000	0.5	6.5	764	4,994	60.5	60.5	802	5,244	60.7	0.2	161	152	1	8	6,105	61.4	0.7
04:00pm	0.958	0.0	12.5	732	8,419	69.0	69.0	769	8,840	69.2	0.2	147	132	0	15	10,261	69.9	0.6
05:00pm	0.879	0.0	11.0	672	6,855	65.1	65.1	705	7,198	65.3	0.2	129	113	4	12	8,411	66.0	0.7
06:00pm	0.827	0.0	9.4	632	5,631	66.3	66.3	664	5,912	66.5	0.2	127	117	0	10	6,867	67.2	0.7
07:00pm	0.871	0.0	7.9	666	5,068	63.9	63.9	699	5,322	64.1	0.2	268	258	0	11	6,487	65.0	0.9
08:00pm	0.819	0.0	6.3	626	3,955	63.1	63.1	657	4,153	63.3	0.2	346	336	0	10	5,302	64.4	1.1
09:00pm	0.840	0.0	4.8	642	3,225	60.8	60.8	674	3,386	61.0	0.2	258	251	0	7	4,241	62.0	1.0
10:00pm	0.779	0.0	3.2	595	2,220	59.7	59.7	625	2,331	59.9	0.2	261	255	0	5	3,028	61.0	1.1
11:00pm	0.728	0.0	1.7	556	1,354	57.8	57.8	584	1,421	58.0	0.2	276	273	0	4	1,998	59.5	1.5
midnight	0.796	0.0	0.2	608	692	60.8	60.8	639	727	61.0	0.2	119	119	0	0	860	61.7	0.7
Leq(24)							62.7			62.9	0.2						63.6	0.7
Ldn							66.4			66.6	0.2						67.3	0.8

TRAFFIC BASED PROPORTIONAL NOISE ANALYSIS MUSEUM OF NATURAL HISTORY

Site:

Location: In Theodore Roosevelt Park between Central Park West and Columbus Ave.

Condition Supplementary Noise Study Analysis with Measured hourly levels NO TERRACE EVENTS

		%	%	1996 Noise Analysis-Existing Con				Noise Analysis--No Build Conditio				Noise Analysis-Build Conditions						
Hour Ending	Tempora Distrib.	Medium Truck	Heavy Truck	Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Traffic Volumes	PCEs	Calcul Levels	Noise Change	Project Generated Traffic Volumes Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.276	0.0	0.4	246	330		54.9	257	344	55.0	0.2	16	16	0	0	366	55.3	0.3
02:00am	0.178	0.0	0.6	159	243		53.4	166	253	53.5	0.2	11	10	0	0	270	53.8	0.3
03:00am	0.109	0.0	1.0	97	181		51.9	101	189	52.1	0.2	6	6	0	0	201	52.3	0.3
04:00am	0.072	0.0	1.5	65	149		50.8	67	155	51.0	0.2	4	4	0	0	165	51.3	0.3
05:00am	0.076	0.0	1.8	68	171		51.3	71	178	51.4	0.2	5	4	0	0	189	51.7	0.3
06:00am	0.153	0.0	2.0	137	372		54.5	143	387	54.6	0.2	9	9	0	0	411	54.9	0.3
07:00am	0.356	0.3	2.3	319	945		58.3	332	984	58.5	0.2	21	21	0	0	1,047	58.8	0.3
08:00am	0.605	0.6	2.5	541	1,736		60.8	564	1,807	61.0	0.2	36	35	0	1	1,922	61.2	0.3
09:00am	0.786	0.4	2.8	703	2,387		62.0	732	2,485	62.1	0.2	47	45	0	1	2,643	62.4	0.3
10:00am	0.641	0.5	3.0	573	2,071		61.2	597	2,157	61.3	0.2	38	37	0	1	2,294	61.6	0.3
11:00am	0.750	0.4	3.3	671	2,554		61.9	698	2,659	62.1	0.2	44	43	0	1	2,828	62.3	0.3
noon	0.760	0.4	3.5	680	2,730		62.0	708	2,842	62.2	0.2	48	46	0	2	3,026	62.4	0.3
01:00pm	0.708	0.5	3.8	597	2,524		61.5	619	2,616	61.6	0.2	59	57	0	2	2,811	61.9	0.3
02:00pm	0.751	0.5	4.0	633	2,809		61.8	656	2,911	61.9	0.2	64	62	0	2	3,129	62.2	0.3
03:00pm	0.809	0.8	3.5	682	2,764	61.5	61.5	707	2,865	61.7	0.2	58	56	0	2	3,069	62.0	0.3
04:00pm	0.890	1.0	3.0	750	2,753	64.4	64.4	778	2,854	64.6	0.2	60	58	1	2	3,054	64.9	0.3
05:00pm	0.797	0.8	4.5	671	3,285	62.2	62.2	696	3,405	62.4	0.2	61	59	0	2	3,650	62.7	0.3
06:00pm	0.765	0.5	2.5	605	1,921	66.3	66.3	624	1,981	66.4	0.1	66	65	0	1	2,146	66.8	0.3
07:00pm	0.818	0.2	1.5	647	1,477	62.6	62.6	667	1,523	62.7	0.1	89	89	0	1	1,675	63.1	0.4
08:00pm	0.838	0.0	2.5	663	2,055	65.2	65.2	684	2,120	65.3	0.1	125	123	0	1	2,348	65.8	0.4
09:00pm	0.795	0.0	2.1	629	1,728	62.4	62.4	648	1,782	62.5	0.1	116	115	0	1	1,980	63.0	0.5
10:00pm	1.000	0.0	1.7	791	1,895	59.4	59.4	816	1,955	59.5	0.1	114	113	0	1	2,152	60.0	0.4
11:00pm	0.649	0.0	1.2	514	1,050	58.0	58.0	530	1,083	58.1	0.1	72	72	0	0	1,196	58.6	0.4
midnight	0.559	0.0	0.8	442	748	58.6	58.6	456	772	58.7	0.1	33	33	0	0	828	59.0	0.3
Leq(24)							61.1			61.3	0.2						61.6	0.3
Ldn							64.5			64.7	0.2						65.0	0.3

TRAFFIC BASED PROPORTIONAL NOISE ANALYSIS MUSEUM OF NATURAL HISTORY SATURDAY

Site:

Location: In Theodore Roosevelt Park between Central Park West and Columbus Ave.

Condition Supplementary Noise Study Analysis with Measured hourly levels and NO TERRACE EVENTS SATURDAY

Hour Ending	Tempora Distrib.	% Medium Truck	% Heavy Truck	1996 Noise Analysis-Existing Conditi: Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Noise Analysis--No Build Conditions: Traffic Volumes	PCEs	Calcul Levels	Noise Change	Noise Analysis-Build Conditions: Project Generated Traffic Volumes: Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.623	0.0	0.2	476	560		59.8	500	588	60.0	0.2	79	79	0	0	681	60.7	0.6
02:00am	0.423	0.0	0.3	323	407		58.4	339	428	58.6	0.2	54	53	0	0	495	59.2	0.6
03:00am	0.347	0.0	0.4	265	349		57.7	278	367	57.9	0.2	44	44	0	0	424	58.5	0.6
04:00am	0.247	0.0	0.5	189	273		56.5	198	286	56.7	0.2	31	31	0	0	332	57.4	0.6
05:00am	0.122	0.0	1.0	93	169		54.4	98	177	54.6	0.2	15	15	0	0	205	55.2	0.6
06:00am	0.127	0.0	1.4	97	211		55.3	102	222	55.5	0.2	16	16	0	0	256	56.2	0.6
07:00am	0.179	0.0	1.8	137	347		57.4	144	365	57.6	0.2	23	22	0	0	422	58.3	0.6
08:00am	0.355	0.0	2.3	271	787		60.9	285	827	61.1	0.2	45	44	0	1	957	61.8	0.6
09:00am	0.512	0.0	2.7	391	1,278		63.0	411	1,342	63.2	0.2	65	63	0	2	1,554	63.8	0.6
10:00am	0.593	0.0	3.1	453	1,646	64.0	64.0	476	1,728	64.2	0.2	75	73	0	2	2,001	64.8	0.6
11:00am	0.861	0.0	3.6	658	2,629	65.1	65.1	691	2,760	65.3	0.2	109	105	0	4	3,196	65.9	0.6
noon	0.841	0.0	4.0	643	2,802	62.1	62.1	675	2,942	62.3	0.2	115	110	0	4	3,415	63.0	0.6
01:00pm	0.916	0.5	4.5	700	3,399	65.1	65.1	735	3,568	65.3	0.2	150	144	1	5	4,166	66.0	0.7
02:00pm	0.995	1.0	9.5	760	6,942	62.3	62.3	798	7,289	62.5	0.2	160	147	1	12	8,474	63.2	0.7
03:00pm	1.000	0.5	6.5	764	4,994	60.5	60.5	802	5,244	60.7	0.2	161	152	1	8	6,105	61.4	0.7
04:00pm	0.958	0.0	12.5	732	8,419	69.0	69.0	769	8,840	69.2	0.2	146	131	0	15	10,260	69.9	0.6
05:00pm	0.879	0.0	11.0	672	6,855	65.1	65.1	705	7,198	65.3	0.2	125	113	0	12	8,347	66.0	0.6
06:00pm	0.827	0.0	9.4	632	5,631	66.3	66.3	664	5,912	66.5	0.2	126	116	0	10	6,866	67.2	0.6
07:00pm	0.871	0.0	7.9	666	5,068	63.9	63.9	699	5,322	54.1	0.2	151	143	0	9	6,202	64.8	0.7
08:00pm	0.819	0.0	6.3	626	3,955	63.1	63.1	657	4,153	63.3	0.2	179	172	0	7	4,883	64.0	0.7
09:00pm	0.840	0.0	4.8	642	3,225	60.8	60.8	674	3,386	61.0	0.2	175	170	0	5	3,990	61.7	0.7
10:00pm	0.779	0.0	3.2	595	2,220	59.7	59.7	625	2,331	59.9	0.2	154	150	0	3	2,753	60.6	0.7
11:00pm	0.728	0.0	1.7	556	1,354	57.8	57.8	584	1,421	58.0	0.2	126	125	0	2	1,680	58.7	0.7
midnight	0.796	0.0	0.2	608	692	60.8	60.8	639	727	61.0	0.2	101	101	0	0	842	61.6	0.6
Leq(24)							62.7			62.9	0.2						63.5	0.7
Ldn							66.4			66.6	0.2						67.2	0.7

TRAFFIC BASED PROPORTIONAL NOISE ANALYSIS MUSEUM OF NATURAL HISTORY

Site:

Location: Predicted at Mid-Rise Level Residences along 81st Street

Conditio Supplementary Noise Study Analysis with Measured hourly levels and 1000-person Terrace Events

Hour Ending	Temporal Distrib.	% Medium Truck	% Heavy Truck	1996 Noise Analysis-Existing Conditions Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Noise Analysis--No Build Condition Traffic Volumes	PCEs	Calcul Levels	Noise Change	Noise Analysis-Build Conditions Project Generated Traffic Volume Total	Autos	MT	HT	Total PCEs	Calcul Levels	Chang
01:00am	0.276	0.0	0.4	246	330		57.6	257	344	57.7	0.2	16	16	0	0	366	58.0	0.3
02:00am	0.178	0.0	0.6	159	243		56.3	166	253	56.5	0.2	11	10	0	0	270	56.7	0.3
03:00am	0.109	0.0	1.0	97	181		55.0	101	189	55.2	0.2	6	6	0	0	201	55.5	0.3
04:00am	0.072	0.0	1.5	65	149		54.2	67	155	54.4	0.2	4	4	0	0	165	54.7	0.3
05:00am	0.076	0.0	1.8	68	171		54.9	71	178	55.0	0.2	5	4	0	0	189	55.3	0.3
06:00am	0.153	0.0	2.0	137	372		58.3	143	387	58.5	0.2	9	9	0	0	411	58.7	0.3
07:00am	0.356	0.3	2.3	319	945		62.4	332	984	62.6	0.2	21	21	0	0	1,047	62.8	0.3
08:00am	0.605	0.6	2.5	541	1,736		65.1	564	1,807	65.2	0.2	36	35	0	1	1,922	65.5	0.3
09:00am	0.786	0.4	2.8	703	2,387		66.5	732	2,485	66.7	0.2	47	45	0	1	2,643	66.9	0.3
10:00am	0.641	0.5	3.0	573	2,071		65.9	597	2,157	66.1	0.2	38	37	0	1	2,294	66.4	0.3
11:00am	0.750	0.4	3.3	671	2,554		66.9	698	2,659	67.0	0.2	44	43	0	1	2,828	67.3	0.3
noon	0.760	0.4	3.5	680	2,730		67.2	708	2,842	67.4	0.2	48	46	0	2	3,026	67.6	0.3
01:00pm	0.708	0.5	3.8	597	2,524		66.9	619	2,616	67.1	0.2	59	57	0	2	2,811	67.4	0.3
02:00pm	0.751	0.5	4.0	633	2,809		67.4	656	2,911	67.6	0.2	64	62	0	2	3,129	67.9	0.3
03:00pm	0.809	0.8	3.5	682	2,764		67.4	707	2,865	67.5	0.2	58	56	0	2	3,069	67.8	0.3
04:00pm	0.890	1.0	3.0	750	2,753	67.4	67.4	778	2,854	67.6	0.2	61	59	1	2	3,055	67.9	0.3
05:00pm	0.797	0.8	4.5	671	3,285	65.7	65.7	696	3,405	65.9	0.2	65	59	4	2	3,714	66.2	0.4
06:00pm	0.765	0.5	2.5	605	1,921	68.2	68.2	624	1,981	68.3	0.1	67	66	0	1	2,147	68.7	0.3
07:00pm	0.818	0.2	1.5	647	1,477	65.1	65.1	667	1,523	65.2	0.1	206	204	0	3	1,960	66.3	1.1
08:00pm	0.838	0.0	2.5	663	2,055	64.3	64.3	684	2,120	64.4	0.1	292	287	0	4	2,767	65.6	1.2
09:00pm	0.795	0.0	2.1	629	1,728	64.3	64.3	648	1,782	64.4	0.1	199	196	0	3	2,231	65.4	1.0
10:00pm	1.000	0.0	1.7	791	1,895	63.2	63.2	816	1,955	63.3	0.1	221	218	0	3	2,427	64.3	0.9
11:00pm	0.649	0.0	1.2	514	1,050	62.5	62.5	530	1,083	62.6	0.1	222	220	0	2	1,514	64.1	1.5
midnight	0.559	0.0	0.8	442	748		61.1	456	772	61.2	0.1	51	51	0	0	846	61.6	0.4
Leq(24)							64.7			64.9	0.2						65.3	0.5
Ldn							68.1			68.3	0.2						68.9	0.6

TRAFFIC BASED PROPORTIONAL NOISE ANALYSIS MUSEUM OF NATURAL HISTORY SATURDAY

Site:
Location: Predicted at Mid-Rise Level Residences along 81st Street
Conditio Supplementary Noise Study Analysis with Measured hourly levels and 1000-person Terrace Events SATURDAY

		%	%	1996 Noise Analysis-Existing Condit				Noise Analysis--No Build Condition				Noise Analysis-Build Conditions						
Hour Ending	Temporal Distrib.	Mediu Truck	Heavy Truck	Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Traffic Volumes	PCEs	Calcul Levels	Noise Change	Project Generated Traffic Volu Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.623	0.0	0.2	476	560		57.9	500	588	58.1	0.2	79	79	0	0	681	58.8	0.6
02:00am	0.423	0.0	0.3	323	407		56.6	339	428	56.8	0.2	54	53	0	0	495	57.4	0.6
03:00am	0.347	0.0	0.4	265	349		55.9	278	367	56.1	0.2	44	44	0	0	424	56.8	0.6
04:00am	0.247	0.0	0.5	189	273		54.9	198	286	55.1	0.2	31	31	0	0	332	55.7	0.6
05:00am	0.122	0.0	1.0	93	169		52.8	98	177	53.0	0.2	15	15	0	0	205	53.7	0.6
06:00am	0.127	0.0	1.4	97	211		53.8	102	222	54.0	0.2	16	16	0	0	256	54.7	0.6
07:00am	0.179	0.0	1.8	137	347		56.0	144	365	56.2	0.2	23	22	0	0	422	56.9	0.6
08:00am	0.355	0.0	2.3	271	787		59.6	285	827	59.8	0.2	45	44	0	1	957	60.4	0.6
09:00am	0.512	0.0	2.7	391	1,278		61.7	411	1,342	61.9	0.2	65	63	0	2	1,554	62.6	0.6
10:00am	0.593	0.0	3.1	453	1,646		62.8	476	1,728	63.1	0.2	75	73	0	2	2,001	63.7	0.6
11:00am	0.861	0.0	3.6	658	2,629	64.9	64.9	691	2,760	65.1	0.2	109	105	0	4	3,196	65.7	0.6
noon	0.841	0.0	4.0	643	2,802	65.0	65.0	675	2,942	65.2	0.2	115	110	0	4	3,415	65.9	0.6
01:00pm	0.916	0.5	4.5	700	3,399	64.4	64.4	735	3,568	64.6	0.2	150	144	1	5	4,166	65.3	0.7
02:00pm	0.995	1.0	9.5	760	6,942	64.7	64.7	798	7,289	64.9	0.2	160	147	1	12	8,474	65.6	0.7
03:00pm	1.000	0.5	6.5	764	4,994	65.4	65.4	802	5,244	65.6	0.2	161	152	1	8	6,105	66.3	0.7
04:00pm	0.958	0.0	12.5	732	8,419	64.6	64.6	769	8,840	64.8	0.2	147	132	0	15	10,261	65.5	0.6
05:00pm	0.879	0.0	11.0	672	6,855	66.6	66.6	705	7,198	66.8	0.2	129	113	4	12	8,411	67.5	0.7
06:00pm	0.827	0.0	9.4	632	5,631	65.3	65.3	664	5,912	65.5	0.2	127	117	0	10	6,867	66.2	0.7
07:00pm	0.871	0.0	7.9	666	5,068	64.9	64.9	699	5,322	65.1	0.2	268	258	0	11	6,487	66.0	0.9
08:00pm	0.819	0.0	6.3	626	3,955	64.3	64.3	657	4,153	64.5	0.2	346	336	0	10	5,302	65.6	1.1
09:00pm	0.840	0.0	4.8	642	3,225	63.9	63.9	674	3,386	64.1	0.2	258	251	0	7	4,241	65.1	1.0
10:00pm	0.779	0.0	3.2	595	2,220	62.8	62.8	625	2,331	63.0	0.2	261	255	0	5	3,028	64.1	1.1
11:00pm	0.728	0.0	1.7	556	1,354	61.7	61.7	584	1,421	61.9	0.2	276	273	0	4	1,998	63.4	1.5
midnight	0.796	0.0	0.2	608	692		58.8	639	727	59.0	0.2	119	119	0	0	860	59.8	0.7
Leq(24)							62.8			63.0	0.2						63.8	0.8
Ldn							66.5			66.7	0.2						67.6	0.9

TRAFFIC BASED PROPORTIONAL NOISE ANALYSIS MUSEUM OF NATURAL HISTORY

Site:

Location: Predicted at Mid-Rise Level Residences along 81st Street

Condition Supplementary Noise Study Analysis with Measured hourly levels NO TERRACE EVENTS

