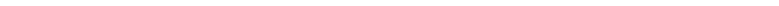


**Chapter Five**  
The Master Plan 2003  
Update for the NIH  
Bethesda Campus



## 5.1 Planning Process and Program Summary

### 5.1.1 Master Plan Process

Development of the NIH Master Plan 2003 Update has followed the same logical and comprehensive process used in the 1995 Master Plan. Throughout the process, Master Plan decisions have been coordinated with NIH staff and administration, local community groups, and public review agencies.

This Update responds to current operational and physical conditions on campus, and maximum capacity of 22,000 employees on campus by the year 2023. The Update follows major concepts established in 1995, and amends other concepts so as to adapt to changing NIH needs.

The following activities were part of the Master Plan Update process.

#### ***Validation of Planning Goals, Objectives, and Premises***

This process reaffirmed the basic objectives, which were established by the 1995 Master Plan in support of the research mission of the NIH, and the fundamental attitudes, which would shape the direction of subsequent studies.

#### ***Data Gathering and Analysis***

This phase began by conducting a series of interviews with key NIH personnel to update the programmatic needs for the campus and to document existing physical site conditions. During the analysis phase the interview data was compiled, augmented, and later adjusted to reflect IC projections of campus population growth and space needs. The physical site data was analyzed to confirm general patterns of land use, building disposition, landscaping, and other important features within the campus, and to understand the NIH Bethesda site in relationship to its surrounding context. During this phase, traffic, parking, stormwater, and environmental studies were begun.

#### ***Development of Program and Planning Principles***

During this phase the campus space needs were further defined to determine appropriate allocations of space to various campus uses and to identify other needs or activities, which should be addressed by the Master Plan Update. Concurrently, general Planning Principles derived from the analysis of existing conditions and Planning Premises were reviewed.

#### ***Alternative Concept Studies***

In 1995, several Alternative Concept Studies showing potential building locations and development strategies were made and tested for appropriateness. After review by the NIH administration and the Master Plan Working Group, the strongest components of these studies were incorporated into a Preferred Concept and tested against the emerging program and space requirements. The design approach in the 2003 Update continues to follow the 1995 Preferred Concept.

#### ***Preliminary Master Plan/Draft Master Plan/Final Master Plan***

The Preferred Concept was further refined through development of the Preliminary Master Plan as more programmatic, transportation, utility, phasing, and environmental data became available. The published *1995 NIH Master Plan* documented all of the completed analysis, programming, and planning work, and incorporates public comment and agency review.

#### ***Master Plan Updates***

Upon revision of the 1995 Master Plan by public agencies, NIH was required to publish a Master Plan *Update* approximately every five years. The NIH Master Plan 2003

Update follows the 1995 goals, principles, and concepts while adapting to changing NIH requirements and campus development over the planned 20-year period. This *NIH Master Plan 2003 Update – Main Campus, Bethesda, MD* incorporates comments from review agencies and the general public, and is published in coordination with the *Environmental Impact Statement (EIS)*.

### **Master Plan Changes**

The Master Plan 2003 Update reflects the changing requirements and campus development over the planned 20-year horizon. Specific program and planning changes from the 1995 Master Plan to the Master Plan 2003 Update are highlighted below:

- Building M use for research support service
- East Quad to have four buildings instead of five, one of which will serve as Research Support Service Building (J/K)
- Reuse of Building 34 /34A and integration of West Child Care into Building 34 / 34A
- Integration of Animal Research Center (ARC) into South Quad
- Removal of Building E and retention of Building 21
- Addition of Multi-Level Parking D (MLP-D) under Central Mall
- Extension of North Drive to the Loop Road
- Removal of underground service level in South Quad, thus maximizing parking space at MLP-C
- New Building R on the southeast corner of campus, requiring demolition of MLP-7
- New MLP-E south of South Quad (above/below grade) to account both for MLP-7 loss and campus growth
- Revision and improvement of the Loop Road, specifically north of the CRC and at the rotary on Center Drive
- Addition of perimeter security fence and controlled access gates
- Addition of Gateway Center for visitors at Medical Center Metro Station area
- Addition of Commercial Vehicle Inspection Facility
- Conversion of West Drive entrance at Cedar Lane to a Clinical Center patient and visitor only entrance.

## 5.1.2 Summary of Master Plan Goals and Objectives

### ***Master Plan Goals and Objectives***

The Master Plan contains the following planning goals in support of the NIH mission implementation strategies. Refer to Section 2.6 for detailed statements and objectives.

#### ***Goal 1***

Foster innovative research strategies designed to advance the nation's capacity to improve health.

#### ***Goal 2***

Provide a physical framework for the changing nature, character, and urgency of medical research and education.

#### ***Goal 3***

Provide a secure and supportive environment for the people involved in NIH activities, including scientists and professional/administrative staff, visitors and other non-NIH users, patients and their families, and residents and students.

#### ***Goal 4***

Enhance and respect the stability and integrity of the surrounding residential community.

#### ***Goal 5***

Protect the natural resources and environmental qualities of the NIH campus and the region.

#### ***Goal 6***

Use the Master Plan to foster communication about NIH goals and policies.

### ***Master Plan Update Review Criteria***

In response to the Master Plan Goals and Objectives and comments from the NIH, review agencies, and citizens groups, the following list of review criteria was created in 1995 to evaluate the various concepts brought forth in the Master Planning process. These criteria were used to guide the selection of the Preferred Concept and to inform the final Master Plan. The most successful planning concepts exemplified the following characteristics, and have been retained in this Update.

- Ability to improve functional requirements and relationships
- Ability to accommodate the space and functional program
- Clarity of organization and hierarchy
- Compatibility with surrounding community
- Ability to build incrementally
- Extent of flexibility/adaptability for future changes
- Success at integrating buildings to be retained
- Efficient use of existing resources
- Ease in accommodating topography and natural attributes
- Ease in accommodating and controlling access (vehicles/parking/transit/pedestrians/bicycles)
- Appropriate coordination with infrastructure and utility systems
- Quality of the resulting campus environment
- Appropriate image to reflect the nature and mission of NIH
- Response to historic and cultural resources

### 5.1.3 Summary of Planning and Program Premises

#### **General Growth**

The Bethesda Campus will continue to be developed to accommodate research needs and required programmatic adjacencies, consistent with the ability to: maintain the “campus” character of the site; be supported by local services and utilities, and; be responsive to the context of adjacent neighborhoods or developments.

#### **Personnel Growth Estimates**

The Bethesda campus is capable of supporting an increase by 25 percent of the current population of 17,511 (year 2003). Within the next twenty years, population increases at NIH may reach the Bethesda campus capacity of approximately 22,000. The primary growth at the campus is planned to be in Intramural Research personnel.

#### **Space Programs**

Based on personnel growth estimates, space requirements are calculated for 2003 and the end of each master plan phase. These are shown in Table 5.1.3-a.

Table 5.1.3a - Assignable Area

Category	2003 GSF	First Phase GSF	Second Phase GSF	Third Phase GSF	Final Phase GSF
Clinical Center Complex	2,272,680	2,927,151	3,315,907	3,315,907	3,315,907
Administrative / Special Function	1,219,305	1,316,412	1,388,959	1,388,959	1,575,959
Research	2,720,238	3,201,593	4,140,763	4,387,214	4,785,414
Animal Facility	432,408	288,071	335,000	335,000	335,000
Service / Support	432,408	413,122	256,886	252,371	252,371
Utility	338,122	338,122	300,575	300,575	300,575
Residential	89,910	150,410	150,410	150,410	150,410
<b>Totals</b>	<b>7,360,734</b>	<b>8,634,881</b>	<b>9,888,500</b>	<b>10,127,436</b>	<b>10,715,636</b>

#### **Clinical Center Complex Stabilization and Renovation**

In accordance with the recommendations of the External Advisors Report on intramural research released in 1994, NIH decided to retain, stabilize and renovate the Clinical Center in its current location (Building 10 at the north-central part of the campus). The program consists of renovation, some additional interior space and removal of Building 10A.

The Clinical Research Center (the Mark O. Hatfield Clinical Research Center - CRC) is currently under construction on the north side of the current facility, creating a new face for the Clinical Center Complex along Center Drive. The Clinical Research Center includes the construction of approximately 1,050,000 gsf of replacement hospital and related research space.

#### **Building and Land Use**

- Similar building uses should be grouped together geographically.
- Residential use on campus should not be expanded.
- Employee amenities and services should be increased and appropriately distributed on campus.

**Open Space**

- A perceivable and hierarchical system of open spaces should be developed.
- The buffer zone should be enhanced and respected where possible. •
- Landscaping elements should be improved and increased.

**Architectural Guidelines**

- Policies and criteria should be developed and used as guidelines for future development.
- Future development should respect historic patterns, and should convey a sense of order, quality, and unity throughout the campus.

**Transportation/Circulation**

- A well-defined road system should be established to increase efficiency, orient visitors, and protect open space.
- Placement of buildings and circulation routes should encourage employee and visitor use of mass transit.
- The character of the campus as one that encourages pedestrian and bicycle use should be promoted.
- Availability and location of parking should be studied to determine the appropriate number of spaces and to ensure a proportional distribution around the site.
- Traffic impacts of further campus development should be mitigated.
- Accessibility for persons with disabilities must be ensured.

**Infrastructure**

- Major utility infrastructure and service uses should be geographically concentrated.
- The development of the Master Utilities Plan should be coordinated with the Master Plan.
- Future buildings should be designed with maximum flexibility to facilitate change as state-of-the-art needs dictate.

**Animal Programs**

- The relationship of the NIH Animal Center to the Bethesda campus should be periodically evaluated as part of the Master Plan update process.
- The 14/28-18/32 Animal Facility building complex should be replaced with more efficient facilities.

**Management**

- The NIH should encourage management and personnel participation in the development, implementation, and update of the Master Plan.
- A “good neighbor” relationship should be maintained with the surrounding community.
- The NIH should continue to provide a means of ensuring greater citizen involvement.

**Amenities and Site Program**

- The Master Plan should provide for programmed child care facilities according to the NIH 2004 Guidelines for Amenities.
- Facilities not specifically programmed, but that may be absorbed within the gross area allocated to space programs of major buildings, such as small-scale employee and business services, convenience retail, and support functions, should be distributed according to the NIH 2004 Guidelines for Amenities. Existing retail and employee services should be enhanced at present locations.
- A Campus Center is planned at the south end of the Central Mall, which would include child care, fitness center, and transit and visitor information, among other campus informational and recreational services. The planned services will be included as part of an adaptive reuse and renovation of portions of the existing Building 34/34A for the strategic concentration of core amenities within a Campus Center.

- The Master Plan should address outdoor recreational spaces for patient and employee fitness and use, including: areas for active recreation, such as ball playing, biking or jogging; and, outdoor eating/picnic facility enhancements.

#### **5.1.4 Planning Principles**

The Planning Principles for the NIH Master Plan 2003 Update are, for the most part, identical to those incorporated in the 1995 Master Plan. They were derived from the project Goals and Objectives, observations made in the Analysis Phase, and the documentation of Opportunities and Constraints. These Principles were the first step toward conceptual designs, and represent broad physical design objectives, which could be applied to any concept, developed for the site.

The major Planning Principles have been grouped into eight categories, which are described below.

##### ***Campus Structure & Organization (Figure 5.1.4-a)***

- Retain the landscaped character of the perimeter of the site and respect the existing topography
- Intensify the density of the campus core for proximity to the Clinical Center and to protect the openness of the campus perimeter.
- Retain and stabilize the existing Clinical Center (Building 10 Complex) as a major campus organizational feature.
- Incorporate the additional four anchor building groupings to remain (northeast corner, Historic Core, west side, and southeast corner) into the new Master Plan.
- Relate existing and future building groupings to an overall campus structure.
- Respect the existing campus orthogonal grid in developing a new campus structure.
- Create a better-defined sense of hierarchy among campus buildings and open spaces.

##### ***Landscape & Open Space (Figure 5.1.4-b)***

- Preserve the perimeter of the campus as informal open space with an informal landscape character.
- Create or enhance defined open space within the interior of the campus. Landscape character within this area of the site should be more formal.
- In keeping with existing conditions, enhance and preserve the unique landscape characteristics of the four corners of the site: the “Woodland” at the northwest corner; the “Stream” at the northeast corner; the “Lawn” at the southeast corner; and the “Park” at the southwest corner.
- Enhance the landscaped screen buffer at the southwest perimeter of the site.
- Retain less densely planted lawn areas allowing views into the site along Rockville Pike and Old Georgetown Road.
- Locate and utilize interior campus open spaces to link the various areas of the campus, and to create a pedestrian friendly environment.

##### ***Development Proximity to Metro (Figure 5.1.4-c)***

- Encourage public transit use by locating development within walking proximity to the Metrorail intermodal facility.
- Visitor-oriented amenities should be located as close to the Metro station transit node as possible.

##### ***Development Density Zones & Community Buffers (Figure 5.1.4-d)***

- Create a series of development density zones for the site, with the highest density being located at the Clinical Center Complex (zone 1) and the lowest density toward the surrounding residential neighborhoods (zone 3).

- Maintain the open space buffers along Rockville Pike and Old Georgetown Road where possible.
- Enhance the neighborhood buffers for screening along the north and south sides of the site.

#### **Functional Relationships (Figure 5.1.4-e)**

- Reinforce the Clinical Center as the functional heart of the campus.
- Cluster Administrative functions along the more “public” east side of the campus.
- Primarily locate Research uses toward the core of the campus with proximity to the Clinical Center
- Consolidate Utility and Support/Service functions in proximity to Building 11.
- Maintain the northwest corner of the site for low-density Residential and Special Use functions.

#### **Clinical Center Stabilization and Renovation Program (Figure 5.1.4-f)**

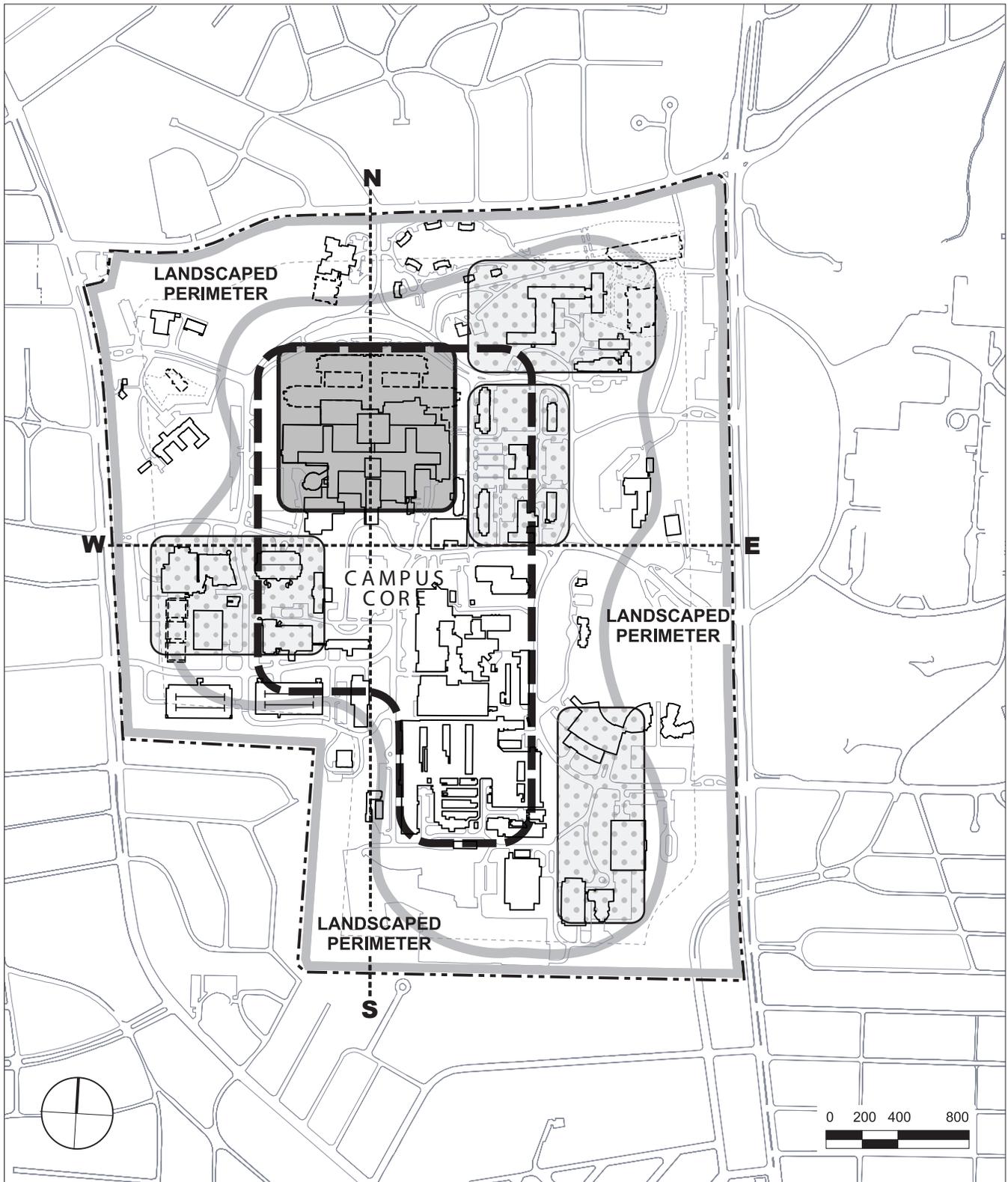
- The existing core of Building 10 will be retained and should remain the highest building mass within the new Clinical Center Complex composition.
- Due to the large bulk of the Clinical Center Complex and the Clinical Research Center expansion, appropriately scaled open spaces should be created around the building and the relative sense of openness of the surrounding landscape should be preserved.
- The “public” face of the complex and the primary public entry should be located on the north side of the complex, addressing the loop road. A primary “campus” or research entry should be located on the south side of the complex.
- The north-south pedestrian “spine” through the complex to connecting areas north of the Clinical Center to the Central Mall and south areas of the campus should be maintained and enhanced.
- Locate service access away from the primary entries and pedestrian circulation paths.

#### **Public Access & Orientation (Figure 5.1.4-g)**

- Reinforce the Rockville Pike and Old Georgetown Road corridors as the primary and secondary regional public “address” or frontages for the site.
- Emphasize the two public visitor campus entries at respectively Cedar Lane and Rockville Pike.
- Reinforce campus organization through the creation of a “campus loop” or “loop road” which will; a) become an orienting device for employees and visitors, and, b) provide clear access to all areas of the campus.
- Align the “campus loop” with existing campus circulation paths where possible; design new portions of the loop so as to minimize impacts on neighboring communities.
- Designate the “campus loop” as the primary campus public “address” for NIH buildings. Reinforce existing buildings/groups, which face the loop and orient new buildings/groups toward the loop.

#### **Parking (Figure 5.1.4-h)**

- Remove remaining surface parking located in the perimeter buffers as soon as possible.
- Reduce surface parking on the campus (to the extent feasible) to create a more pedestrian friendly environment and reduce stormwater runoff.
- Concentrate parking in existing or new parking “receptors” which are: a) conveniently accessed from major entries or the campus loop; b) located away from the Metro station except visitors' parking structure; c) separated and buffered from residential neighborhoods, and; d) distributed in proportion to campus population in the various sub-areas of the site.



- CLINICAL RESEARCH CENTER
- FIXED ELEMENTS

**Figure 5.1.4-a**

**Planning Principle**

**Campus Structure**

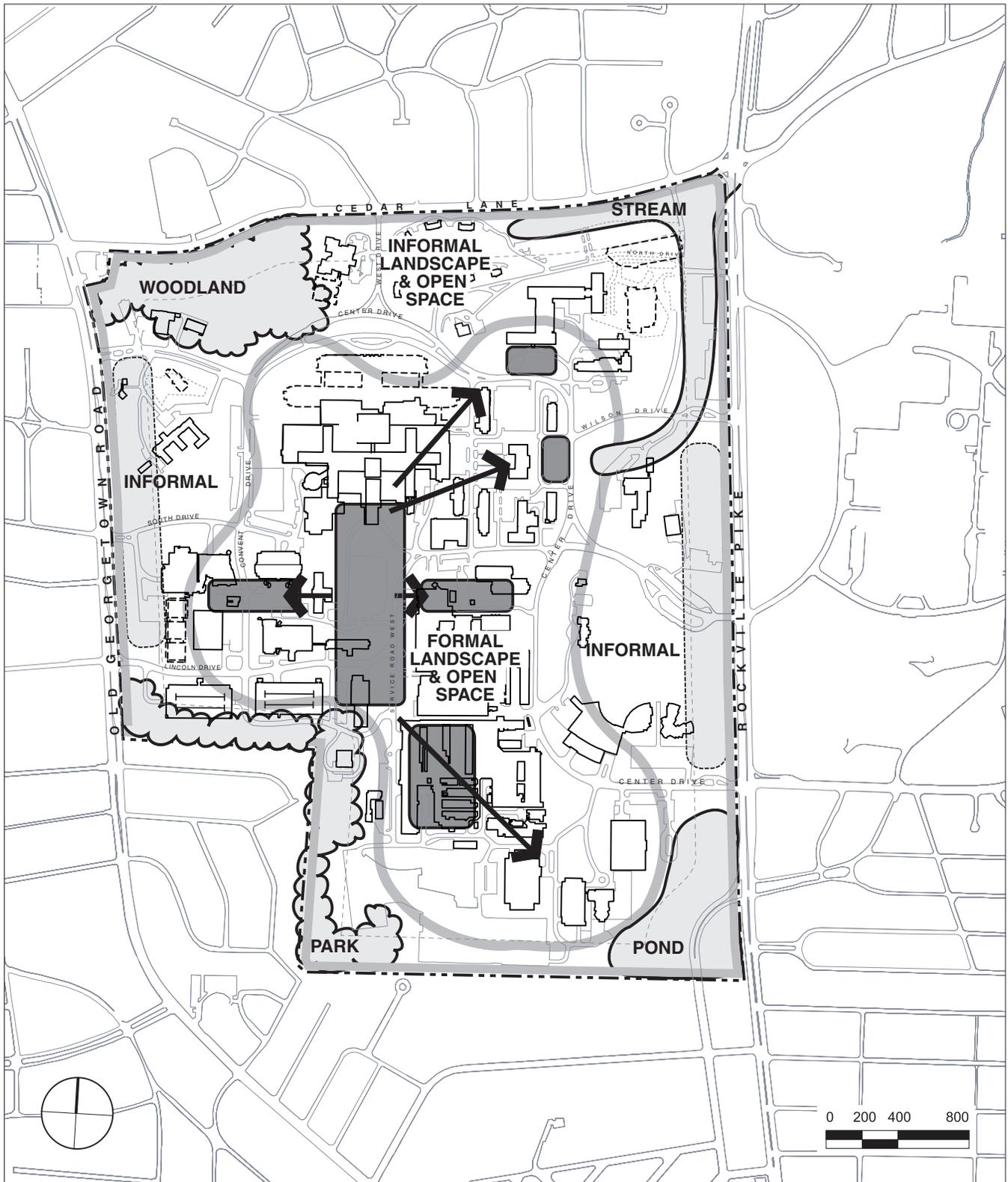
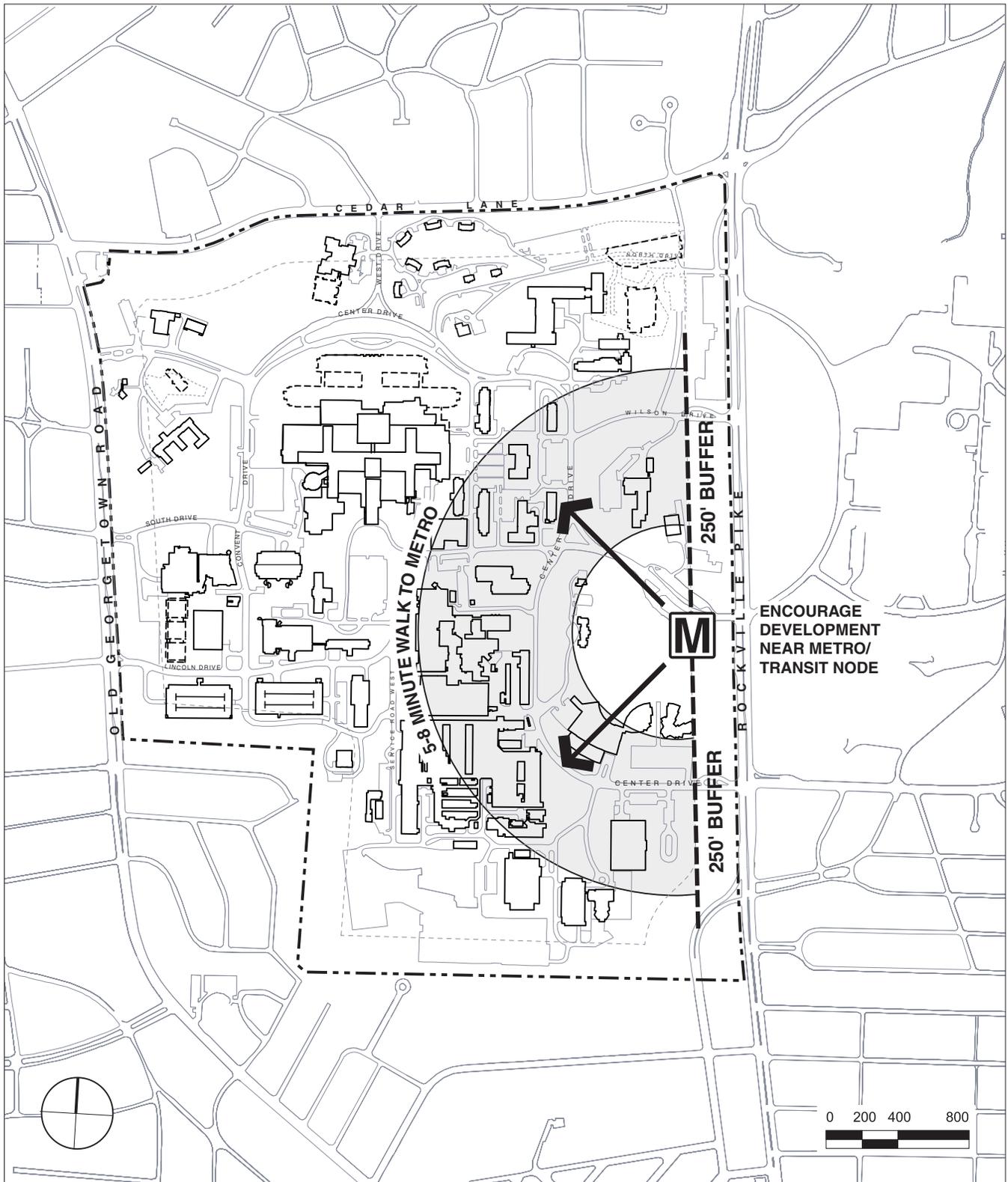
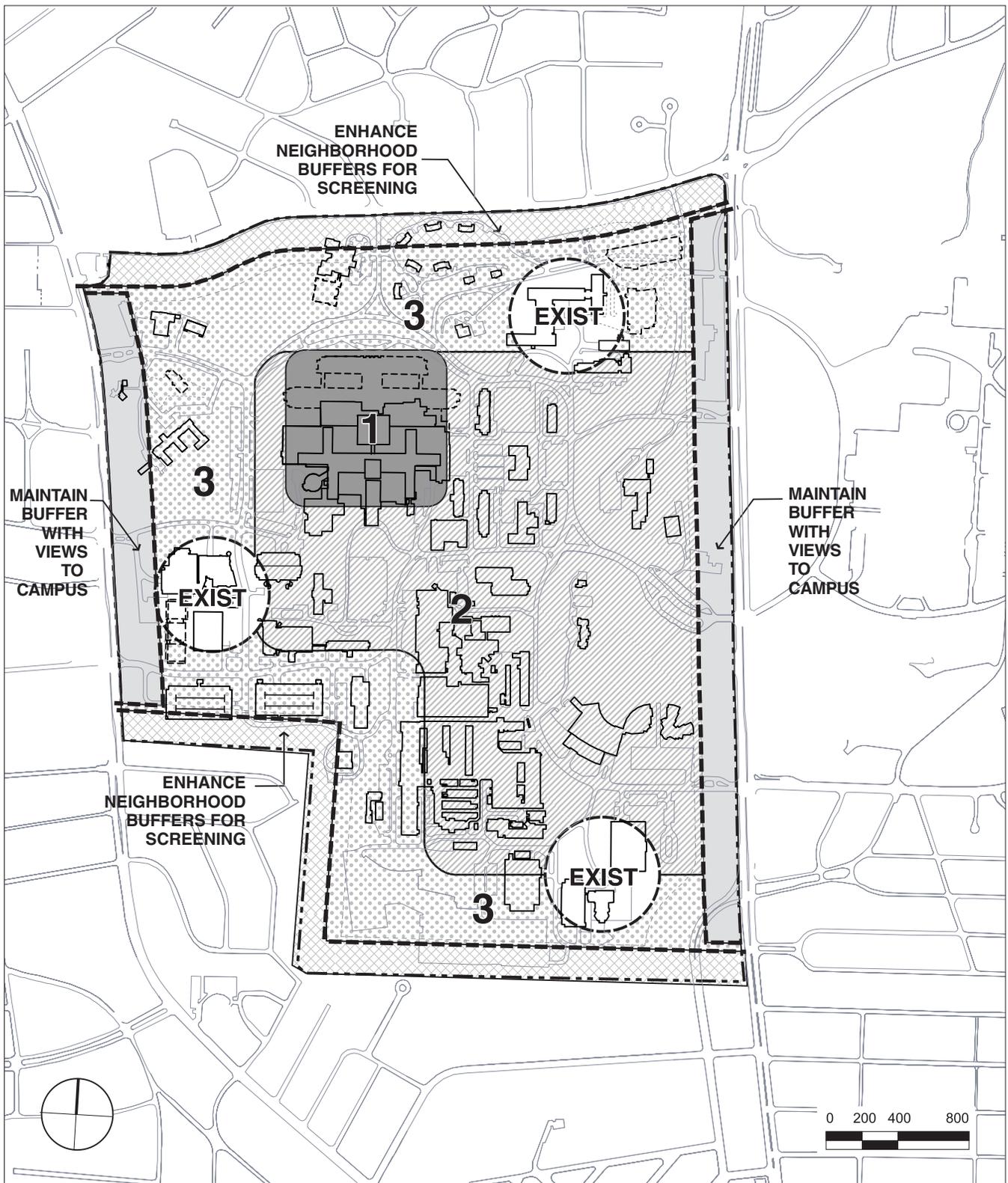