		%	%	1996 Noise Analysis-Existing Con				Noise Analysis--No Build Conditio				Noise Analysis-Build Conditions						
Hour Ending	Tempora Distrib.	Medium Truck	Heavy Truck	Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Traffic Volumes	PCEs	Calcul Levels	Noise Change	Project Generated Traffic Volumes Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.276	0.0	0.4	246	330		57.6	257	344	57.7	0.2	16	16	0	0	366	58.0	0.3
02:00am	0.178	0.0	0.6	159	243		56.3	166	253	56.5	0.2	11	10	0	0	270	56.7	0.3
03:00am	0.109	0.0	1.0	97	181		55.0	101	189	55.2	0.2	6	6	0	0	201	55.5	0.3
04:00am	0.072	0.0	1.5	65	149		54.2	67	155	54.4	0.2	4	4	0	0	165	54.7	0.3
05:00am	0.076	0.0	1.8	68	171		54.9	71	178	55.0	0.2	5	4	0	0	189	55.3	0.3
06:00am	0.153	0.0	2.0	137	372		58.3	143	387	58.5	0.2	9	9	0	0	411	58.7	0.3
07:00am	0.356	0.3	2.3	319	945		62.4	332	984	62.6	0.2	21	21	0	0	1,047	62.8	0.3
08:00am	0.605	0.6	2.5	541	1,736		65.1	564	1,807	65.2	0.2	36	35	0	1	1,922	65.5	0.3
09:00am	0.786	0.4	2.8	703	2,387		66.5	732	2,485	66.7	0.2	47	45	0	1	2,643	66.9	0.3
10:00am	0.641	0.5	3.0	573	2,071		65.9	597	2,157	66.1	0.2	38	37	0	1	2,294	66.4	0.3
11:00am	0.750	0.4	3.3	671	2,554		66.9	698	2,659	67.0	0.2	44	43	0	1	2,828	67.3	0.3
noon	0.760	0.4	3.5	680	2,730		67.2	708	2,842	67.4	0.2	48	46	0	2	3,026	67.6	0.3
01:00pm	0.708	0.5	3.8	597	2,524		66.9	619	2,616	67.1	0.2	59	57	0	2	2,811	67.4	0.3
02:00pm	0.751	0.5	4.0	633	2,809		67.4	656	2,911	67.6	0.2	64	62	0	2	3,129	67.9	0.3
03:00pm	0.809	0.8	3.5	682	2,764		67.4	707	2,865	67.5	0.2	58	56	0	2	3,069	67.8	0.3
04:00pm	0.890	1.0	3.0	750	2,753	67.4	67.4	778	2,854	67.6	0.2	60	58	1	2	3,054	67.9	0.3
05:00pm	0.797	0.8	4.5	671	3,285	65.7	65.7	696	3,405	65.9	0.2	61	59	0	2	3,650	66.2	0.3
06:00pm	0.765	0.5	2.5	605	1,921	68.2	68.2	624	1,981	68.3	0.1	66	65	0	1	2,146	68.7	0.3
07:00pm	0.818	0.2	1.5	647	1,477	65.1	65.1	667	1,523	65.2	0.1	89	89	0	1	1,675	65.6	0.4
08:00pm	0.838	0.0	2.5	663	2,055	64.3	64.3	684	2,120	64.4	0.1	125	123	0	1	2,348	64.9	0.4
09:00pm	0.795	0.0	2.1	629	1,728	64.3	64.3	648	1,782	64.4	0.1	116	115	0	1	1,980	64.9	0.5
10:00pm	1.000	0.0	1.7	791	1,895	63.2	63.2	816	1,955	63.3	0.1	114	113	0	1	2,152	63.8	0.4
11:00pm	0.649	0.0	1.2	514	1,050	62.5	62.5	530	1,083	62.6	0.1	72	72	0	0	1,196	63.1	0.4
midnight	0.559	0.0	0.8	442	748		61.1	456	772	61.2	0.1	33	33	0	0	828	61.5	0.3
Leq(24)							64.7			64.9	0.2						65.2	0.3
Ldn							68.1			68.3	0.2						68.6	0.3

TRAFFIC BASED PROPORTIONAL NOISE ANALYSIS MUSEUM OF NATURAL HISTORY SATURDAY

Site:

Location: Predicted at Mid-Rise Level Residences along 81st Street

Condition Supplementary Noise Study Analysis with Measured hourly levels and NO TERRACE EVENTS SATURDAY

				1996 Noise Analysis-Existing Conditi				Noise Analysis--No Build Conditions				Noise Analysis-Build Conditions						
		%	%									Project Generated Traffic Volumes						
Hour Ending	Tempora Distrib.	Medium Truck	Heavy Truck	Traffic Volumes	PCEs	Measur. Levels	Calcul Levels	Traffic Volumes	PCEs	Calcul Levels	Noise Change	Total	Autos	MT	HT	Total PCEs	Calcul Levels	Change
01:00am	0.623	0.0	0.2	476	560		57.9	500	588	58.1	0.2	79	79	0	0	681	58.8	0.6
02.00am	0.423	0.0	0.3	323	407		56.6	339	428	56.8	0.2	54	53	0	0	495	57.4	0.6
03:00am	0.347	0.0	0.4	265	349		55.9	278	367	56.1	0.2	44	44	0	0	424	56.8	0.6
04:00am	0.247	0.0	0.5	189	273		54.9	198	286	55.1	0.2	31	31	0	0	332	55.7	0.6
05:00am	0.122	0.0	1.0	93	169		52.8	98	177	53.0	0.2	15	15	0	0	205	53.7	0.6
06:00am	0.127	0.0	1.4	97	211		53.8	102	222	54.0	0.2	16	16	0	0	256	54.7	0.6
07:00am	0.179	0.0	1.8	137	347		56.0	144	365	56.2	0.2	23	22	0	0	422	56.9	0.6
08:00am	0.355	0.0	2.3	271	787		59.6	285	827	59.8	0.2	45	44	0	1	957	60.4	0.6
09:00am	0.512	0.0	2.7	391	1,278		61.7	411	1,342	61.9	0.2	65	63	0	2	1,554	62.6	0.6
10:00am	0.593	0.0	3.1	453	1,646		62.8	476	1,728	63.1	0.2	75	73	0	2	2,001	63.7	0.6
11:00am	0.861	0.0	3.6	658	2,629	64.9	64.9	691	2,760	65.1	0.2	109	105	0	4	3,196	65.7	0.6
noon	0.841	0.0	4.0	643	2,802	65.0	65.0	675	2,942	65.2	0.2	115	110	0	4	3,415	65.9	0.6
01:00pm	0.916	0.5	4.5	700	3,399	64.4	64.4	735	3,568	64.6	0.2	150	144	1	5	4,166	65.3	0.7
02:00pm	0.995	1.0	9.5	760	6,942	64.7	64.7	798	7,289	64.9	0.2	160	147	1	12	8,474	65.6	0.7
03.00pm	1.000	0.5	6.5	764	4,994	65.4	65.4	802	5,244	65.6	0.2	161	152	1	8	6,105	66.3	0.7
04:00pm	0.958	0.0	12.5	732	8,419	64.6	64.6	769	8,840	64.8	0.2	146	131	0	15	10,260	65.5	0.6
05:00pm	0.879	0.0	11.0	672	6,855	66.6	66.6	705	7,198	66.8	0.2	125	113	0	12	8,347	67.5	0.6
06:00pm	0.827	0.0	9.4	632	5,631	65.3	65.3	664	5,912	65.5	0.2	126	116	0	10	6,866	66.2	0.6
07:00pm	0.871	0.0	7.9	666	5,068	64.9	64.9	699	5,322	65.1	0.2	151	143	0	9	6,202	65.8	0.7
08:00pm	0.819	0.0	6.3	626	3,955	64.3	64.3	657	4,153	64.5	0.2	179	172	0	7	4,883	65.2	0.7
09:00pm	0.840	0.0	4.8	642	3,225	63.9	63.9	674	3,386	64.1	0.2	175	170	0	5	3,990	64.8	0.7
10:00pm	0.779	0.0	3.2	595	2,220	62.8	62.8	625	2,331	63.0	0.2	154	150	0	3	2,753	63.7	0.7
11:00pm	0.728	0.0	1.7	556	1,354	61.7	61.7	584	1,421	61.9	0.2	126	125	0	2	1,680	62.6	0.7
midnight	0.796	0.0	0.2	608	692		58.8	639	727	59.0	0.2	101	101	0	0	842	59.7	0.6
Leq(24)							62.8			63.0	0.2						63.7	0.7
Ldn							66.5			66.7	0.2						67.3	0.7

ATTACHMENT G.2

FRANCIS DANIEL/Senior Associate

Francis Daniel is currently project manager on a wide spectrum of SMW assignments including the Truman Library, U. S. Capitol Visitors Center, and Music Works, a large recording studio in Kingston, Jamaica.

He has conducted noise surveys and made recommendations for problems ranging from mechanical system noise to heliport impact on residential buildings. He has done reverberation studies for multi-purpose public spaces leading to designs for retrofitting architecturally acceptable absorption as well as sound reinforcement systems. He has received specialized training in computerized traffic noise modelling and projections, applying that skill to projects here and in London.

One of his specialties has been the acoustical design and testing of recording studios for audio, video and film.

Relevant projects include:

- Chinese Information & Cultural Center, New York, NY
- Kuala Lumpur City Centre, Performing Arts Theatre, Malaysia
- BMG Studios, (Bertelsmann Music Division) New York, NY
- Wintergarden Theater, New York, NY
- CNBC, Cable TV Studios
- The Roundabout Theatre, New York, NY
- Manhattan School of Music, New York, NY

His work on these projects has included: noise and vibration surveys; establishing noise criteria; specifying wall, ceiling and floor constructions; control of reverberation, early reflections and diffuse sound field and HVAC acoustic design; advanced time domain acoustical measurements and analysis.

Francis Daniel received a Bachelor's Degree with Honors in Architecture from Harvard College in 1959.

His already well-established interest in sound and music led him immediately after college into the fields of recording and sound reproduction. He designed and developed an innovative and critically acclaimed concert hall ambience extractor for music reproduction while working for Benchmark Acoustics. This device evolved from original experimental work comparing the frequency vs amplitude spectra of live and reproduced music.

He is a longstanding member of: The Acoustical Society of America: The Audio Engineering Society; IEEE; SPARS.

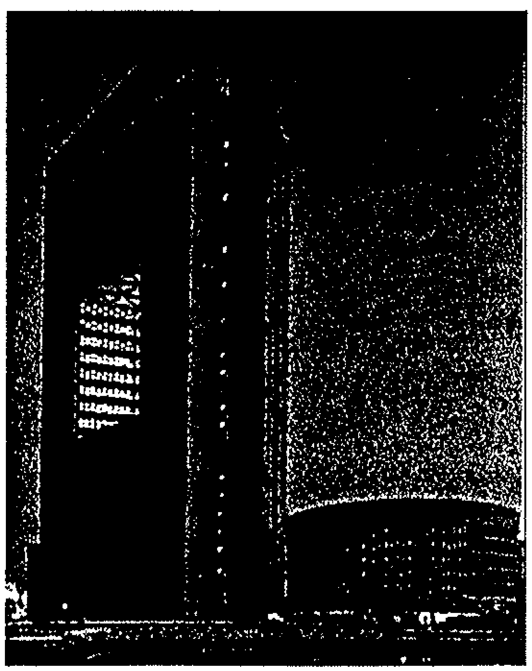
SCOTT MILSOM
Consultant

SCOTT MILSOM, the most recent addition to our acoustic department, comes to Shen Milsom & Wilke from the University of Delaware where he received a Bachelor of Science degree in Mechanical Engineering.

While studying for his degree, Mr. Milsom gained valuable professional experience by completing a variety of internships within the acoustic field. At Mason Berger East, Mr. Milsom worked on the engineering, production and installation of acoustical and vibration control products including spring isolation mounts, floating floors, flexible pipe connectors, and spring hangers. He conducted engineering analysis and design of seismic restraint devices for building mechanical systems in accordance with project specifications as part of his duties at Seismic Design.

In addition to engineering analysis and design, Mr. Milsom has invaluable experience in conducting field testing and sound surveys including the analysis of field data and the preparation of design solutions. While at Parsons Brinkerhoff Quade and Douglass, he assisted in the development of a computerized acoustical modeling program for an acoustical impact study for the Long Island Expressway sound barrier project.

With the recent increase in concern over quality-of-life issues, Shen Milsom & Wilke has found itself involved in the study and analysis of the acoustical impact of mass transit facilities on the urban environment. Conducting acoustic and vibration testing of planes, trains, and automobiles, as well as analysing the data collected and providing solution recommendations, is fast becoming Mr. Milsom's forte.



Shen Milsom &Wilke, Inc

LANCE B. BISCHOFF

Lance B. Bischoff, an engineer of the firm, is experienced in the mathematical modeling of mobile and stationary source noise analyses. Mr. Bischoff is also familiar with CAD-based shadow modeling for shadow studies, Geographical Information System (GIS) studies, and air quality analysis.

Mr. Bischoff has prepared analyses for various Environmental Impact Statements (EISs) for the firm, including:

- The noise analysis for the Orimulsion Conversion of the Consolidated Edison Astoria Power Generating Station EIS, a project that involved complex analyses of both mobile and stationary source noise. Stationary source noise was modeled with a computer-based EUENP model designed for the Empire State Electric Energy Research Corporation, specifically for industrial noise produced by power-generating facilities. Mobile source noise was modeled for both operation and construction of the proposed project.
- The noise analysis for the Tuxedo Park II Development EIS, which involved computer-based modeling of highway traffic noise. Because of the project's location in a rural setting, it was particularly sensitive to any area development.
- The noise analysis for the Lexington Avenue Rezoning EIS. Located on the Upper East Side of Manhattan, the proposed rezoning would allow residential development with ground-level commercial space.
- The noise analysis for the Davids Island EIS, which involved computer-based modeling of highway traffic noise. The proposed project, sponsored by the Trump Organization, calls for the construction of luxury residences on an island off New Rochelle, New York. The currently undeveloped project site is sensitive to the addition of a shuttle ferry, which would be used for transportation to and from the island.
- The noise and shadow analyses for the EIS for the proposed hotel, residential, and commercial development of Site 25 in Battery Park City. Both the noise and shadow analyses examined probable impacts of the three alternative Build scenarios.
- The noise analysis for the EIS for the proposed rebuilding of the Hayden Planetarium and expansion and modernization of New York's Museum of Natural History. One of the proposed additions would be an outdoor terrace, and Mr. Bischoff prepared an analysis of events that could be held on the proposed outdoor terrace and the probable impact associated with them.
- The development of a Corporate Environmental Procedure manual about noise for Consolidated Edison. This work involved researching federal, state, and local noise regulations and developing procedures that guarantee compliance with these regulations.
- The noise and shadow analyses for the EIS for the proposed U.S. Federal Courthouse in Downtown Brooklyn, which involved computer-based modeling of highway noise and CAD-based modeling of buildings and sensitive land uses.
- The noise and air quality analyses for the EIS of Newtown Creek II. The air quality analysis for this project required assessment of project-generated impacts using MOBILE5A, U.S. EPA's latest emissions computer-based modeling software.
- The noise analysis for the Metropolitan Avenue Retail Center EIS, which involved 24-hour noise monitoring, octave band measurements, and design recommendations for a noise barrier to mitigate delivery truck noise problems.

- The GIS analysis for the Catskill-Delaware Water Filtration project. For this project, which concerns the study of proposed water filtration sites along the Catskill and Delaware aqueduct systems—which are New York City's main supply of drinking water—Mr. Bischoff performed GIS work involving geocoding proposed sites, digitizing topographical information, and preparing maps of the aqueduct system for presentations.

Mr. Bischoff is currently preparing noise analyses for the following projects: the proposed new Mets stadium near Shea Stadium, the proposed Hudson concrete recycling plant in the Village of Tarrytown, NY; the College Point Retail Center in Queens, NY; and Rego Park North, also in Queens. He is also working on the Manhattan East Side Alternative project, which is a study of proposed mass-transit alternatives for additional service to Manhattan's East Side. For this project, Mr. Bischoff is preparing extensive databases, linking and geocoding databases from the New York City Transit Authority, New York Metropolitan Transit Council, and 1980 and 1990 Census data.

Another of Mr. Bischoff's areas of expertise is the measurement and documentation of noise problems for private residences. The documentation has been used as legal evidence for intrusive noise problems in several private lawsuits.

His assignments have also included noise analyses for a project investigating a possible summer performance location at the SUNY campus in Westchester, New York for the New York Philharmonic; a Pathmark supermarket in the Bronx, New York; expansion of the Queens Mall in Queens, New York; an Edwards supermarket in North White Plains, New York; and a concrete recycling plant in Bridgeport, Connecticut.

Mr. Bischoff is proficient in numerous software applications for the Windows and DOS operating systems, including Quattro Pro, MS Excel, Microstation CAD, MS Project, MS Power Point, Monarch, Paradox, Atlas GIS, Maptitude GIS, MATLAB, and various word processors. He is experienced with numerous noise models used for highway, aircraft, and stationary noise modeling, including STAMINA 2.0, INM 5.0, and EUENP 2.0. He also has extensive knowledge of testing equipment and measurement procedures, and is responsible for most noise monitoring associated with preparation of the firm's EISs.

Before joining Allee King Rosen & Fleming, Mr. Bischoff was a senior engineer in the active muffler division at Walker Noise Cancellation Technologies. His responsibilities included development of active mufflers for both industrial and automotive applications, development of electronic hardware and software algorithms used to drive active mufflers, and management of cooperative education engineering students. Mr. Bischoff assisted in the design of an anechoic dynamometer testing facility, helped in the redesign of loudspeakers and other electronic components used in the active muffler business, assisted in packaging issues, built customized electronics and testing apparatuses, and managed research studies for active noise control technology. His expertise included computer skills, digital signal processing, transducer design, control theory, and standardization of measurement procedures.

Previously, Mr. Bischoff worked for AMI Research, an Analysis and Technology company. His responsibilities included developing complex testing software, maintaining a local area computer network, assisting in overside acoustical and vibrational testing of a submersible submarine section, and supporting the Navy's 350T group, responsible for acoustical development of the Seawolf submarine.

Education

University of Hartford, B.S., Electrical Engineering, 1988; Pennsylvania State University, M.S., Acoustics, 1991.

Publications, Patents, and Presentations

"Multichannel Active Vibration Control of a Mounted Plate,"presented at Pennsylvania State University Graduate Program in Acoustics as a M.S. thesis defense, November 7, 1990.

"In-Pipe Microphone for use in Active Mufflers," with Timothy Meeks. Submitted to U.S. Patent Office by Noise Cancellation Technologies, Inc., March 1994.

Professional Status and Memberships

Member of the Institute of Noise Control Engineers
Secret Level Security Clearance, United States Government
Engineer-in-Training Status, State of Connecticut.

Years of Experience

With Allee King Rosen & Fleming: 1. With other firms: 4½.