Figure 5.1.4-b



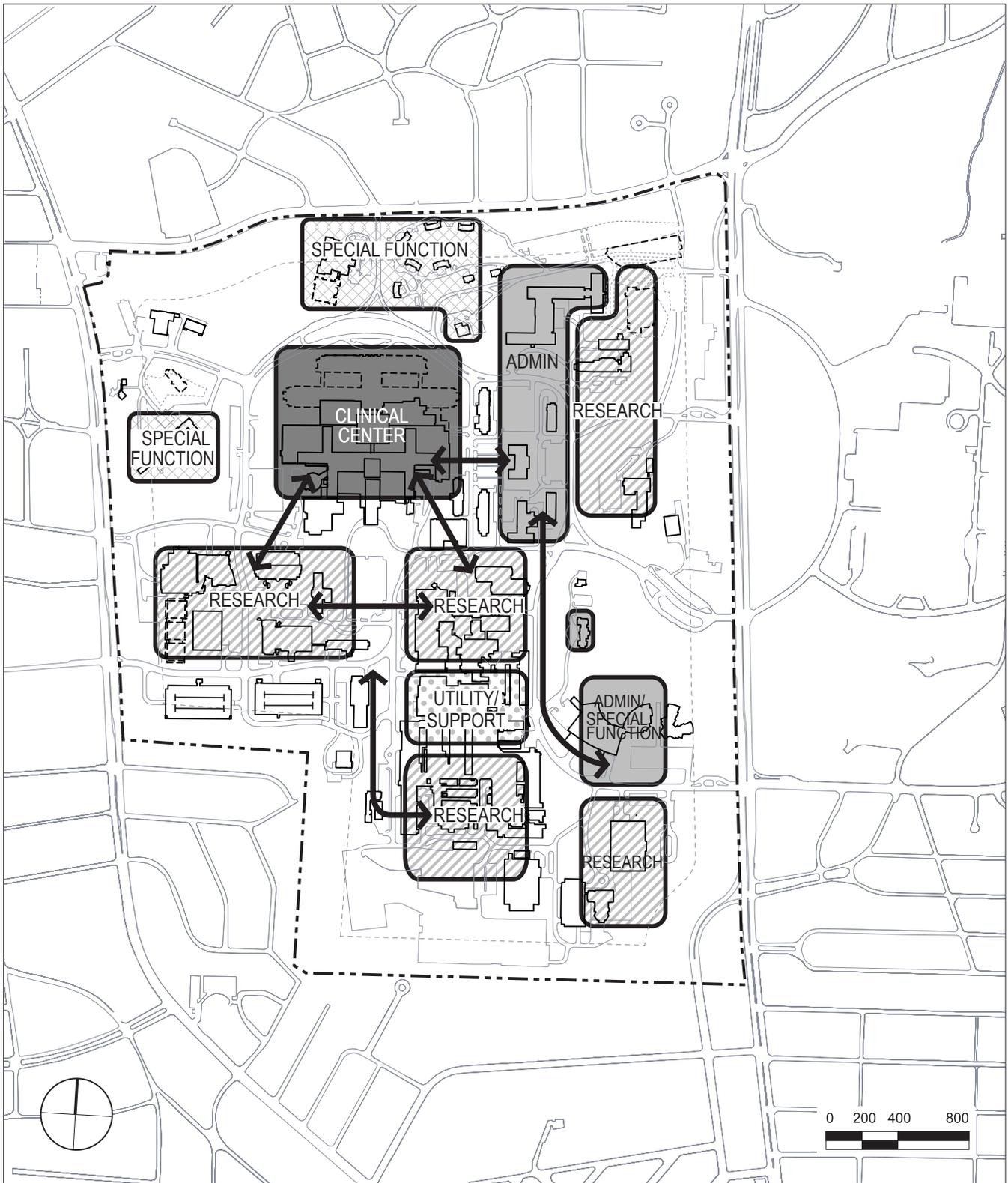


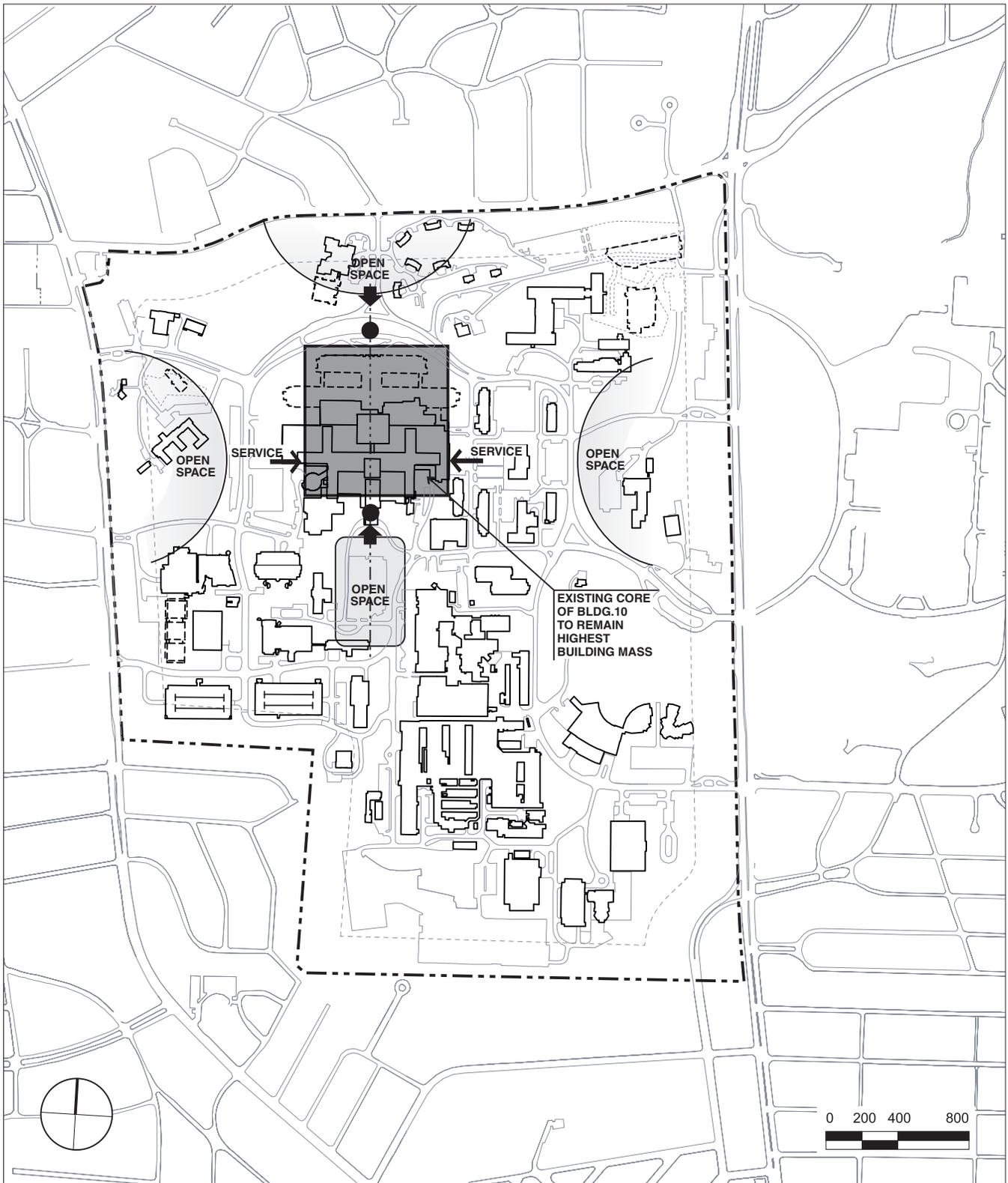
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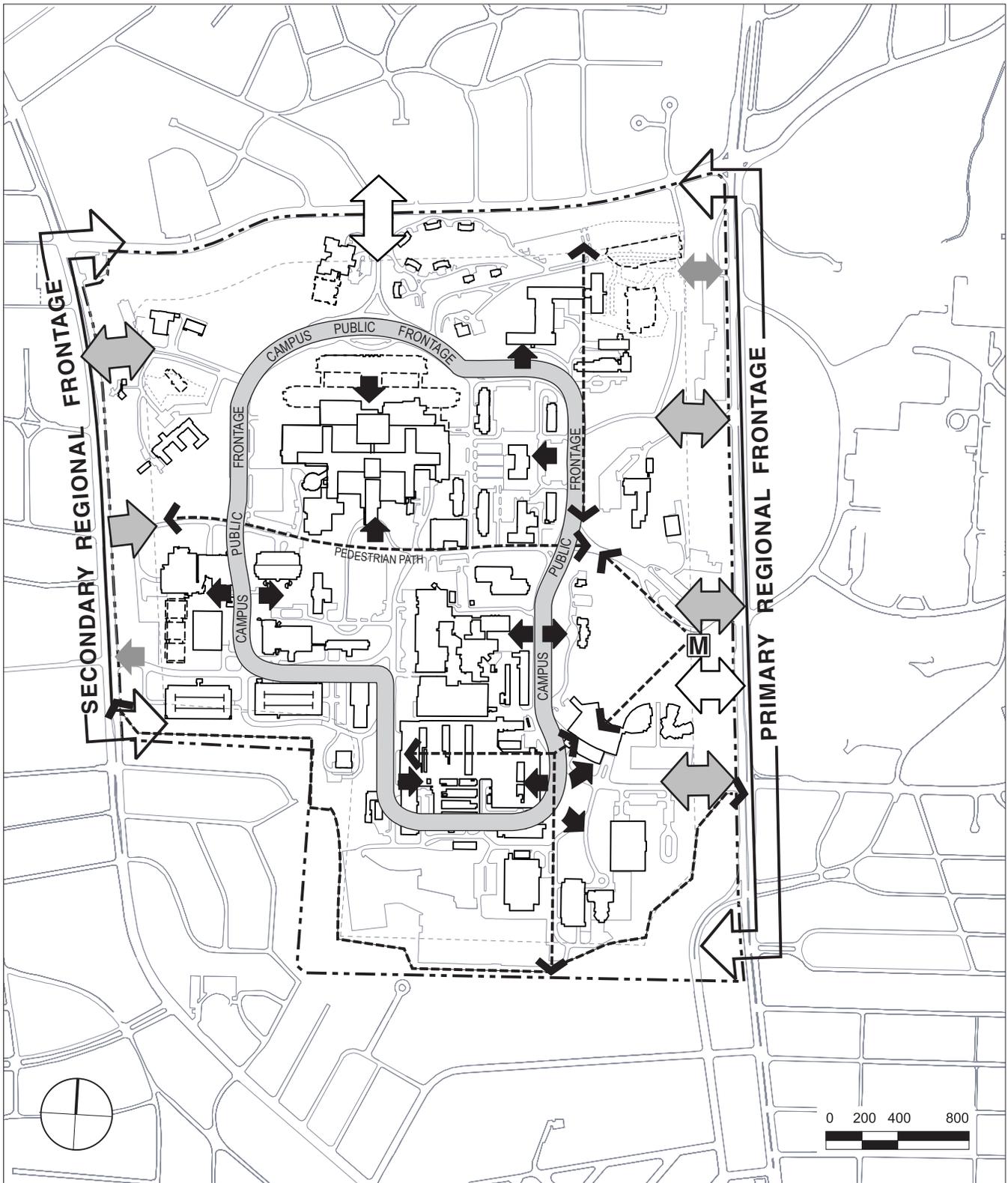
- 1** HIGHEST DENSITY
- 2** MEDIUM DENSITY
- 3** LOWEST DENSITY
- SCREEN BUFFER
- OPEN SPACE BUFFER

Figure 5.1.4-d

**Planning Principle**  
**Development Density Zones  
& Community Buffers**





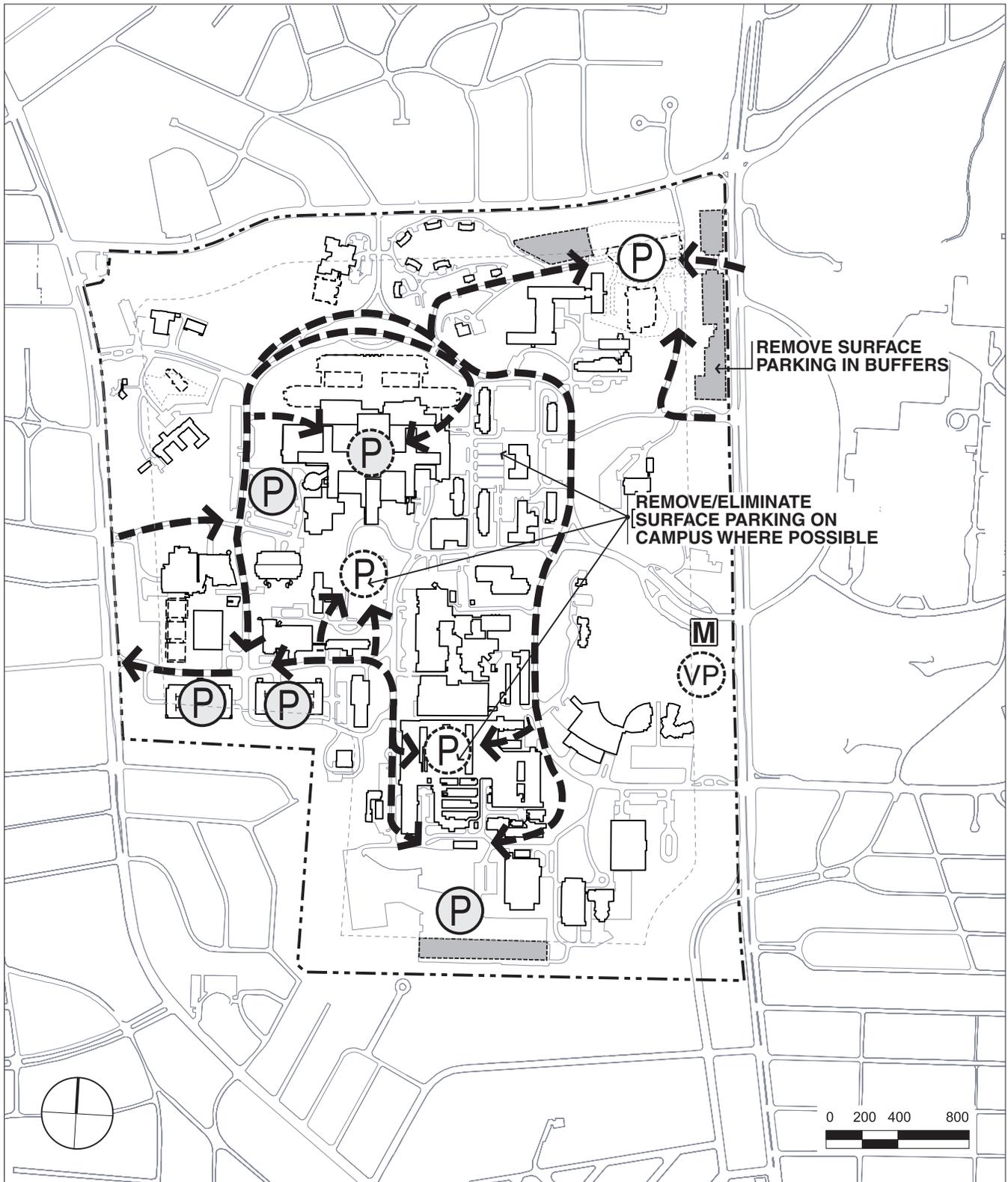


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- MAJOR VEHICULAR ACCESS (EMPLOYEE ONLY)
- VEHICULAR, PEDESTRIAN & BICYCLE VISITOR ACCESS
- SECONDARY VEHICULAR ACCESS (EMPLOYEE ONLY)
- CAMPUS PUBLIC ADDRESS ORIENTATION
- PEDESTRIAN/BICYCLE CONNECTION

Figure 5.1.4-g

**Public Access  
& Orientation**



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NIH / ORF / DFP

- (P)** EXISTING PARKING LAND USE TO REMAIN
- (P)** PROPOSED PARKING LAND USE
- (P)** EXISTING PARKING BELOW GRADE TO REMAIN
- (P)** PROPOSED PARKING BELOW GRADE
- (VP)** PROPOSED VISITOR PARKING
- (M)** BUFFER PARKING TO BE REMOVED

Oudens & Knoop, Architects, P.C.

Figure 5.1.4-h

**Planning Principle**

**Parking**

SmithGroup

## **5.2 Master Development Plan**

### **5.2.1 Introduction to the Master Plan**

The main campus of the National Institutes of Health is located in Bethesda, Maryland on a rolling, landscaped, 310-acre site. The 1995-Approved Master Plan and 1999-Approved Amendment for the site are illustrated in Figures 4.1.6-a and 4.1.6-b, respectively. The 2003-Updated Master Plan, shown in Figure 5.2.1-b, accommodates a campus employee population growth, over the 20-year time frame of the plan, from 17,511 currently to a maximum of approximately 22,000. To support the potential growth in campus employees, and required utility upgrades, the campus gross built area would increase during the Master Plan period from approximately 7.36 million gross square feet (not including parking structures) to approximately 10.7 million gross square feet (gsf). Much of the building area growth will be accommodated through the redevelopment of the Campus Core in a more efficient manner. Further, the Master Plan directs density and development closer to the Metro station to encourage greater use of public transit. To the extent possible, surface parking will be consolidated into structured parking to decrease the net area of built or paved surfaces.

Several specific project programs are included in the Master Plan, the largest of which is the nearly complete 1,050,000-gsf CRC expansion. This new facility will house inpatient care functions and related research laboratories currently located in the core of the existing Clinical Center Complex, Building 10. Other specific projects accommodated by the Master Plan include Research Building 33, Building 35 (Neuroscience Research Center), replacement Animal Research Center for the Building 14/28-18/32 complex, and replacement facilities for relocation of selected portions of the Support and Service functions housed in Buildings 12 and 13. Some projects included in this Update are a result of post-9/11 security improvements, such as the Security Improvements Plan (see section 2.12), Commercial Vehicle Inspection Facility, and the Gateway Center for visitors.

The NIH Master Plan is a strategic tool for the efficient allocation of campus resources, the orderly development of future growth, and the creation of an environment, which is both functionally and aesthetically conducive to accomplishing the mission of the National Institutes of Health. The plan continues the programmatic requirements set forth in Section 5.1.3, and responds to the Goals and Objectives elaborated in Section 5.1.2. The plan also creates a rational framework to accommodate projected growth incrementally, and in a manner which clearly reinforces the sense of the campus as a larger whole.

The Master Plan defines the Clinical Center Complex and the Central Mall as the heart of the campus. Open spaces and building groups extend out from the center, linking all parts of the campus into orthogonal related clusters. The core of the campus has a denser, urban character. The periphery buildings are set within the landscape.

The core of the campus is circumscribed by a loop road with campus entries on the east and west sides. The West Cedar Lane entrance on axis with the CRC will be the most ceremonial public patient entrance with the east campus visitor entrance off of Rockville Pike being the main visitor entry at the Gateway Center.

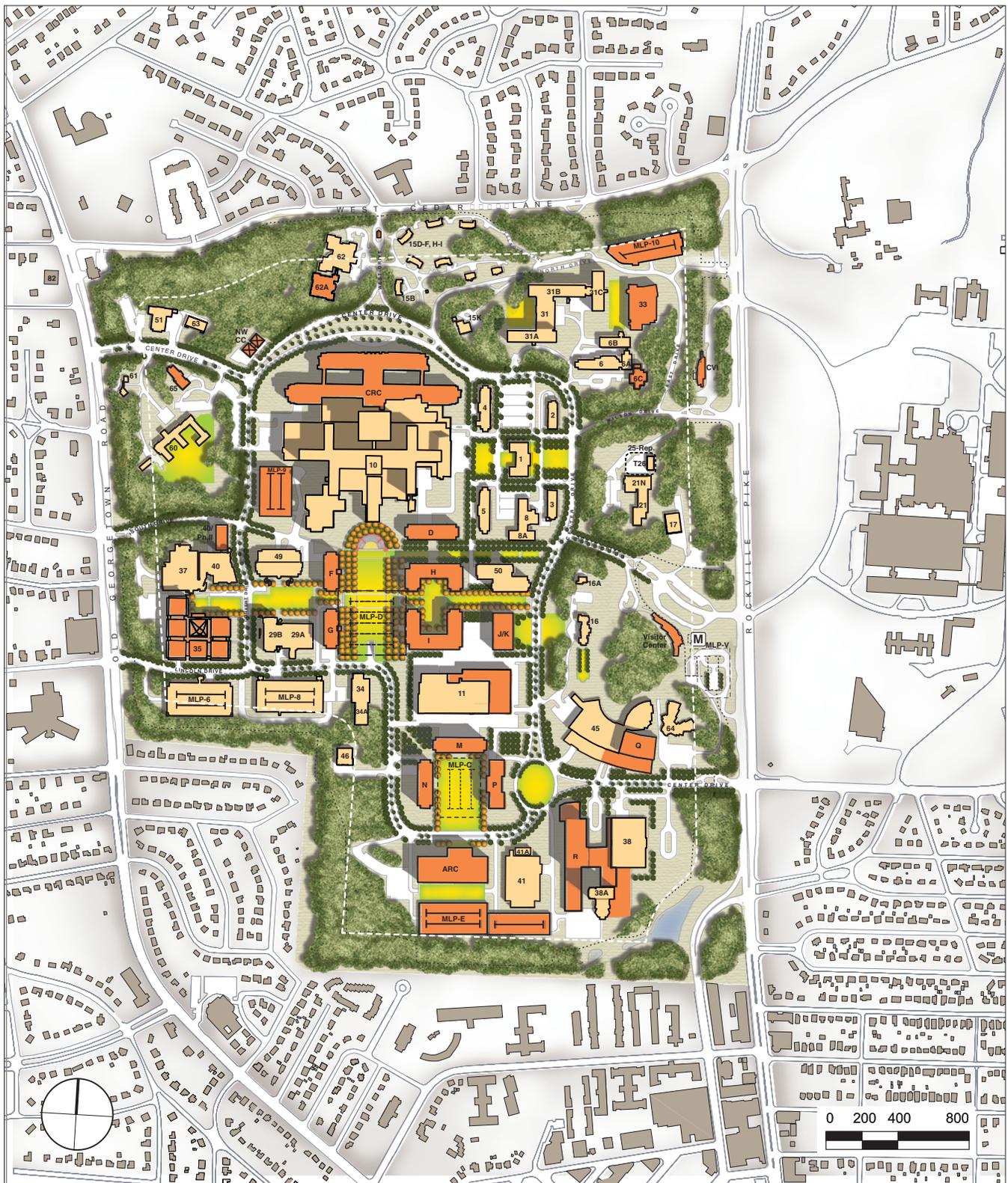
Buffer setbacks around the site are respected and expanded on the north and south sides of the campus. Due to security improvement requirements a portion of the proposed Commercial Vehicle Inspection Facility and the vehicular screening facility at the Gateway Center for visitors will be located in the buffer along Rockville Pike. Remaining surface parking is proposed to be removed from buffer areas and eliminated

from many parts of the site to enhance the campus setting. The natural landscaping of the periphery is extended into the core of the campus at many locations.

Section 5.2.2 below describes the major concepts, which create the framework of the Master Plan. Section 5.2.5 illustrates the detailed elements of the plan through an in-depth discussion of each of the campus sectors.

Table 5.2.1-b Key - Master Plan Building Directory and Area Summary (areas do not include parking structures)

Building Number	Gross Area (target)	Primary Use
1	95,948	Central Administration
2	46,860	Research
3	48,860	Research (currently vacant)
4	91,292	Research
5	91,292	Research
6, 6A & 6B	145,043	Research
6C	16,500	Research
8	99,296	Research
10	2,264,907	Clinical Center Complex
10 / CRC	1,050,000	Mark O. Hatfield Clinical Research Center
11	267,400	Central Power Plant
15B	8,065	Offices
15C-I	52,345	Residential
15K	11,670	Research
16	17,480	Offices (Stone House)
16A	2,880	Offices
17	7,651	Substation
21 & 21N	36,216	Research & Waste Handling Facility
25 - Rep	12,000	Building 25 Replacement / Research & Waste Handling Facility
T26	2,900	Research & Waste Handling Facility
29A	106,694	Research
29B	102,700	Research
31A - C	72,547	Offices
33	150,000	Research
34 & 34A	72,547	Campus Center
35	600,000	Porter Neuroscience Research Center
37	248,469	Research
38	230,347	Research
38A	222,120	Research
40	84,600	Vaccine Research Center
40 Ph. II	50,000	Vaccine Research Center
41 & 41A	141,794	Research
ARC	335,000	Animal Research Center
45	372,535	Natcher Conference Center & Offices
46	11,526	Substation
49	270,311	Sylvio Conte Research Building
50	290,000	Louis Stokes Research Building
51	22,000	Fire Station
53	3,968	Utility
60	67,500	Mary Woodard Lasker Center (Convent Building)
61 & 61A	3,296	Office / Storage
62	37,565	Children's Inn
62A	34,000	Children's Inn Addition
63	10,030	Substation
64	21,000	East Child Care
35	26,500	Family Lodge
Visitor Center	20,528	Gateway Center
CVI	6,719	Commercial Vehicle Inspection Facility
D	168,700	Research
F	149,600	Research
G	112,200	Research
H	229,500	Research
I	249,900	Research
J / K	212,175	Research Service Building
M	178,500	Research
N	137,700	Research
P	183,600	Research
Q	190,000	Natcher Addition
R	389,370	Administration / Special Function
NWCC	21,000	Northwest Child Care
<b>Total</b>	<b>10,715,636</b>	



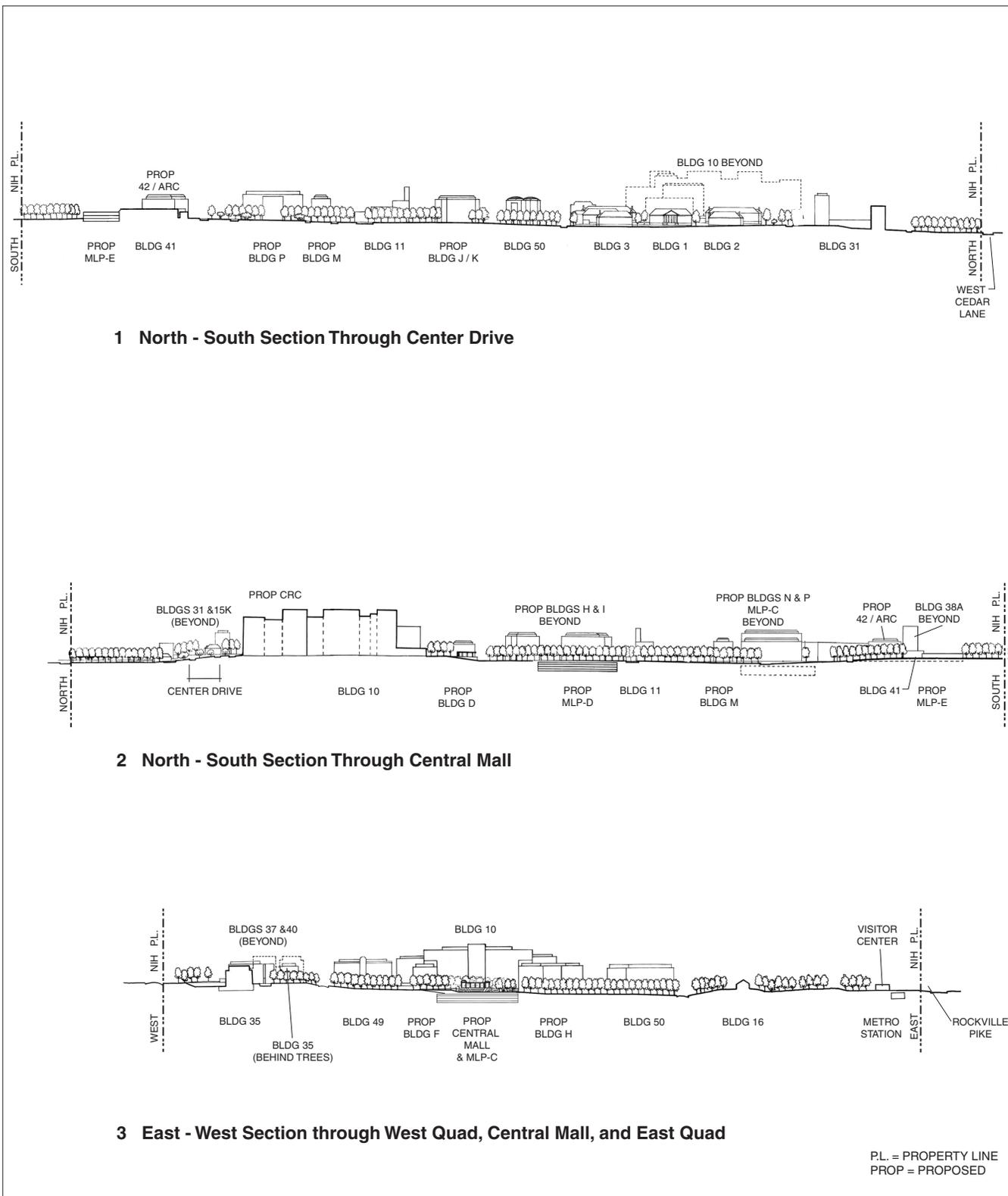
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- EXISTING
- PROPOSED
- GREEN/OPEN SPACE / RECREATION
- CENTRAL MALL/PRIMARY OPEN SPACE
- M METRO STATION

- SECURITY FENCE
- BUFFER LINE

**Figure 5.2.1-a**

**Illustrative  
Master Plan**



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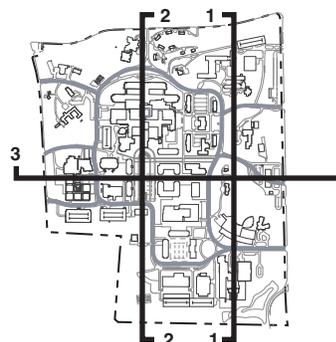


Figure 5.2.1-b

**Site Sections**

## 5.2.2 Master Plan Component Concepts

The following paragraphs describe in broad terms the fundamental recommendations of the proposed Master Plan.

### ***Functional Relationships***

The primary functional relationship concept for the Master Plan is the location of the Clinical Center Complex at the center of the campus, flanked on the southeast and west by research functions. There is a strong relationship between the hospital and clinical research functions of the Clinical Center Complex (Building 10) and the activities and personnel of surrounding research buildings. Administrative and office uses also have a functional relationship to Building 10, but will be clustered on the more “public” center of the site.

With the exception of Natcher (Building 45) and Building 16 (Stone House), to the southeast, residential and Special Function uses will continue to occupy the north end of the campus with their unique activities and smaller scaled structures. Utility functions will remain in their current location for efficient central utility distribution, and support/shops facilities will be relocated to proposed Building J/K, Research Service Building.

### ***Open Space Systems***

At the perimeter of the campus, the Master Plan proposes to retain and enhance the natural character, which provides much of the perimeter image for NIH. At the boundaries of the site the buffer zone will be expanded on the north and south and enhanced as landscaped open space. The Master Plan shows no new structures to be placed within this buffer zone, with the exception of the Commercial Vehicle Inspection (CVI) facility and the Gateway Center for visitors, which are part of the Perimeter Security Improvements program (see Section 2.12). Surface parking will be removed from the buffer zone as allowed by phasing. Between the perimeter buffer and the campus core will be a zone of natural landscape character with buildings placed in the landscape, responding to topography and natural features.

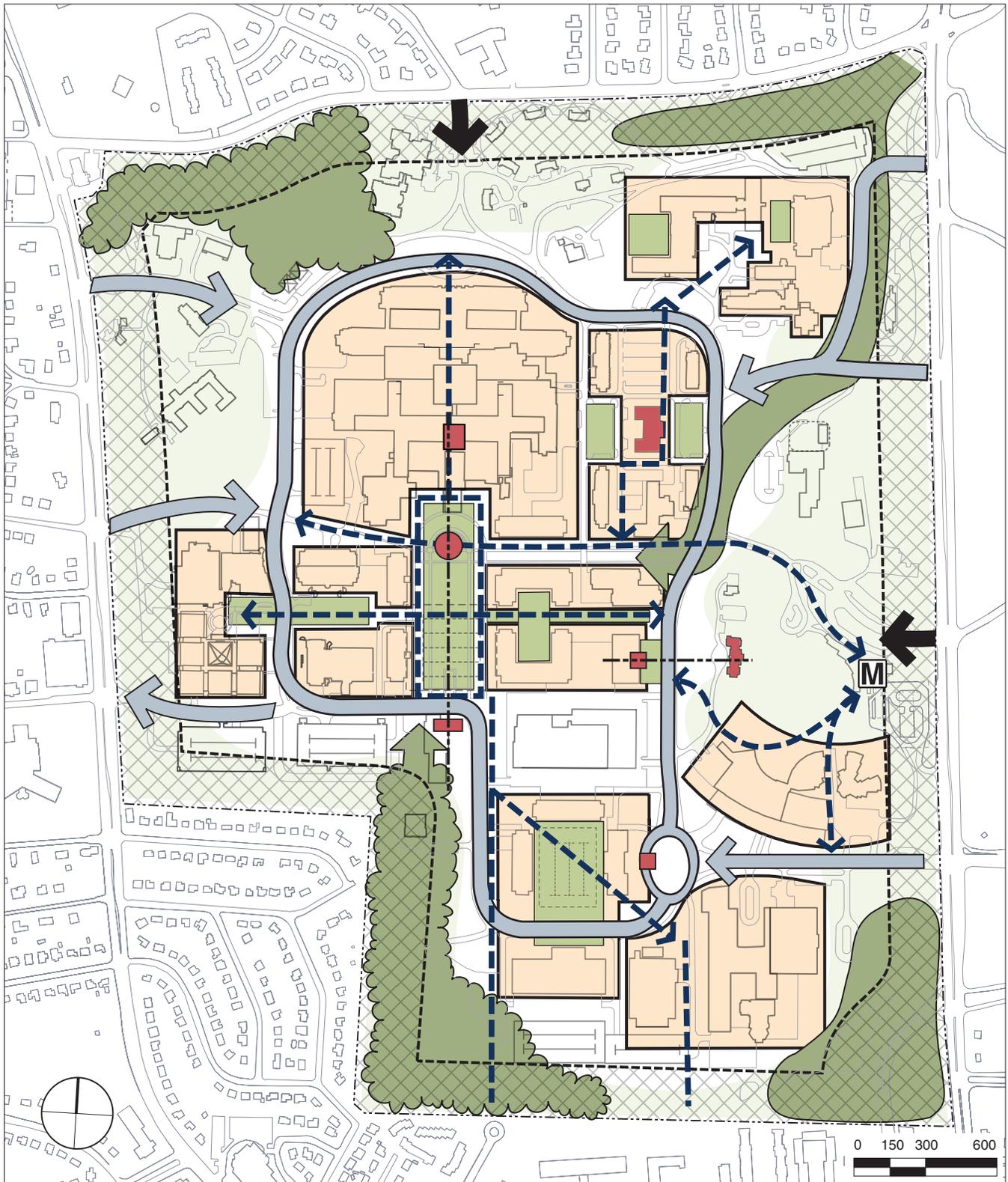
As special features of the perimeter open space system, the four significant corners of the site will retain their existing characters. These are the “woodland” setting of the northwest corner, the “stream” character of the northeast corner, the “lawn and pond” image of the southeast corner, and the “park” setting and activity of the southwest corner.

In the interior of the campus, the Master Plan proposes a focal mall supported by a series of interconnected and well-defined quadrangle spaces as the basic structure of the campus. This concept is well suited for creating a “campus” atmosphere, and it creates identifiable groupings of buildings while maintaining their relationships to the larger whole. The system of quads creates visual and physical connections among all sectors of the campus, thus promoting pedestrian use and scale.

The primary focal space on campus is the Central Mall, which becomes the connecting element among the Clinical Center Complex, the East Research Quad, and West Research Quad. The Central Mall is also an important component of the north-south pedestrian connection. Secondary spaces radiate from this central space toward all other building groups on campus, creating a network for movement. There is also an important connection between the Central Mall and the Metro station along South Drive.

### ***Building Patterns***

The existing pattern of building clusters on campus is continued and enhanced by the Master Plan. Since buildings are placed to relate to each other through commonly



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-  250' BUFFER
-  MAJOR VEHICULAR ENTRY
-  VISITOR ENTRY
-  LOOP ROAD
-  QUAD/BLDG GROUP
-  FOCAL POINT
-  FORMAL OPEN SPACE
-  INFORMAL LANDSCAPE
-  SPECIAL CORNERS
-  METRO STATION
-  INTERNAL PED/BIKE PATHS

Oudens & Knoop, Architects, P.C.

**Figure 5.2.2**

**Concept  
Diagram**

SmithGroup

defined open spaces and clearly articulated “front doors”, each quadrangle open space clearly identifies a building group.

There are five existing building groups which will remain and anchor the site: The general office Building 31 group on the northeast; the Historic Core (Buildings 1 through 5); the Clinical Center Complex (Building 10); the research Buildings 35, 37 and 40 group on the west; and the Lister Hill group (Buildings 38 and 38A), including the William H. Natcher Building (Building 45), on the southeast. Two new research groups to replace the support services Building 12/13 complex in the center and the existing Animal Facility in Buildings 14 and 28 on the south redefine the core of the campus. At the perimeter of the campus is the residential group to the north, and several stand-alone structures such as Building 16 (the Stone House), Building 60 (the Mary Lasker Woodard Center), and Building 62 (the Children’s Inn).

All new development is illustrated to follow the orthogonal grid initially generated by the Historic Core (Buildings 1 through 5). Within this grid important focal points and axes are identified which should be respected in the location and design of individual buildings. These key focal points include the central administration Building 1, Building 16 (the Stone House), the termination of the restructured entry of Center Drive at Rockville Pike, and the north and south ends of the Central Mall. Advantages of developing the campus on a grid system include ease of integration with existing orthogonal oriented structures, efficiency of land use, and the acknowledgment and further establishment of a clearly defined pattern to guide future growth.

### ***Massing and Heights***

The primary concept for building massing on the NIH Bethesda Campus is the concentration of the tallest structures at the center of the campus, with a transition in height to lower buildings toward the perimeter. The Clinical Center Complex (Building 10) will continue to be the tallest structure as the focal building of the campus.

It is also important to establish a transition in height between new development and existing historic structures such as the Historic Core, the Stone House, and the Wilson Estate. Additionally, certain key areas such as the southwest corner near adjacent residential areas and the site along the NIH Stream valley require further height definition because of their sensitive locations.

### ***Circulation***

The vehicular circulation concept for the campus is the clear definition of a primary interior campus loop, which acts as a distributor for employees and as a path finding tool for visitors. There are seven entries to campus, four on Rockville Pike, two on Old Georgetown Road and one on Cedar Lane. With the exception of South Drive at Rockville Pike and West Drive at Cedar Lane that will remain open to the public (visitors and patients) all other entries will be designated as employee only entries. Commercial vehicles will enter campus through Wilson Drive, after passing through inspection (see Figure 5.3.6). The campus loop creates a system which provides an “address” for many of the major public-oriented functions on campus, especially on the more public oriented east side of the campus. There are also several secondary roads, which connect to this primary system.

Inside the campus loop is a primarily non-vehicular precinct, where pedestrians are accommodated on two major pathways across campus. The first is a north-south pathway, which extends from the campus loop on the north, through the Clinical Center Complex and the Central Mall, and along the pedestrian spine to the replacement Animal Facility on the south. The second major path is east-west, and brings pedestrians to the Central Mall from the Metro station or from Old Georgetown Road along the path of South Drive. This interior pedestrian system, along with the campus loop, will also be used for campus bicycle circulation.

**Utilities**

Details on utility planning are given in the 1992 Master Utility Plan and the Master Utility Plan 2000 Update. For utilities, the highest priority at NIH Bethesda is reliability of service while meeting environmental regulatory requirements. The Master Plan adopts the major features and concepts that are in the two documents. They are:

- Modernize the NIH-owned central steam and chilled water generation plants to decrease operating cost and increase energy efficiencies. Many of the projects proposed in the Master Utility Plan and its Update have been completed, or are in various stages or phases of implementation. The Master Plan calls for continuation of the plant expansion and utility distribution system development programs that have been established in the two documents.
- Maintain sufficient steam and chilled water plant capacity to ensure peak campus demands are met with the largest generating unit out of service for maintenance or repair.
- When and where feasible, consolidate utility lines around the campus into utility corridors.
- To increase service reliability, extend existing campus steam, chilled water, water, and electric power distribution lines into “grid” or “loop” systems so that individual buildings are serviced from two directions.
- Provide sufficient emergency electric power generation to ensure critical hospital and laboratory demands are met under foreseeable conditions.

### 5.2.3 Land Use

#### ***Functional Land Use***

The proposed primary functional uses of the site by area are shown in Figure 5.2.3-a.

With the retention of the Clinical Center Complex (Building 10) at the north-central end of the site, this facility acts as both the functional and geographic “heart” of the campus. In the south-central area of the campus is the existing Power Plant (Building 11), which will remain centrally located for efficient utility distribution, uninterrupted service, and fiscal economy.

There are strong functional relationships between the research buildings and the research activities of Clinical Center (Building 10). With the Clinical Center centrally located, the Master Plan recommends that research zones be developed adjacent to the facility in the central core of the campus. The administrative functions including Building 31 complex are generally located north and east central. Central administrative functions will remain at Building 1 in the Historic Core, which also has a strong relationship with the administrative/research activities in the Clinical Center.

On the north and northwest side of the campus is a Special Function district, including Building 60, the replacement Fire Station (Building 51), the Wilson Estate, the Children’s Inn (Building 62) and several residential structures. The center of the campus contains the existing Power Plant (Building 11). Service and Support functions will be relocated to proposed Research Service Building (Building J/K) located northeast of the Power Plant. These functions serve the entire campus, and have moderate connections to the Clinical Center and the administrative core. At the south end of the campus is the south research quad and the replacement Animal Research Center (ARC) which functions in many respects as laboratory also, and is thus integrated into the South Quad. Support facilities such as child care, retail, and dining centers are dispersed throughout the site.

#### ***Site Development Capacities***

Figure 5.2.3-a and Table 5.2.3-c show the amount of new development which is planned for each major building site or area identified in the Master Plan. For each site, a target area is indicated. The cumulative target areas meet the overall campus development program shown in Section 5.1.3. Development of a site below its target number will decrease the possibility of meeting the overall campus development program. Target area estimates are based on the building footprints shown in the Illustrative Master Plan, and a target building height determined according to the context of each structure and its massing relationship to other buildings. The target heights are illustrated in the campus sectional drawings illustrated in Figures 5.2.1-c, 6.2.2-c and 6.2.2-d. Area quantities shown do not include structured parking. Target building areas might be increased in the case of developing additional basement levels or enlarging the building footprint. However, exceeding the target building areas and illustrated footprints may compromise the desired campus character proposed by the Master Plan and create awkward massing relationships between buildings.

An important principle of the Master Plan is to increase development density near the Metro station to encourage increased public transit use. Several existing main visitor sites are located in the immediate vicinity: Building 45 (Natcher) and Building 38 and 38A (the National Library of Medicine). The East Child care is also located in the immediate vicinity. The proposed Gateway Center for visitors channeling visitor traffic is located integral to the Metro station, and within a 5-to-8 minute walk (1,500 feet) the Master Plan proposes several new buildings with increased population concentrations. Proposed Building Q and the East and South Quads and Building R fall within this larger area. The East Quad includes proposed buildings D, H, J/K, and I. The South Quad includes proposed buildings M, N, P, and the ARC.

Table 5.2.3-a Site Development Capacities

Site	Target GSF
6C	16,500
10 / CRC	1,050,000
25 - Rep	12,000
33	150,000
35	600,000
40 Ph. II	50,000
ARC	335,000
62A	34,000
65	26,500
Visitor Center	20,528
CVI	6,719
D	168,700
F	149,600
G	112,200
H	229,500
I	249,900
J / K	212,175
M	178,500
N	137,700
P	183,600
Q	190,000
R	389,370
NWCC	21,000
TOTALS	4,523,492

(in occupiable gross square feet, not including parking)

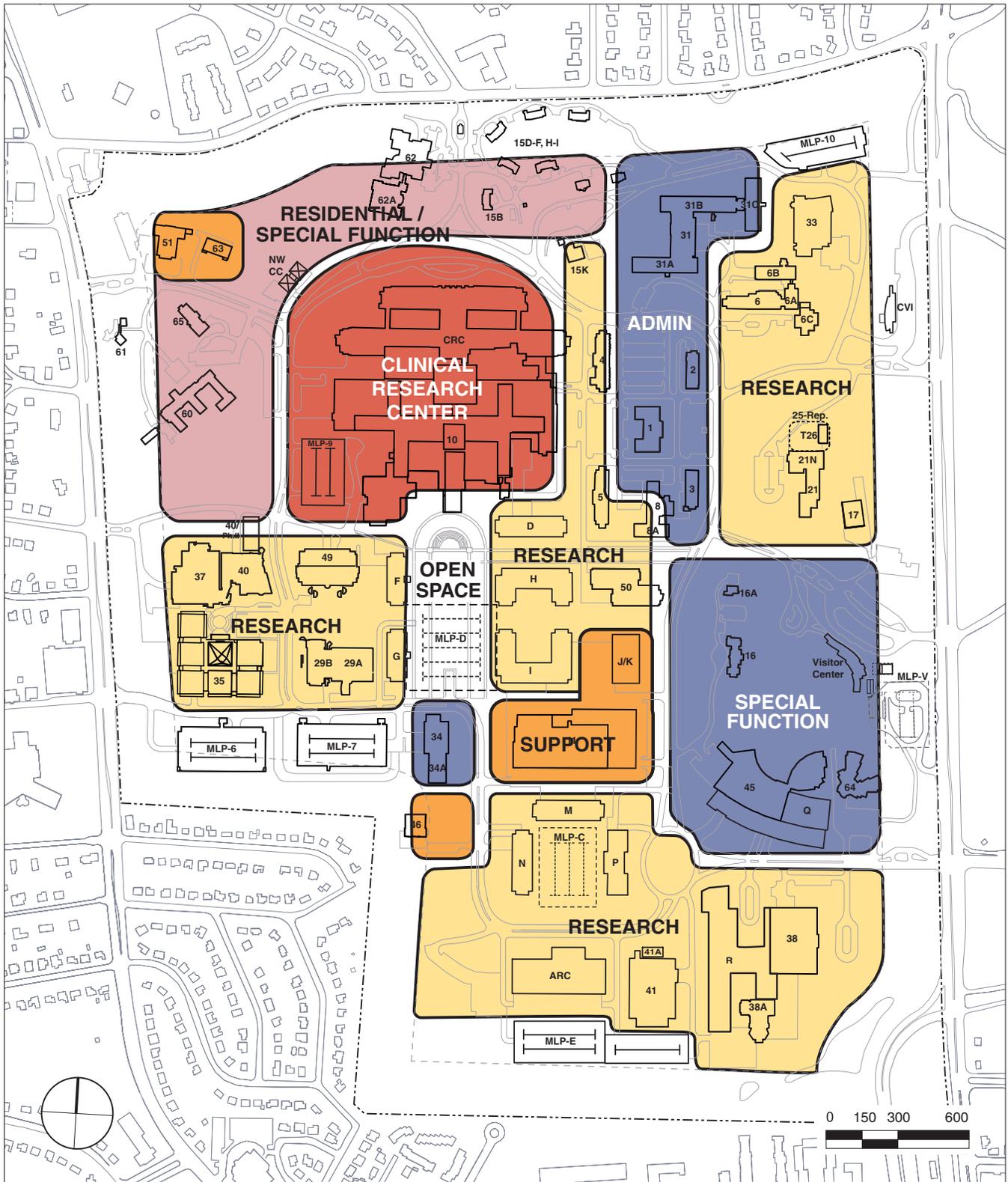
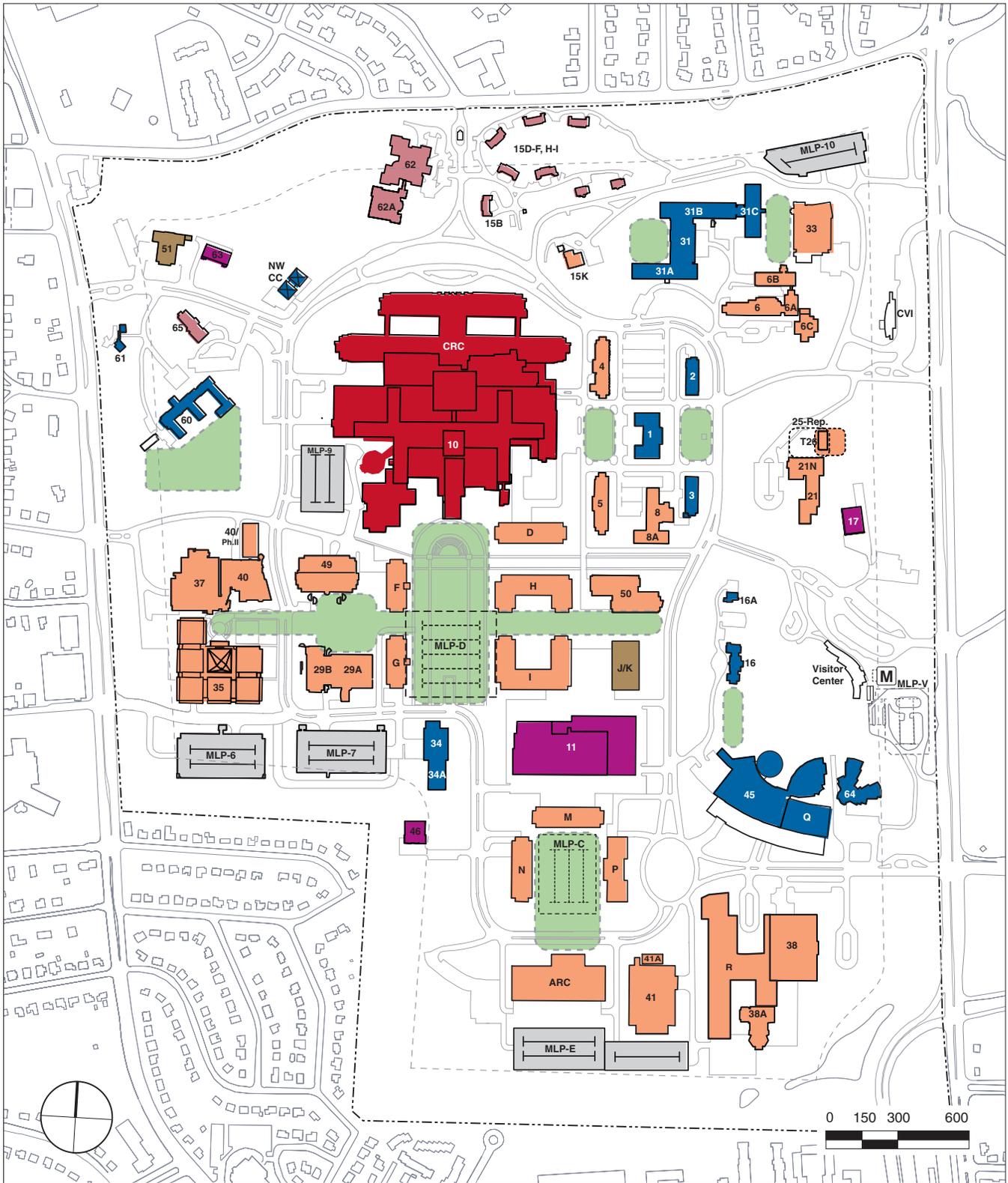