APPENDIX H*

TRAFFIC ANALYSES FOR MITIGATION OPTIONS

* *This appendix is new to the FEIS.*

Table H-1

Signalized Intersections:

2001 No Build, Build with Alternative Garage Access Option 1, and Mitigation for Option 1 - Level of Service Analyses

Intersection	Midday Peak Hour: No Build								Build with Alternative Garage Access Option 1								Mitigation for Option 1								Mitigation Measures Applied for Option 1
	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	
Central Park West & West 72nd Street																									
Eastbound	DfL	1.11	113.8	F	43.0	E	25.9	D	DfL	1.11	113.8	F	43.0	E	27.8	D	DfL								
	TR	0.45	14.8	B					TR	0.45	14.8	B					TR								
Westbound	LTR	0.63	16.9	C	16.9	C			LTR	0.63	16.9	C	16.9	C			LTR								
Northbound	LTR	0.90	16.9	C	16.9	C			LTR	0.93	19.2	C	19.2	C			LTR								
Southbound	LTR	0.98	27.2	D	27.2	D			LTR	1.00	31.8	D	31.8	D			LTR								
Central Park West & West 76th Street																									
Eastbound	LTR	0.16	14.6	B	14.6	B	7.5	B	LTR	0.16	14.6	B	14.6	B	7.5	B	LTR								
Northbound	T	0.57	6.5	B	6.5	B			T	0.58	6.5	B	6.5	B			T								
Southbound	T	0.69	7.5	B	7.5	B			T	0.69	7.5	B	7.5	B			T								
Central Park West & West 77th Street																									Signal Retiming: Subtract 2 Seconds Green Time EB/WB and Add 2 Seconds Green Time NB/SB.
Eastbound	LTR	0.29	14.9	B	14.9	B	16.1	C	LTR	0.29	14.9	B	14.9	B	19.3	C	LTR	0.31	16.0	C	16.0	C	13.7	B	
Northbound	LT	1.01	25.0	C	25.0	C			LT	1.05	32.3	D *	32.3	D			LT	1.00	20.8	C	20.8	C			
Southbound	TR	0.72	8.5	B	8.5	B			TR	0.73	8.6	B	8.6	B			TR	0.70	7.2	B	7.2	B			
Central Park West & West 81st Street																									Multiple Changes: Create NB/SB Left-Turn Lanes; Add a Protected Leading Left-Turn Phase to the Traffic Signal, NB/SB; Prohibit Parking on the NB/SB Approaches During Weekday & Saturday Peak Hours; and Re-Stripe the WB Approach with an Exclusive Left-Turn, & Shared Left/Thru & Thru/Right Lanes.
Eastbound	LTR	0.32	15.6	C	15.6	C	24.9	C	LTR	0.34	15.7	C	15.7	C	29.4	D	LTR	0.31	13.6	B	13.6	B	15.1	C	
Westbound	DfL	1.12	107.5	F	50.3	E			DfL	1.18	138.8	F *	61.0	F			L	0.47	15.1	C	16.0	C			
	TR	0.69	19.8	C					TR	0.71	20.1	C					LTR	0.61	16.5	C					
Northbound	LTR	0.84	11.2	B	11.2	B			LTR	0.89	13.4	B	13.4	B			L	0.29	8.9	B	16.0	C			
																	TR	0.75	16.6	C					
Southbound	LTR	0.83	11.4	B	11.4	B			LTR	0.85	12.3	B	12.3	B			L	0.47	10.7	B	13.3	B			
																	TR	0.54	13.7	B					
Central Park West & West 82nd Street																									
Eastbound	LTR	0.48	17.5	C	17.5	C	7.0	B	LTR	0.48	17.5	C	17.5	C	7.0	B	LTR								
Northbound	T	0.55	6.3	B	6.3	B			T	0.55	6.3	B	6.3	B			T								
Southbound	T	0.44	5.7	B	5.7	B			T	0.45	5.7	B	5.7	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	0.80	27.4	D	27.4	D	19.6	C	LTR	0.81	27.6	D	27.6	D	20.1	C	LTR								
Westbound	LTR	0.72	18.0	C	18.0	C			LTR	0.73	18.0	C	18.0	C			LTR								
Northbound	LTR	0.92	18.6	C	18.6	C			LTR	0.93	19.7	C	19.7	C			LTR								
Southbound	LTR	0.87	16.2	C	16.2	C			LTR	0.88	16.9	C	16.9	C			LTR								
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.48	15.1	C	15.1	C	11.4	B	TR	0.48	15.1	C	15.1	C	11.4	B	TR								
Westbound	DfL	0.67	21.6	C	15.9	C			DfL	0.67	21.6	C	15.9	C			DfL								
	T	0.26	13.3	B					T	0.27	13.3	B					T								
Southbound	LTR	0.69	9.3	B	9.3	B			LTR	0.69	9.4	B	9.4	B			LTR								
Columbus Avenue & West 76th Street																									
Eastbound	TR	0.55	18.9	C	18.9	C	9.0	B	TR	0.55	18.9	C	18.9	C	9.1	B	TR								
Southbound	LT	0.79	7.9	B	7.9	B			LT	0.80	8.1	B	8.1	B			LT								
Columbus Avenue & West 77th Street																									
Westbound	LT	0.29	15.9	C	15.9	C	9.4	B	LT	0.30	16.0	C	16.0	C	9.6	B	LT								
Southbound	LTR	0.82	8.6	B	8.6	B			LTR	0.83	8.8	B	8.8	B			LTR								
Columbus Avenue & West 78th Street																									
Eastbound	R	0.21	15.4	C	15.4	C	6.2	B	R	0.22	15.4	C	15.4	C	6.3	B	R								
Southbound	T	0.56	5.7	B	5.7	B			T	0.56	5.8	B	5.8	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.24	17.5	C	17.5	C	7.8	B	R	0.24	17.6	C	17.6	C	8.1	B	R								
Southbound	TR	0.83	6.6	B	6.6	B			TR	0.85	6.9	B	6.9	B			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.29	15.9	C	15.9	C	5.9	B	R	0.30	16.0	C	16.0	C	5.9	B	R								
Southbound	T	0.43	5.1	B	5.1	B			T	0.44	5.1	B	5.1	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	0.81	34.6	D	34.6	D	18.7	C	TR	0.83	36.3	D	36.3	D	19.0	C	TR								
Westbound	L	0.54	23.1	C	23.1	C			L	0.56	23.3	C	23.3	C			L								
Southbound	LT	0.69	15.1	C	15.1	C			LT	0.69	15.1	C	15.1	C			LT								
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.48	17.8	C	17.8	C	6.7	B	TR	0.48	17.8	C	17.8	C	6.7	B	TR								
Southbound	LT	0.47	5.3	B	5.3	B			LT	0.47	5.3	B	5.3	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.38	14.1	B	14.1	B	12.6	B	TR	0.38	14.1	B	14.1	B	12.6	B	TR								
Westbound	LT	0.61	16.3	C	16.3	C			LT	0.61	16.3	C	16.3	C			LT								
Southbound	LTR	0.72	9.7	B	9.7	B			LTR	0.72	9.8	B	9.8	B			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.66	21.1	C	17.4	C	10.5	B	DfL	0.69	22.9	C	18.3	C	10.7	B	DfL								
	T	0.27	13.4	B					T	0.27	13.4	B					T								
Westbound	TR	0.31	13.6	B	13.6	B			TR	0.32	13.7	B	13.7	B			TR								
Northbound	LTR	0.53	8.0	B	8.0	B			LTR	0.53	8.0	B	8.0	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.43	17.1	C	17.1	C	6.7	B	LT	0.45	17.3	C	17.3	C	6.8	B	LT								
Northbound	TR	0.45	5.2	B	5.2	B			TR	0.46	5.2	B	5.2	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.50	5.5	B	5.5	B	5.5	B	LTR	0.51	5.5	B	5.5	B	5.5	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.

Table H-2
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Option 1, and Mitigation for Option 1 - Level of Service Analyses

	PM Peak Hour																								
	No Build								Build with Alternative Garage Access Option 1								Mitigation for Option 1								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied for Option 1
Central Park West & West 72nd Street																									
Eastbound	DfL	0.90	47.6	E	25.1	D	31.0	D	DfL	0.90	47.6	E	25.1	D	34.7	D	DfL	0.90	47.6	E	25.1	D	12.7	B	Parking Restriction:
	TR	0.43	16.5	C					TR	0.43	16.5	C					TR	0.43	16.5	C					Prohibit Parking at the NB Approach
Westbound	LTR	0.54	17.7	C	17.7	C			LTR	0.54	17.7	C	17.7	C			LTR	0.54	17.7	C	17.7	C			During the PM Peak Hour.
Northbound	LTR	1.08	53.6	E	53.6	E			LTR	1.10	62.7	F*	62.7	F			LTR	0.65	7.0	B	7.0	B			
Southbound	LTR	0.73	8.6	B	8.6	B			LTR	0.74	8.8	B	8.8	B			LTR	0.75	8.9	B	8.9	B			
Central Park West & West 76th Street																									
Eastbound	LTR	0.14	14.4	B	14.4	B	7.0	B	LTR	0.14	14.5	B	14.5	B	7.0	B	LTR								
Northbound	T	0.65	7.1	B	7.1	B			T	0.66	7.2	B	7.2	B			T								
Southbound	T	0.45	5.7	B	5.7	B			T	0.46	5.7	B	5.7	B	7.0	B	T								
Central Park West & West 77th Street																									
Eastbound	LTR	0.28	14.8	B	14.8	B	34.0	D	LTR	0.28	14.8	B	14.8	B	42.0	E	LTR	0.30	15.9	C	15.9	C	30.0	D	Signal Retiming:
Northbound	LTR	1.12	52.7	E	52.7	E			LTR	1.16	67.6	F*	67.6	F			LTR	1.11	46.6	E	46.6	E			Add 2 Seconds Green Time NB/SB &
Southbound	LTR	0.87	13.8	B	13.8	B			LTR	0.88	14.5	B	14.5	B			LTR	0.85	11.4	B	11.4	B			Subtract 2 Seconds Green Time EB/WB.
Central Park West & West 81st Street																									Multiple Changes:
Eastbound	LTR	0.40	16.2	C	16.2	C	44.1	E	LTR	0.42	16.3	C	16.3	C	60.3	F	LTR	0.42	15.9	C	15.9	C	18.3	C	Create NB/SB Left-Turn Lanes; Add a Pro-
Westbound	DfL	1.13	124.4	F	57.3	E			DfL	1.21	170.4	F*	74.5	F			L	0.97	68.5	F	32.3	D			tected Leading Left-Turn Phase to the Traf-
	TR	0.40	16.2	C					TR	0.41	16.3	C					LTR	0.76	22.2	C					fic Signal, NB/SB; Prohibit Parking on the
Northbound	LTR	0.94	17.8	C	17.8	C			LTR	0.99	25.9	D*	25.9	D			L	0.31	7.6	B	13.8	B			NB/SB Approaches During Weekday & Sat-
																	TR	0.74	14.4	B					urday Peak Hours; and Re-Stripe the WB
Southbound	DfL	1.54	349.5	F	88.7	F			DfL	1.66	504.7	F*	126.4	F			L	0.83	25.4	D	14.3	B			Approach with an Exclusive Left-Turn, &
	TR	0.76	9.7	B					TR	0.76	10.0	B					TR	0.41	11.0	B					Shared Left/Thru & Thru/Right Lanes.
Central Park West & West 82nd Street																									
Eastbound	LTR	0.52	18.3	C	18.3	C	7.1	B	LTR	0.53	18.3	C	18.3	C	7.1	B	LTR								
Northbound	T	0.53	6.2	B	6.2	B			T	0.54	6.2	B	6.2	B			T								
Southbound	T	0.38	5.4	B	5.4	B			T	0.39	5.4	B	5.4	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	1.03	56.4	E	56.4	E	83.1	F	LTR	1.05	61.5	F*	61.5	F	85.5	F	LTR	1.00	48.5	E	48.5	E	35.2	D	Multiple Changes:
Westbound	LTR	0.63	16.5	C	16.5	C			LTR	0.63	16.5	C	16.5	C			LTR	0.63	16.5	C	16.5	C			Add 1 Second Green Time to EB/WB Phase,
Northbound	LTR	1.08	54.6	E	54.6	E			LTR	1.09	60.1	F*	60.1	F			LTR	0.63	9.0	B	9.0	B			Subtract 1 Second Green Time from WB
Southbound	DfL	1.88	1103.6	F	267.6	F			DfL	1.88	1103.6	F	265.7	F			DfL	1.47	324.7	F	85.1	F			Leading Phase, & Prohibit Parking at the
	TR	0.77	12.6	B					TR	0.78	12.8	B					TR	0.78	12.8	B					NB Approach.
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.61	16.7	C	16.7	C	12.5	B	TR	0.61	16.7	C	16.7	C	12.6	B	TR								
Westbound	DfL	0.54	18.1	C	14.4	B			DfL	0.54	18.1	C	14.4	B			DfL								
	T	0.26	13.3	B					T	0.26	13.3	B					T								
Southbound	LTR	0.82	11.0	B	11.0	B			LTR	0.82	11.2	B	11.2	B			LTR								
Columbus Avenue & West 76th Street																									
Eastbound	TR	0.45	17.5	C	17.5	C	8.6	B	TR	0.45	17.5	C	17.5	C	8.7	B	TR								
Southbound	LT	0.78	7.8	B	7.8	B			LT	0.78	7.9	B	7.9	B			LT								
Columbus Avenue & West 77th Street																									
Westbound	LT	0.24	15.5	C	15.5	C	9.5	B	LT	0.25	15.6	C	15.6	C	9.7	B	LT								
Southbound	LTR	0.84	8.9	B	8.9	B			LTR	0.84	9.1	B	9.1	B			LTR								
Columbus Avenue & West 78th Street																									
Eastbound	R	0.31	16.1	C	16.1	C	6.6	B	R	0.31	16.1	C	16.1	C	6.6	B	R								
Southbound	T	0.57	5.8	B	5.8	B			T	0.58	5.9	B	5.9	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.29	17.8	C	17.8	C	7.3	B	R	0.29	17.9	C	17.9	C	7.5	B	R								
Southbound	TR	0.77	5.6	B	5.6	B			TR	0.78	5.8	B	5.8	B			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.19	15.3	C	15.3	C	5.7	B	R	0.20	15.3	C	15.3	C	5.7	B	R								
Southbound	T	0.45	5.2	B	5.2	B			T	0.46	5.2	B	5.2	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	1.07	88.8	F	88.8	F	26.7	D	TR	1.11	104.4	F*	104.4	F	29.2	D	TR	1.06	83.0	F	83.0	F	26.8	D	Signal Retiming:
Westbound	L	0.41	21.9	C	21.9	C			L	0.43	22.1	C	22.1	C			L	0.43	22.1	C	22.1	C			Add 1 Second Green Time EB & Subtract
Southbound	LT	0.74	15.7	C	15.7	C			LT	0.74	15.7	C	15.7	C			LT	0.76	16.7	C	16.7	C			1 Second Green Time SB.
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.40	16.9	C	16.9	C	6.6	B	TR	0.40	16.9	C	16.9	C	6.6	B	TR								
Southbound	LT	0.53	5.6	B	5.6	B			LT	0.53	5.6	B	5.6	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.65	16.8	C	16.8	C	17.4	C	TR	0.66	16.9	C	16.9	C	17.5	C	TR								
Westbound	DfL	1.04	82.9	F	30.2	D			DfL	1.05	84.7	F	30.6	D			DfL								
	T	0.60	16.3	C					T	0.60	16.3	C					T								
Southbound	LTR	0.72	9.8	B	9.8	B			LTR	0.73	9.9	B	9.9	B			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.55	16.9	C	15.4	C	9.9	B	DfL	0.57	17.4	C	15.7	C	10.0	B	DfL								
	T	0.36	14.1	B					T	0.36	14.1	B					T								
Westbound	TR	0.21	13.0	B	13.0	B			TR	0.22	13.1	B	13.1	B			TR								
Northbound	LTR	0.62	8.6	B	8.6	B			LTR	0.62	8.6	B	8.6	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.56	19.2	C	19.2	C	6.8	B	LT	0.57	19.4	C	19.4	C	6.8	B	LT								
Northbound	TR	0.53	5.6	B	5.6	B			TR	0.54	5.6	B	5.6	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.62	6.1	B	6.1	B	6.1	B	LTR	0.63	6.2	B	6.2	B	6.2	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.

Table H-3
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Option 1, and Mitigation for Option 1 - Level of Service Analyses

	Saturday Peak Hour																								
	No Build								Build with Alternative Garage Access Option 1								Mitigation for Option 1								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied for Option 1
Central Park West & West 72nd Street																									Signal Retiming: Subtract 3 Seconds Green Time EB/WB and Add 3 Seconds Green Time NB/SB.
Eastbound	LTR	0.28	13.4	B	13.4	B	17.3	C	LTR	0.28	13.4	B	13.4	B	22.1	C	LTR	0.31	15.0	B	15.0	B	16.2	C	
Northbound	LT	1.00	26.8	D	26.8	D			LT	1.05	39.0	D*	39.0	D			LT	0.98	26.7	D	26.7	D			
Southbound	TR	0.78	11.3	B	11.3	B			TR	0.80	11.5	B	11.5	B			TR	0.75	8.9	B	8.9	B			
Central Park West & West 76th Street																									
Eastbound	LTR	0.19	14.7	B	14.7	B	7.0	B	LTR	0.19	14.7	B	14.7	B	7.1	B	LTR								
Northbound	T	0.51	6.1	B	6.1	B			T	0.54	6.2	B	6.2	B			T								
Southbound	T	0.59	6.6	B	6.6	B			T	0.60	6.7	B	6.7	B			T								
Central Park West & West 77th Street																									Signal Retiming: Subtract 3 Seconds Green Time EB/WB and Add 3 Seconds Green Time NB/SB.
Eastbound	LTR	0.23	14.5	B	14.5	B	14.5	B	LTR	0.23	14.5	B	14.5	B	19.5	C	LTR	0.25	16.1	C	16.1	C	15.0	B	
Northbound	LT	0.99	21.6	C	21.6	C			LT	1.05	32.7	D*	32.7	D			LT	0.98	24.3	C	24.3	C			
Southbound	TR	0.70	8.2	B	8.2	B			TR	0.72	8.4	B	8.4	B			TR	0.68	6.4	B	6.4	B			
Central Park West & West 81st Street																									Multiple Changes: Create NB/SB Left-Turn Lanes; Add a Protected Leading Left-Turn Phase to the Traffic Signal, NB/SB; Prohibit Parking on the NB/SB Approaches During Weekday & Saturday Peak Hours; and Re-Stripe the WB Approach with an Exclusive Left-Turn, & Shared Left/Thru & Thru/Right Lanes.
Eastbound	LTR	0.53	17.4	C	17.4	C	56.0	E	LTR	0.62	18.4	C	18.4	C	67.0	F	LTR	0.63	18.6	C	18.6	C	24.0	C	
Westbound	DfL	1.08	97.9	F	47.1	E			DfL	1.10	109.2	F	50.2	E			L	1.02	75.9	F	38.0	D			
	TR	0.37	16.0	C					TR	0.40	16.2	C					LTR	0.40	16.2	C					
Northbound	LTR	1.14	83.2	F	83.2	F			LTR	1.26	108.9	F*	108.9	F			L	0.43	9.4	B	17.7	C			
																	TR	0.84	18.9	C					
Southbound	DfL	1.13	108.0	F	53.5	E			DfL	1.16	124.5	F*	62.5	F			L	0.95	45.3	E	23.3	C			
	TR	1.02	34.9	D					TR	1.04	41.0	E*					TR	0.73	16.1	C					
Central Park West & West 82nd Street																									
Eastbound	LTR	0.50	17.6	C	17.6	C	6.9	B	LTR	0.50	17.7	C	17.7	C	7.0	B	LTR								
Northbound	T	0.28	5.0	A	5.0	A			T	0.29	5.0	A	5.0	A			T								
Southbound	T	0.53	6.1	B	6.1	B			T	0.54	6.2	B	6.2	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	0.69	24.1	C	24.1	C	16.7	C	LTR	0.70	24.3	C	24.3	C	17.3	C	LTR								
Westbound	LTR	0.60	16.2	C	16.2	C			LTR	0.61	16.3	C	16.3	C			LTR								
Northbound	LTR	0.87	16.3	C	16.3	C			LTR	0.90	18.0	C	18.0	C			LTR								
Southbound	LTR	0.76	11.4	B	11.4	B			LTR	0.78	11.9	B	11.9	B			LTR								
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.42	14.5	B	14.5	B	14.5	B	TR	0.42	14.5	B	14.5	B	15.2	C	TR								
Westbound	DfL	0.29	13.7	B	13.0	B			DfL	0.29	13.7	B	13.0	B			DfL								
	T	0.18	12.8	B					T	0.19	12.8	B					T								
Southbound	LTR	0.93	14.6	B	14.6	B			LTR	0.94	15.6	C	15.6	C			LTR								
Columbus Avenue & West 76th Street																									Signal Retiming: Add 1 Second Green Time SB & Subtract 1 Second Green Time EB.
Eastbound	TR	0.49	18.0	C	18.0	C	29.9	D	TR	0.49	18.0	C	18.0	C	36.0	D	TR	0.51	18.8	C	18.8	C	29.0	D	
Southbound	LT	1.04	30.7	D	30.7	D			LT	1.06	37.3	D*	37.3	D			LT	1.04	29.8	D	29.8	D			
Columbus Avenue & West 77th Street																									Signal Retiming: Add 1 Second Green Time SB & Subtract 1 Second Green Time WB.
Westbound	LT	0.30	15.9	C	15.9	C	21.3	C	LT	0.31	16.0	C	16.0	C	26.6	D	LT	0.32	16.6	C	16.6	C	21.1	C	
Southbound	LTR	1.00	21.8	C	21.8	C			LTR	1.03	27.2	D*	27.2	D			LTR	1.01	21.6	C	21.6	C			
Columbus Avenue & West 78th Street																									
Eastbound	R	0.25	15.6	C	15.6	C	8.5	B	R	0.25	15.7	C	15.7	C	8.8	B	R								
Southbound	T	0.82	8.2	B	8.2	B			T	0.84	8.5	B	8.5	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.25	17.6	C	17.6	C	13.8	B	R	0.25	17.6	C	17.6	C	20.0	C	R								
Southbound	TR	0.97	13.4	B	13.4	B			TR	1.01	20.2	C	20.2	C			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.30	16.0	C	16.0	C	6.2	B	R	0.38	16.7	C	16.7	C	6.4	B	R								
Southbound	T	0.53	5.6	B	5.6	B			T	0.54	5.6	B	5.6	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	1.07	88.7	F	88.7	F	32.4	D	TR	1.03	75.4	F	75.4	F	31.3	D	TR								
Westbound	L	0.61	23.9	C	23.9	C			L	0.63	24.3	C	24.3	C			L								
Southbound	LT	0.98	26.0	D	26.0	D			LT	0.99	26.8	D	26.8	D			LT								
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.36	16.5	C	16.5	C	7.3	B	TR	0.36	16.5	C	16.5	C	7.4	B	TR								
Southbound	LT	0.69	6.7	B	6.7	B			LT	0.70	6.7	B	6.7	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.41	14.4	B	14.4	B	21.3	C	TR	0.42	14.4	B	14.4	B	22.3	C	TR								
Westbound	LT	0.54	15.5	C	15.5	C			LT	0.55	15.6	C	15.6	C			LT								
Southbound	LTR	1.01	25.8	D	25.8	D			LTR	1.01	27.4	D	27.4	D			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.42	15.0	B	14.1	B	9.8	B	DfL	0.52	16.6	C	15.0	B	10.0	B	DfL								
	T	0.25	13.3	B					T	0.25	13.3	B					T								
Westbound	TR	0.24	13.2	B	13.2	B			TR	0.27	13.4	B	13.4	B			TR								
Northbound	LTR	0.54	8.1	B	8.1	B			LTR	0.56	8.2	B	8.2	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.62	20.2	C	20.2	C	7.4	B	LT	0.67	21.5	C	21.5	C	7.7	B	LT								
Northbound	TR	0.478	5.3	B	5.3	B			TR	0.50	5.5	B	5.5	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.536	5.6	B	5.6	B	5.6	B	LTR	0.55	5.7	B	5.7	B	5.7	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.