Figure 5.2.3-a

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- CLINICAL RESEARCH CENTER
- RESEARCH
- ADMIN./SPECIAL FUNCTION
- SERVICE / SUPPORT
- RESIDENTIAL/SPECIAL FUNCTION

**Land Use**

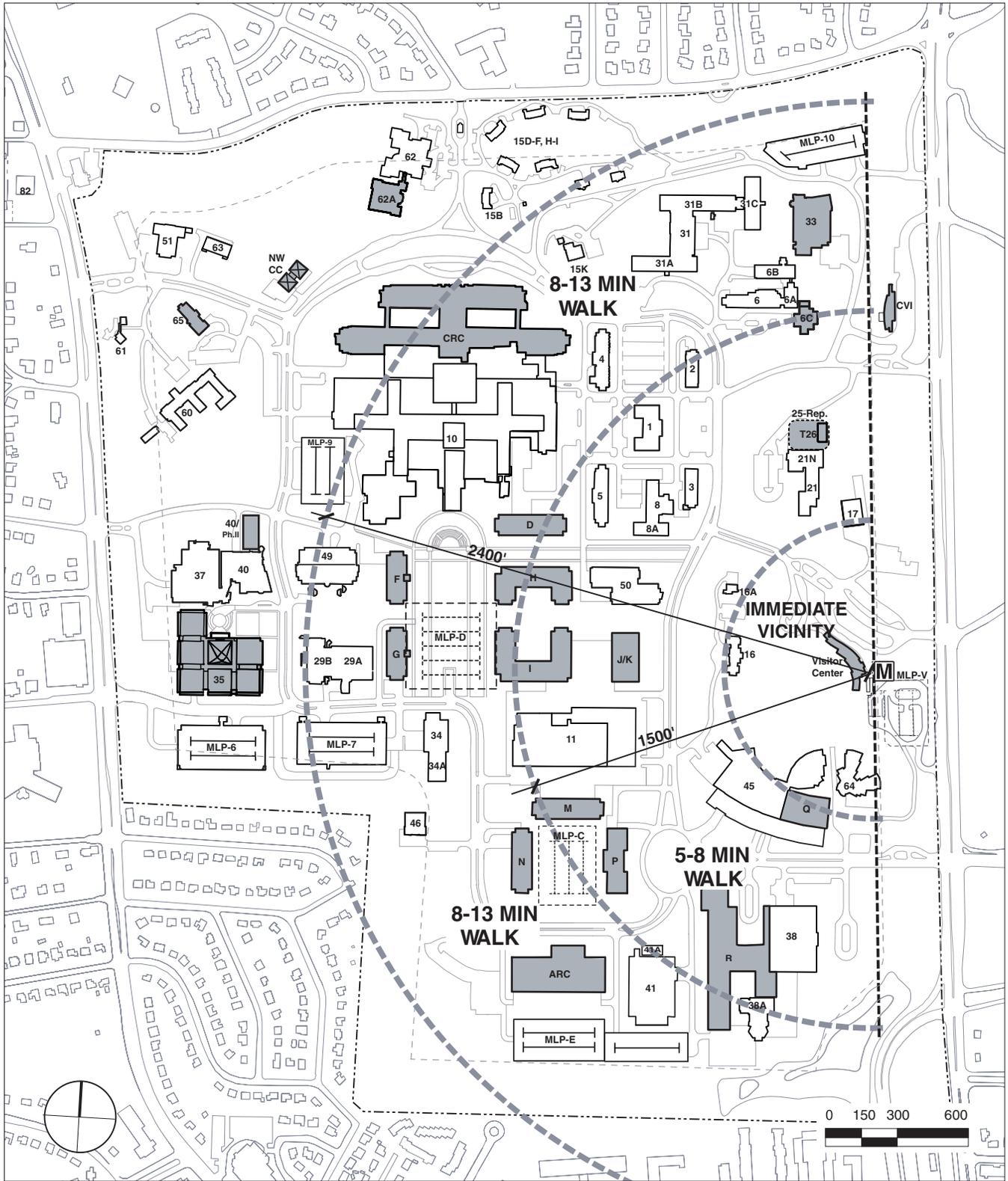


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 Bethesda Campus

- |   |  |
|---|--|
| <span style="color: red;">■</span> CLINICAL RESEARCH CENTER | <span style="color: pink;">■</span> RESIDENTIAL/SPECIAL FUNCTION |
| <span style="color: orange;">■</span> RESEARCH              | <span style="color: grey;">■</span> MULTI-LEVEL PARKING          |
| <span style="color: blue;">■</span> ADMIN/SPECIAL FUNCTION  | <span style="color: green;">■</span> DEFINED OPEN SPACE          |
| <span style="color: brown;">■</span> SERVICE/SUPPORT        |  |
| <span style="color: purple;">■</span> UTILITIES             |  |

**Figure 5.2.3-b**

**Building Use**



 PROPOSED DEVELOPMENT SITES

Figure 5.2.3-c

# Development Sites

## 5.2.4 Perimeter Buffers

In order to achieve the Master Plan goal of ensuring that development on the NIH campus respects and enhances the environment of the surrounding communities, open space buffers have been kept around the perimeter of the site. The Master Plan proposes that all buffer zones be maintained as extending 250 feet inward from the NIH property line. The guidelines below seek to define the character and activities, which should apply to all buffer areas, as well as traits, which will vary around the site due to differing existing conditions. Light recreation envisioned for buffer areas includes activities, which are non-invasive to adjacent areas, such as jogging, bicycling, walking of dogs, picnicking, etc.

Some Master Plan changes have occurred in the buffer zone as a result of the ongoing Security Improvements, discussed and illustrated in Section 2.12. Security Improvements projects are carefully integrated so as to maintain the established principles and concept of the Master Plan. These projects include the Commercial Vehicle Inspection facility (CVI), the Gateway Center for visitors, and the existing perimeter fence. It is the goal of the Master Plan to remove all surface parking from the buffers, with the exception of paved surfaces associated with the CVI and the new Gateway Center.

The main access for visitors to the campus will be at the Gateway Center to be located integral to the Metro bus and rail station. This location along Rockville Pike across from the Naval Medical Center, bounded north, south, and west by NIH property is not proximate to any of the surrounding neighborhoods. The Gateway Center will be a facility to perform security checks for incoming visitor traffic. The Gateway Center will include a visitor center for visitors arriving by foot, transit, or bicycle and a visitor parking structure for visitors arriving by vehicle and. A secondary access for Clinical Center patients and their visitors arriving by foot, bicycle or vehicle will be provided at West Cedar Land and West Drive.

### General Guidelines:

#### **All Buffer Zones**

- Buffers will primarily be landscaped open space
- Existing buildings to remain
- No new buildings or parking lots to be allowed, except for CVI and The Gateway Center
- Surface parking to be removed as possible
- Utility easements and necessary infrastructure to remain
- Security fence, gates, signage and lighting to be allowed for entry identification and direction

#### **North Campus Buffer**

- Existing screen landscaping to remain
- Small scaled buildings with vehicular access to remain
- Light recreational activity to be allowed (\*)
- Stream and stormwater management areas to be allowed
- Surface parking to be removed

#### **Old Georgetown Road Buffer**

- Landscape and lawns to remain allowing views to campus
- Light recreational activity to be allowed (\*)
- Service access drives to remain

#### **Edgewood/Glenwood Buffer**

- Dense landscape and elements to provide visual buffers

- No activity to be programmed or encouraged
- Service access to be removed where possible
- Child Care center to be relocated to Building 34/34A
- Pedestrian path and employee entrance on the south side of the perimeter fence under construction

***South Campus Buffer***

- Enhanced landscaping to provide additional screening
- Light recreational activity to be allowed (\*)
- Service access to remain
- Community event staging to be allowed (\*)
- Bicycle and pedestrian connections (east-west path to Metro Station) allowed to cross buffer outside campus perimeter fence (see Figures 5.3.8-a & b)

***Rockville Pike Buffer***

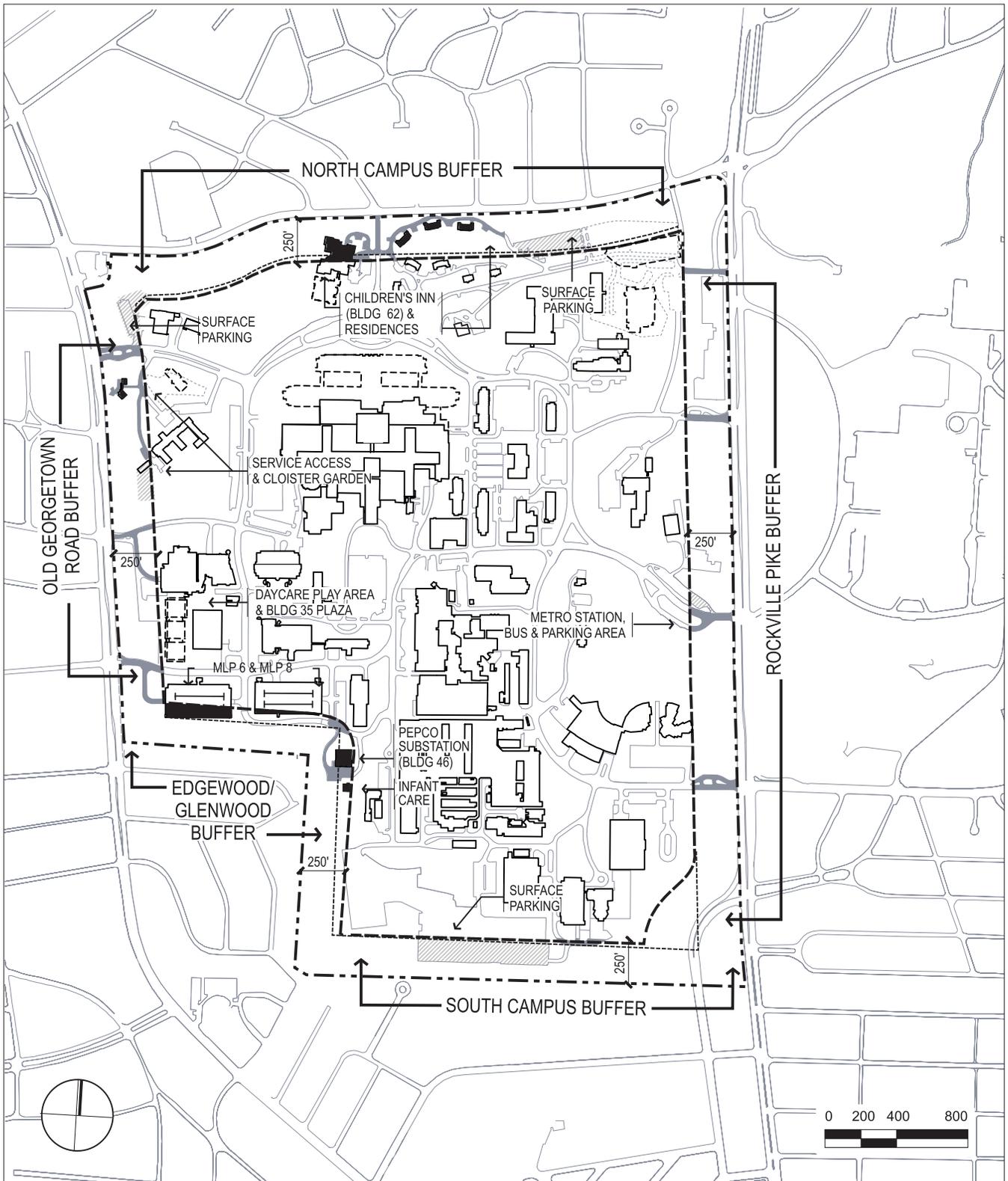
- Landscape and lawns to remain allowing views to campus
- Light recreational activity to be allowed (\*)
- Bikeways and walkways to be allowed along length of buffer outside campus perimeter fence (\*)
- Stream and stormwater management areas to be allowed
- Metro easement and transit node activities to be reconfigured to allow for Perimeter Security Improvements

(\*) As permitted by Security Improvements, see section 2.12.

***Perimeter Security***

See paragraph 2.12 for a discussion of the perimeter and other security measures shown in figure 5.2.4a. Access to the campus entrances and vehicle and personal screening take place in certain buffer areas.

The perimeter fence and vehicle barriers located in the buffers are made as inconspicuous as possible to preserve the landscape character of the buffers.

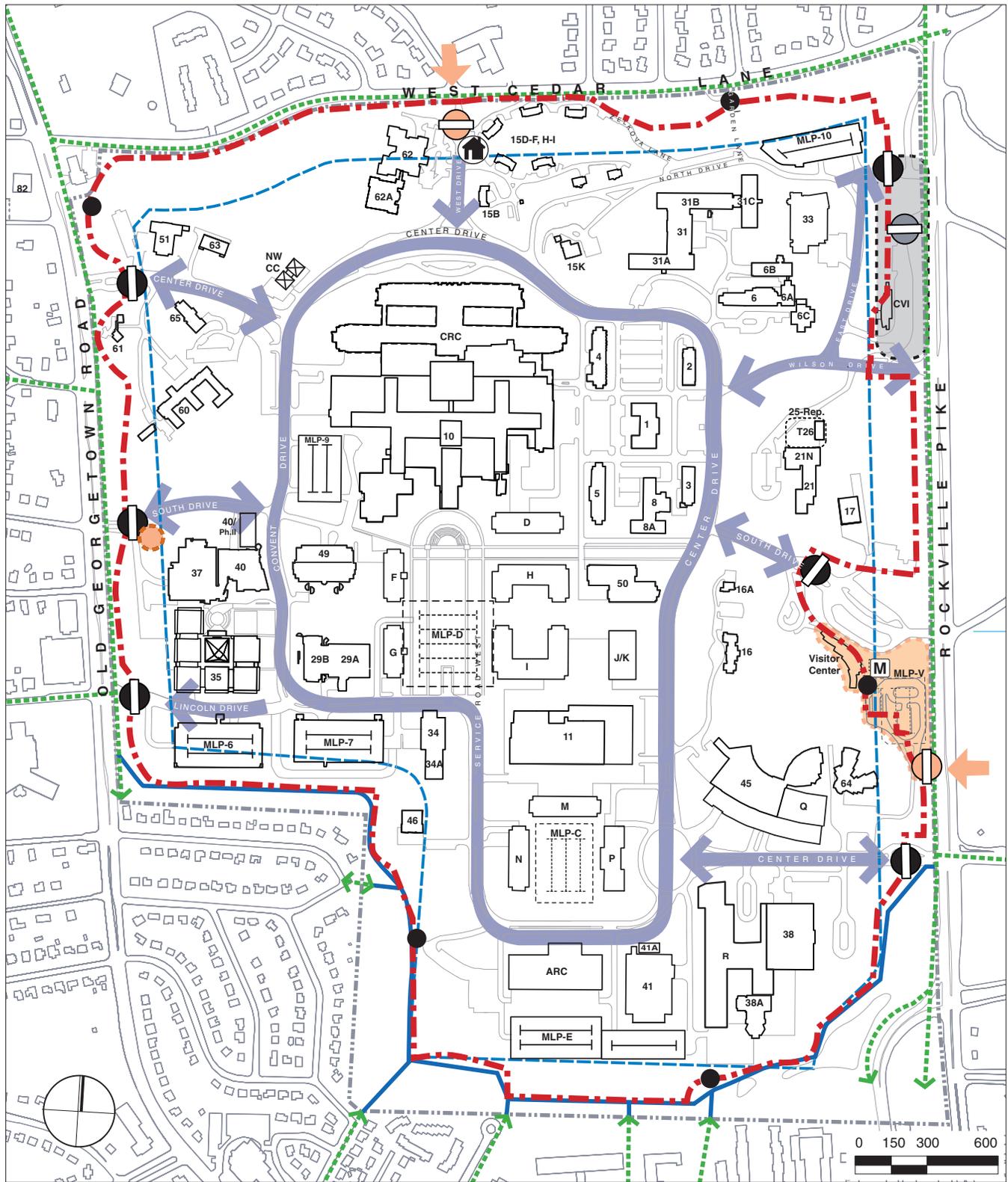


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- EXISTING BUFFER
- - - - - PROPOSED 250' BUFFER
- EXISTING BUILDINGS TO REMAIN
- ▨ EXISTING SURFACE PARKING TO BE REMOVED
- ▩ EXISTING ROAD TO REMAIN

**Figure 5.2.4**

**Perimeter  
Buffers**



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- Visitor Access
- Vehicle Access
- Veh. & Service Access
- Emergency Evacuation/Exit Only
- NIH Residence Access
- Pedestrian Access
- Property Line
- Buffer Line
- Fence Line
- Proposed Loop Road
- NIH Bike/Pedestrian Path
- Public Bike/Ped. Path
- Proposed Building Currently Under Development

- Proposed Commercial Vehicle Inspection Site
- Proposed Gateway Center
- Possible Site of West Visitor Facility

**Figure 5.2.4a**

**Security  
Improvements Plan**

SmithGroup

## 5.2.5 Open Space and Landscape

### ***Landscape Development Principles***

The guiding principles of the landscape plan serve to complement and reinforce the overall Master Plan by:

- Improving and strengthening the buffers to adjacent land uses,
- Giving the plan identity and structure,
- Articulating the circulation system, and
- Creating a hierarchy of open spaces which will encourage interaction among NIH staff and visitors

Plants integrate the man-made architectural elements into the natural landscape and reinforce the site's indigenous character. Various combinations of plants and water are encouraged, not only due to their historical use in the landscape, but also as a metaphor due to their medicinal value in the maintenance of mankind, thereby underscoring the mission of NIH. Landscape Concepts are shown in Figure 5.2.5.

### ***Landscape Zones***

The landscape plan is divided into three distinct zones, concentrically placed around a central green or commons.

### ***Perimeter and Buffer Landscape***

The perimeter and buffer landscape includes a distinctive natural landscape character at each of the campus' four corners among the design goals for the landscape plan are to repair the site following the removal of surface lots in order to preserve and extend the landscape character of each corner to strengthen the perimeter. In addition, the landscape concepts include additional plant material to screen and enhance the NIH facility from adjacent land uses, particularly the neighboring residential areas along the southwest corner of the facility. Specific landscape recommendations for each distinctive corner are as follows:

#### *a. Southeast Corner*

The southeast corner, with its open pastoral views to the National Library of Medicine and the William H. Natcher Building (Building 45), will remain open but will change character with the addition of the southeast stormwater pond and water related landscaping. along Stony Creek.

#### *b. Northeast Corner*

As one proceeds northward along Rockville Pike, the landscape character will remain open and informal with views to the Stone House and Clinical Research Center beyond. North of South Drive, the character of the perimeter landscape will begin to close, presenting selective views into the NIH campus. The NIH stream area will be enhanced from the northeast corner down to South and Center Drives. Existing surface parking in the buffers in this corner area will be replaced with informal landscape. The landscape concepts for the Northeast corner should include additional plant material to screen and enhance the NIH facilities currently under construction in this area from adjacent neighboring residential areas.

(see Figure 5.2.6-c)

#### *c. Northwest Corner*

The landscape character of the northwest's corner magnificent Poplar grove should be extended toward the campus core.

To the north along West Cedar Lane, the predominantly residential quality of the NIH campus is compatible with the adjacent neighboring community, but it should be augmented with evergreen screening and ornamental plantings.

To the west, the area's woodland character should be extended to the existing Poplar groves. Again, it is recommended that the woodland floor be allowed to develop. Where additional screening is necessary to buffer NIH development from residential neighborhoods, the landscape should be supplemented with evergreen and ornamental plants. Additional understory screening should be required adjacent to new parking structures and in areas where the perimeter setbacks narrow.

*d. Southwest Corner*

From its hilltop topography, the southwest corner provides commanding views of the campus. The hilltop acts as a park-like resource for the neighborhood and campus. All existing plantings should be retained and additional plants should be used to screen the adjacent neighborhoods, to direct prominent vistas of the campus, and to form spaces in the park.

**Outer Building Zone**

The outer building zone, which encircles the campus core, is more relaxed and less formal than the core, providing subtle yet contrasting character. A campus loop divides the central campus core from the outer building zone. Access roads further segment the area. The outer building zone serves as a transition between the more organized central core and the natural woodland character of the perimeter landscape.

**Central Campus Core**

The Central Campus Core forms the innermost zone of the campus, and is dominated by buildings organized in an orthogonal pattern. Spaces between the buildings and the landscapes within this zone should be designed to relate to the axial and orthogonal arrangement of the buildings, through the formation of tree bosques, alleys, pedestrian streets, outdoor rooms, and courtyards.

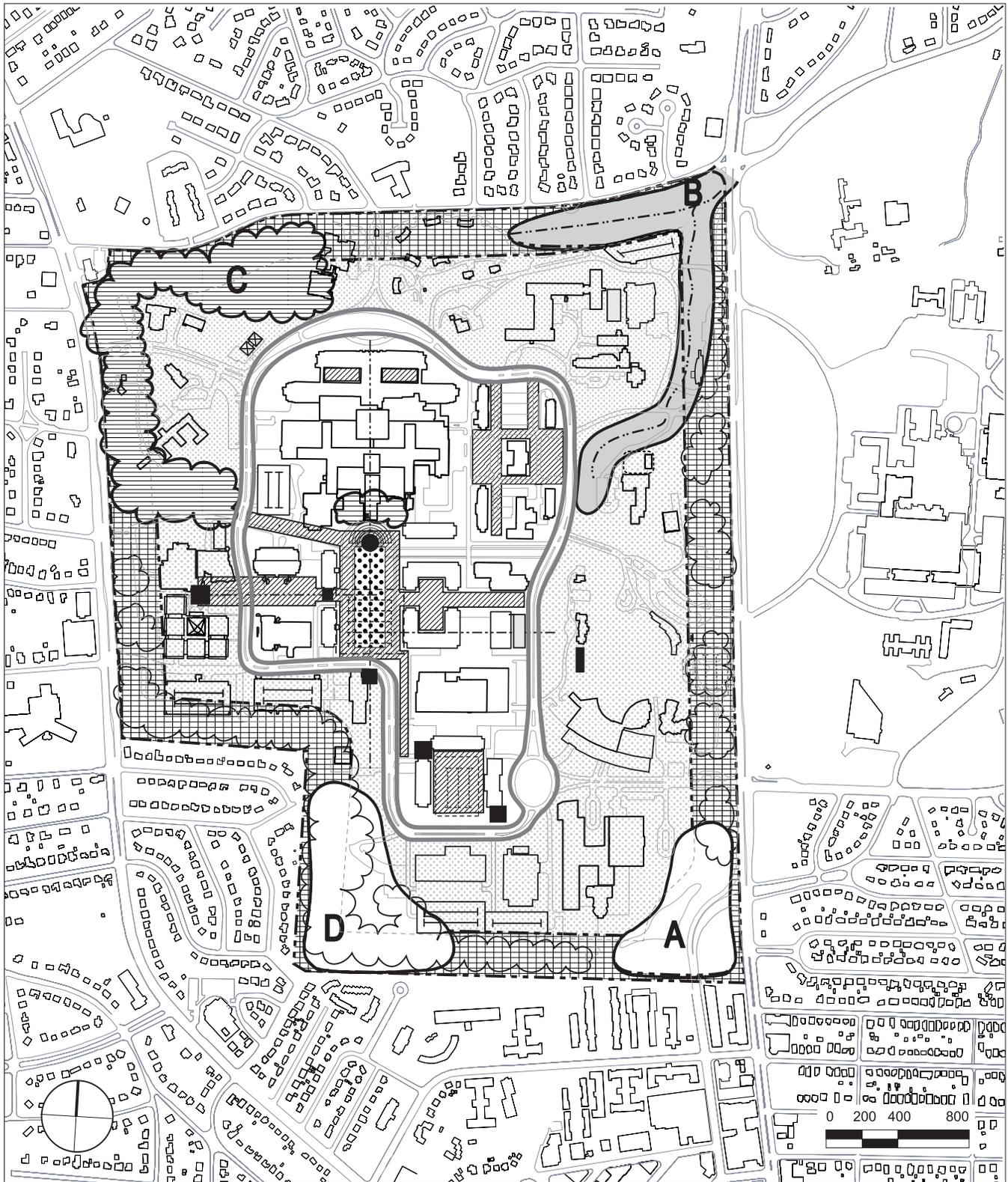
**Hierarchy of Open Space**

The NIH campus open space is formed by two contrasting systems. The first is the group of formally designed spaces, originating with the Central Mall and continuing into the smaller outdoor rooms, courtyards, and pedestrian promenades. The second is the enhancement of the natural stream and the informal extension of the woodland into the central core. The dovetailing of the two systems will knit the campus together while the subtle contrast between the systems will serve to generate a variety of public spaces. To further encourage the use of the outdoors, building arcades in the central core and trellised walkways are recommended to tie buildings and the pedestrian circulation system together.

**Streetscape Treatments**

The landscape serves to reinforce the Master Plan by helping to articulate and clarify the circulation systems. A singular campus loop, into which all NIH campus roads feed, accommodates primary vehicular circulation. In the future, the campus's most prominent employee entry or gateway will be the intersection of Center Drive with Rockville Pike. Primary gateway and avenue street tree planting is established using two double rows of street trees, spaced at 40' on center, with pedestrian walks centered on either side. In addition to the street tree plantings, the front facade of the CRC may be lined with tree bosques to enhance the vehicular arrival from the street to the drop-off area.

The streetscape of the central loop road is defined by a single row of street trees 40' on center and an 8 foot median, planted with ornamental trees and groundcovers. The remaining roadways should be informally planted with shade and ornamental trees. The interior pedestrian paths and promenades should be defined by linear bosques and groves of trees.



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- |  |   |
|--|---|
|  PERIM/BUFFER LANDSCAPE |  UPLAND WOODS    |
|  OUTER BLDG ZONE        |  CENTRAL LAWN    |
|  CAMPUS CORE            |  QUAD/COURTYARDS |
|  LOOP ROAD              |  SPECIAL FEATURE |
|  DISTINCTIVE CORNERS    |   |
|  STREAM VALLEY WOODS    |   |

Oudens & Knoop, Architects, P.C.