Table H-4
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Option 2, and Mitigation for Option 2 - Level of Service Analyses

Midday Peak Hour

Intersection	No Build								Build with Alternative Garage Access Option 2								Mitigation for Option 2								Mitigation Measures Applied for Option 2
	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	
Central Park West & West 72nd Street																									
Eastbound	DfL	1.11	113.8	F	43.0	E	25.9	D	DfL	1.11	113.8	F	43.0	E	27.8	D	DfL								
	TR	0.45	14.8	B					TR	0.45	14.8	B					TR								
Westbound	LTR	0.63	16.9	C	16.9	C			LTR	0.63	16.9	C	16.9	C			LTR								
Northbound	LTR	0.90	16.9	C	16.9	C			LTR	0.93	19.2	C	19.2	C			LTR								
Southbound	LTR	0.98	27.2	D	27.2	D			LTR	1.00	31.8	D	31.8	D			LTR								
Central Park West & West 76th Street																									
Eastbound	LTR	0.16	14.6	B	14.6	B	7.5	B	LTR	0.16	14.6	B	14.6	B	7.5	B	LTR								
Northbound	T	0.57	6.5	B	6.5	B			T	0.58	6.5	B	6.5	B			T								
Southbound	T	0.69	7.5	B	7.5	B			T	0.69	7.5	B	7.5	B			T								
Central Park West & West 77th Street																									Signal Retiming:
Eastbound	LTR	0.29	14.9	B	14.9	B	16.1	C	LTR	0.29	14.9	B	14.9	B	19.3	C	LTR	0.31	16.0	C	16.0	C	13.7	B	Subtract 2 Seconds Green Time EB/WB and Add 2 Seconds Green Time NB/SB.
Northbound	LT	1.01	25.0	C	25.0	C			LT	1.05	32.3	D*	32.3	D			LT	1.00	20.8	C	20.8	C			
Southbound	TR	0.72	8.5	B	8.5	B			TR	0.73	8.6	B	8.6	B			TR	0.70	7.2	B	7.2	B			
Central Park West & West 81st Street																									Multiple Changes:
Eastbound	LTR	0.32	15.6	C	15.6	C	24.9	C	LTR	0.34	15.7	C	15.7	C	29.4	D	LTR	0.32	13.7	B	13.7	B	17.6	C	Create NB/SB Left-Turn Lanes; Add a Protected Leading Left-Turn Phase to the Traffic Signal, NB/SB; Prohibit Parking on the NB/SB Approaches During Weekday & Saturday Peak Hours; and Re-Stripe the WB Approach with an Exclusive Left-Turn, & Shared Left/Thru & Thru/Right Lanes.
Westbound	DfL	1.12	107.5	F	50.3	E			DfL	1.18	138.8	F*	61.0	F			L	0.92	44.6	E	23.7	C			
	TR	0.69	19.8	C					TR	0.71	20.1	C					LTR	0.70	18.0	C					
Northbound	LTR	0.84	11.2	B	11.2	B			LTR	0.89	13.4	B	13.4	B			L	0.29	8.9	B	16.0	C			
																	TR	0.75	16.6	C					
Southbound	LTR	0.83	11.4	B	11.4	B			LTR	0.85	12.3	B	12.3	B			L	0.47	10.7	B	13.3	B			
																	TR	0.54	13.7	B					
Central Park West & West 82nd Street																									
Eastbound	LTR	0.48	17.5	C	17.5	C	7.0	B	LTR	0.48	17.5	C	17.5	C	7.0	B	LTR								
Northbound	T	0.55	6.3	B	6.3	B			T	0.55	6.3	B	6.3	B			T								
Southbound	T	0.44	5.7	B	5.7	B			T	0.45	5.7	B	5.7	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	0.80	27.4	D	27.4	D	19.6	C	LTR	0.81	27.6	D	27.6	D	20.1	C	LTR								
Westbound	LTR	0.72	18.0	C	18.0	C			LTR	0.73	18.0	C	18.0	C			LTR								
Northbound	LTR	0.92	18.6	C	18.6	C			LTR	0.93	19.7	C	19.7	C			LTR								
Southbound	LTR	0.87	16.2	C	16.2	C			LTR	0.88	16.9	C	16.9	C			LTR								
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.48	15.1	C	15.1	C	11.4	B	TR	0.48	15.1	C	15.1	C	11.4	B	TR								
Westbound	DfL	0.67	21.6	C	15.9	C			DfL	0.67	21.6	C	15.9	C			DfL								
	T	0.26	13.3	B					T	0.27	13.3	B					T								
Southbound	LTR	0.69	9.3	B	9.3	B			LTR	0.69	9.4	B	9.4	B			LTR								
Columbus Avenue & West 76th Street																									
Eastbound	TR	0.55	18.9	C	18.9	C	9.0	B	TR	0.55	18.9	C	18.9	C	9.1	B	TR								
Southbound	LT	0.79	7.9	B	7.9	B			LT	0.80	8.1	B	8.1	B			LT								
Columbus Avenue & West 77th Street																									
Westbound	LT	0.29	15.9	C	15.9	C	9.4	B	LT	0.30	16.0	C	16.0	C	9.6	B	LT								
Southbound	LTR	0.82	8.6	B	8.6	B			LTR	0.83	8.8	B	8.8	B			LTR								
Columbus Avenue & West 78th Street																									
Eastbound	R	0.21	15.4	C	15.4	C	6.2	B	R	0.22	15.4	C	15.4	C	6.3	B	R								
Southbound	T	0.56	5.7	B	5.7	B			T	0.56	5.8	B	5.8	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.24	17.5	C	17.5	C	7.8	B	TR	0.24	17.6	C	17.6	C	8.1	B	R								
Westbound	This Movement Does Not Occur For No Build Conditions								LT	0.02	16.3	C	16.3	C			LT								
Southbound	TR	0.83	6.6	B	6.6	B			LTR	0.84	6.8	B	6.8	B			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.29	15.9	C	15.9	C	5.9	B	R	0.29	15.9	C	15.9	C	5.9	B	R								
Southbound	T	0.43	5.1	B	5.1	B			T	0.44	5.1	B	5.1	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	0.81	34.6	D	34.6	D	18.7	C	TR	0.83	36.3	D	36.3	D	19.0	C	TR								
Westbound	L	0.54	23.1	C	23.1	C			L	0.56	23.3	C	23.3	C			L								
Southbound	LT	0.69	15.1	C	15.1	C			LT	0.69	15.1	C	15.1	C			LT								
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.48	17.8	C	17.8	C	6.7	B	TR	0.48	17.8	C	17.8	C	6.7	B	TR								
Southbound	LT	0.47	5.3	B	5.3	B			LT	0.47	5.3	B	5.3	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.38	14.1	B	14.1	B	12.6	B	TR	0.38	14.1	B	14.1	B	12.6	B	TR								
Westbound	LT	0.61	16.3	C	16.3	C			LT	0.61	16.3	C	16.3	C			LT								
Southbound	LTR	0.72	9.7	B	9.7	B			LTR	0.72	9.8	B	9.8	B			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.66	21.1	C	17.4	C	10.5	B	DfL	0.69	22.4	C	18.0	C	10.6	B	DfL								
	T	0.27	13.4	B					T	0.28	13.5	B					T								
Westbound	TR	0.31	13.6	B	13.6	B			TR	0.32	13.7	B	13.7	B			TR								
Northbound	LTR	0.53	8.0	B	8.0	B			LTR	0.53	8.0	B	8.0	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.43	17.1	C	17.1	C	6.7	B	LT	0.44	17.2	C	17.2	C	6.8	B	LT								
Northbound	TR	0.45	5.2	B	5.2	B			TR	0.45	5.2	B	5.2	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.50	5.5	B	5.5	B	5.5	B	LTR	0.51	5.5	B	5.5	B	5.5	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual.*

Table H-5
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Option 2, and Mitigation for Option 2 - Level of Service Analyses

PM Peak Hour

Intersection	No Build								Build with Alternative Garage Access Option 2								Mitigation for Option 2								Mitigation Measures Applied for Option 2
	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	
Central Park West & West 72nd Street																									
Eastbound	DfL	0.90	47.6	E	25.1	D	31.0	D	DfL	0.90	47.6	E	25.1	D	34.7	D	DfL	0.90	47.6	E	25.1	D	12.7	B	Parking Restriction:
	TR	0.43	16.5	C					TR	0.43	16.5	C					TR	0.43	16.5	C					Prohibit Parking at the NB Approach
Westbound	LTR	0.54	17.7	C	17.7	C			LTR	0.54	17.7	C	17.7	C			LTR	0.54	17.7	C	17.7	C			During the PM Peak Hour.
Northbound	LTR	1.08	53.6	E	53.6	E			LTR	1.10	62.7	F*	62.7	F			LTR	0.65	7.0	B	7.0	B			
Southbound	LTR	0.73	8.6	B	8.6	B			LTR	0.74	8.8	B	8.8	B			LTR	0.75	8.9	B	8.9	B			
Central Park West & West 76th Street																									
Eastbound	LTR	0.14	14.4	B	14.4	B	7.0	B	LTR	0.14	14.5	B	14.5	B	7.0	B	LTR								
Northbound	T	0.65	7.1	B	7.1	B			T	0.66	7.2	B	7.2	B			T								
Southbound	T	0.45	5.7	B	5.7	B			T	0.46	5.7	B	5.7	B			T								
Central Park West & West 77th Street																									
Eastbound	LTR	0.28	14.8	B	14.8	B	34.0	D	LTR	0.28	14.8	B	14.8	B	42.0	E	LTR	0.30	15.9	C	15.9	C	30.0	D	Signal Retiming:
Northbound	LTR	1.12	52.7	E	52.7	E			LTR	1.16	67.6	F*	67.6	F			LTR	1.11	46.6	E	46.6	E			Add 2 Seconds Green Time NB/SB &
Southbound	LTR	0.87	13.8	B	13.8	B			LTR	0.88	14.5	B	14.5	B			LTR	0.85	11.4	B	11.4	B			Subtract 2 Seconds Green Time EB/WB.
Central Park West & West 81st Street																									Multiple Changes:
Eastbound	LTR	0.40	16.2	C	16.2	C	44.1	E	LTR	0.42	16.3	C	16.3	C	60.3	F	LTR	0.44	16.5	C	16.5	C	18.8	C	Create NB/SB Left-Turn Lanes; Add a Pro-
Westbound	DfL	1.13	124.4	F	57.3	E			DfL	1.21	170.4	F*	74.5	F			L	1.00	81.4	F	36.3	D			tected Leading Left-Turn Phase to the Traf-
	TR	0.40	16.2	C					TR	0.41	16.3	C					LTR	0.79	23.8	C					fic Signal, NB/SB; Prohibit Parking on the
Northbound	LTR	0.94	17.8	C	17.8	C			LTR	0.99	25.9	D*	25.9	D			L	0.30	7.2	B	12.9	B			NB/SB Approaches During Weekday & Sat-
																	TR	0.72	13.5	B					urday Peak Hours; and Re-Stripe the WB
Southbound	DfL	1.54	349.5	F	88.7	F			DfL	1.66	504.7	F*	126.4	F			L	0.83	25.5	D	13.8	B			Approach with an Exclusive Left-Turn, &
	TR	0.76	9.7	B					TR	0.76	10.0	B					TR	0.40	10.4	B					Shared Left/Thru & Thru/Right Lanes.
Central Park West & West 82nd Street																									
Eastbound	LTR	0.52	18.3	C	18.3	C	7.1	B	LTR	0.53	18.3	C	18.3	C	7.1	B	LTR								
Northbound	T	0.53	6.2	B	6.2	B			T	0.54	6.2	B	6.2	B			T								
Southbound	T	0.38	5.4	B	5.4	B			T	0.39	5.4	B	5.4	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	1.03	56.4	E	56.4	E	83.1	F	LTR	1.05	61.5	F*	61.5	F	85.5	F	LTR	1.00	48.5	E	48.5	E	35.2	D	Multiple Changes:
Westbound	LTR	0.63	16.5	C	16.5	C			LTR	0.63	16.5	C	16.5	C			LTR	0.63	16.5	C	16.5	C			Add 1 Second Green Time to EB/WB Phase.
Northbound	LTR	1.08	54.6	E	54.6	E			LTR	1.09	60.1	F*	60.1	F			LTR	0.63	9.0	B	9.0	B			Subtract 1 Second Green Time from WB
Southbound	DfL	1.88	1103.6	F	267.6	F			DfL	1.88	1103.6	F	265.7	F			DfL	1.47	324.7	F	85.1	F			Leading Phase, & Prohibit Parking at the
	TR	0.77	12.6	B					TR	0.78	12.8	B					TR	0.78	12.8	B					NB Approach.
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.61	16.7	C	16.7	C	12.5	B	TR	0.61	16.7	C	16.7	C	12.6	B	TR								
Westbound	DfL	0.54	18.1	C	14.4	B			DfL	0.54	18.1	C	14.4	B			DfL								
	T	0.26	13.3	B					T	0.26	13.3	B					T								
Southbound	LTR	0.82	11.0	B	11.0	B			LTR	0.82	11.2	B	11.2	B			LTR								
Columbus Avenue & West 76th Street																									
Eastbound	TR	0.45	17.5	C	17.5	C	8.6	B	TR	0.45	17.5	C	17.5	C	8.7	B	TR								
Southbound	LT	0.78	7.8	B	7.8	B			LT	0.78	7.9	B	7.9	B			LT								
Columbus Avenue & West 77th Street																									
Westbound	LT	0.24	15.5	C	15.5	C	9.5	B	LT	0.25	15.6	C	15.6	C	9.7	B	LT								
Southbound	LTR	0.84	8.9	B	8.9	B			LTR	0.84	9.1	B	9.1	B			LTR								
Columbus Avenue & West 78th Street																									
Eastbound	R	0.31	16.1	C	16.1	C	6.6	B	R	0.31	16.1	C	16.1	C	6.6	B	R								
Southbound	T	0.57	5.8	B	5.8	B			T	0.58	5.9	B	5.9	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.29	17.8	C	17.8	C	7.3	B	TR	0.29	17.8	C	17.8	C	7.5	B	TR								
Westbound	This movement does not exist for No Build conditions.								LT	0.02	16.3	C	16.3	C			LT								
Southbound	TR	0.77	5.6	B	5.6	B			LTR	0.78	5.8	B	5.8	B			LTR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.19	15.3	C	15.3	C	5.7	B	R	0.19	15.3	C	15.3	C	5.7	B	R								
Southbound	T	0.45	5.2	B	5.2	B			T	0.46	5.2	B	5.2	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	1.07	88.8	F	88.8	F	26.7	D	TR	1.11	104.4	F*	104.4	F	29.2	D	TR	1.06	83.0	F	83.0	F	26.8	D	Signal Retiming:
Westbound	L	0.41	21.9	C	21.9	C			L	0.43	22.1	C	22.1	C			L	0.43	22.1	C	22.1	C			Add 1 Second Green Time EB & Subtract
Southbound	LT	0.74	15.7	C	15.7	C			LT	0.74	15.7	C	15.7	C			LT	0.76	16.7	C	16.7	C			1 Second Green Time SB.
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.40	16.9	C	16.9	C	6.6	B	TR	0.40	16.9	C	16.9	C	6.6	B	TR								
Southbound	LT	0.53	5.6	B	5.6	B			LT	0.53	5.6	B	5.6	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.65	16.8	C	16.8	C	17.4	C	TR	0.66	16.9	C	16.9	C	17.5	C	TR								
Westbound	DfL	1.04	82.9	F	30.2	D			DfL	1.05	84.7	F	30.6	D			DfL								
	T	0.60	16.3	C					T	0.60	16.3	C					T								
Southbound	LTR	0.72	9.8	B	9.8	B			LTR	0.73	9.9	B	9.9	B			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.55	16.9	C	15.4	C	9.9	B	DfL	0.57	17.3	C	15.7	C	10.0	B	DfL								
	T	0.36	14.1	B					T	0.37	14.2	B					T								
Westbound	TR	0.21	13.0	B	13.0	B			TR	0.22	13.1	B	13.1	B			TR								
Northbound	LTR	0.62	8.6	B	8.6	B			LTR	0.62	8.6	B	8.6	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.56	19.2	C	19.2	C	6.8	B	LT	0.57	19.4	C	19.4	C	6.8	B	LT								
Northbound	TR	0.53	5.6	B	5.6	B			TR	0.54	5.6	B	5.6	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.62	6.1	B	6.1	B	6.1	B	LTR	0.63	6.2	B	6.2	B	6.2	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.

Table H-6
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Option 2, and Mitigation for Option 2 - Level of Service Analyses

	Saturday Peak Hour																								
	No Build								Build with Alternative Garage Access Option 2								Mitigation for Option 2								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied for Option 2
Central Park West & West 72nd Street																									Signal Retiming:
Eastbound	LTR	0.28	13.4	B	13.4	B	17.3	C	LTR	0.28	13.4	B	13.4	B	22.1	C	LTR	0.31	15.0	B	15.0	B	16.2	C	Subtract 3 Seconds Green Time EB/WB
Northbound	LT	1.00	26.8	D	26.8	D			LT	1.05	39.0	D*	39.0	D			LT	0.98	26.7	D	26.7	D			and Add 3 Seconds Green Time NB/SB.
Southbound	TR	0.78	11.3	B	11.3	B			TR	0.80	11.5	B	11.5	B			TR	0.75	8.9	B	8.9	B			
Central Park West & West 76th Street																									
Eastbound	LTR	0.19	14.7	B	14.7	B	7.0	B	LTR	0.19	14.7	B	14.7	B	7.1	B	LTR								
Northbound	T	0.51	6.1	B	6.1	B			T	0.54	6.2	B	6.2	B			T								
Southbound	T	0.59	6.6	B	6.6	B			T	0.60	6.7	B	6.7	B			T								
Central Park West & West 77th Street																									Signal Retiming:
Eastbound	LTR	0.23	14.5	B	14.5	B	14.5	B	LTR	0.23	14.5	B	14.5	B	19.5	C	LTR	0.25	16.1	C	16.1	C	12.0	B	Subtract 3 Seconds Green Time EB/WB
Northbound	LT	0.99	21.6	C	21.6	C			LT	1.05	32.7	D*	32.7	D			LT	0.98	17.7	C	17.7	C			and Add 3 Seconds Green Time NB/SB.
Southbound	TR	0.70	8.2	B	8.2	B			TR	0.72	8.4	B	8.4	B			TR	0.68	6.4	B	6.4	B			
Central Park West & West 81st Street																									Multiple Changes:
Eastbound	LTR	0.53	17.4	C	17.4	C	56.0	E	LTR	0.62	18.4	C	18.4	C			LTR	0.66	19.0	C	19.0	C	21.0	C	Create NB/SB Left-Turn Lanes; Add a Pro-
Westbound	DfL	1.08	97.9	F	47.1	E			DfL	1.10	109.2	F*	50.2	E			L	0.70	25.3	D	24.7	C			tected Leading Left-Turn Phase to the Traf-
	TR	0.37	16.0	C					TR	0.40	16.2	C					LTR	0.80	24.5	C					fic Signal, NB/SB; Prohibit Parking on the
Northbound	LTR	1.14	83.2	F	83.2	F			LTR	1.26	108.9	F*	108.9	F	67.0	F	L	0.43	9.4	B	17.7	C			NB/SB Approaches During Weekday & Sat-
																	TR	0.84	18.9	C					urday Peak Hours; and Re-Stripe the WB
Southbound	DfL	1.13	108.0	F	53.5	E			DfL	1.16	124.5	F*	62.6	F			L	0.95	45.3	E	23.3	C			Approach with an Exclusive Left-Turn, &
	TR	1.02	34.9	D					TR	1.04	41.3	E*					TR	0.73	16.1	C					Shared Left/Thru & Thru/Right Lanes.
Central Park West & West 82nd Street																									
Eastbound	LTR	0.50	17.6	C	17.6	C	6.9	B	LTR	0.50	17.7	C	17.7	C	7.0	B	LTR								
Northbound	T	0.28	5.0	A	5.0	A			T	0.29	5.0	A	5.0	A			T								
Southbound	T	0.53	6.1	B	6.1	B			T	0.54	6.2	B	6.2	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	0.69	24.1	C	24.1	C	16.7	C	LTR	0.70	24.3	C	24.3	C	17.3	C	LTR								
Westbound	LTR	0.60	16.2	C	16.2	C			LTR	0.61	16.3	C	16.3	C			LTR								
Northbound	LTR	0.87	16.3	C	16.3	C			LTR	0.90	18.0	C	18.0	C			LTR								
Southbound	LTR	0.76	11.4	B	11.4	B			LTR	0.78	11.9	B	11.9	B			LTR								
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.42	14.5	B	14.5	B	14.5	B	TR	0.42	14.5	B	14.5	B	15.2	C	TR								
Westbound	DfL	0.29	13.7	B	13.0	B			DfL	0.29	13.7	B	13.0	B			DfL								
	T	0.18	12.8	B					T	0.19	12.8	B					T								
Southbound	LTR	0.93	14.6	B	14.6	B			LTR	0.94	15.6	C	15.6	C			LTR								
Columbus Avenue & West 76th Street																									Signal Retiming:
Eastbound	TR	0.49	18.0	C	18.0	C	29.9	D	TR	0.49	18.0	C	18.0	C	36.0	D	TR	0.51	18.8	C	18.8	C	29.0	D	Add 1 Second Green Time SB & Subtract
Southbound	LT	1.04	30.7	D	30.7	D			LT	1.06	37.3	D*	37.3	D			LT	1.04	29.8	D	29.8	D			1 Second Green Time EB.
Columbus Avenue & West 77th Street																									Signal Retiming:
Westbound	LT	0.30	15.9	C	15.9	C	21.3	C	LT	0.31	16.0	C	16.0	C	26.2	D	LT	0.32	16.6	C	16.6	C	21.1	C	Add 1 Second Green Time SB & Subtract
Southbound	LTR	1.00	21.8	C	21.8	C			LTR	1.03	27.2	D*	27.2	D			LTR	1.01	21.6	C	21.6	C			1 Second Green Time WB.
Columbus Avenue & West 78th Street																									
Eastbound	R	0.25	15.6	C	15.6	C	8.5	B	R	0.25	15.7	C	15.7	C	8.8	B	R								
Southbound	T	0.82	8.2	B	8.2	B			T	0.84	8.5	B	8.5	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.25	17.6	C	17.6	C	13.8	B	TR	0.28	17.8	C	17.8	C	16.8	C	TR								
Westbound	This movement does not exist for No Build conditions.								LT	0.10	16.8	C	16.8	C			LT								
Southbound	TR	0.97	13.4	B	13.4	B			LTR	0.99	16.7	C	16.7	C			LTR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.30	16.0	C	16.0	C	6.2	B	R	0.30	16.0	C	16.0	C	6.2	B	R								
Southbound	T	0.53	5.6	B	5.6	B			T	0.54	5.6	B	5.6	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	1.07	88.7	F	88.7	F	32.4	D	TR	1.03	75.4	F	75.4	F	31.3	D	TR								
Westbound	L	0.61	23.9	C	23.9	C			L	0.63	24.3	C	24.3	C			L								
Southbound	LT	0.98	26.0	D	26.0	D			LT	0.98	26.8	D	26.8	D			LT								
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.36	16.5	C	16.5	C	7.3	B	TR	0.36	16.5	C	16.5	C	7.4	B	TR								
Southbound	LT	0.69	6.7	B	6.7	B			LT	0.70	6.7	B	6.7	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.41	14.4	B	14.4	B	21.3	C	TR	0.42	14.4	B	14.4	B	22.3	C	TR								
Westbound	LT	0.54	15.5	C	15.5	C			LT	0.55	15.6	C	15.6	C			LT								
Southbound	LTR	1.01	25.8	D	25.8	D			LTR	1.01	27.4	D	27.4	D			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.42	15.0	B	14.1	B	9.8	B	DfL	0.47	15.8	C	14.6	B	10.0	B	DfL								
	T	0.25	13.3	B					T	0.32	13.8	B					T								
Westbound	TR	0.24	13.2	B	13.2	B			TR	0.27	13.4	B	13.4	B			TR								
Northbound	LTR	0.54	8.1	B	8.1	B			LTR	0.55	8.2	B	8.2	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.62	20.2	C	20.2	C	7.4	B	LT	0.63	20.6	C	20.6	C	7.5	B	LT								
Northbound	TR	0.478	5.3	B	5.3	B			TR	0.49	5.4	B	5.4	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.536	5.6	B	5.6	B	5.6	B	LTR	0.55	5.7	B	5.7	B	5.7	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.

Table H-7
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Option 3, and Mitigation for Option 3 - Level of Service Analyses

	Midday Peak Hour																								
	No Build								Build with Alternative Garage Access Option 3								Mitigation for Option 3								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied for Option 3
Central Park West & West 72nd Street																									
Eastbound	DfL	1.11	113.8	F	43.0	E	25.9	D	DfL	1.11	113.8	F	43.0	E	27.8	D	DfL								
	TR	0.45	14.8	B					TR	0.45	14.8	B					TR								
Westbound	LTR	0.63	16.9	C	16.9	C			LTR	0.63	16.9	C	16.9	C			LTR								
Northbound	LTR	0.90	16.9	C	16.9	C			LTR	0.93	19.2	C	19.2	C			LTR								
Southbound	LTR	0.98	27.2	D	27.2	D			LTR	1.00	31.8	D	31.8	D			LTR								
Central Park West & West 76th Street																									
Eastbound	LTR	0.16	14.6	B	14.6	B	7.5	B	LTR	0.16	14.6	B	14.6	B	7.5	B	LTR								
Northbound	T	0.57	6.5	B	6.5	B			T	0.58	6.5	B	6.5	B			T								
Southbound	T	0.69	7.5	B	7.5	B			T	0.69	7.5	B	7.5	B			T								
Central Park West & West 77th Street																									Signal Retiming:
Eastbound	LTR	0.29	14.9	B	14.9	B	16.1	C	LTR	0.29	14.9	B	14.9	B	19.3	C	LTR	0.31	16.0	C	16.0	C	13.7	B	Subtract 2 Seconds Green Time EB/WB
Northbound	LT	1.01	25.0	C	25.0	C			LT	1.05	32.3	D*	32.3	D			LT	1.00	20.8	C	20.8	C			and Add 2 Seconds Green Time NB/SB.
Southbound	TR	0.72	8.5	B	8.5	B			TR	0.73	8.6	B	8.6	B			TR	0.70	7.2	B	7.2	B			
Central Park West & West 81st Street																									Muliple Changes:
Eastbound	LTR	0.32	15.6	C	15.6	C	24.9	C	LTR	0.34	15.7	C	15.7	C	29.4	D	LTR	0.32	13.7	B	13.7	B	17.6	C	Create NB/SB Left-Turn Lanes; Add a Pro-
Westbound	DfL	1.12	107.5	F	50.3	E			DfL	1.18	138.8	F*	61.0	F			L	0.92	44.6	E	23.7	C			tected Leading Left-Turn Phase to the Traf-
	TR	0.69	19.8	C					TR	0.71	20.1	C					LTR	0.70	18.0	C					fic Signal, NB/SB; Prohibit Parking on the
Northbound	LTR	0.84	11.2	B	11.2	B			LTR	0.88	13.2	B	13.2	B			L	0.29	8.9	B	16.0	C			NB/SB Approaches During Weekday & Sat-
																	TR	0.75	16.6	C					urday Peak Hours; and Re-Stripe the WB
Southbound	LTR	0.83	11.4	B	11.4	B			LTR	0.85	12.3	B	12.3	B			L	0.47	10.7	B	13.3	B			Approach with an Exclusive Left-Turn, &
																	TR	0.54	13.7	B					Shared Left/Thru & Thru/Right Lanes
Central Park West & West 82nd Street																									
Eastbound	LTR	0.48	17.5	C	17.5	C	7.0	B	LTR	0.48	17.5	C	17.5	C	7.0	B	LTR								
Northbound	T	0.55	6.3	B	6.3	B			T	0.55	6.3	B	6.3	B			T								
Southbound	T	0.44	5.7	B	5.7	B			T	0.45	5.7	B	5.7	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	0.80	27.4	D	27.4	D	19.6	C	LTR	0.81	27.6	D	27.6	D	20.1	C	LTR								
Westbound	LTR	0.72	18.0	C	18.0	C			LTR	0.73	18.0	C	18.0	C			LTR								
Northbound	LTR	0.92	18.6	C	18.6	C			LTR	0.93	19.7	C	19.7	C			LTR								
Southbound	LTR	0.87	16.2	C	16.2	C			LTR	0.88	16.9	C	16.9	C			LTR								
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.48	15.1	C	15.1	C	11.4	B	TR	0.48	15.1	C	15.1	C	11.4	B	TR								
Westbound	DfL	0.67	21.6	C	15.9	C			DfL	0.67	21.6	C	15.9	C			DfL								
	T	0.26	13.3	B					T	0.27	13.3	B					T								
Southbound	LTR	0.69	9.3	B	9.3	B			LTR	0.69	9.4	B	9.4	B			LTR								
Columbus Avenue & West 76th Street																									
Eastbound	TR	0.55	18.9	C	18.9	C	9.0	B	TR	0.55	18.9	C	18.9	C	9.1	B	TR								
Southbound	LT	0.79	7.9	B	7.9	B			LT	0.80	8.1	B	8.1	B			LT								
Columbus Avenue & West 77th Street																									
Westbound	LT	0.29	15.9	C	15.9	C	9.4	B	LT	0.30	16.0	C	16.0	C	9.6	B	LT								
Southbound	LTR	0.82	8.6	B	8.6	B			LTR	0.83	8.8	B	8.8	B			LTR								
Columbus Avenue & West 78th Street																									
Eastbound	R	0.21	15.4	C	15.4	C	6.2	B	R	0.22	15.4	C	15.4	C	6.3	B	R								
Southbound	T	0.56	5.7	B	5.7	B			T	0.57	5.8	B	5.8	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.24	17.5	C	17.5	C	7.8	B	R	0.25	17.6	C	17.6	C	8.1	B	R								
Southbound	TR	0.83	6.6	B	6.6	B			TR	0.84	6.8	B	6.8	B			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.29	15.9	C	15.9	C	5.9	B	R	0.29	15.9	C	15.9	C	5.9	B	R								
Southbound	T	0.43	5.1	B	5.1	B			T	0.44	5.1	B	5.1	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	0.81	34.6	D	34.6	D	18.7	C	TR	0.83	36.3	D	36.3	D	19.0	C	TR								
Westbound	L	0.54	23.1	C	23.1	C			L	0.56	23.3	C	23.3	C			L								
Southbound	LT	0.69	15.1	C	15.1	C			LT	0.69	15.1	C	15.1	C			LT								
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.48	17.8	C	17.8	C	6.7	B	TR	0.48	17.8	C	17.8	C	6.7	B	TR								
Southbound	LT	0.47	5.3	B	5.3	B			LT	0.47	5.3	B	5.3	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.38	14.1	B	14.1	B	12.6	B	TR	0.38	14.1	B	14.1	B	12.6	B	TR								
Westbound	LT	0.61	16.3	C	16.3	C			LT	0.61	16.3	C	16.3	C			LT								
Southbound	LTR	0.72	9.7	B	9.7	B			LTR	0.72	9.8	B	9.8	B			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.66	21.1	C	17.4	C	10.5	B	DfL	0.67	21.8	C	17.7	C	10.6	B	DfL								
	T	0.27	13.4	B					T	0.28	13.5	B					T								
Westbound	TR	0.31	13.6	B	13.6	B			TR	0.31	13.6	B	13.6	B			TR								
Northbound	LTR	0.53	8.0	B	8.0	B			LTR	0.53	8.0	B	8.0	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.43	17.1	C	17.1	C	6.7	B	LT	0.44	17.2	C	17.2	C	6.8	B	LT								
Northbound	TR	0.45	5.2	B	5.2	B			TR	0.45	5.2	B	5.2	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.50	5.5	B	5.5	B	5.5	B	LTR	0.51	5.5	B	5.5	B	5.5	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*

Table H-8
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Option 3, and Mitigation for Option 3 - Level of Service Analyses

	PM Peak Hour																								
	No Build								Build with Alternative Garage Access Option 3								Mitigation for Option 3								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied for Option 3
Central Park West & West 72nd Street																									
Eastbound	DfL	0.90	47.6	E	25.1	D	31.0	D	DfL	0.90	47.6	E	25.1	D	34.7	D	DfL	0.90	47.6	E	25.1	D	12.7	B	Parking Restriction:
	TR	0.43	16.5	C					TR	0.43	16.5	C					TR	0.43	16.5	C					Prohibit Parking at the NB Approach
Westbound	LTR	0.54	17.7	C	17.7	C			LTR	0.54	17.7	C	17.7	C			LTR	0.54	17.7	C	17.7	C			During the PM Peak Hour.
Northbound	LTR	1.08	53.6	E	53.6	E			LTR	1.10	62.7	F*	62.7	F			LTR	0.65	7.0	B	7.0	B			
Southbound	LTR	0.73	8.6	B	8.6	B			LTR	0.74	8.8	B	8.8	B			LTR	0.75	8.9	B	8.9	B			
Central Park West & West 76th Street																									
Eastbound	LTR	0.14	14.4	B	14.4	B	7.0	B	LTR	0.14	14.5	B	14.5	B	7.0	B	LTR								
Northbound	T	0.65	7.1	B	7.1	B			T	0.66	7.2	B	7.2	B			T								
Southbound	T	0.45	5.7	B	5.7	B			T	0.46	5.7	B	5.7	B			T								
Central Park West & West 77th Street																									
Eastbound	LTR	0.28	14.8	B	14.8	B	34.0	D	LTR	0.28	14.8	B	14.8	B	42.0	E	LTR	0.30	15.9	C	15.9	C	30.0	D	Signal Retiming:
Northbound	LTR	1.12	52.7	E	52.7	E			LTR	1.16	67.6	F*	67.6	F			LTR	1.11	46.6	E	46.6	E			Add 2 Seconds Green Time NB/SB &
Southbound	LTR	0.87	13.8	B	13.8	B			LTR	0.88	14.5	B	14.5	B			LTR	0.85	11.4	B	11.4	B			Subtract 2 Seconds Green Time EB/WB
Central Park West & West 81st Street																									Multiple Changes.
Eastbound	LTR	0.40	16.2	C	16.2	C	44.1	E	LTR	0.42	16.3	C	16.3	C	60.3	F	LTR	0.44	16.5	C	16.5	C	18.8	C	Create NB/SB Left-Turn Lanes; Add a Pro-
Westbound	DfL	1.13	124.4	F	57.3	E			DfL	1.21	170.4	F*	74.5	F			L	1.00	81.4	F	36.3	D			tected Leading Left-Turn Phase to the Traf-
	TR	0.40	16.2	C					TR	0.41	16.3	C					LTR	0.79	23.8	C					fic Signal, NB/SB; Prohibit Parking on the
Northbound	LTR	0.94	17.8	C	17.8	C			LTR	0.99	25.9	D*	25.9	D			L	0.30	7.2	B	12.9	B			NB/SB Approaches During Weekday & Sat-
																	TR	0.72	13.5	B					urday Peak Hours; and Re-Stripe the WB
Southbound	DfL	1.54	349.5	F	88.7	F			DfL	1.66	504.7	F*	126.4	F			L	0.83	25.5	D	13.8	B			Approach with an Exclusive Left-Turn, &
	TR	0.76	9.7	B					TR	0.76	10.0	B					TR	0.40	10.4	B					Shared Left/Thru & Thru/Right Lanes.
Central Park West & West 82nd Street																									
Eastbound	LTR	0.52	18.3	C	18.3	C	7.1	B	LTR	0.53	18.3	C	18.3	C	7.1	B	LTR								
Northbound	T	0.53	6.2	B	6.2	B			T	0.54	6.2	B	6.2	B			T								
Southbound	T	0.38	5.4	B	5.4	B			T	0.39	5.4	B	5.4	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	1.03	56.4	E	56.4	E	83.1	F	LTR	1.05	61.5	F*	61.5	F	85.5	F	LTR	0.99	44.9	E	44.9	E	35.2	D	Multiple Changes:
Westbound	LTR	0.63	16.5	C	16.5	C			LTR	0.63	16.5	C	16.5	C			DfL	0.63	18.1	C	17.8	C			Add 1 Second Green Time to EB/WB Phase,
Westbound	LTR	0.63	16.5	C	16.5	C											TR	0.70	17.8	C					Subtract 1 Second Green Time from WB
Northbound	LTR	1.08	54.6	E	54.6	E			LTR	1.09	60.1	F*	60.1	F			LTR	0.63	9.0	B	9.0	B			Leading Phase, & Prohibit Parking at the
Southbound	DfL	1.88	1103.6	F	267.6	F			DfL	1.88	1103.6	F	265.7	F			DfL	1.47	324.7	F	85.1	F			NB Approach.
	TR	0.77	12.6	B					TR	0.78	12.8	B					TR	0.78	12.8	B					
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.61	16.7	C	16.7	C	12.5	B	TR	0.61	16.7	C	16.7	C	12.6	B	TR								
Westbound	DfL	0.54	18.1	C	14.4	B			DfL	0.54	18.1	C	14.4	B			DfL								
	T	0.26	13.3	B					T	0.26	13.3	B					T								
Southbound	LTR	0.82	11.0	B	11.0	B			LTR	0.82	11.2	B	11.2	B			LTR								
Columbus Avenue & West 76th Street																									
Eastbound	TR	0.45	17.5	C	17.5	C	8.6	B	TR	0.45	17.5	C	17.5	C	8.7	B	TR								
Southbound	LT	0.78	7.8	B	7.8	B			LT	0.78	7.9	B	7.9	B			LT								
Columbus Avenue & West 77th Street																									
Westbound	LT	0.24	15.5	C	15.5	C	9.5	B	LT	0.25	15.6	C	15.6	C	9.8	B	LT								
Southbound	LTR	0.84	8.9	B	8.9	B			LTR	0.85	9.2	B	9.2	B			LTR								
Columbus Avenue & West 78th Street																									
Eastbound	R	0.31	16.1	C	16.1	C	6.6	B	R	0.31	16.1	C	16.1	C	6.6	B	R								
Southbound	T	0.57	5.8	B	5.8	B			T	0.58	5.9	B	5.9	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.29	17.8	C	17.8	C	7.3	B	R	0.29	17.9	C	17.9	C	7.5	B	R								
Southbound	TR	0.77	5.6	B	5.6	B			TR	0.78	5.8	B	5.8	B			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.19	15.3	C	15.3	C	5.7	B	R	0.19	15.3	C	15.3	C	5.7	B	R								
Southbound	T	0.45	5.2	B	5.2	B			T	0.46	5.2	B	5.2	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	1.07	88.8	F	88.8	F	26.7	D	TR	1.11	104.4	F*	104.4	F	29.2	D	TR	1.06	83.0	F	83.0	F	26.8	D	Signal Retiming:
Westbound	L	0.41	21.9	C	21.9	C			L	0.44	22.1	C	22.1	C			L	0.44	22.1	C	22.1	C			Add 1 Second Green Time EB & Subtract
Southbound	LT	0.74	15.7	C	15.7	C			LT	0.74	15.8	C	15.8	C			LT	0.76	16.7	C	16.7	C			1 Second Green Time SB.
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.40	16.9	C	16.9	C	6.6	B	TR	0.40	16.9	C	16.9	C	6.6	B	TR								
Southbound	LT	0.53	5.6	B	5.6	B			LT	0.53	5.6	B	5.6	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.65	16.8	C	16.8	C	17.4	C	TR	0.66	16.9	C	16.9	C	17.5	C	TR								
Westbound	DfL	1.04	82.9	F	30.2	D			DfL	1.05	84.7	F	30.6	D			DfL								
	T	0.60	16.3	C					T	0.60	16.3	C					T								
Southbound	LTR	0.72	9.8	B	9.8	B			LTR	0.73	9.9	B	9.9	B			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.55	16.9	C	15.4	C	9.9	B	DfL	0.56	17.1	C	15.6	C	10.0	B	DfL								
	T	0.36	14.1	B					T	0.37	14.2	B					T								
Westbound	TR	0.21	13.0	B	13.0	B			TR	0.22	13.0	B	13.0	B			TR								
Northbound	LTR	0.62	8.6	B	8.6	B			LTR	0.62	8.6	B	8.6	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.56	19.2	C	19.2	C	6.8	B	TR	0.57	19.4	C	19.4	C	6.8	B	TR								
Northbound	TR	0.53	5.6	B	5.6	B			LT	0.54	5.6	B	5.6	B			LT								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.62	6.1	B	6.1	B	6.1	B	LTR	0.63	6.2	B	6.2	B	6.2	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual.*