**Figure 5.2.5**

**Landscape  
Concepts**

SmithGroup

### ***Tree Conservation***

NIH has had a Tree Preservation and Replacement Policy since 1996 on a one-for-one basis. New projects called for in the Master Plan have been located to minimize tree loss, especially in the significant tree canopy areas at the northwest and southwest corners of the site, as well as along the NIH Stream.. NIH is in the process of preparing a Draft Tree Conservation Plan covering the entire campus that will include a more formal tree replacement policy.

The Master Plan reduces the overall footprint of buildings and surface parking while creating new campus open spaces, which will provide opportunities for additional plantings. Approximately 925 new trees will be added for street, walkway, Central Mall, and quadrangle plantings. Additional evergreen and extensive understory plantings are called for in the enhancement of the buffer areas.

### ***Plant Material Selection Criteria***

The initial selection and arrangement of plants is a crucial step in the ultimate success of any landscape plan. Three general criteria have guided initial plant selections:

- Preference for indigenous material,
- Reinforcement of the organizational strategy of the campus,
- Reflection of the mission of NIH.

Consideration should be given to the arrangement of plants which best integrates the man-made landscape within the natural landscape. The use of balance or symmetry in repetitive arrangements is one method of integrating formal buildings and circulation designs, giving order to outdoor space. This type of plant arrangement should be used is used throughout the Central Campus Core. The Outer Building Zone will utilize this structured organizational treatment of plants and trees near building and parking areas, with transitions to more informal plantings to tie into the natural landscape of the Perimeter Buffer.

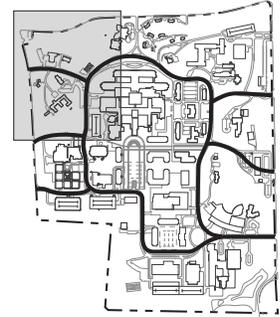
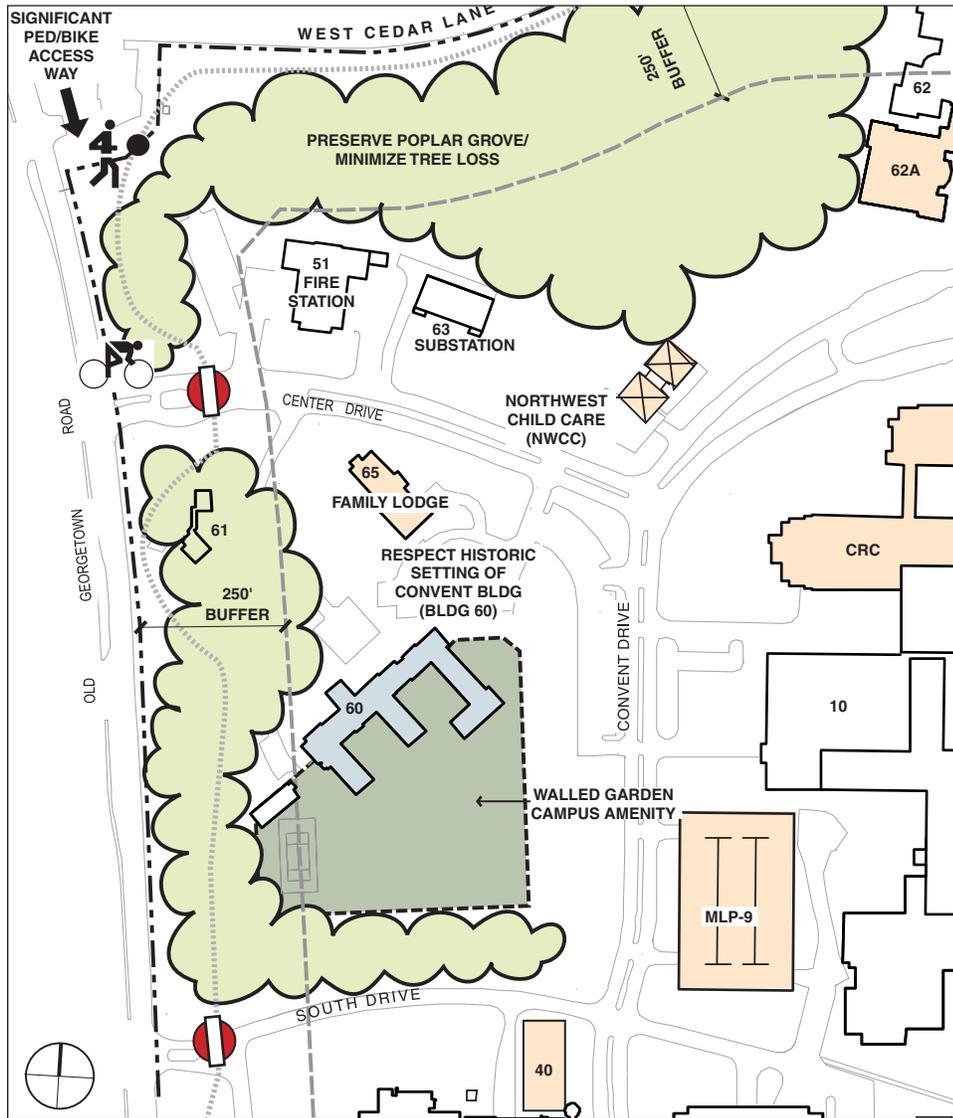
Plant material selection criteria will also provide educational or symbolic meaning to the landscape. One such concept for the NIH campus is the use of plants to dramatize and acknowledge their medicinal values. Water has also played a significant role in the healing and caring of mankind. The name Bethesda is literally translated as “house of mercy”. As a result, the use of water in pools, springs, and fountains would be most appropriate as focal points and open space linkages at NIH. The use of plants and water will form an interrelated theme, which tells the story of how these elements have served man’s health and well-being, and have acted as important garden elements in the landscape.

## **5.2.6 Campus Sectors**

To illustrate detailed elements of the Master Plan, the campus has been divided into ten sectors. Although each sector is primarily defined by a building group or an open space, there may be some overlap and interface between the sectors.

### ***Convent Sector***

This sector is a primarily wooded area with little new construction proposed to preserve the historical setting of the Convent Building (Building 60 - also known as The Cloister). Its dominant features are the Poplar grove along West Cedar Lane, the Convent Building, which is now occupied by the Mary Woodard Lasker Center for Research and Education and the recently completed Fire Station replacement (Building 51). The recently opened Family Lodge (Building 65) will allow the housing of adult out patients (and families of patients) undergoing treatment and clinical trials at the Clinical Center. To the immediate left of the Fire Station (Building 51), Parking lot 10K, which is currently partially within the Old Georgetown Road buffer zone, will be removed as soon



NOTE: SECTOR PLANS ARE STRICTLY DIAGRAMATIC DRAWINGS AND ARE NOT TO BE TAKEN LITERALLY.



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Bethesda Campus**

- PROPOSED
- FENCELINE
- CONTROLLED ACCESS GATE
- PEDESTRIAN CONTROLLED ACCESS
- HISTORIC PROPERTY

**Figure 5.2.6-a**

**Convent Sector**

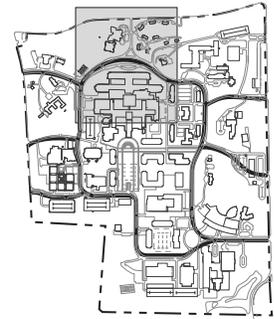
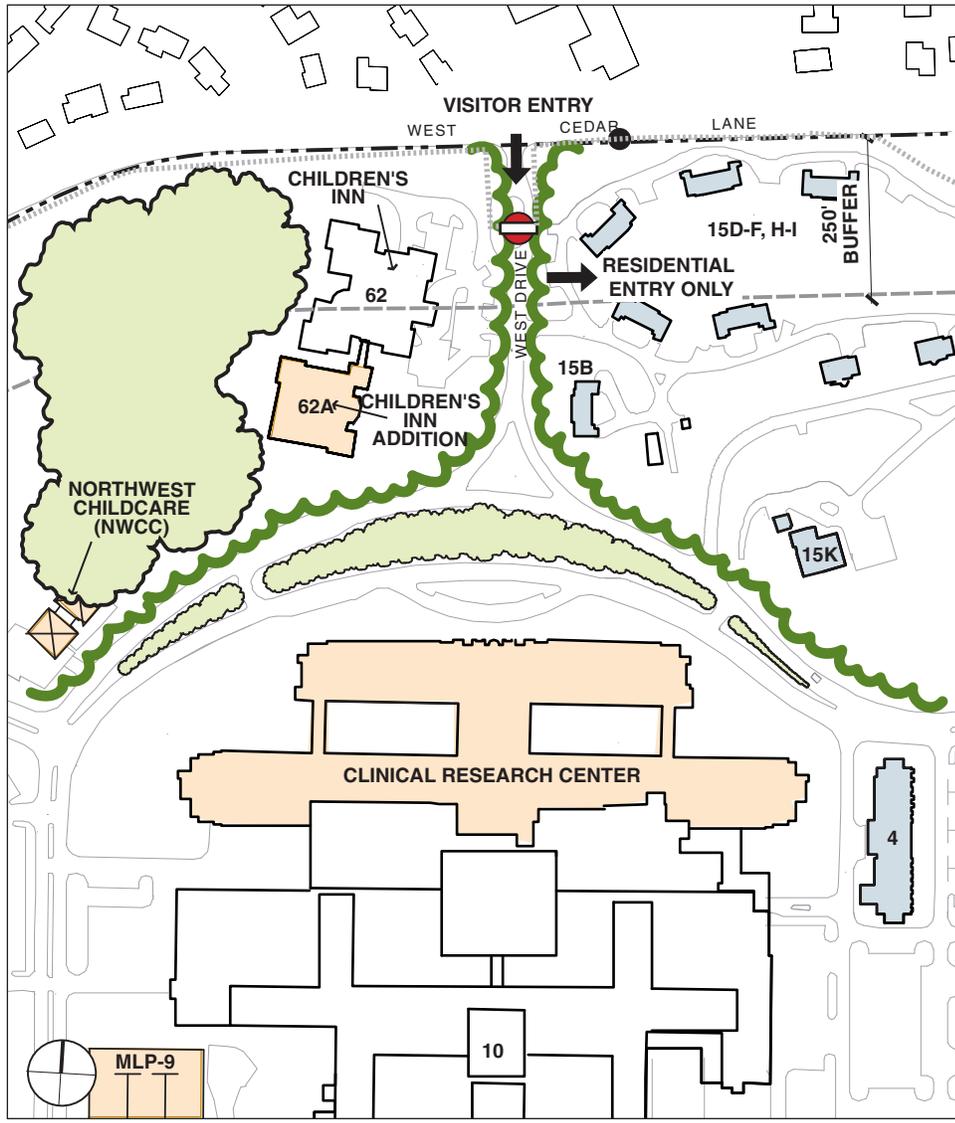
as possible. Structures in this sector should be located to respect the buffers and minimize tree loss.

Since the Poplar grove is a significant site feature of large and mature trees, it is recommended that as little impact as possible be made in this portion of the site. The Convent Building has been recognized by NIH and the Maryland Historic Trust (MHT) as an historic property whose environmental setting should be respected, thus no development has been proposed for the parcel it occupies. The walled garden behind the Convent Building should be better utilized as a campus amenity.

The section of Center Drive between Old Georgetown Road and the inner campus loop is proposed as a employee only entry to the campus.

***Residential Sector***

The Residential Sector includes the smaller residential structures at the north end of the campus between West Cedar Lane and the campus loop. It is proposed that the area remain lightly developed, respecting the West Cedar Lane buffer zone and the scale of the existing structures. The West Drive entrance will allow exclusive access for Clinical Center patients and employees .



NOTE: SECTOR PLANS ARE STRICTLY DIAGRAMATIC DRAWINGS AND ARE NOT TO BE TAKEN LITERALLY.

**NIH  
Master Plan  
2003 Update**  
Bethesda Campus

- PROPOSED
- FENCELINE
- CONTROLLED ACCESS GATE
- PEDESTRIAN CONTROLLED ACCESS
- HISTORIC PROPERTY

**Figure 5.2.6-b**

**Residential Sector**

**Building 31 / Stream Sector**

The sector includes the general office Building 31 complex, the Building 6 research complex, and the open area at the northeast corner of the site. A new research Building 33 and Multi-Level Parking 10 (MLP-10), with space for approximately 1,262 cars are now under construction. The new research building will form an entry court shared by Building 31C and Building 6B. The parking deck is located north of Building 33 and south of the north buffer zone, which will allow for a mature tree buffer to screen the structure. Care should be taken in landscape screening to avoid negative effects to the prominent view into campus from the corner of Rockville Pike and West Cedar Lane. The remaining historic setting of Building 6 should be protected.

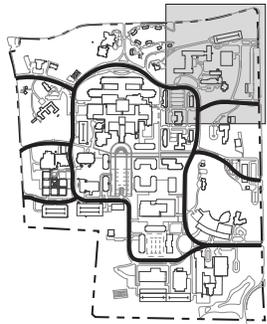
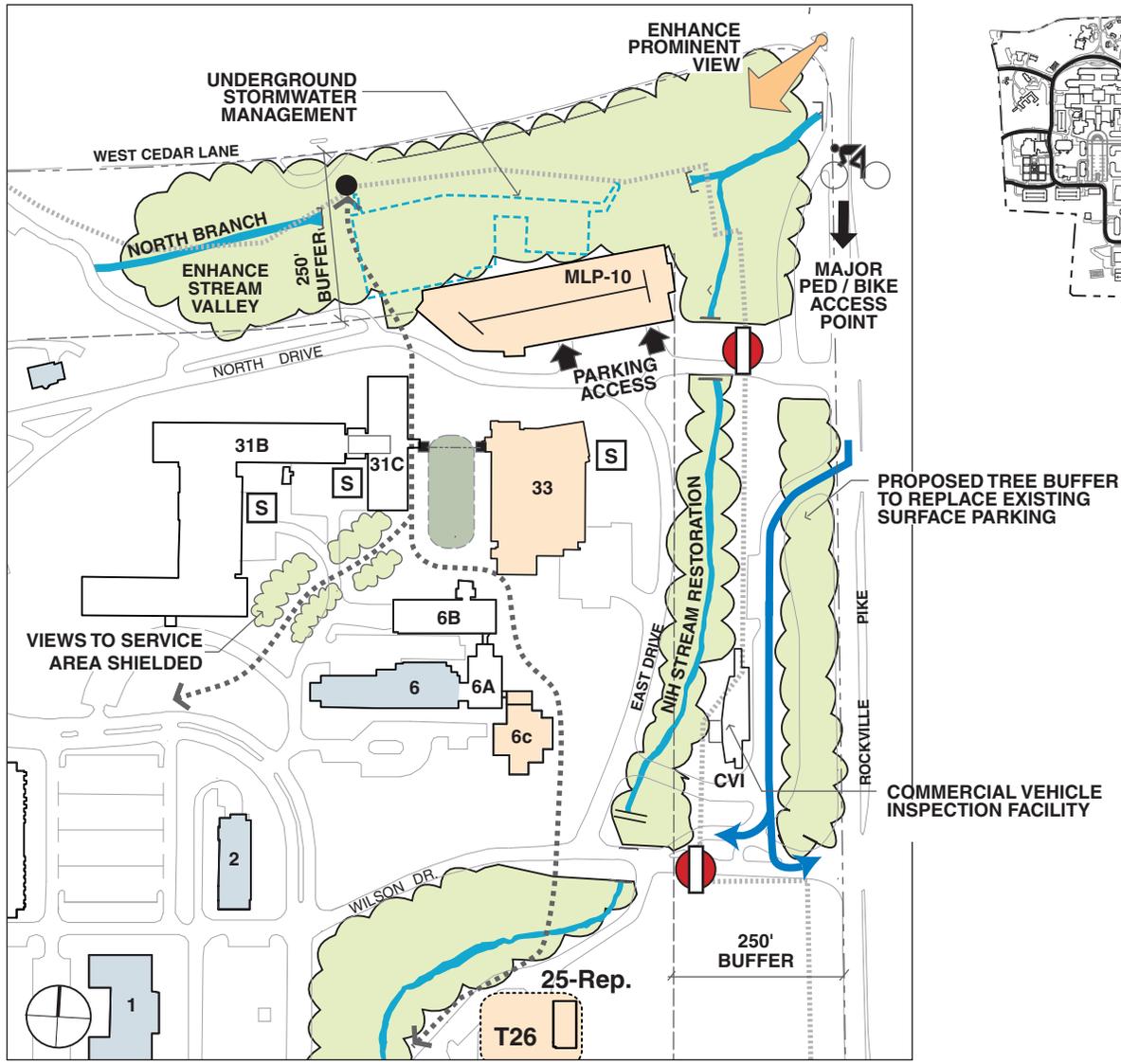
To connect the parking structure and new development to the rest of the campus, pedestrian paths are proposed to the north and south of the Building 6 complex, with views into service areas shielded where possible. A new road (extension of North Drive) north of Building 31 connecting Building 33 and MLP 10 to the campus loop has been constructed, and a NIH Shuttle stop is planned at the building entry court to accommodate pedestrians going to the research Building 33 as well as those coming into campus from MLP-10.

Surface parking located within the buffer zones along West Cedar Lane and Rockville Pike will be removed as possible. The areas reclaimed will be landscaped to enhance the stream valleys as a campus open space amenity. As part of the reclamation program the North Branch of the NIH Stream has been unchannelized and a stormwater management system has been created between West Cedar Lane and MLP-10. Additionally, the NIH Stream Restoration project will restore 3.54 acres or 2,100 linear feet of the NIH stream channel. Restoration plans consist of extensive stream bank restoration, erosion control measures to reduce flow velocities.

Wilson Drive has been designated as a major entry and also as commercial vehicle entry after passing through inspection. There will be a new vehicular bridge from the CVI to East Drive carrying trucks to Wilson Drive. All roadway changes in this sector should affect existing bridges and mature trees as little as possible.

Figure 5.2.6 - D Stream Valley View





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- PROPOSED
- FENCELINE
- CONTROLLED ACCESS GATE
- S SERVICE AREA
- PEDESTRIAN CONTROLLED ACCESS
- PEDESTRIAN PATH
- COMMERCIAL VEHICLE ROUTE
- HISTORIC PROPERTY

Figure 5.2.6-c

**Building 31/  
Stream Sector**

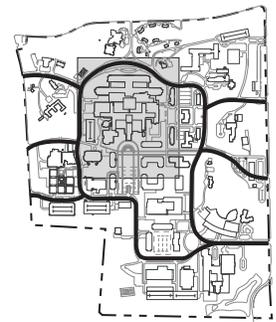
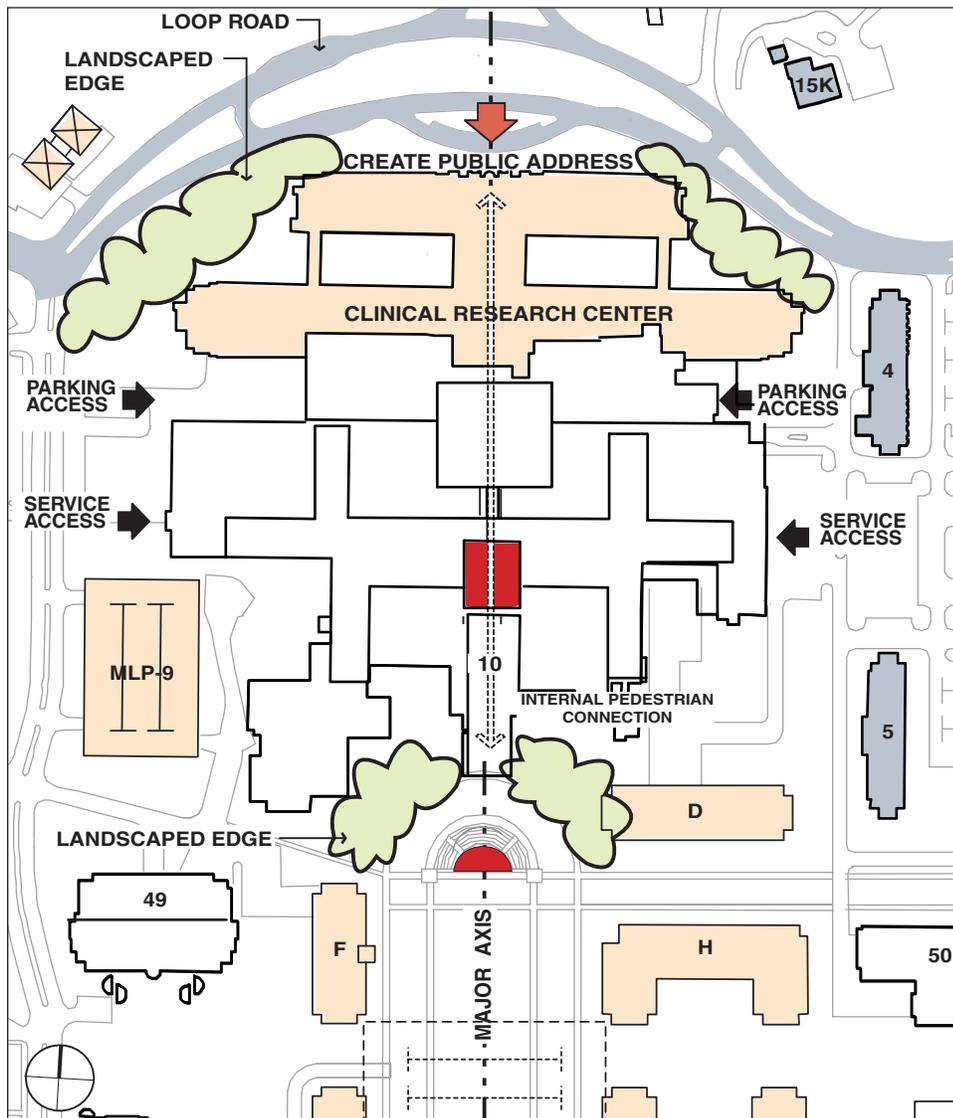
**Clinical Center Sector**

The Master Plan is premised on the retention and renovation of Building 10 as the Clinical Center and construction of the Mark O. Hatfield Clinical Research Center (CRC) with approximately 1,050,000 gsf expansion of patient care and related research space north of the existing facility.

Within the sector there are two sites, which are outside the footprint of the Building 10 complex. The site to the west of Building 10 and north of research Building 49 is planned to be developed as a multi-level parking structure (MLP-9) with space for approximately 940 cars. The site east of Building 10 and west of research Building 5 is planned to be developed as research Building D.

The open space strategy for the Clinical Center Sector is to terminate the Central Mall and create a landscaped edge around the facility, especially along the Center Drive side. In terms of massing, the tallest building elements should relate to the central axis of the mall, and there should be a transition in building heights toward the lower buildings of the Historic Core on the east, the residential buildings on the north, and the Convent Building on the west. The well-defined and accessible internal pedestrian connection should be made through the Clinical Center Complex should continue to connect the Central Mall to the north area of the campus.

Parking to accommodate approximately 1,550 spaces will continue to be provided in the ACRF garage. Service access to the Clinical Center should be limited to the east and west sides of the facility as opposed to the more publicly oriented north and south sides.



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- PROPOSED
- FOCAL POINT
- HISTORIC PROPERTY

Figure 5.2.6-e

**Clinical Center  
Sector**

**Historic Core Sector**

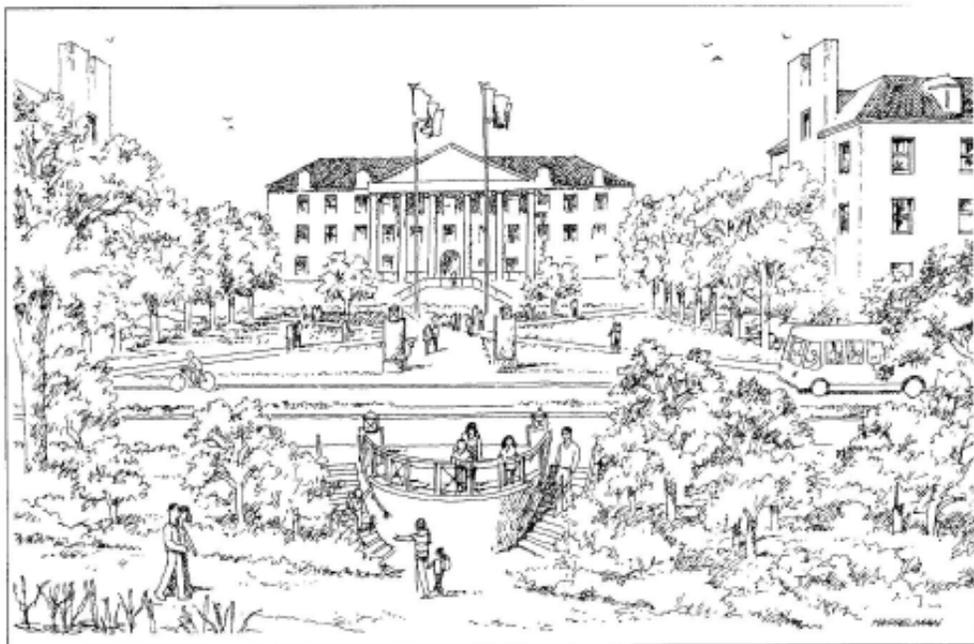
The Historic Core Sector is defined as the area of the early campus structures (Buildings 1 through 5) and the existing radiation safety/waste handling Building 21 site to the east. The goals for this area are to enhance the historic setting of Buildings 1, 2, 3, 4 and 5, and to enhance the NIH Stream by the Building 21 site, and to more clearly relate the Building 21 site.