Table H-9
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Option 3, and Mitigation for Option 3 - Level of Service Analyses

Intersection	Saturday Peak Hour																								
	No Build								Build with Alternative Garage Access Option 3								Mitigation for Option 3								Mitigation Measures Applied for Option 3
	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	
Central Park West & West 72nd Street																									Signal Retiming: Subtract 3 Seconds Green Time EB/WB and Add 3 Seconds Green Time NB/SB.
Eastbound	LTR	0.28	13.4	B	13.4	B	17.3	C	LTR	0.28	13.4	B	13.4	B	22.1	C	LTR	0.31	15.0	B	15.0	B	16.2	C	
Northbound	LT	1.00	26.8	D	26.8	D			LT	1.05	39.0	D*	39.0	D			LT	0.98	26.7	D	26.7	D			
Southbound	TR	0.78	11.3	B	11.3	B			TR	0.80	11.5	B	11.5	B			TR	0.75	8.9	B	8.9	B			
Central Park West & West 76th Street																									
Eastbound	LTR	0.19	14.7	B	14.7	B	7.0	B	LTR	0.19	14.7	B	14.7	B	7.1	B	LTR								
Northbound	T	0.51	6.1	B	6.1	B			T	0.54	6.2	B	6.2	B			T								
Southbound	T	0.59	6.6	B	6.6	B			T	0.60	6.7	B	6.7	B			T								
Central Park West & West 77th Street																									Signal Retiming: Subtract 3 Seconds Green Time EB/WB and Add 3 Seconds Green Time NB/SB.
Eastbound	LTR	0.23	14.5	B	14.5	B	14.5	B	LTR	0.23	14.5	B	14.5	B	19.5	C	LTR	0.25	16.1	C	16.1	C	12.0	B	
Northbound	LT	0.99	21.6	C	21.6	C			LT	1.05	32.7	D*	32.7	D			LT	0.98	17.7	C	17.7	C			
Southbound	TR	0.70	8.2	B	8.2	B			TR	0.72	8.4	B	8.4	B			TR	0.68	6.4	B	6.4	B			
Central Park West & West 81st Street																									Multiple Changes: Create NB/SB Left-Turn Lanes; Add a Protected Leading Left-Turn Phase to the Traffic Signal, NB/SB; Prohibit Parking on the NB/SB Approaches During Weekday & Saturday Peak Hours; and Re-Stripe the WB Approach with an Exclusive Left-Turn, & Shared Left/Thru & Thru/Right Lanes.
Eastbound	LTR	0.53	17.4	C	17.4	C	56.0	E	LTR	0.62	18.4	C	18.4	C			LTR	0.66	19.0	C	19.0	C	21.0	C	
Westbound	DfL	1.08	97.9	F	47.1	E			DfL	1.10	109.2	F*	50.2	E			L	0.70	25.3	D	24.7	C			
	TR	0.37	16.0	C					TR	0.40	16.2	C					LTR	0.80	24.5	C					
Northbound	LTR	1.14	83.2	F	83.2	F			LTR	1.26	108.4	F*	108.4	F	66.9	F	L	0.43	9.4	B	17.7	C			
																	TR	0.84	18.9	C					
Southbound	DfL	1.13	108.0	F	53.5	E			DfL	1.16	124.5	F*	62.6	F			L	0.95	45.3	E	23.3	C			
	TR	1.02	34.9	D					TR	1.04	41.3	E*					TR	0.73	16.1	C					
Central Park West & West 82nd Street																									
Eastbound	LTR	0.50	17.6	C	17.6	C	6.9	B	LTR	0.50	17.6	C	17.6	C	7.0	B	LTR								
Northbound	T	0.28	5.0	A	5.0	A			T	0.29	5.0	A	5.0	A			T								
Southbound	T	0.53	6.1	B	6.1	B			T	0.54	6.2	B	6.2	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	0.69	24.1	C	24.1	C	16.7	C	LTR	0.70	24.3	C	24.3	C	17.3	C	LTR								
Westbound	LTR	0.60	16.2	C	16.2	C			LTR	0.61	16.3	C	16.3	C			LTR								
Northbound	LTR	0.87	16.3	C	16.3	C			LTR	0.90	18.0	C	18.0	C			LTR								
Southbound	LTR	0.76	11.4	B	11.4	B			LTR	0.78	11.9	B	11.9	B			LTR								
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.42	14.5	B	14.5	B	14.5	B	TR	0.42	14.5	B	14.5	B	15.2	C	TR								
Westbound	DfL	0.29	13.7	B	13.0	B			DfL	0.29	13.7	B	13.0	B			DfL								
	T	0.18	12.8	B					T	0.19	12.8	B					T								
Southbound	LTR	0.93	14.6	B	14.6	B			LTR	0.94	15.6	C	15.6	C			LTR								
Columbus Avenue & West 76th Street																									Signal Retiming: Add 1 Second Green Time SB & Subtract 1 Second Green Time EB.
Eastbound	TR	0.49	18.0	C	18.0	C	29.9	D	TR	0.49	18.0	C	18.0	C	36.0	D	TR	0.51	18.8	C	18.8	C	29.0	D	
Southbound	LT	1.04	30.7	D	30.7	D			LT	1.06	37.3	D*	37.3	D			LT	1.04	29.8	D	29.8	D			
Columbus Avenue & West 77th Street																									Signal Retiming: Add 1 Second Green Time SB & Subtract 1 Second Green Time WB.
Westbound	LT	0.30	15.9	C	15.9	C	21.3	C	LT	0.31	16.0	C	16.0	C	31.4	D	LT	0.33	17.2	C	17.2	C	20.5	C	
Southbound	LTR	1.00	21.8	C	21.8	C			LTR	1.04	33.0	D*	33.0	D			LTR	1.01	20.9	C	20.9	C			
Columbus Avenue & West 78th Street																									
Eastbound	R	0.25	15.6	C	15.6	C	8.5	B	R	0.25	15.7	C	15.7	C	9.0	B	R								
Southbound	T	0.82	8.2	B	8.2	B			T	0.85	8.7	B	8.7	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.25	17.6	C	17.6	C	13.8	B	R	0.30	17.9	C	17.9	C	16.5	C	R								
Southbound	TR	0.97	13.4	B	13.4	B			TR	0.99	16.3	C	16.3	C			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.30	16.0	C	16.0	C	6.2	B	R	0.30	16.0	C	16.0	C	6.2	B	R								
Southbound	T	0.53	5.6	B	5.6	B			T	0.58	5.6	B	5.6	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	1.07	88.7	F	88.7	F	32.4	D	TR	1.03	75.1	F	75.1	F	31.3	D	TR								
Westbound	L	0.61	23.9	C	23.9	C			L	0.64	24.3	C	24.3	C			L								
Southbound	LT	0.98	26.0	D	26.0	D			LT	0.98	26.8	D	26.8	D			LT								
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.36	16.5	C	16.5	C	7.3	B	TR	0.36	16.5	C	16.5	C	7.4	B	TR								
Southbound	LT	0.69	6.7	B	6.7	B			LT	0.70	6.7	B	6.7	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.41	14.4	B	14.4	B	21.3	C	TR	0.42	14.4	B	14.4	B	22.3	C	TR								
Westbound	LT	0.54	15.5	C	15.5	C			LT	0.55	15.6	C	15.6	C			LT								
Southbound	LTR	1.01	25.8	D	25.8	D			LTR	1.01	27.4	D	27.4	D			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.42	15.0	B	14.1	B	9.8	B	DfL	0.44	15.2	C	14.3	B	9.9	B	DfL								
	T	0.25	13.3	B					T	0.29	13.5	B					T								
Westbound	TR	0.24	13.2	B	13.2	B			TR	0.25	13.2	B	13.2	B			TR								
Northbound	LTR	0.54	8.1	B	8.1	B			LTR	0.56	8.2	B	8.2	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.62	20.2	C	20.2	C	7.4	B	LT	0.63	20.6	C	20.6	C	7.5	B	LT								
Northbound	TR	0.478	5.3	B	5.3	B			TR	0.49	5.4	B	5.4	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.536	5.6	B	5.6	B	5.6	B	LTR	0.55	5.7	B	5.7	B	5.7	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.

Table H-10
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Options 5 & 6**, and Mitigation for Options 5 & 6 - Level of Service Analyses

	Midday Peak Hour																								
	No Build								Build with Alternative Garage Access Options 5 & 6								Mitigation for Options 5 & 6								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	LOS	Intersection Delay	LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	LOS	Intersection Delay	LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	LOS	Intersection Delay	LOS	Mitigation Measures Applied for Options 5 & 6
Central Park West & West 72nd Street																									
Eastbound	DfL	1.11	113.8	F	43.0	E	25.9	D	DfL	1.11	113.8	F	43.0	E	27.9	D	DfL								
	TR	0.45	14.8	B					TR	0.45	14.8	B					TR								
Westbound	LTR	0.63	16.9	C	16.9	C			LTR	0.63	16.9	C	16.9	C			LTR								
Northbound	LTR	0.90	16.9	C	16.9	C			LTR	0.93	19.2	C	19.2	C			LTR								
Southbound	LTR	0.98	27.2	D	27.2	D			LTR	1.00	31.9	D	31.9	D			LTR								
Central Park West & West 76th Street																									
Eastbound	LTR	0.16	14.6	B	14.6	B	7.5	B	LTR	0.16	14.6	B	14.6	B	7.5	B	LTR								
Northbound	T	0.57	6.5	B	6.5	B			T	0.58	6.5	B	6.5	B			T								
Southbound	T	0.69	7.5	B	7.5	B			T	0.69	7.5	B	7.5	B			T								
Central Park West & West 77th Street																									Signal Retiming:
Eastbound	LTR	0.29	14.9	B	14.9	B	16.1	C	LTR	0.29	14.9	B	14.9	B	19.3	C	LTR	0.31	16.0	C	16.0	C	13.7	B	Subtract 2 Seconds Green Time EB/WB
Northbound	LT	1.01	25.0	C	25.0	C			LT	1.05	32.3	D*	32.3	D			LT	1.00	20.8	C	20.8	C			and Add 2 Seconds Green Time NB/SB.
Southbound	TR	0.72	8.5	B	8.5	B			TR	0.73	8.6	B	8.6	B			TR	0.70	7.2	B	7.2	B			
Central Park West & West 81st Street																									Multiple Changes:
Eastbound	LTR	0.32	15.6	C	15.6	C	24.9	C	LTR	0.34	15.7	C	15.7	C	29.6	D	LTR	0.32	13.7	B	13.7	B	17.6	C	Create NB/SB Left-Turn Lanes; Add a Pro-
Westbound	DfL	1.12	107.5	F	50.3	E			DfL	1.18	140.7	F*	61.7	F			L	0.92	44.9	E	23.7	C			tected Leading Left-Turn Phase to the Traf-
	TR	0.69	19.8	C					TR	0.71	20.1	C					LTR	0.70	18.0	C					fic Signal, NB/SB; Prohibit Parking on the
Northbound	LTR	0.84	11.2	B	11.2	B			LTR	0.88	13.2	B	13.2	B			L	0.28	8.9	B	16.0	C			NB/SB Approaches During Weekday & Sat-
																	TR	0.75	16.6	C					urday Peak Hours; and Re-Stripe the WB
Southbound	LTR	0.83	11.4	B	11.4	B			LTR	0.85	12.3	B	12.3	B			L	0.47	10.7	B	13.3	B			Approach with an Exclusive Left-Turn, &
																	TR	0.54	13.7	B					Shared Left/Thru & Thru/Right Lanes.
Central Park West & West 82nd Street																									
Eastbound	LTR	0.48	17.5	C	17.5	C	7.0	B	LTR	0.48	17.5	C	17.5	C	7.0	B	LTR								
Northbound	T	0.55	6.3	B	6.3	B			T	0.55	6.3	B	6.3	B			T								
Southbound	T	0.44	5.7	B	5.7	B			T	0.45	5.7	B	5.7	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	0.80	27.4	D	27.4	D	19.6	C	LTR	0.81	27.6	D	27.6	D	20.1	C	LTR								
Westbound	LTR	0.72	18.0	C	18.0	C			LTR	0.73	18.0	C	18.0	C			LTR								
Northbound	LTR	0.92	18.6	C	18.6	C			LTR	0.93	19.7	C	19.7	C			LTR								
Southbound	LTR	0.87	16.2	C	16.2	C			LTR	0.88	16.9	C	16.9	C			LTR								
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.48	15.1	C	15.1	C	11.4	B	TR	0.48	15.1	C	15.1	C	11.4	B	TR								
Westbound	DfL	0.67	21.6	C	15.9	C			DfL	0.67	21.6	C	15.9	C			DfL								
	T	0.26	13.3	B					T	0.27	13.3	B					T								
Southbound	LTR	0.69	9.3	B	9.3	B			LTR	0.69	9.4	B	9.4	B			LTR								
Columbus Avenue & West 76th Street																									
Eastbound	TR	0.55	18.9	C	18.9	C	9.0	B	TR	0.55	18.9	C	18.9	C	9.1	B	TR								
Southbound	LT	0.79	7.9	B	7.9	B			LT	0.80	8.1	B	8.1	B			LT								
Columbus Avenue & West 77th Street																									
Westbound	LT	0.29	15.9	C	15.9	C	9.4	B	LT	0.30	16.0	C	16.0	C	9.5	B	LT								
Southbound	LTR	0.82	8.6	B	8.6	B			LTR	0.83	8.7	B	8.7	B			LTR								
Columbus Avenue & West 78th Street																									
Eastbound	R	0.21	15.4	C	15.4	C	6.2	B	R	0.22	15.5	C	15.5	C	6.3	B	R								
Southbound	T	0.56	5.7	B	5.7	B			T	0.57	5.8	B	5.8	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.24	17.5	C	17.5	C	7.8	B	R	0.25	17.6	C	17.6	C	8.1	B	R								
Southbound	TR	0.83	6.6	B	6.6	B			TR	0.84	6.8	B	6.8	B			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.29	15.9	C	15.9	C	5.9	B	R	0.29	15.9	C	15.9	C	5.9	B	R								
Southbound	T	0.43	5.1	B	5.1	B			T	0.44	5.1	B	5.1	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	0.81	34.6	D	34.6	D	18.7	C	TR	0.83	36.3	D	36.3	D	19.0	C	TR								
Westbound	L	0.54	23.1	C	23.1	C			L	0.56	23.4	C	23.4	C			L								
Southbound	LT	0.69	15.1	C	15.1	C			LT	0.69	15.1	C	15.1	C			LT								
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.48	17.8	C	17.8	C	6.7	B	TR	0.48	17.8	C	17.8	C	6.7	B	TR								
Southbound	LT	0.47	5.3	B	5.3	B			LT	0.47	5.3	B	5.3	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.38	14.1	B	14.1	B	12.6	B	TR	0.38	14.1	B	14.1	B	12.6	B	TR								
Westbound	LT	0.61	16.3	C	16.3	C			LT	0.61	16.3	C	16.3	C			LT								
Southbound	LTR	0.72	9.7	B	9.7	B			LTR	0.72	9.8	B	9.8	B			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.66	21.1	C	17.4	C	10.5	B	DfL	0.68	21.8	C	17.7	C	10.6	B	DfL								
	T	0.27	13.4	B					T	0.28	13.5	B					T								
Westbound	TR	0.31	13.6	B	13.6	B			TR	0.31	13.6	B	13.6	B			TR								
Northbound	LTR	0.53	8.0	B	8.0	B			LTR	0.53	8.0	B	8.0	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.43	17.1	C	17.1	C	6.7	B	LT	0.44	17.2	C	17.2	C	6.8	B	LT								
Northbound	TR	0.45	5.2	B	5.2	B			TR	0.45	5.2	B	5.2	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.50	5.5	B	5.5	B	5.5	B	LTR	0.51	5.5	B	5.5	B	5.5	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual*.
** = Build Conditions for Option 4 are the same as for the Proposed Project during the Midday Peak Hour.