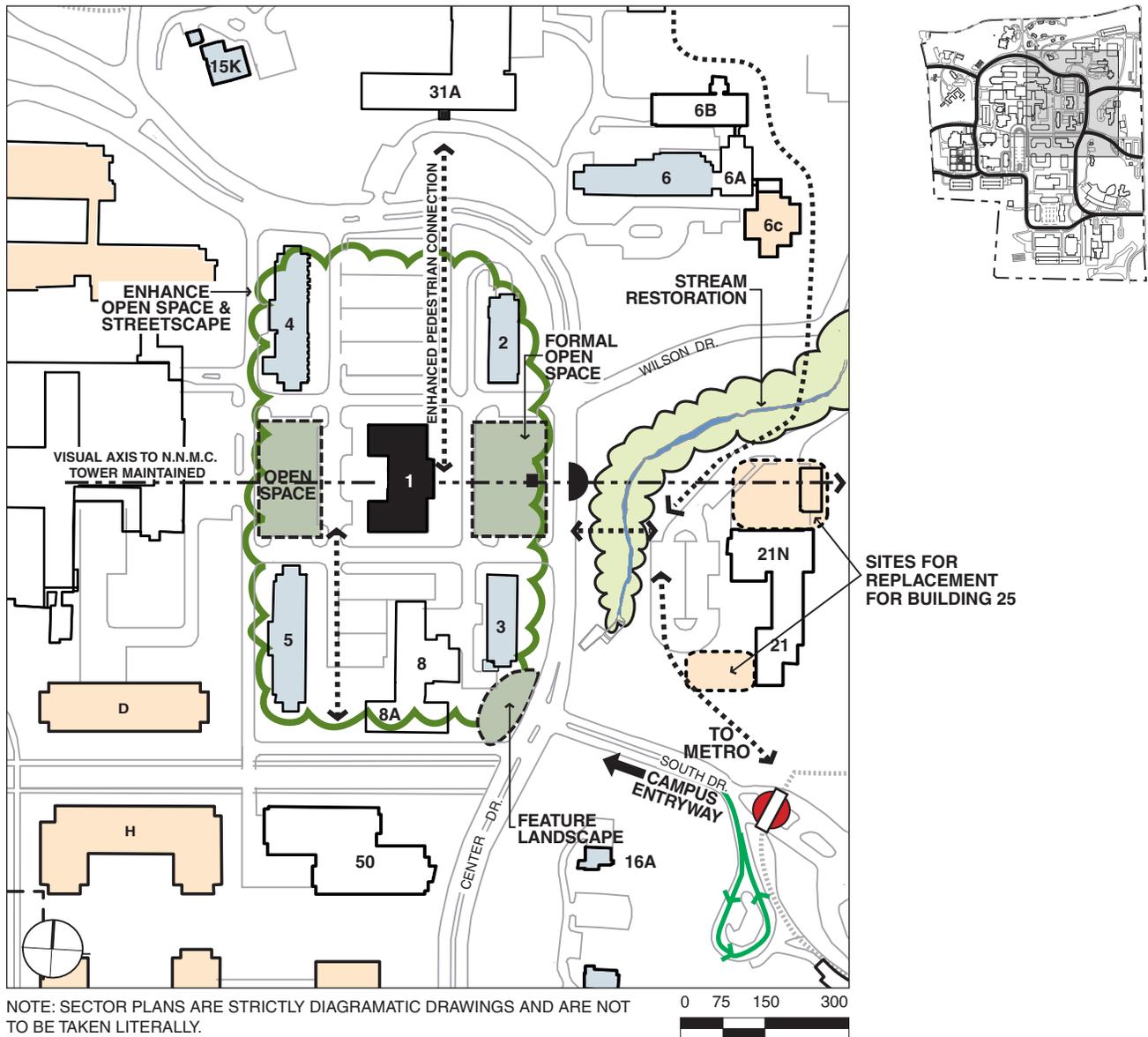
As part of the enhancement of the Historic Core, the Master Plan proposes that some of the surface parking in this area be removed when possible, including the removal of parking directly in front of Building 1. This will allow landscaped open spaces to surround and highlight Building 1, which is the actual and symbolic origination point of the Bethesda campus. These landscaped areas will also allow clear pedestrian movement from the campus core to periphery buildings such as the general office Building 31 complex. One of the most important “ceremonial” open spaces on the campus is the quad in front of Building 1, which is often used as a defining image for the NIH campus environment.

In the immediate future, Buildings 2 and 3 of the Historic Core will be converted from research use to administrative use, complementing Building 1 which houses the Office of the Director of NIH. The Master Plan proposes that Buildings 4 and 5, recently renovated, continue to be used as research buildings. Future Master Plan updates should evaluate the future potential conversion of these buildings to administrative use, allowing them to be returned to their original architectural condition. Any modifications to buildings within the Historic Core should conform to the Secretary of the Interior’s *Standards for Rehabilitation...* as discussed in Section 6.3.1, Historical Guidelines.

Direct pedestrian connection to the Metro station is highly desirable for this site. Further, the NIH Stream area should be upgraded for pedestrian access and use, and a tree shaded pool area should be created at the outfall of the piped section of the stream to affect water temperature cooling.

Figure 5.2.6 - G Ceremonialc Space in Front of Building 1





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- PROPOSED
- FENCELINE
- CONTROLLED ACCESS GATE
- PEDESTRIAN CONTROLLED ACCESS
- PEDESTRIAN PATH
- NIH SHUTTLE ROUTE
- HISTORIC PROPERTY

Figure 5.2.6-f

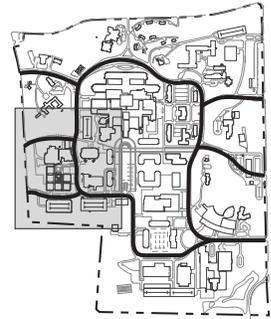
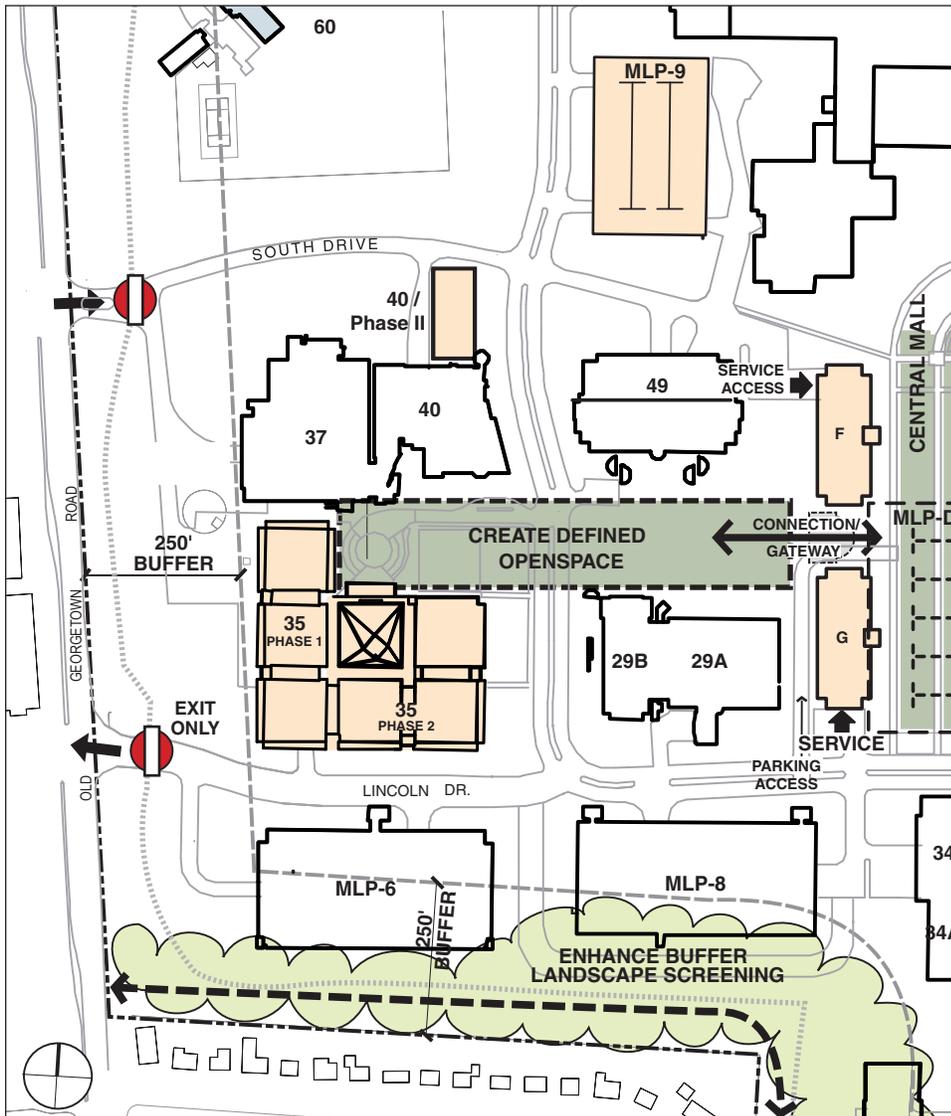
**Historic Core Sector**

### **West Quad Sector**

The West Quad Sector is one of the significant existing building groups proposed to remain on campus. Research Buildings 37, 40, 49, 29A and 29B will be retained, while research Buildings 29, 30 and 36 are proposed to be demolished. Phase I of the Neuroscience Research Center (35/NRC) is currently under construction and replaces former Building 35, which has been demolished. Phase II of the NRC will replace Building 36. New research buildings F and G are proposed for the east end of the quad to increase the amount of research space in the sector. They are located to reinforce the enclosure of the quad space and to create the western edge of the new Central Mall. Multi-level parking structures MLP 6 and MLP 8 are also retained in this sector.

The open space goal of this sector is to better define and connect the open space between the NRC and Building 40 with the open space between Buildings 49 and 29A/B. This enhanced quad is then connected to the Central Mall through the gateway created by the demolition of Building 30 and the construction of the two new research buildings facing the mall. Due to the significant elevation change from west to east, care must be taken to create a coherent open space while maintaining building entry relationships. To help accommodate this grade change, the quad may terminate in a belvedere overlooking the Central Mall.

Service for the two new research buildings F and G on the Central Mall should be provided away from the West Quad open space or the Central Mall, on the north and south sides of the buildings, respectively. An alternative service solution may be to create an underground service concourse between Buildings F and G, accessed from the service area of Building 49. Due to the conflict of having service areas for Buildings 29A and B directly off of the loop road, moving service for these two buildings into the possible underground service concourse mentioned above should be explored.



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- PROPOSED
- FENCELINE
- CONTROLLED ACCESS GATE
- PEDESTRIAN PATH
- HISTORIC PROPERTY

**Figure 5.2.6-h**

**West Quad Sector**

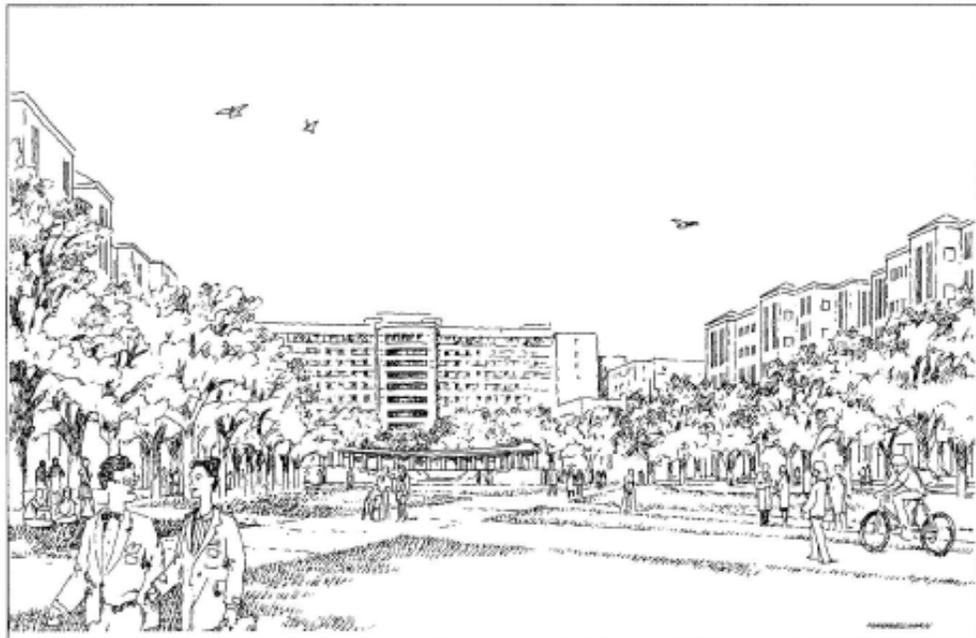
**Central Mall Sector**

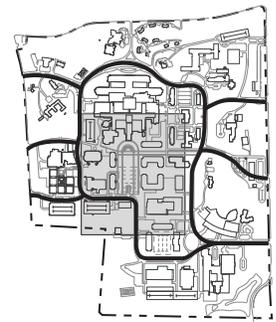
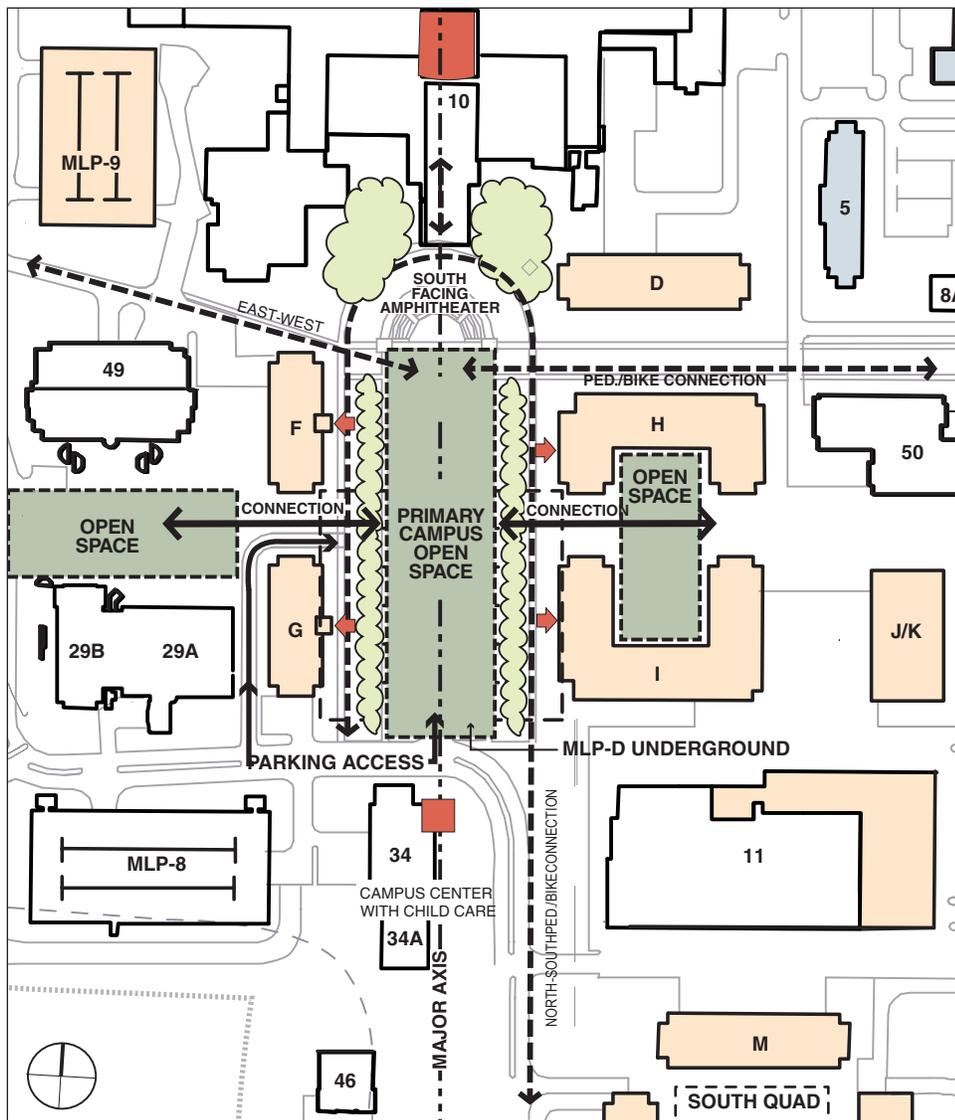
The Central Mall is intended as the primary outdoor “room” and symbolic heart of the campus. It will be the primary space on campus for interaction and collegiality (a goal of the Master Plan) because of its central location and proximity to the Clinical Center Complex. The Master Plan envisions the Central Mall as an active space with a central open area for ceremonial gatherings or informal recreation, and edges strongly defined by alleys of trees, with pathways accommodating pedestrian and bicycle circulation, seating, and garden spaces. There should be as much “people” activity as possible at the building edges, which define the space. At the north end of the mall, the space is terminated by a south-facing amphitheater, which is set into the hillside and can be used for recreation, seminars, and other NIH programs and events.

Functionally, the central Mall helps organize pedestrian movement through the center of campus, creating clearly defined north-south and east-west paths across campus. Spatially, the Central Mall provides an open area, which allows the connection of the other campus spaces, such as the West Quad, to the central core. The scale of the space is also an appropriate foreground to the height and bulk of the Clinical Center Complex. Also, underground parking structure, MLP-D, is planned at the south half of the Mall. This multilevel underground structure can accommodate 1,360 cars centrally located to campus.

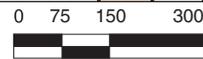
The Central Mall accommodates and responds to the strong axial and symmetrical character of the existing Building 10 configuration. However, much of the mall will eventually be defined by new development. New research Buildings H and I, developed on the current site of support and computer services Building 12/13, will define the east edge of the mall, while new research Buildings F and G will define the west edge. A Campus Center housing consolidated employee activities, special functions and Child Care is proposed in renovated and converted Building 34/34A, to define and activate the south end of the mall. Building articulations around the mall open space should respond to major spatial axes such as the north-south axis of the Central Mall and the east-west axis of the West Quad.

Figure 5.2.6 - J View of Central Mall's North End





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- PROPOSED
- HISTORIC PROPERTY
- FENCELINE
- FOCAL POINT
- BUILDING ENTRY
- PEDESTRIAN PATH

**Figure 5.2.6-i**

**Central Mall Sector**

**East Quad Sector**

To make more efficient use of a central site near the Clinical Center Complex in close proximity to the Metro station, the Master Plan proposes the redevelopment of the existing support and computer services Building 12/13 site for more intense and higher scaled laboratory uses. Buildings H and I, which define the eastern edge of the mall, will also define the western edge of the East Quad. Building J/K and Building 50, (the latter already in place), will define the eastern edge of the East Quad. Building J/K will house research service functions and will have a service area contiguous to the Power Plant to be shielded from the East Quad open space by a dense landscape buffer and/or walls. The eastern edge of this quad will also serve as frontage to the loop road.

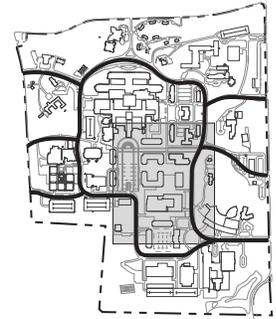
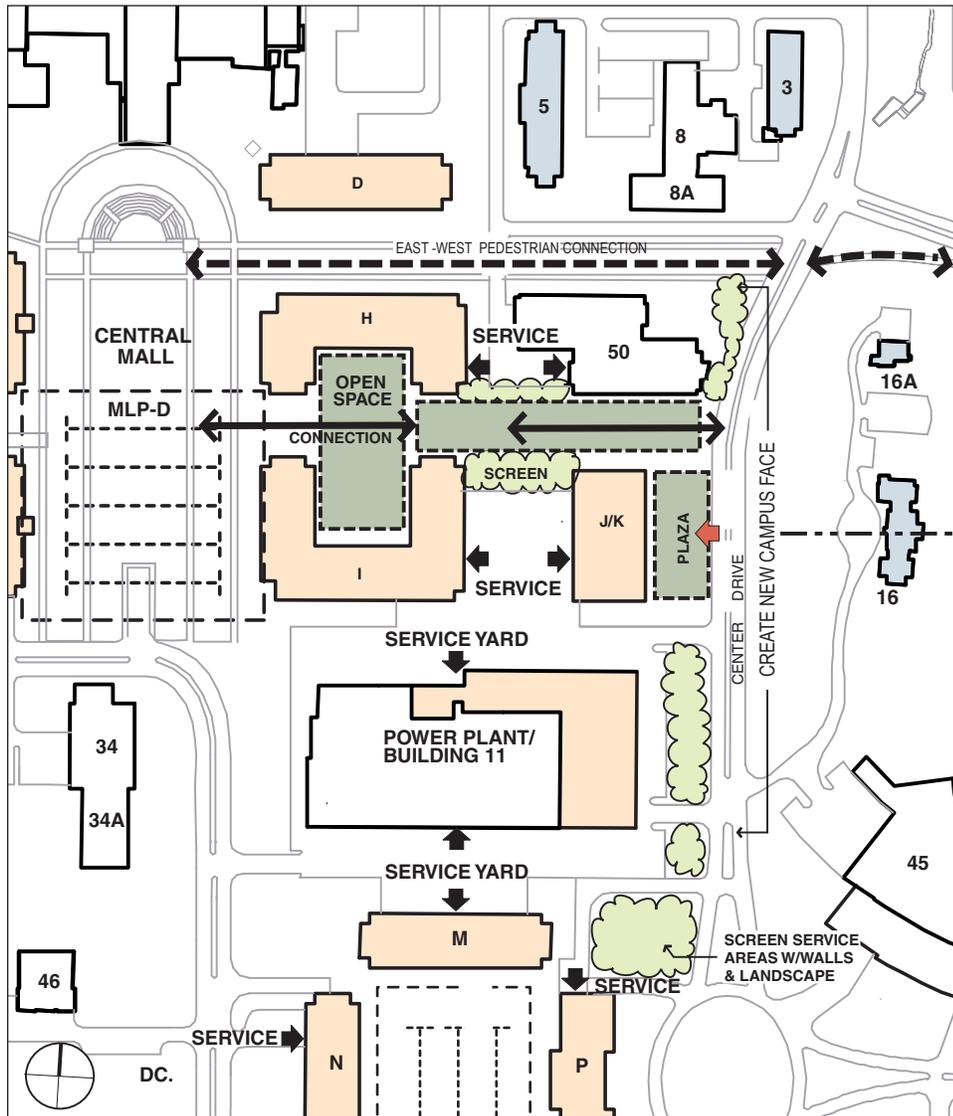
On the east side of the Quad the Master Plan proposes a plaza and landscape bosque as a foreground for the building group. A plaza is shown to respond to the central axis of the Stone House (Building 16). An internal pedestrian connection should also be provided through the buildings of the quad. Building massing should step down toward the smaller scaled buildings of the Historic Core.

Projects for Power Plant expansion are under development, and are taken into account under the building outline shown. This expansion will also incorporate the consolidation of chiller capacity, which is currently housed in Building 34. For more detailed information on the Power Plant expansion see section 5.4.1.

Service courts are provided around the north and south sides of the Power Plant for access to equipment and deliveries. A replacement fuel oil storage tank is proposed to be located in a below grade vault within the north service yard to provide a secure area for tank filling. All service areas should be screened by walls and landscaping, with special attention given to the areas facing Center Drive and the Central Mall.

Figure 5.2.6 -L View of East Quad Interior Courtyard





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- PROPOSED
- HISTORIC PROPERTY

**Figure 5.2.6-k**

**East Quad Sector**

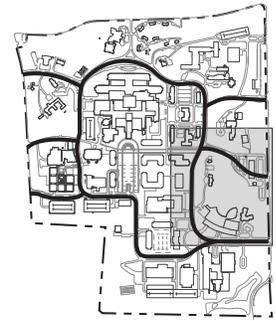
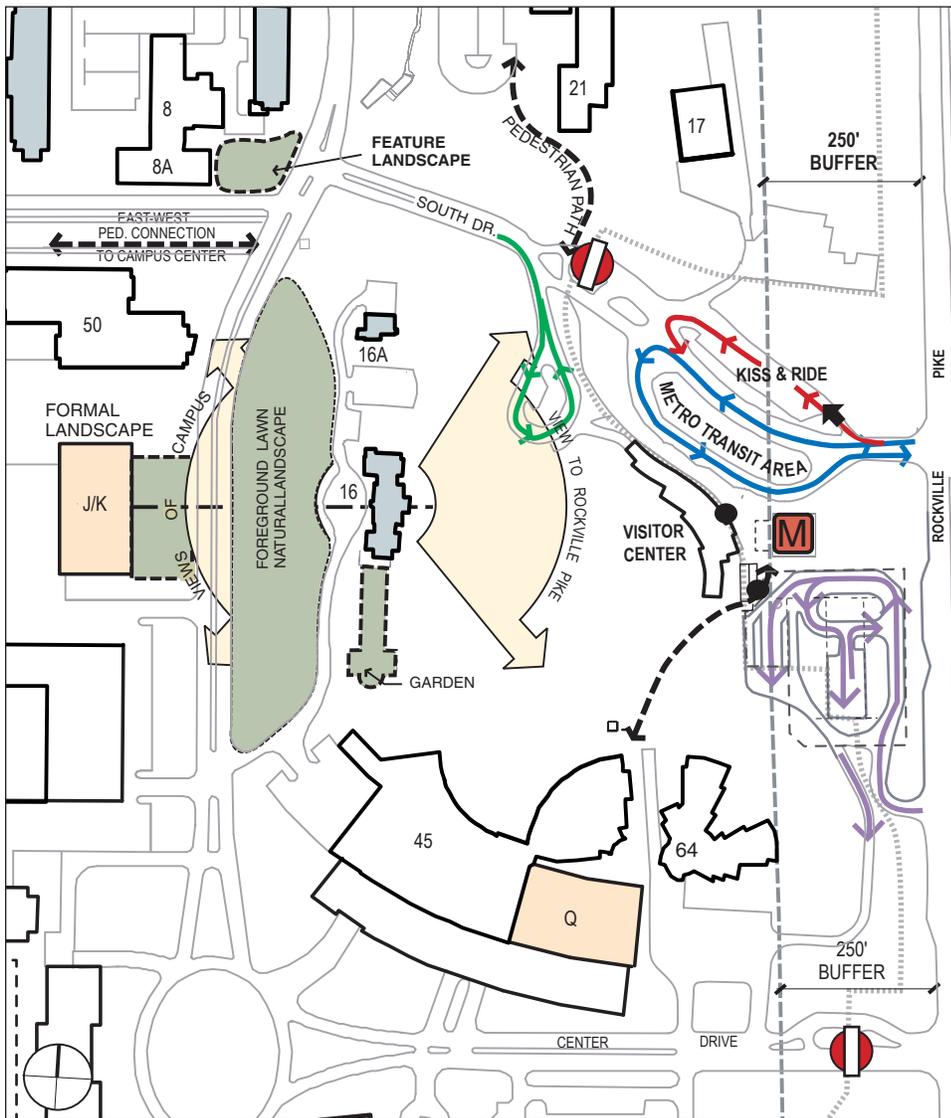
**Stone House/Metro Sector**

The Stone House sector is a highly open area at the east periphery of the campus, made up primarily of foreground lawns, which highlight the Stone House (Building 16). The Stone House, which has been identified as an historic structure, sits atop a prominent hill and has views over the campus toward the west and Rockville Pike to the east. The southern edge of the sector is defined by the William H. Natcher Building (Building 45).

At the east edge of the sector is the Medical Center Metro station, which will continue to serve as the major transit node for NIH and the surrounding area. Public buses and NIH shuttles interface with the Metro Red Line at the transit plaza. As part of the Security Improvements program (see section 2.12) the Gateway Center for Visitors will be placed contiguous to the Metro station, with the purpose of screening visitors to the NIH grounds. The Gateway Center will be accompanied by an underground multi-level parking structure with space for approximately 350 visitor cars. An internal campus NIH Shuttle stop has been constructed contiguous to both the Metro stop and the Visitor Center to continue facilitating mass transportation for pedestrians, both employees and visitors.

This sector also includes the East Child Care Center located along Center Drive and Rockville Pike. As part of the Gateway Center a new road to run from the visitors' vehicle inspection east of the child center to join Center Drive is planned.

At the intersection of South Drive and the loop road, the existing triangular island often prevents a smooth flow of pedestrian and vehicular traffic. Therefore, a "T" intersection is proposed in place of the existing triangular island. In order to create a significant arrival feature, formal landscaping should be provided at the point where South Drive terminates at the loop road.