Table H-11
Signalized Intersections:
2001 No Build, Build with Alternative Garage Access Options 5 & 6**, and Mitigation for Options 5 & 6 - Level of Service Analyses

PM Peak Hour

Intersection	No Build								Build with Alternative Garage Access Options 5 & 6								Mitigation for Options 5 & 6								Mitigation Measures Applied for Options 5 & 6
	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	
Central Park West & West 72nd Street																									
Eastbound	DfL	0.90	47.6	E	25.1	D	31.0	D	DfL	0.90	47.6	E	25.1	D	34.7	D	DfL	0.90	47.6	E	25.1	D	12.7	B	Parking Restriction:
	TR	0.43	16.5	C					TR	0.43	16.5	C					TR	0.43	16.5	C					Prohibit Parking at the NB Approach
Westbound	LTR	0.54	17.7	C	17.7	C			LTR	0.54	17.7	C	17.7	C			LTR	0.54	17.7	C	17.7	C			During the PM Peak Hour.
Northbound	LTR	1.08	53.6	E	53.6	E			LTR	1.10	62.7	F*	62.7	F			LTR	0.65	7.0	B	7.0	B			
Southbound	LTR	0.73	8.6	B	8.6	B			LTR	0.74	8.8	B	8.8	B			LTR	0.75	8.9	B	8.9	B			
Central Park West & West 76th Street																									
Eastbound	LTR	0.14	14.4	B	14.4	B	7.0	B	LTR	0.14	14.5	B	14.5	B	7.0	B	LTR								
Northbound	T	0.65	7.1	B	7.1	B			T	0.66	7.2	B	7.2	B			T								
Southbound	T	0.45	5.7	B	5.7	B			T	0.46	5.7	B	5.7	B			T								
Central Park West & West 77th Street																									
Eastbound	LTR	0.28	14.8	B	14.8	B	34.0	D	LTR	0.28	14.8	B	14.8	B	43.1	E	LTR	0.30	15.9	C	15.9	C	30.7	D	Signal Retiming:
Northbound	LTR	1.12	52.7	E	52.7	E			LTR	1.17	69.6	F*	69.6	F			LTR	1.12	47.9	E	47.9	E			Add 2 Seconds Green Time NB/SB &
Southbound	LTR	0.87	13.8	B	13.8	B			LTR	0.88	14.5	B	14.5	B			LTR	0.85	11.4	B	11.4	B			Subtract 2 Seconds Green Time EB/WB.
Central Park West & West 81st Street																									Multiple Changes:
Eastbound	LTR	0.40	16.2	C	16.2	C	44.1	E	LTR	0.42	16.3	C	16.3	C	60.4	F	LTR	0.44	16.5	C	16.5	C	18.9	C	Create NB/SB Left-Turn Lanes; Add a Pro-
Westbound	DfL	1.13	124.4	F	57.3	E			DfL	1.21	171.7	F*	75.0	F			L	1.01	82.3	F	36.6	D			tected Leading Left-Turn Phase to the Traf-
	TR	0.40	16.2	C					TR	0.41	16.3	C					LTR	0.79	23.8	C					fic Signal, NB/SB; Prohibit Parking on the
Northbound	LTR	0.94	17.8	C	17.8	C			LTR	0.99	25.9	D*	25.9	D			L	0.30	7.2	B	12.9	B			NB/SB Approaches During Weekday & Sat-
																	TR	0.72	13.5	B					urday Peak Hours; and Re-Stripe the WB
Southbound	DfL	1.54	349.5	F	88.7	F			DfL	1.66	504.7	F*	126.4	F			L	0.83	25.5	D	13.8	B			Approach with an Exclusive Left-Turn, &
	TR	0.76	9.7	B					TR	0.76	10.0	B					TR	0.40	10.4	B					Shared Left/Thru & Thru/Right Lanes.
Central Park West & West 82nd Street																									
Eastbound	LTR	0.52	18.3	C	18.3	C	7.1	B	LTR	0.53	18.3	C	18.3	C	7.1	B	LTR								
Northbound	T	0.53	6.2	B	6.2	B			T	0.54	6.2	B	6.2	B			T								
Southbound	T	0.38	5.4	B	5.4	B			T	0.39	5.4	B	5.4	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	1.03	56.4	E	56.4	E	83.1	F	LTR	1.05	61.5	F*	61.5	F	85.5	F	LTR	1.00	48.5	E	48.5	E	35.2	D	Multiple Changes:
Westbound	LTR	0.63	16.5	C	16.5	C			LTR	0.63	16.5	C	16.5	C			LTR	0.63	16.5	C	16.5	C			Add 1 Second Green Time to EB/WB Phase,
Northbound	LTR	1.08	54.6	E	54.6	E			LTR	1.09	60.1	F*	60.1	F			LTR	0.63	9.0	B	9.0	B			Subtract 1 Second Green Time from WB
Southbound	DfL	1.88	1103.6	F	267.6	F			DfL	1.88	1103.6	F	265.7	F			DfL	1.47	324.7	F	85.1	F			Leading Phase, & Prohibit Parking at the
	TR	0.77	12.6	B					TR	0.78	12.8	B					TR	0.78	12.8	B					NB Approach.
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.61	16.7	C	16.7	C	12.5	B	TR	0.61	16.7	C	16.7	C	12.6	B	TR								
Westbound	DfL	0.54	18.1	C	14.4	B			DfL	0.54	18.1	C	14.4	B			DfL								
	T	0.26	13.3	B					T	0.26	13.3	B					T								
Southbound	LTR	0.82	11.0	B	11.0	B			LTR	0.82	11.2	B	11.2	B			LTR								
Columbus Avenue & West 76th Street																									
Eastbound	TR	0.45	17.5	C	17.5	C	8.6	B	TR	0.45	17.5	C	17.5	C	8.6	B	TR								
Southbound	LT	0.78	7.8	B	7.8	B			LT	0.78	7.9	B	7.9	B			LT								
Columbus Avenue & West 77th Street																									
Westbound	LT	0.24	15.5	C	15.5	C	9.5	B	LT	0.25	15.6	C	15.6	C	9.7	B	LT								
Southbound	LTR	0.84	8.9	B	8.9	B			LTR	0.84	9.0	B	9.0	B			LTR								
Columbus Avenue & West 78th Street																									
Eastbound	R	0.31	16.1	C	16.1	C	6.6	B	R	0.32	16.1	C	16.1	C	6.6	B	R								
Southbound	T	0.57	5.8	B	5.8	B			T	0.58	5.9	B	5.9	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.29	17.8	C	17.8	C	7.3	B	R	0.29	17.9	C	17.9	C	7.5	B	R								
Southbound	TR	0.77	5.6	B	5.6	B			TR	0.78	5.8	B	5.8	B			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.19	15.3	C	15.3	C	5.7	B	R	0.19	15.3	C	15.3	C	5.7	B	R								
Southbound	T	0.45	5.2	B	5.2	B			T	0.46	5.2	B	5.2	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	1.07	88.8	F	88.8	F	26.7	D	TR	1.11	104.4	F*	104.4	F	29.2	D	TR	1.06	83.0	F	83.0	F	26.8	D	Signal Retiming:
Westbound	L	0.41	21.9	C	21.9	C			L	0.44	22.1	C	22.1	C			L	0.44	22.1	C	22.1	C			Add 1 Second Green Time EB & Subtract
Southbound	LT	0.74	15.7	C	15.7	C			LT	0.74	15.8	C	15.8	C			LT	0.76	16.7	C	16.7	C			1 Second Green Time SB.
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.40	16.9	C	16.9	C	6.6	B	TR	0.40	16.9	C	16.9	C	6.6	B	TR								
Southbound	LT	0.53	5.6	B	5.6	B			LT	0.53	5.6	B	5.6	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.65	16.8	C	16.8	C	17.4	C	TR	0.66	16.9	C	16.9	C	17.5	C	TR								
Westbound	DfL	1.04	82.9	F	30.2	D			DfL	1.05	84.7	F	30.6	D			DfL								
	T	0.60	16.3	C					T	0.60	16.3	C					T								
Southbound	LTR	0.72	9.8	B	9.8	B			LTR	0.73	9.9	B	9.9	B			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.55	16.9	C	15.4	C	9.9	B	DfL	0.56	17.2	C	15.6	C	10.0	B	DfL								
	T	0.36	14.1	B					T	0.37	14.2	B					T								
Westbound	TR	0.21	13.0	B	13.0	B			TR	0.22	13.0	B	13.0	B			TR								
Northbound	LTR	0.62	8.6	B	8.6	B			LTR	0.62	8.6	B	8.6	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.56	19.2	C	19.2	C	6.8	B	LT	0.57	19.4	C	19.4	C	6.8	B	LT								
Northbound	TR	0.53	5.6	B	5.6	B			TR	0.54	5.6	B	5.6	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.62	6.1	B	6.1	B	6.1	B	LTR	0.63	6.2	B	6.2	B	6.2	B	LTR								

Notes:
Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).
*=Significant traffic impact, as defined in the *CEQR Technical Manual.*
** = Build Conditions for Option 4 are the same as for the Proposed Project during the PM Peak Hour.

Table H-12

Signalized Intersections:

2001 No Build, Build with Alternative Garage Access Options 4-6, and Mitigation for Options 4-6 - Level of Service Analyses

	Saturday Peak Hour																								
	No Build								Build with Alternative Garage Access Options 4-6								Mitigation for Options 4-6								
Intersection	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Lane Group	V/C Ratio	Delay (seconds)	LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Mitigation Measures Applied for Options 4-6
Central Park West & West 72nd Street																									Signal Retiming:
Eastbound	LTR	0.28	13.4	B	13.4	B	17.3	C	LTR	0.28	13.4	B	13.4	B	22.1	C	LTR	0.31	15.0	B	15.0	B	16.2	C	Subtract 3 Seconds Green Time EB/WB
Northbound	LT	1.00	26.8	D	26.8	D			LT	1.05	39.0	D*	39.0	D			LT	0.98	26.7	D	26.7	D			and Add 3 Seconds Green Time NB/SB.
Southbound	TR	0.78	11.3	B	11.3	B			TR	0.80	11.6	B	11.6	B			TR	0.75	8.9	B	8.9	B			
Central Park West & West 76th Street																									
Eastbound	LTR	0.19	14.7	B	14.7	B	7.0	B	LTR	0.19	14.7	B	14.7	B	7.1	B	LTR								
Northbound	T	0.51	6.1	B	6.1	B			T	0.54	6.2	B	6.2	B			T								
Southbound	T	0.59	6.6	B	6.6	B			T	0.61	6.7	B	6.7	B			T								
Central Park West & West 77th Street																									Signal Retiming:
Eastbound	LTR	0.23	14.5	B	14.5	B	14.5	B	LTR	0.23	14.5	B	14.5	B	20.6	C	LTR	0.25	16.1	C	16.1	C	12.5	B	Subtract 3 Seconds Green Time EB/WB
Northbound	LT	0.99	21.6	C	21.6	C			LT	1.06	35.2	D*	35.2	D			LT	0.99	18.8	C	18.8	C			and Add 3 Seconds Green Time NB/SB.
Southbound	TR	0.70	8.2	B	8.2	B			TR	0.72	8.4	B	8.4	B			TR	0.68	6.4	B	6.4	B			
Central Park West & West 81st Street																									Multiple Changes:
Eastbound	LTR	0.53	17.4	C	17.4	C	56.0	E	LTR	0.62	18.5	C	18.5	C	65.1	F	LTR	0.67	19.2	C	19.2	C	21.1	C	Create NB/SB Left-Turn Lanes; Add a Pro-
Westbound	DfL	1.08	97.9	F	47.1	E			DfL	1.10	109.2	F*	50.2	E			L	0.69	25.1	D	24.9	C			tected Leading Left-Turn Phase to the Traf-
	TR	0.37	16.0	C					TR	0.40	16.2	C					LTR	0.80	24.8	C					fic Signal, NB/SB; Prohibit Parking on the
Northbound	LTR	1.14	83.2	F	83.2	F			LTR	1.24	102.8	F*	102.8	F			L	0.42	9.2	B	17.8	C			NB/SB Approaches During Weekday & Sat-
																	TR	0.84	18.9	C					urday Peak Hours; and Re-Stripe the WB
Southbound	DfL	1.13	108.0	F	53.5	E			DfL	1.16	124.5	F*	62.6	F			L	0.95	45.3	E	23.3	C			Approach with an Exclusive Left-Turn, &
	TR	1.02	34.9	D					TR	1.04	41.3	E*					TR	0.73	16.1	C					Shared Left/Thru & Thru/Right Lanes.
Central Park West & West 82nd Street																									
Eastbound	LTR	0.50	17.6	C	17.6	C	6.9	B	LTR	0.50	17.7	C	17.7	C	7.0	B	LTR								
Northbound	T	0.28	5.0	A	5.0	A			T	0.29	5.0	A	5.0	A			T								
Southbound	T	0.53	6.1	B	6.1	B			T	0.54	6.2	B	6.2	B			T								
Central Park West & West 86th Street																									
Eastbound	LTR	0.69	24.1	C	24.1	C	16.7	C	LTR	0.70	24.3	C	24.3	C	17.3	C	LTR								
Westbound	LTR	0.60	16.2	C	16.2	C			LTR	0.61	16.3	C	16.3	C			LTR								
Northbound	LTR	0.87	16.3	C	16.3	C			LTR	0.90	18.2	C	18.2	C			LTR								
Southbound	LTR	0.76	11.4	B	11.4	B			LTR	0.78	12.0	B	12.0	B			LTR								
Columbus Avenue & West 72nd Street																									
Eastbound	TR	0.42	14.5	B	14.5	B	14.5	B	TR	0.42	14.5	B	14.5	B	15.1	C	TR								
Westbound	DfL	0.29	13.7	B	13.0	B			DfL	0.29	13.7	B	13.0	B			DfL								
	T	0.18	12.8	B					T	0.19	12.8	B					T								
Southbound	LTR	0.93	14.6	B	14.6	B			LTR	0.94	15.4	C	15.4	C			LTR								
Columbus Avenue & West 76th Street																									Signal Retiming:
Eastbound	TR	0.49	18.0	C	18.0	C	29.9	D	TR	0.49	18.0	C	18.0	C	35.8	D	TR	0.51	18.8	C	18.8	C	28.8	D	Add 1 Second Green Time SB & Subtract
Southbound	LT	1.04	30.7	D	30.7	D			LT	1.06	37.1	D*	37.1	D			LT	1.04	29.5	D	29.5	D			1 Second Green Time EB.
Columbus Avenue & West 77th Street																									Signal Retiming:
Westbound	LT	0.30	15.9	C	15.9	C	21.3	C	LT	0.31	16.0	C	16.0	C	25.4	D	LT	0.32	16.6	C	16.6	C	20.6	C	Add 1 Second Green Time SB & Subtract
Southbound	LTR	1.00	21.8	C	21.8	C			LTR	1.02	26.4	D	26.4	D*			LTR	1.00	21.0	C	21.0	C			1 Second Green Time WB.
Columbus Avenue & West 78th Street																									
Eastbound	R	0.25	15.6	C	15.6	C	8.5	B	R	0.29	16.0	C	16.0	C	8.5	B	R								
Southbound	T	0.82	8.2	B	8.2	B			T	0.82	8.1	B	8.1	B			T								
Columbus Avenue & West 79th Street																									
Eastbound	R	0.25	17.6	C	17.6	C	13.8	B	R	0.28	17.8	C	17.8	C	18.0	C	R								
Southbound	TR	0.97	13.4	B	13.4	B			TR	1.00	18.0	C	18.0	C			TR								
Columbus Avenue & West 80th Street																									
Eastbound	R	0.30	16.0	C	16.0	C	6.2	B	R	0.30	16.0	C	16.0	C	6.2	B	R								
Southbound	T	0.53	5.6	B	5.6	B			T	0.55	5.7	B	5.7	B			T								
Columbus Avenue & West 81st Street																									
Eastbound	TR	1.07	88.7	F	88.7	F	32.4	D	TR	1.03	75.1	F	75.1	F	31.3	D	TR								
Westbound	L	0.61	23.9	C	23.9	C			L	0.66	24.7	C	24.7	C			L								
Southbound	LT	0.98	26.0	D	26.0	D			LT	0.98	26.8	D	26.8	D			LT								
Columbus Avenue & West 82nd Street																									
Eastbound	TR	0.36	16.5	C	16.5	C	7.3	B	TR	0.36	16.5	C	16.5	C	7.4	B	TR								
Southbound	LT	0.69	6.7	B	6.7	B			LT	0.70	6.7	B	6.7	B			LT								
Columbus Avenue & West 86th Street																									
Eastbound	TR	0.41	14.4	B	14.4	B	21.3	C	TR	0.42	14.4	B	14.4	B	22.3	C	TR								
Westbound	LT	0.54	15.5	C	15.5	C			LT	0.55	15.6	C	15.6	C			LT								
Southbound	LTR	1.01	25.8	D	25.8	D			LTR	1.01	27.4	D	27.4	D			LTR								
Amsterdam Avenue & West 79th Street																									
Eastbound	DfL	0.42	15.0	B	14.1	B	9.8	B	DfL	0.45	15.4	C	14.4	B	9.9	B	DfL								
	T	0.25	13.3	B					T	0.29	13.6	B					T								
Westbound	TR	0.24	13.2	B	13.2	B			TR	0.26	13.3	B	13.3	B			TR								
Northbound	LTR	0.54	8.1	B	8.1	B			LTR	0.55	8.2	B	8.2	B			LTR								
Amsterdam Avenue & West 80th Street																									
Eastbound	LT	0.62	20.2	C	20.2	C	7.4	B	LT	0.63	20.6	C	20.6	C	7.5	B	LT								
Northbound	TR	0.478	5.3	B	5.3	B			TR	0.49	5.4	B	5.4	B			TR								
Amsterdam Avenue & West 81st Street																									
Northbound	LTR	0.536	5.6	B	5.6	B	5.6	B	LTR	0.55	5.7	B	5.7	B	5.7	B	LTR								

Notes:

Lane group designations: L=Left turn; T=Through movement; R=Right turn; LT=Through & Left turn movements; R=Through & right turn movements; LTR=Left turn, through, & right turn movements; DfL=Defacto Left turn (Left turns that force a lane to function as an exclusive left turn lane becasue of the volume of left turns being processed.) V/C Ratio=The ratio of volume to capacity. LOS=Level-of-Service (a letter designation representing the operation of lane groups, approaches, and/or intersections, determined by delay in seconds).

*=Significant traffic impact, as defined in the *CEQR Technical Manual.*

APPENDIX I*

COPIES OF COMMENTS ON THE DEIS

* *This appendix is new to the FEIS.*

July 4, 1996

Mr. Sigmund G. Ginsburg
Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

Dear Mr. Ginsburg:

The proposed Planetarium-Museum project has several commendable features. However, I am appalled at the possibility that expanded parking for the project – in the form of a three-story garage accommodating almost 400 cars – threatens to result in a tree-destroying, traffic-clogging automobile entrance/exit off Columbus Avenue.

The trees are precious and the promenade along Columbus Avenue, already a major north-south street, is an urban treasure. To cut a 24-foot wide gash through this gentle, leafy environment – in the name of traffic flow – would be intolerable. Further, during busy periods, cars headed for the museum garage would queue along 79th, as well as along Columbus, compounding neighborhood traffic headaches.

I urge project planners to:

1. Eliminate or scale back the auto-attracting garage, which would be two and a half times its current size.

2. Place greater emphasis on mass transit and other environmentally sound solutions to traffic problems.

3. Forswear **ANY** steps that would kill mature trees and mutilate the priceless Columbus Avenue streetscape.

Sincerely,

Signed: Bonnie Holzer

Print Name: Bonnie Holzer
Print Address: 127 W. 79 St-3J
New York, NY 10024

RECEIVED JUL 17 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Michael Thomas Iben

Print Name: Michael Thomas Iben
Print Address: 127 W. 79th St., 11B
NY, NY, 10024

106

RECEIVED JUL 1 1996

July 4, 1996

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New York, NY 10024

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Sincerely,
Susi Kaminsky
Signed: S

Print Name: Susan Kaminsky
Print Address: 127 W 79 St #9C

RECEIVED JUL · 0 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed:

Print Name: Erca Kandler
Print Address: 130 W. 79th St

RECEIVED JUL 1 1 1996

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Sincerely,

Signed:

Print Name: JAMES R. KAPLOW
Print Address: 127 W 79 ST #2F NY NY 10024

P.S. I HAVE FOUR (4) KIDS WHO PLAY IN THAT PARK!!

109

July 4, 1996

Mr. Sigmund G. Ginsburg
Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: David Kendalton

Print Name: DAVID KENDALTON
Print Address: 127 WEST 79 TH STREET, 4E
NEW YORK, NY 10024

RECEIVED JUL 12 1996

July 4, 1996

Mr. Sigmund G. Ginsburg
Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Nancy Kyriacos

Print Name: NANCY KYRIACOS
Print Address: 146 W 79th St
New York NY 10024

111

RECEIVED JUL 12 1996

July 4, 1996

Mr. Sigmund G. Ginsburg
Senior Vice President
American Museum of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

Dear Mr. Ginsburg: does not have ~~M~~

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Sincerely,

Signed:

Print Name: Wilson Lam
Print Address: 101 W. 79th St. #11H
NY, NY 10024

112

RECEIVED JUL 1 7 1996

July 4, 1996

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Senior Vice President
American Museum of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Martha Lazarevic

Print Name: MARTHA LAZAREVIC
Print Address: 124 West 79 St
N.Y. NY 10024

113

RECEIVED JUL 1 6 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Ellen Lerner

Print Name: ELLEN LERNER
Print Address: 175 W 79 ST
NY, NY 10024

114

July 4, 1996

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American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Judith Lidz

Print Name: JUDITH LIDZ
Print Address: 127 W 79th St
NY, NY 10024

115

RECEIVED JUL 1 7 1996

July 4, 1996

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Senior Vice President
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and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Wendy Lobel
Print Name: WENDY LOBEL
Print Address: 145 W. 79th St. 10024

116

RECEIVED JUL 1 7 1996

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Senior Vice President
American Musuem of Natural History
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Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Kaitilin B Mahony

Print Name: Kaitilin B. Mahony
Print Address: 127 W 79th #14H
NY NY 10024

117

RECEIVED JUL 7 1996

July 4, 1996

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Sincerely,

Signed: Lynn Mantione

Print Name: Lynn Mantione
Print Address: 127 W 79th St
Apt 3D

118

RECEIVED JUL 1 6 1996

July 4, 1996

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Sincerely,

Signed: Brian + Rachel Matthews

Print Name: Brian + Rachel Matthews
Print Address: 101 W. 79th St 2 1 B NYC 10024

119

RECEIVED JUL 1 2 1996

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Signed: Gerald Mayer

Print Name: GERALD MAYER
Print Address: 124 W. 79th ST.
New York, NY 10024

120

July 4, 1996

Mr. Sigmund G. Ginsburg
Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

Dear Mr. Ginsburg:

The proposed Planetarium-Museum project has several commendable features. However, I am appalled at the possibility that expanded parking for the project -- in the form of a three-story garage accommodating almost 400 cars -- threatens to result in a tree-destroying, traffic-clogging automobile entrance/exist off Columbus Avenue.