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- |  |                           |  |                              |
|--|---------------------------|--|------------------------------|
|  | PROPOSED                  |  | VISITOR PARKING              |
|  | FENCELINE                 |  | CONTROLLED ACCESS GATE       |
|  | VISITOR PEDESTRIAN PATH   |  | PEDESTRIAN CONTROLLED ACCESS |
|  | KISS & RIDE ROUTE         |  | VISITOR ACCESS               |
|  | METRO BUS / RIDE ON ROUTE |  | HISTORIC PROPERTY            |
|  | NIH SHUTTLE ROUTE         |  |                              |
|  | VISITOR ROUTE             |  |                              |
- Oudens & Knoop, Architects, P.C.

Figure 5.2.6-m

**Stone House/  
Metro Sector**

SmithGroup

### **South Quad Sector**

The South Quad Sector occupies the site of the existing animal facility (Building 14/28-18/32 complex) and the area surrounding surface parking lot 41. Because of its large footprint and one-story construction, the existing Animal Facility makes inefficient use of its site. With increasing space demands this site will become valuable for more densely developed research space. Likewise, the area south of the Building 14/28 complex is underutilized as a surface parking area.

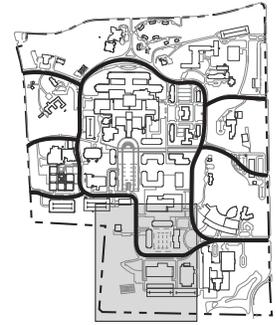
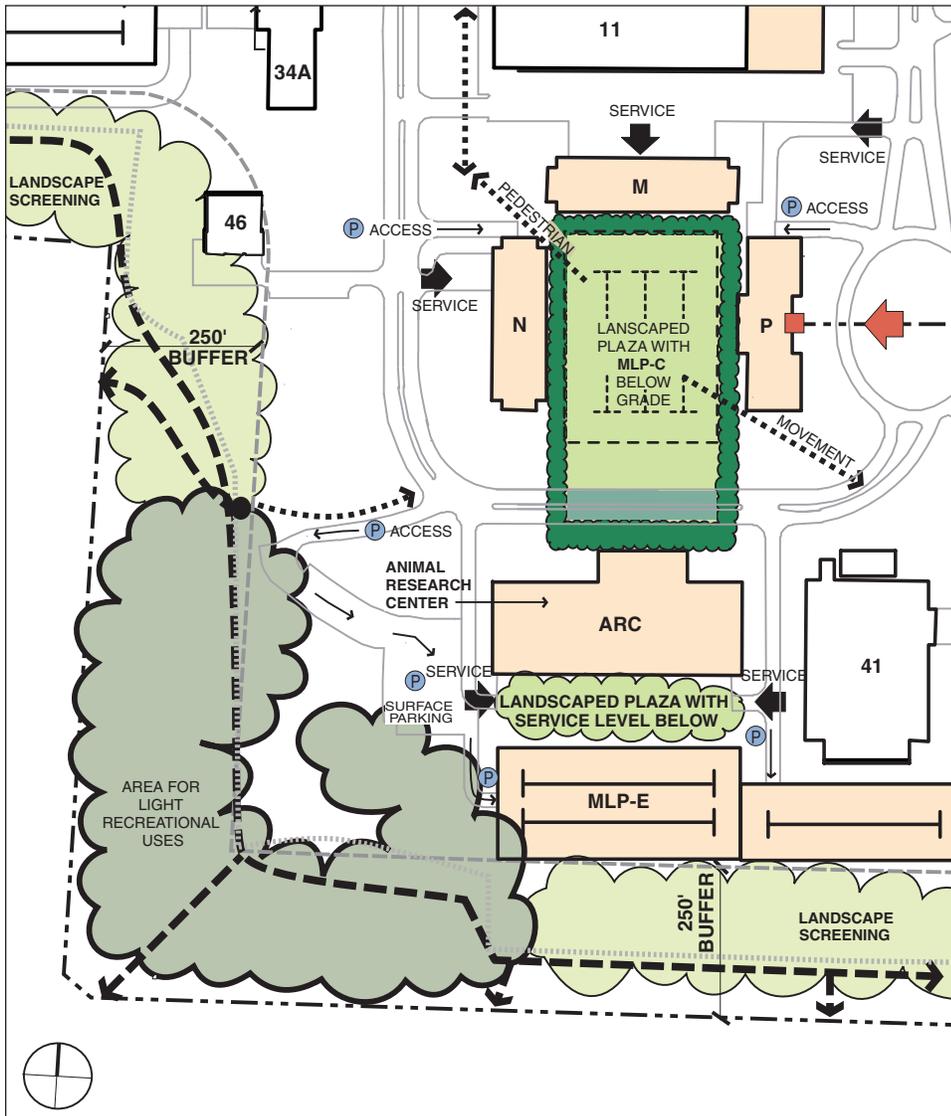
Development proposed for this sector includes the replacement of the animal facility at the south end of the South Quad contiguous to research Building 41 in a new Animal Research Center (42/ARC) mid-rise structure. This location reduces the apparent height of the proposed structure by taking advantage of a large elevation change through placing the building into the side of the hill. It also allows for construction of the new facility while maintaining the operation of the existing facility.

The South Quad complex proposed for the site of Building 14/28 and 18/32 is composed of four new buildings surrounding a central landscaped plaza with underground parking. The four buildings include research Buildings M, N, P and 42/ARC (Animal Research Center). The underground parking (MLP-C) can accommodate 1,024 cars in four levels. Building heights step down toward the Edgewood/Glenwood neighborhood. Access to this new development will be provided by the completion of the loop road system through the south end of the campus. Due to site topography, much of the south portion of the loop road will be at a lower elevation than the adjacent neighborhood, and the roadway has been moved as far as possible from the west boundary of the site.

A new quad open space is developed as the focal point of the sector on top of the parking deck. The open space facilitates pedestrian movement from the campus core to the South Quad buildings, and to the Lister Hill (National Center/National Library of Medicine) Complex to the southeast. The plaza space would be landscaped to enhance views from within the surrounding buildings and would serve as an open space amenity for employees. This plaza space extends from Building M to the ARC. This section of the loop would be treated primarily as a pedestrian plaza allowing vehicular circulation. Plaza paving and signage would alert drivers that they would be entering a primarily pedestrian zone.

The ARC will have a service yard on its south side, located at the lower loop road elevation, and will be covered by a landscaped plaza that matches the elevation of the higher topography. As a result, service functions will be hidden under the natural topography line. MLP-E proposed South of the ARC, is a structure with parking decks that set back as they rise to respect neighborhood buffers and campus height limitation guidelines (see section 6.2.2). The parking structure is one deck below grade and no more than two decks above grade, and can accommodate approximately 1,116 cars. A campus shuttle stop is proposed at the southeast corner of the South Quad, conveniently accessible to MLP-E as well as to major pedestrian traffic in the South Quad, Natcher and Lister Hill zones.

At the south and west perimeter of the site the buffer zones are respected and expanded to 250 feet. Surface parking currently within the buffer is proposed to be removed as soon as possible and no new construction is planned within the buffer. The west PEPCO substation (Building 46) will remain, however. The existing child care center (Building T-46) is proposed to be relocated from the buffer to an upgraded, permanent facility at Building 34/34A. Its location was selected to accommodate pedestrian, vehicular, and parking access to serve the south end of the campus, which



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- PROPOSED
- FENCELINE
- PEDESTRIAN CONTROLLED ACCESS
- PEDESTRIAN PATH
- PARKING

Figure 5.2.6-n

**South Quad  
Sector**

is planned to have employee population growth. The open space at the southwest end of the campus is reserved for light recreational uses. No active uses should be encouraged along the Edgewood/Glenwood buffer.

### ***Library Entry Sector***

This sector includes buildings at the southeast corner of the site, which define the major employee entry to the campus from Rockville Pike. The goals for the Master Plan for this area of the site are to efficiently accommodate the large volumes of traffic, which use the Center Drive entry, to create a positive entry image for the campus, and to integrate the existing and proposed buildings into the overall Master Plan structure.

Major development proposed for this sector includes the construction of a replacement building for the office component of the support and computer services Building 12/13 complex (Building Q). This proposed facility would complete the building mass of the William H. Natcher Building (Building 45) in response to the curve of Center Drive, and would be a compatible functional use for the existing facility.

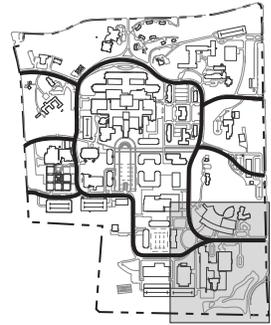
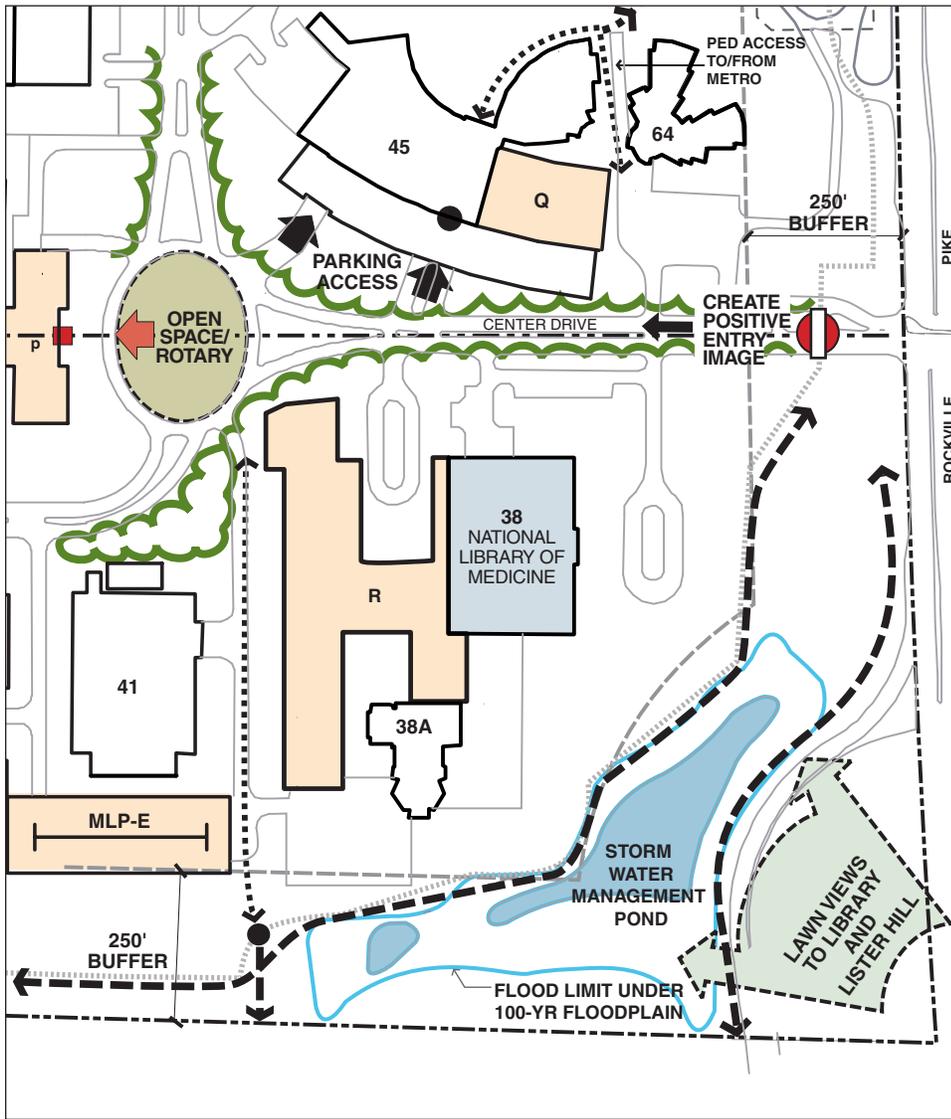
New research Building P is proposed as the axial termination of the Center Drive entry and forms the east edge of the South Quad open space. The architectural design and functional use of this building should be of significance commensurate with its prime location. The Addition to the National Library of Medicine (Building R), of administrative/special function use, is planned in the area in front of Building 38A (Lister Hill Building). Spatially, a dialogue is created between new research Building P, the Natcher Building complex (Buildings 45 and Q), and Lister Hill (Buildings 38), but the space defined is primarily for vehicular circulation. MLP-7 will be demolished to give way for Building R, and its capacity will be absorbed by Phase I of MLP-E. The Master Plan proposes that alleys of trees be planted along both sides of Center Drive, creating a vista, which opens to a landscaped focal space at the termination of the entry axis. The prominent lawn at the southeast corner of the site will include a retention pond, and will provide views to the National Library of Medicine and the Lister Hill Building.

The Center Drive entry at Rockville Pike currently has the highest volume of entering and exiting traffic of any entry on campus. In the future, traffic projections indicate that the use of this intersection will increase with additional employees using this entry to travel north into the campus and south to the proposed MLP-C and MLP-E. The roadway is proposed to be upgraded to four lanes with a landscaped median. Additional turn lanes will be added at the intersection with Rockville Pike (see section 5.3.4, Roadway Improvements and Traffic Operations). Service and parking access points are to remain in their current locations, however not all will be accessible from both directions on Center Drive to simplify traffic movements.

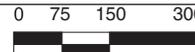
A traffic circle or rotary is proposed for the intersection of Center Drive with the loop road. The configuration shown is a circulation concept, which would require detailed analysis and design before implementation. With the additional volumes of traffic anticipated from the population increase in the South Quad Sector, the completion of the office building east of the Natcher Building, and the construction of MLP-C, the concept of a rotary is positive for several reasons: it simplifies traffic patterns to a series of one-way movements; it allows a large volume of traffic to move south toward MLP-C without signaling the intersection at the loop road; it maintains the continuity of the loop road; and it allows for the tendency of much of the incoming traffic to easily flow north toward the Clinical Center and campus core.

## **5.2.7 Campus Amenities**

Campus amenities can generally be divided into two groups: employee/visitor services, and positive site features which enhance the use or image of the campus. The Master Plan addresses the issue of campus amenities in an effort to provide for the practical



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- |  |                              |  |                   |
|--|------------------------------|--|-------------------|
|  | PROPOSED                     |  | FOCAL POINT       |
|  | FENCELINE                    |  | BUILDING ENTRY    |
|  | CONTROLLED ACCESS GATE       |  | HISTORIC PROPERTY |
|  | PEDESTRIAN CONTROLLED ACCESS |  |                   |
|  | PEDESTRIAN PATH              |  |                   |

**Figure 5.2.6-o**

**Library Entry Sector**

needs of employees as well as to create a campus setting which is conducive to attracting and retaining the highly qualified employees who are needed to carry out the mission of NIH. There is also an increased emphasis at NIH on providing amenities and therapeutic environments for patients who may be undergoing treatment at the Clinical Center.

Proposed locations for future campus amenities are shown in Figure 5.2.7. In the Master Plan, employee and visitor services continue to be dispersed throughout the site at the locations of greatest employee concentrations. Most of the existing services will remain, however some will need to be relocated as demolition and replacement occurs over time (e.g. Building 12/13 services). A large number of campus services will continue to be located in the Clinical Center Complex, which has the highest density of employee and visitor population. Where possible, campus amenities and activity areas should be placed at the ground level of buildings and along paths, which are convenient to pedestrians or bicyclists. Amenities or services, which are supportive of public transit use, should be located along paths in proximity to the Metro station.

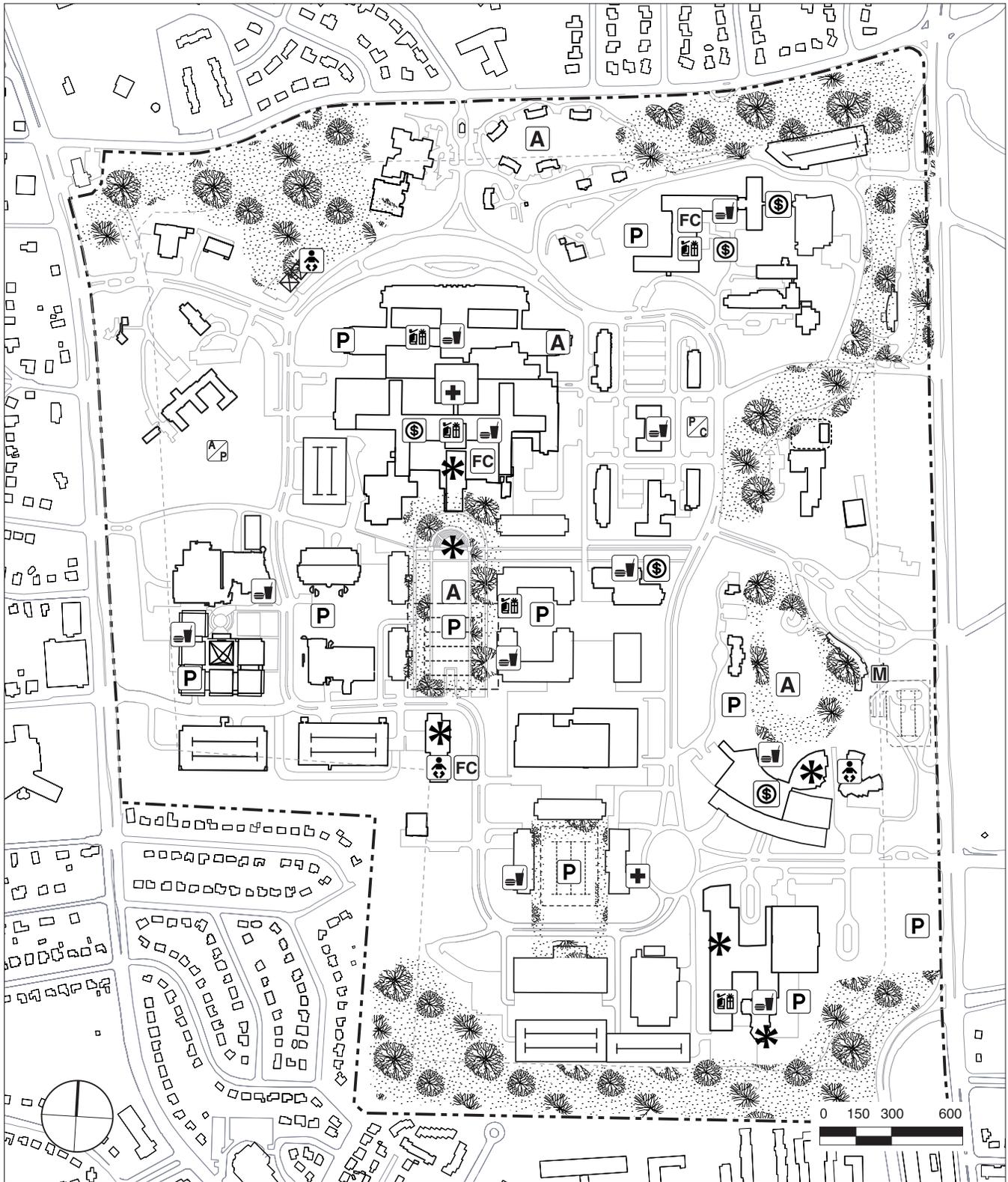
At the south end of the Central Mall, the Master Plan shows a new Campus Center in renovated Building 34/34A, which would be analogous to a university center on a college campus. The Campus Center would house such uses as fitness and recreation space, transit information, employee meeting rooms, dining facilities, banking facilities, convenience retail, and child care. The facility could also house office space for campus-wide organizations. Although these functions could be incorporated into other buildings, it is important to create an identifiable place for services located in a centralized location for ease of access, and to provide a focus for informal interaction of research staff.

Child care facilities are also an increasingly important campus amenity. There are currently two child care facilities on campus: the Master Plan-implemented East Child Care with 21,000 gsf and the 3,000 gsf facility in T-46 on the southwest side of campus. The Master Plan proposes that the child care on T-46 be replaced in converted Building 34/34A. Also, one new facility is proposed to be constructed on the north side of the campus (Wilson Estate area), the Northwest Child Care (NWCC). In accordance with current General Services Administration (GSA) and NIH 2004 Guidelines for Amenities it is recommended that facility sizes accommodate between 75 and 150 children.

Child care locations are proximate to major campus entries and parking facilities for convenience of drop-off and pick-up, and are all located at the campus perimeter for ease of access to outdoor play areas and to avoid the more intense uses of the core of the campus.

New or enhanced open spaces on campus will be major site amenities for visual and recreational purposes. These spaces can be utilized for outdoor eating, campus gatherings, or collegial interaction. The Central Mall in particular will create an orderly image for NIH and be a place for active and passive recreation. Spaces at the edge of the mall can be smaller and more intimately defined, and would be well suited for use by NIH employees and Clinical Center patients. At the north end of the Central Mall, an amphitheater is proposed for outdoor gatherings and events.

The wooded area to the northwest of the Clinical Research Center will also offer a positive image for the public side of the campus as well as passive recreation space for the Clinical Center. The NIH Stream valley and water garden is proposed to be enhanced as a naturalistic retreat area for the campus. The open area at the south end of the site will be improved with landscaping and opportunities for light recreation.



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- |   |                      |   |                            |
|---|----------------------|---|----------------------------|
|  | CREDIT UNION / ATM   |  | CONVENIENCE RETAIL         |
|  | CLINIC               |  | CHILD CARE                 |
|  | RECREATION (ACTIVE)  |  | OPEN SPACE AMENITY         |
|  | RECREATION (PASSIVE) |  | DINING CENTER / COFFEE BAR |
|  | FITNESS CENTER       |  | SPECIAL FUNCTION           |

**Figure 5.2.7**

**Campus  
Amenities**

## **5.2.8 Reuse/Demolition**

Figure 5.2.8 shows the extent of building reuse and demolition proposed by the Master Plan. Most new construction and currently identified historic buildings on campus will be retained; however, over the twenty-year period of the Master Plan, much of the outdated core of the campus will be rebuilt. Major components of this redefinition of the campus core include: the renovation and reuse of the Building 10 complex with the exception of the demolition of Building 10A; demolition and replacement of the Building 12/13 Support/Services complex for more intense lab development; and demolition and replacement of the Building 14/28 Animal Facilities complex (including 18/32) for more intense research development. The amount of current campus area to be retained is approximately 5.5 million gross square feet (gsf). The total amount of demolition proposed is approximately 1.2 million gsf.

Figure 5.2.8 also shows surface parking areas to be removed, most of which are at the perimeter of campus. Much of the surface parking lost will need to be replaced by structured parking.

## **5.2.9 Fire/Life Safety**

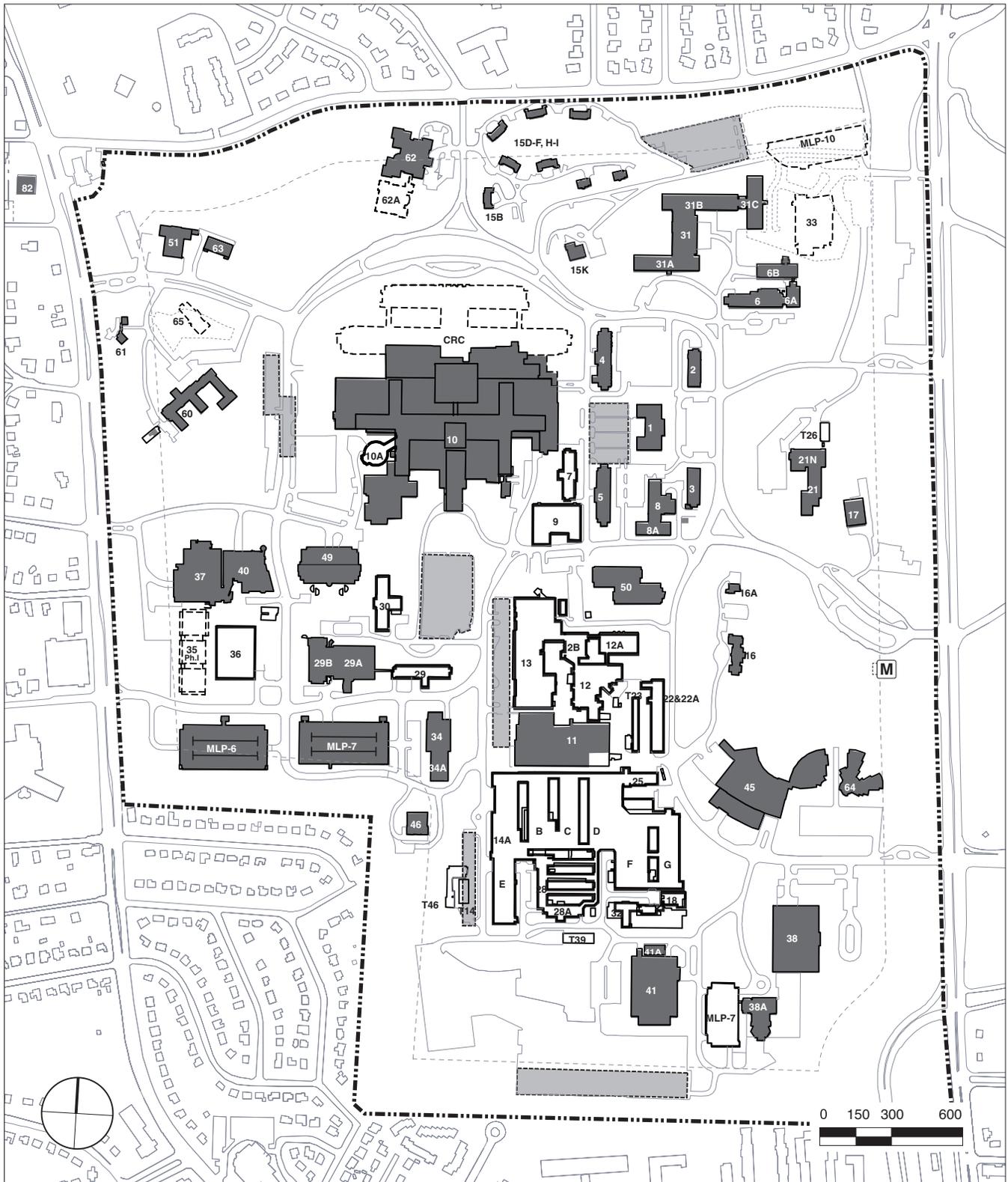
### ***Emergency Vehicle Access***

All buildings on the NIH campus should have a minimum clearance of 30 feet to other structures to provide for fire separation and emergency vehicle access. Emergency cross-campus travel can also be accommodated on the South Drive pedestrian cross-campus connector. NIH also has an emergency co-response agreement with the Montgomery County Fire Department.

All major campus pedestrian pathways (such as the pedestrian spine from the South Quad research group and the paths surrounding the Central Mall) should be designed to accommodate emergency vehicles. Landscape and path design should allow for a clear path of 16 feet minimum width and 14 feet minimum height. Walkways should be designed to withstand occasional emergency vehicle loads.

### ***Utility System Capabilities***

The existing WSSC water supply has sufficient capacity to meet existing and projected campus fire flow requirements. Additional booster pumps would be installed at individual buildings where needed.