The trees are precious and the promenade along Columbus Avenue, already a major north-south street, is an urban treasure. To cut a 24-foot wide gash through this gentle, leafy environment -- in the name of traffic flow -- would be intolerable. Further, during busy periods, cars headed for the museum garage would queue along 79th, as well as along Columbus, compounding neighborhood traffic headaches.

I urge project planners to:

1. Eliminate or scale back the auto-attracting garage, which would be two and a half times its current size.

2. Place greater emphasis on mass transit and other environmentally sound solutions to traffic problems.

3. Forswear **ANY** steps that would kill mature trees and mutilate the priceless Columbus Avenue streetscape.

Sincerely,

Signed: Jacqui McConnell

Print Name: Jacqui McConnell
Print Address: 127 W. 79th St
Apt 15B
NY, NY 10024

121

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Elizabeth M. McGuire
Print Name: ELIZABETH McGUIRE
Print Address: 127 W. 79 Street #7B
NY, NY 10024

Bruce McGuire
Bruce McGuire
127 W. 79th St #7B
NY, NY 10024

122

July 4, 1996

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Sincerely,

Signed: Maria Teresa Manuel

Print Name:
Print Address: MARIA TERESA F. MANUEL
127 W. 79th ST - #4A
NY, NY 10024

123

RECEIVED JUL 17 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Sandy Needham

Print Name: SANDY NEEDHAM
Print Address: 145 W79
NY NY 10024

124

RECEIVED JUL 1 7 1996

July 4, 1996

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Senior Vice President
American Museum of Natural History
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Central Park West & 79th Street
New York, NY 10024

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Sincerely,
Ingrid Oertell
Signed: Ingrid [signature]
Print Name: Ingrid Oertell
Print Address: 101 W 79th St Apt 12F
New York, NY 10024

125

RECEIVED JUL 7 1996

July 4, 1996

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Central Park West & 79th Street
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Sincerely,

Signed:

Print Name: NOBUKO OGANESOFF
Print Address:
127 W. 79th St Apt 12D
New York, N.Y. 10024

126

RECEIVED JUL 17 1996

July 4, 1996

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Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Cornelia T. Ravenal

Print Name: CORNELIA RAVENAL
Print Address: 127 W 79th #16A

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Steve and Debbie Kane Raymar

Signed:

Print Name: Steve Raymar and Debbie Kane Raymar

Print Address: 127 W. 79 St # 14D
New York, N.Y. 10024

128

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Sol Rosenblatt & Vicky Rosenblatt

Print Name: SOL & VICKY ROSENBLATT
Print Address: 127 W. 79 St. 11C, New York, NY 10024

129

RECEIVED JUL 1 7 [illegible]

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed:

Print Name: RENE' RYBAKOFF
Print Address: 124 W. 79 ST
NY NY 10024

130

RECEIVED JUL 1 7 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Jane H. Schreck

Print Name:
Print Address:
Jane H. Schreck
175 W. 79th St.
NY NY 10024

131

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Bob + Lisa Sheehan

Print Name: Bob + Lisa Sheehan
Print Address: 127 West 79th Street, 1C
New York, NY 10024-6401

132

July 4, 1996

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Senior Vice President
American Musuem of Natural History
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Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Naomi Sherman

Print Name: Naomi Sherman
Print Address: 127 W. 79 ST
NYC 10024

RECEIVED JUL 1 1 1996

July 4, 1996

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American Musuem of Natural History
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Sincerely,

Signed: [signature]

Print Name: Marlyn Slavin
Print Address: 130 West 79th St 7E
NYC 10024

134

RECEIVED JUL 1 1 1996

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American Museum of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Helen K. Sparks

Print Name: Helen K. Sparks
Print Address: 101 W. 79th St. #5A
New York, NY 10024

135

July 4, 1996

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Senior Vice President
American Musuem of Natural History
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Central Park West & 79th Street
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Sincerely,

Signed: [signature]

Print Name: JENNIFER SPROWL
Print Address: 127 W. 79th #2L
NYC 10024

136

RECEIVED JUL : 8 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Judith Sternlight

Print Name: Judith Sternlight
Print Address: 127 West 79th St, 2G
New York NY 10024

July 4, 1996

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Senior Vice President
American Musuem of Natural History
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Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Mr. and Mrs. Jay Stromer

Print Name: Mr. & Mrs. Jay Stromer
Print Address: 127 West 79th Street
New York, NY 10024

138

RECEIVED JUL 1 6 1996

As long-time members of the Museum of Natural History and residents of this neighborhood, our family strongly oppose the proposed parking project. We urge you to consider other options. Thank-you.

July 4, 1996

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Senior Vice President
American Museum of Natural History
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Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Julia & James Stokien

Print Name: Mr. & Mr. James Stokien
Print Address: 90 Riverside Dr. #10E
N.Y. N.Y. 10024

139

RECEIVED JUL 1 7 1996

July 4, 1996

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Sincerely,

Signed: Bernard Thall

Print Name: BERNARD THALL
Print Address: 175 W. 79 ST.
N.Y. N.Y. 10024

140

RECEIVED JUL 1 2 1996

July 4, 1996

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Sincerely,

Signed: Katherine Torok

Print Name: Katherine Torok
Print Address: 127 W 79th St. Apt 16H
NYC, NY 10024

141

July 4, 1996

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Senior Vice President
American Musuem of Natural History
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Central Park West & 79th Street
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Sincerely,

Signed: [signature]

Print Name: DAVID TRAHAN VP Citicorp
Print Address: 127 W 79th 4B

142

This plan cannot go forward

July 4, 1996

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Senior Vice President
American Musuem of Natural History
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The trees are precious and the promenade along Columbus Avenue, already a major north-south street, is an urban treasure. To cut a 24-foot wide gash through this gentle, leafy environment -- in the name of traffic flow -- would be intolerable. Further, during busy periods, cars headed for the museum garage would queue along 79th, as well as along Columbus, compounding neighborhood traffic headaches.

I urge project planners to:

1. Eliminate or scale back the auto-attracting garage, which would be two and a half times its current size.

2. Place greater emphasis on mass transit and other environmentally sound solutions to traffic problems.

3. Forswear **ANY** steps that would kill mature trees and mutilate the priceless Columbus Avenue streetscape.

Sincerely,

Signed: Victoria Traube

Print Name: VICTORIA TRAUBE
Print Address: 127 WEST 79 ST
NYC NY 10024

P.S. I am a supporting member of the Museum, which I adore, but I do feel that the current parking garage plans are unacceptable for the neighborhood

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RECEIVED JUL 1 6 1996

July 4, 1996

Mr. Sigmund G. Ginsburg
Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Clara Lipshie
Print Name:
Print Address: 175 W 79 ST
NYC 10024

144

RECEIVED JUL 17 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Monica Valenti

Print Name: MONICA VALENTI
Print Address: 124 W. 79 St. #3D
NYC 10024

Angelo Valenti
Angelo Valenti
124 West 79th 3D
N.Y. 10024

145

July 4, 1996

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Senior Vice President
American Museuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,
Diana Wadia
Signed:
DIANA WADIA, 127 W. 79th ST., N.Y., N.Y., 10024-6401 (9A)
Print Name:
Print Address:

146

P.S. Crossing 79th Street/Columbus Ave. is already extremely hazardous and we do not need any more reckless drivers about whom no-one and no government agency ever have done anything in the past and we don't need your museum to add further hazards of walking near our homes.

RECEIVED JUL 1 6 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Fred

Print Name: Fred Weinberg
Print Address: 175 West 79 St, NY NY 10024

147

RECEIVED JUL 1 2 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Sheri Weiner

Print Name: SHERI WEINER
Print Address: 146 W. 79 St. NYC 10024

148

RECEIVED JUL 17 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Carol R Whitehead

Print Name: CAROL R Whitehead
Print Address: 124 West 79th #4A

149

RECEIVED JUL 17 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Thomas Wommack

Print Name: THOMAS WOMMACK
Print Address: 145 W 79 #3B
NYC 10024

150

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Sandra Yanowitz

Print Name: SANDRA YANOWITZ AKA JULIA RAND
Print Address: 127 WEST 79 TH ST APT 3C
NEW YORK, N.Y 10024

151

RECEIVED JUL 1 6 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Sarah Zenis

Print Name: Z
Print Address Ms. Sarah Zenis
146 W 79th St Apt 3D
New York, NY 10024-6456

152

RECEIVED JUL 1 0 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
Central Park West & 79th Street
New York, NY 10024

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Sincerely,

Signed: Harriet S. Zucker

Print Name: HARRIET S. ZUCKER
Print Address: 145 W. 79th ST
NY, 10024 NY.

153

RECEIVED JUL 1 1 1996

July 4, 1996

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Senior Vice President
American Musuem of Natural History
and Planetarium Authority
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New York, NY 10024

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Sincerely,

Signed:

Print Name: 130 W 79th Street 6E
Print Address: NY NY 10024

154

LANDMARK WEST!

THE COMMITTEE TO PRESERVE THE UPPER WEST SIDE

RECEIVED JUL 26 1996 PLANETARIUM & NORTH SIDE PROJECT

LANDMARK WEST!
Comments on the DEIS for the Planetarium Project
of the Museum of Natural History
July 26, 1996

The Museum of Natural History was listed on the National Register of Historic Places in 1976 and on the State Register in 1980 when it came into existence. The New York State Office of Parks, Recreation and Historic Preservation indicates that "the Hayden Planetarium is considered to be a historic addition to the museum -- in other words it contributes to the significance of the museum complex."[1]

We have reviewed in detail the Executive Summary of the Draft Environmental Impact Statement prepared for the Museum of Natural History Planetarium Authority by Allee King Rosen & Fleming, Inc. and dated May 1996. We have the following comments:

- We feel that the Historic Resource which the Hayden Planetarium is, does not receive serious consideration: saving a few grilles or architectural and decorative elements is a poor substitute to saving the building. The project plans the demolition of the Planetarium, the new design is exciting and beautiful, but that we do not believe that the museum, in conjunction with a firm of such caliber as James Stewart Polshek's, cannot find a solution to the problem of keeping the existing building while constructing a new one - difficult, but not unsolvable. In any event the DEIS does not offer a convincing argument that the problem cannot be solved.

- The DEIS implies that dwindling attendance at the Planetarium is due to its being "out of date" without recognizing that it has not been maintained and that no effort has been made at keeping it current (an analysis of dollars invested in maintenance/refurbishing and promotion compared to attendance numbers would be interesting).

- The Background Research Report on the history of the Planetarium that was submitted to the Landmarks Preservation Commission clearly spells-out the technological importance of the Hayden Planetarium in the United States. It is the second thin-shell concrete building ever to be constructed in the United States (the first, built in 1933, was demolished in 1934) and is unique as an early hemispherical dome that did not utilize common barrel vaulting techniques of other thin-shell buildings. The framing technology for the dome was custom designed in a uniquely American fashion to house the projector technology within. The construction technology of the Hayden Planetarium building is therefore of local and national significance.

---

1 Letter to LANDMARK WEST! dated July 19, 1996 from the NYSOPRHP, Historic Preservation Field Services Bureau

45 WEST 67 STREET NEW YORK NY 10023 212-496-8110 FAX 212-875-0209

- Regarding the question of traffic, is visitor parking really necessary? The Upper West Side is exceedingly well served by public transportation and there is a direct entrance from the subway to the Museum on Central Park West. We suggest that the Museum contemplate an advertising campaign that would play up this asset; we suggest that this entrance be restored, maintained, made as attractive as possible and publicized. It is already well used: all of us who live on the Upper West Side routinely see groups of visitors get off the train at that station - headed for the Museum. The Upper West Side is a "walking neighborhood": the DEIS, in our opinion, puts too much emphasis on vehicular traffic and neglects to fully use the opportunity of public transportation as a positive tool.

Secondly, we are concerned that traffic solutions be appropriate to the context of the historic district and not borrowed from the highway: What are "Lane stripping measures" (page 1-7)? Are these measures, and others like them, appropriate to a historic urban context?

- With regard to the park design, lighted banners are mentioned on pages 1-6: we are concerned about the size and impact of what seems like an advertising medium (the banners are lighted) on the traditionally quiet park.

In conclusion, LANDMARK WEST! would like to reiterate our position that the proposed demolition of this landmark building concerns us, and that every reasonable alternative should be thoroughly explored. We acknowledge the museum's effort to be technically current and competitive, but we are not convinced that this may be achieved only by the sacrifice of the historic Hayden Planetarium.

RECEIVED JUL 22 1996

New York
July 18, 1996

Mr. Sigmund Ginsburg
Senior Vice President
American Museum of Natural History
Central Park West at 79th Street
New York, N.Y. 10024

Dear Mr. Ginsburg:

I am writing in response to a bulletin (copy attached) from the West 79th ~~Street~~ Block Association.

As a longtime resident of West 79th ~~Street~~ (and also a member of the Museum) I am distressed to learn of the Museum's plans to destroy the existing Hayden Planetarium, much less the rest of these "improvements" in the Museum complex.

I think it would be a great pity to destroy this unique building, and replace it with a glitzy project. I was shocked to learn - as I understand it - that the New York Landmarks Preservation Commission agreed to such a thing.

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It seems to me that the Museum would become more of an "entertainment" mall than a cultural and educational institution.

I may not be around in the year 2000 when this proposed project is to be completed, and the thought of another four years of dirt, noise, confusion, and disruption in the neighborhood is hard to bear.

I hope the Museum will consider carefully the effect its proposed project would have on our community.

Sincerely,

Eleanor Allaway

Eleanor Allaway
140 West 79 St.
Apt. 11-C
New York, NY 10024-6427

West 79th Street
'Museum' Block
Association

July 15, 1996

Dear Neighbor: The American Museum of Natural History plans a $136 million construction project that would:

--Continue the Columbus Avenue construction chaos in the neighborhood at least until the year 2000.

--Bring an additional 670,000 people a year to the neighborhood ON TOP OF a new 670,000 attendance increase the museum projects WITHOUT THIS PROJECT. That's an increase of an additional 1,340,000 new people a year without the countless others, who will come as consumers to the outdoor terrace (where amplified music is planned) to be built on top of the parking garage, the restaurant, the "galleria", and other, yet to be articulated mall-like activities. This project promises an irreparable dose of traffic jams, pollution, safety concerns (e.g. a new driveway into the parking lot from Columbus Ave.), overcrowding, stress, and chaos for our neighborhood.

--Add a new futuristic building that is architecturally completely out of character with our neighborhood.

--Tear down the existing landmark planetarium without adequately showing why it couldn't be adapted to meet educational needs, as the museum has done in the rest of its existing complex. The prestigious West Side landmarks watchdog, "Landmarks West," officially opposed the destruction of the existing Planetarium.

--Effectively change the planetarium's zoning by creating a consumer and entertainment project in the guise of developing science education.

--Completely disrupt the green belt between our street trees and plants and Central Park provided by the beautiful trees in Margaret Mead Green, the park on the Museum's west and north sides. This would ultimately encroach upon and decrease the usability of the existing park space.

Clearly the quality of life of our neighborhood as we know it is threatened by this project. The Museum Community needs honest answers to the following questions.

--Do we <u>really</u> need this project? What are the true educational alternatives? Have they really been explored?

--Isn't our <u>residential</u> community already "maxed out" from the existing plethora of "tourist" attractions including the museum itself, Central Park, the burgeoning local bar scene, and countless special events on the Great Lawn and elsewhere, such as Pocohontas, the Thanksgiving Day Parade, movie productions, etc?

--After two years of Columbus Ave construction, aren't we already at the breaking point when it comes to traffic jams, construction noise and confusion?

--Won't the futuristic architecture of the projected planetarium be a jarring eyesore in a landmark community whose solid architectural foundations were established in a different era?

--What is the position of our local representatives on this project?

--We are concerned and dismayed that the museum, as a leading urban scientific institution which should be on the cutting edge of urban habitat preservation, should be involved in a project that would degrade its own highly regarded urban habitat--our neighborhood.

We are in touch with other concerned neighbors on 81st, 80th, and 78th Sts. The Environmental Impact Statement deadline is **THIS** Wednesday. We need your response (and, if you can, a copy to Sam Leff, 171. W. 79th St. #3) by then.

You can do this by either writing your comments on this sheet or writing your own letter and sending it/them to:

Mr. Sigmund Ginsburg
Senior Vice President
AMNH
Central Park West & 79th St.
New York, NY 10024

Peyton Budinger
101 West 79th Street
New York, NY 10024

RECEIVED JUL 18 1996

July 15, 1996

Mr. Sigmund Ginsburg
Senior Vice President.
American Museum of Natural History
CPW & 79th ST.
New York, NY 10024

Dear Mr. Ginsburg,

I'm writing with concerns about the Planetarium museum project. Though I understand that modernization is a fact of life, and I'm sure you treasure your beautiful museum as much as the rest of us, I do not support an oversized garage that would harm the environment in many ways.

I am sure you are aware that the Promenade along Columbus Avenue, evocative of some of the grandest walkways in Europe, is one of New York City's treasures. The unbroken expanse, and the beautiful mature trees are what make it that way.

I beg you: Do not disturb the beautiful walkways around the museum; do not remove any of our treasured trees; and rethink the size and scale of this garage that will bring so many traffic problems to the Upper West Side.

Please take a stand for history & beauty!

Sincerely,

Peyton Budinger

080697

RECEIVED AUG 0 5 1996

rk State
... Recreation and Historic Preservation

Bernadette Castro
Commissioner

July 31, 1996

Mr. Sigmund G. Ginsburg
Senior Vice President
American Museum of Natural History
Planetarium Authority
Central Park West at 79th Street
New York, New York 10024

Dear Mr. Ginsburg:

Thank you for forwarding a copy of the Bus Management Plan proposed for the north end of the American Museum of Natural History. It is obvious that much careful thought has gone into this portion of the Draft Environmental Impact Statement. The alternatives proposed will go far in alleviating the potential congestion of bus traffic while providing for the convenience of the public and the normal operations of the Museum.

Again, thank you for the Management Plan. I appreciate being updated on developments at the Museum.

Most sincerely,

Bernadette Castro
Commissioner

162

Empire State Plaza • Agency Building 1 • Albany, New York 12238
518-474-0463 • FAX: 518-474-1365

RECEIVED JUL 2 2 1996

Richard Gershon

127 WEST 79TH STREET, NEW YORK, NEW YORK 10024 (212) 799-1325

5/16/96

Mr. Sigmund Ginsburg
Senior Vice President
AMNH
Central Park West + 79th St
NY NY 10024

Dear Mr. Ginsburg:

"Progress" is a wonderful thing. It's too bad that everyone's definition differs. I believe that the wholesale changes that you propose for the museum - if I understand them - are generally ill-conceived. You may view all of them as necessary. I certainly don't and its my neighborhood. I understand that the museum is trying to overcome its reputation as stodgy - well deserved I believe - but little steps before big steps may be in order.

Any project, of any size, in New York takes longer, is more disruptive and more costly than planned (the latter is your problem chiefly; the first two are my problems). When you juxtapose your plans on to what's been happening 163
(cont.)

on Columbus ave. for years, I can only react unfavorably.

And, again if I understand it correctly, much of what you want to do is under the guise of education. Perhaps you're stretching the definition of "education" (If the rather cheesy way you are overmerchandising some of the exhibits today is any example, I can only think that way).

You have wonderful exhibits and if I couldn't figure out how to promote the great resources of the museum without wrecking the neighborhood for a year or three or perhaps forever, I would hang up my PR shingle. Anyone who knows anything about the natural world - and I do - could.

The answer to the museum's problems is not massive reconstruction, glitzy merchandising (some has its place) and many more people, it's using what you've got well before you bring in the bulldozers. I'll fight you and so will the entire neighborhood -

Very Truly Yours
Richard Gordon

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