**NIH  
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- BUILDINGS TO BE RETAINED
- BUILDINGS TO BE DEMOLISHED
- SURFACE PARKING TO BE REMOVED (AS POSSIBLE)
- BUILDINGS CURRENTLY UNDER CONSTRUCTION

**Figure 5.2.8**

**Reuse/  
Demolition**

## 5.3 Circulation

For more detailed discussion of topics in this section, refer to the NIH Master Plan Traffic Report, Gorove/Slade Associates, Inc., and the Final Environmental Impact Statement for the Master Plan 2003 Update.

### 5.3.1 Transportation Management

The National Institutes of Health has an ongoing Transportation Management Plan (TMP) with the objective of reducing peak hour vehicular traffic by encouraging NIH employees who drive alone to ride share, use public transportation, or use other alternative modes. The TMP is an important element of the transportation component of the Master Plan because it defines policies and programs that influence the design of the transportation and parking systems at NIH.

A primary goal of the NIH TMP is to reduce the rate of vehicular trip generation per employee such that growth in employment does not generate additional peak hour vehicular traffic. An important strategy that NIH uses in trying to accomplish this goal is to encourage the increase in multiple occupant vehicles (carpools, vanpools, shuttles) (HOVs) drivers traveling to and from NIH through the Transportation Management Plan (TMP). Maintaining the Transportation Management Plan as part of NIH administrative responsibilities is mandated in a Memorandum of Understanding (MOU) signed by NIH, the Montgomery County Planning Board, and the National Capital Planning Commission in May 1992. NIH will continue to explore a variety of approaches to reducing its vehicular trip generation and parking demands. This effort includes:

**Evolution of the Transportation Management Plan.** A broad range of enhancements to the current TMP have been identified; these are presented in Section 6.7. Effective techniques for monitoring TMP programs have been reviewed and will be implemented.

**Division of Facilities Planning.** Since the 1995 Master Plan, NIH has consolidated the parking and shuttle programs, along with transportation planning, into its Division of Facilities Planning. NIH actively manages the elements of the Transportation Management Plan through this office, including handling daily employee/visitor inquiries regarding local and regional transit systems, such as: Metro, MTA, MARC, Ride-On, VRE, and several rush period express bus systems.

NIH has been extremely successful in implementing a more robust transportation management program since the 1995 Master Plan. The transportation management plan goals may be reached to differing degrees in the future, with gradual shifts in the mode choice over the Master Plan period. By achieving these shifts the MOU impact goal:

- Parking demand will continue to be reduced,
- Nonauto driver mode split will continue to increase, and
- Average Passenger Occupancy (APO) will continue to increase.

### 5.3.2 Trip Generation Analysis

In May 1992, NIH entered into a Memorandum of Understanding (MOU) with the Montgomery County Planning Board and the National Capital Planning Commission that dictated that future growth at NIH would have no net impact on the surrounding road network. In accordance with the stipulations of this Memorandum of Understanding, NIH established a semiannual traffic-monitoring program as a component of its Transportation Management Plan (TMP). The purpose of this monitoring program is to

measure the effectiveness of the TMP in reducing the rate of peak hour vehicular trip generation for the NIH campus. BartonAschman Associates, Inc. conducted the initial monitoring survey in September 1992, which set the base condition for no net impact. The baseline number for allowable trips generated under the MOU has been defined in Master Plan studies as the number of trips counted in the 1992 survey. This equals 5,888 AM peak hour trips and 5,772 PM peak hour trips.

Gorove/Slade Associates, Inc. has conducted traffic surveys for the NIH campus as stipulated in the Memorandum of Understanding every six months since May 1993. Major changes, which have occurred at the NIH Bethesda Campus since the 1992 base condition survey, include:

- increase in total employment at the Bethesda Campus from 15,826 in 1994, to currently, 17,500 employees in 2003;
- implementation of TMP activities, which have induced a shift from solo driving to increased ridesharing and public transportation use;
- relocation of 700 parking spaces to offsite locations to accommodate major construction projects;
- the opening of MLP -8 and the Natcher Building;
- rehabilitation of the ACRF parking garage resulting in a loss of 450 parking spaces;
- loss of 300 parking spaces due to construction of Building 50 and the loss of 200 parking spaces due to construction related to the new Clinical Research Center and the Power Plant;
- implementation of attendant-assisted parking at MLP-8 and Building 31 parking lots;
- permanent closure of four (4) vehicular entrances onto campus as part of a more robust campus security operation, which reduced the total number of campus entrances from eleven (11) to seven (7) entrances;
- implementation of vehicle checkpoints for visitor and selected commercial vehicles at the Center Drive/Old Georgetown Road and South Drive/Rockville Pike entrances, which are the only two (2) entrances through which visitors are currently allowed to drive onto campus;
- restricting the Wilson Drive/Rockville Pike entrance to outbound-only from 3:00 to 7:00 PM on weekdays; and
- loss of 144 parking spaces with the closure of Lot 10K, due to the construction of a new NIH firehouse.

The principal finding of the most current traffic monitoring survey is that the rate of vehicle trip generation and the absolute number of peak period vehicle trips generated has declined from 1992 by approximately twenty (20) percent (AM peak period).

Existing and projected NIH peak hour trips for the years 2003 and 2020 are shown in Table 5.3.2. The 1992 MOU trips are those counted in May 1992 by Barton Aschman. The 2003 trips were counted in October 2003 and reflect the effectiveness of the NIH TMP. Projected 2023 values for the Master Plan account for employee population variation from 16,350 in 1993 to 22,000 by 2023.

Table 5.3.2 Existing and Projected NIH Peak-Hour Trip Generation

	1992 MOU	2003 Count	2023 MP
Total AM Peak Hour Trips	5888	4190	5264
Total PM Peak Hour Trips	5772	3159	3969

**Transportation Modes**

Employee modes of transportation to be determined, upon updated completion of NIH Employee Survey.

### 5.3.4 Roadway Improvements and Traffic Operations

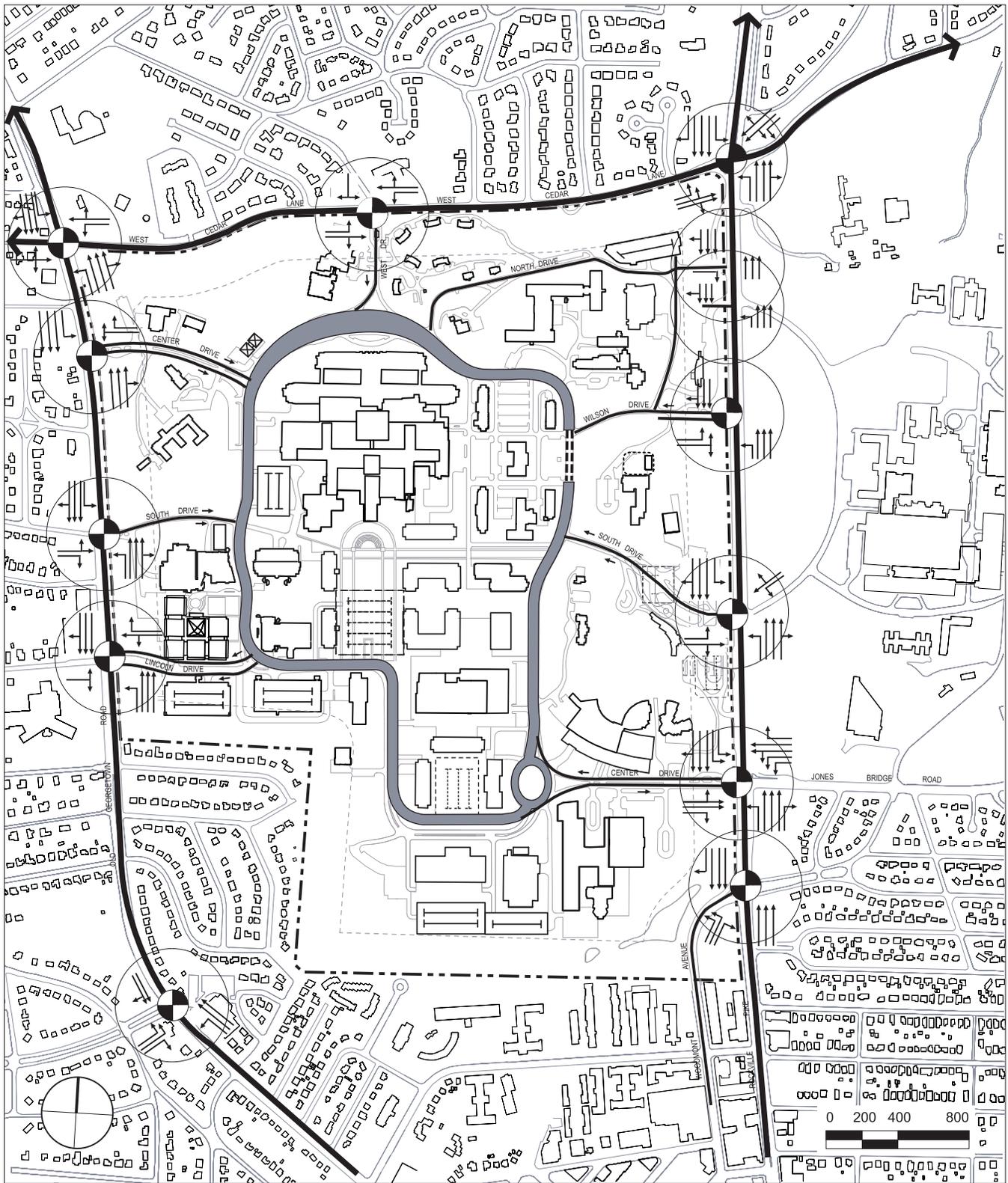
Vehicular access to the Bethesda campus will continue to occur at all of the entrances on Rockville Pike. The South Drive entrance will be used as an NIH employee; the North Drive entrance will be used as an NIH employee; and the Center and Wilson Drive entrances will be used as NIH employee-only entrances. The Lincoln Drive, South Drive, and Center Drive entrances along Old Georgetown Road will be used as NIH employee-only entrances (Lincoln Drive is "exit only") The West Drive entrance will be used as an entrance designated only for Clinical Center patients and visitors. Analysis indicates that very few modifications will be required to each entrance, such as vehicular gates, although these measures will not significantly change the existing entrance geometrics. Those entrances, which are modified will a) provide adequate capacity for NIH turning movements when vehicles are inspected under up to Code Orange Alert requirements, and b) ensure efficient traffic movement on the adjacent public streets. At Code Red, the number of employees coming to campus will be reduced, and increased vehicle scrutiny and throughput time should not adversely affect the surrounding public roads. Figure 5.3.4 shows the proposed turn lane configurations at all of the campus entrances and indicates modifications to those entrances to be implemented as part of the Master Plan as boxed turn arrows. These turn lane modifications are required to accommodate future changes in traffic patterns at the entrances, mainly due to redistribution of parking within the site. The technical studies, which were carried out to determine the future need for these lane modifications, are presented in the Master Plan EIS.

The intersection of North Drive with Rockville Pike is currently without a signal. Both right and left turns into and out of this driveway are permitted, as there is a median break in Rockville Pike. Pending concurrence by the public agencies, this median break should be modified to prohibit vehicles turning left from North Drive onto northbound Rockville Pike.

The major unifying element of the on-site vehicular circulation plan is a continuous loop road. Most campus entrances will provide access to the loop road. Motorists will then circulate to parking near their destination on campus. In some cases, motorists will be able to enter parking directly from the access entrance without using the loop road. Vehicular penetration inside the loop road will be limited to a few areas and will be primarily for passenger drop-off and pick-up at building entrances, access to parking structures, and truck service.

Intersections of the access roads with the loop road will primarily be three-legged "Tee" intersections with stop signs on each of the three (3) approaches. This will ensure safe pedestrian crossings of the roadways at these intersections. The exceptions to the "Tee", stop sign-controlled intersection will be at the intersections of:

- South Drive with the loop road where a signalized intersection is proposed to facilitate the heavy pedestrian activity associated with the Metro station.
- East Center Drive with the loop road, where a traffic rotary is proposed. This rotary will efficiently accommodate a relatively high number of turning movements occurring at this primary entrance to the campus.
- Lincoln Drive with the loop road, where a three-way, signalized intersection is proposed. This proposed intersection configuration would efficiently accommodate a relatively high volume of vehicular and shuttle bus traffic on each of the three approaches, occurring at this primary entrance to the campus. In addition, the proposed intersection configuration and geometrics would enhance the safe crossing of the loop road by pedestrian and bicycle traffic, between Lincoln Drive and the inside of the campus Core area.



**NIH  
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NIH / ORF / DFP

- PERIMETER ARTERIAL
- LOOP ROAD WITH MEDIAN
- LOOP ROAD, NO MEDIAN
- 4 LANES, WITH MEDIAN
- 2 LANES, NO MEDIAN
- INTERSECTION IMPROVEMENT
- SIGNALIZED INTERSECTION

Oudens & Knoop, Architects, P.C.

**Figure 5.3.4**

**Roadway  
Improvements**

SmithGroup

The roadway cross sections of the access roads will be four lanes. In some cases a median will be provided. The median will serve to identify the entrance as a major entrance, will provide a landscaped area, and will be a safety feature by separating opposing traffic flows. The access driveways will be widened at their approach to the adjacent public roadways to provide for additional turning lane capacity. The loop road cross section will contain four travel lanes and will include a landscaped median, with the exception of a 40-foot wide cross section (Section E) located between East South Drive and Wilson Drive. Off-peak parallel curb lane parking will be permitted on sections of the access and loop roads where low traffic volumes and no turning or maneuvering are prevalent.

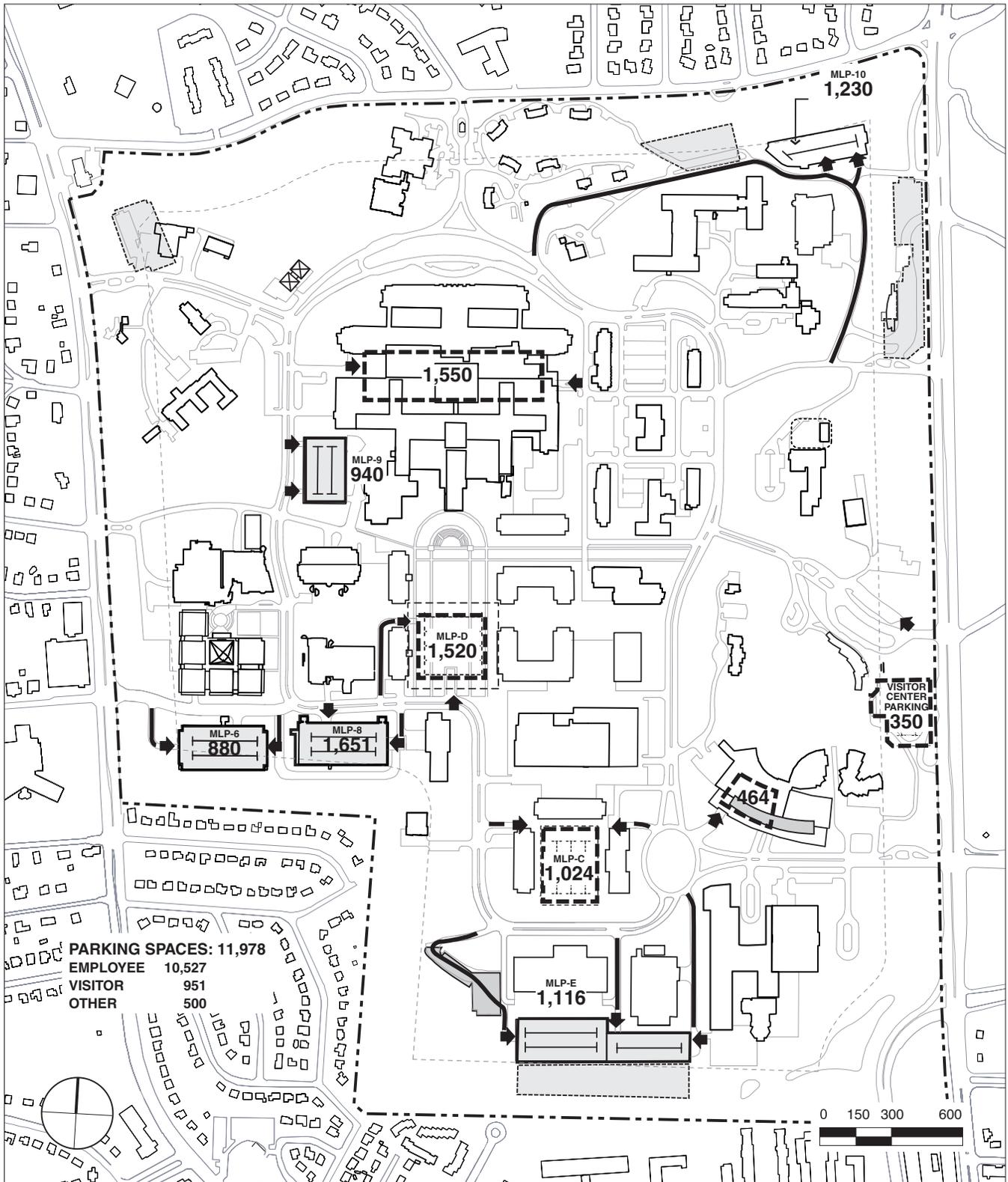
### **5.3.5 Parking**

The current parking level recommended for the NIH Bethesda campus, as established in the federal parking policies of the NCPC Comprehensive Plan, is 0.33 spaces per employee. The goals of the NIH Master Plan related to parking are to continually strive to attain a practical maximum parking ratio of 0.45, and to remove all parking from the buffer areas. Should paid parking be mandated throughout the federal government and/or legislation adopted permitting agencies to retain parking revenues, the NIH will strive to further reduce the employee parking ratio below 0.45 employing continuing and new TMP measures, as required. The employee-parking ratio will be re-evaluated as part of each five-year update to the Master Plan. Depending on the extent of future regional transportation improvements, whether or not the federal government requires the NIH, along with other Federal agencies, to implement fee-based parking, and the level of success of the NIH TMP, the NIH will try to achieve the ratio of 0.45.

It is critical however, that NIH maintain adequate parking on site to meet legitimate employee and visitor needs, and avoid parking shortages, which would encourage employees to park in residential neighborhoods. Provision of parking at the NIH Bethesda campus is a complex issue affected by: campus population fluctuations; the target employee parking ratio; on-campus security measures; provision of visitor and motor pool parking; the need to offset future parking losses due to ongoing construction; and stormwater management requirements.

To accomplish the goal of an employee-parking ratio of 0.45, the NIH will endeavor through TMP measures and transportation monitoring to achieve a steady decrease in the employee-parking ratio from its current level. It should be recognized, however, that this decrease in the ratio (and the absolute number of spaces on campus) would be episodic in nature and not a straight-line reduction. This is due to the fact that for much of the Master Plan period, a significant amount of "surge" parking will need to be maintained on campus which may temporarily exceed the target parking ratio in order to offset future parking losses for the construction of new buildings, construction of MLP structures, on-campus security measures, or the removal of buffer parking.

Removal of parking from buffer areas is also planned on a gradual basis throughout the Master Plan period. The specific timing of removal, however, will be tied to the following four factors: 1) the ability of NIH to obtain funding for construction of replacement parking outside of the buffers (primarily in structured parking); 2) the phasing of the construction of this replacement parking prior to the removal buffer parking; 3) the need to maintain some amount of "surge" parking to offset future parking losses due to construction and on-campus security measures, and; 4) the need to maintain an appropriate ratio of parking to employees within each sector of the campus as well as for the entire site. The priority for removal of buffer parking is: the northeast buffer along Cedar Lane; the area east of the Natcher Building; the south campus buffer; the northeast buffer along Rockville Pike; and lastly, the northwest buffer.



**NIH  
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- PARKING ACCESS
- ▭ ABOVE GRADE MLP
- ▭ BELOW GRADE MLP
- ▭ MAJOR SURFACE PARKING
- ⋯ CURB PARKING ALLOWED
- ▭ PARKING ZONE

Oudens & Knoop, Architects, P.C.

- ▭ EXISTING SURFACE PARKING TO BE REMOVED

**Figure 5.3.5**

**Proposed  
 Parking Distribution**

SmithGroup

Based on the projected parking demand analysis described in Section 6.7.5, the resultant parking is projected to be 10,512 employee spaces, 1,237 visitor spaces, plus 500 spaces for motor pool and other special parking. With an ultimate possible campus population of 22,000 employees, the maximum amount of employee parking on campus would represent an employee-parking ratio as 0.477 for the end of the Master Plan period.

Parking construction will be phased to correspond to population growth. Also, it will be dispersed throughout the site and mostly accommodated by new and existing multilevel parking structures (MLPs). The majority of parking spaces will be located at the periphery of the site (but not within the buffer zones) and should be easily accessible from campus entries or the loop road. Recaptured surface parking areas will be landscaped to improve the image of the campus. Figure 5.3.5 shows the proposed parking distribution around the site.

### **5.3.6 Service Access**

All future commercial delivery truck traffic will access the NIH campus using the exclusive commercial vehicle access point for the Commercial Vehicle Inspection (CVI) area. This truck entrance will be located just south side of the North Drive employee-only entrance, and will only provide access to the inspection facility. Commercial vehicles that pass inspection will be allowed to continue into campus to their final destination, and commercial vehicles that do not pass inspection could either be detained and/or turned away. The release of inspected vehicles from the CVI will be coordinated with loading dock managers at destination buildings to avoid overloading the building facilities and adjacent access roads.

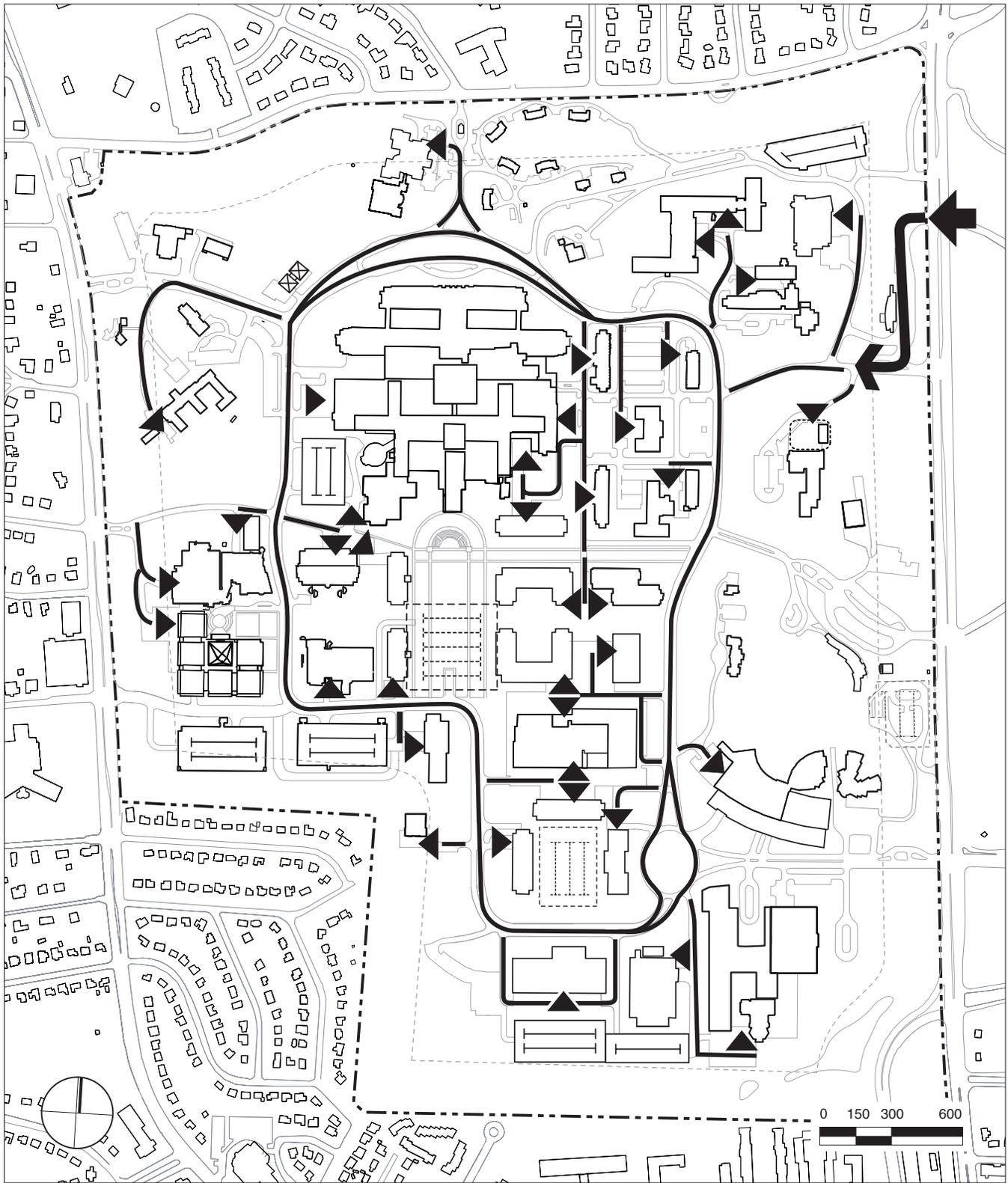
The Master Plan consolidates and simplifies service access on the Bethesda Campus to avoid conflicts with passenger vehicles and minimize the negative visual impacts of multiple service areas. Most existing buildings will continue to have individual service areas. However, most of these will be better screened to limit visibility from surrounding areas. Where possible, new construction provides underground service access, which could serve several buildings. Particularly, with the redevelopment of the research Buildings 29 and 30 area there is an opportunity to create belowgrade service to serve Buildings 29A and 29B to eliminate their visually unattractive service areas along the loop road. See Figure 5.3.6.

The two major service areas on campus will be the Clinical Center Complex service area at the north end of the site and the Support Services/Utility Complex service area at the center of the site. The service zone west of research Buildings 4 and 5 will continue to serve as a primary service point for the Clinical Center. Service areas for the Clinical Center expansion have been located at the east end of the complex and not along the more public north or south sides. Service access to the replacement Support Services/Shops complex is envisioned as occurring within the deck at the East Quad. The landscaped deck and buildings would shield the service area from surrounding neighborhoods. This service area would also support the research buildings in the South Quad.

Service access to the Power Plant is proposed to be relocated from the west end of the facility with atgrade service yards provided at the south west and north sides of the facility. These service yards will also create a securable area for hazardous waste storage and fuel oil tank filling.

### **5.3.7 Public Transit**

The area of the Medical Center Metro station/Gateway Center for Visitors will continue to operate as one of two transit nodes for the campus, providing intermodal connections



**NIH**  
**Master Plan**  
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- ▲ SERVICE AREA
- SERVICE ACCESS ROUTE
- ← CAMPUS SERVICE ENTRANCE
- ↶ VEHICLE INSPECTION ROUTE

**Figure 5.3.6**

**Service**  
**Access**

among the subway, public buses, NIH on-campus shuttles, NIH off-campus shuttles, passenger vehicles, bicycles, and pedestrian traffic.

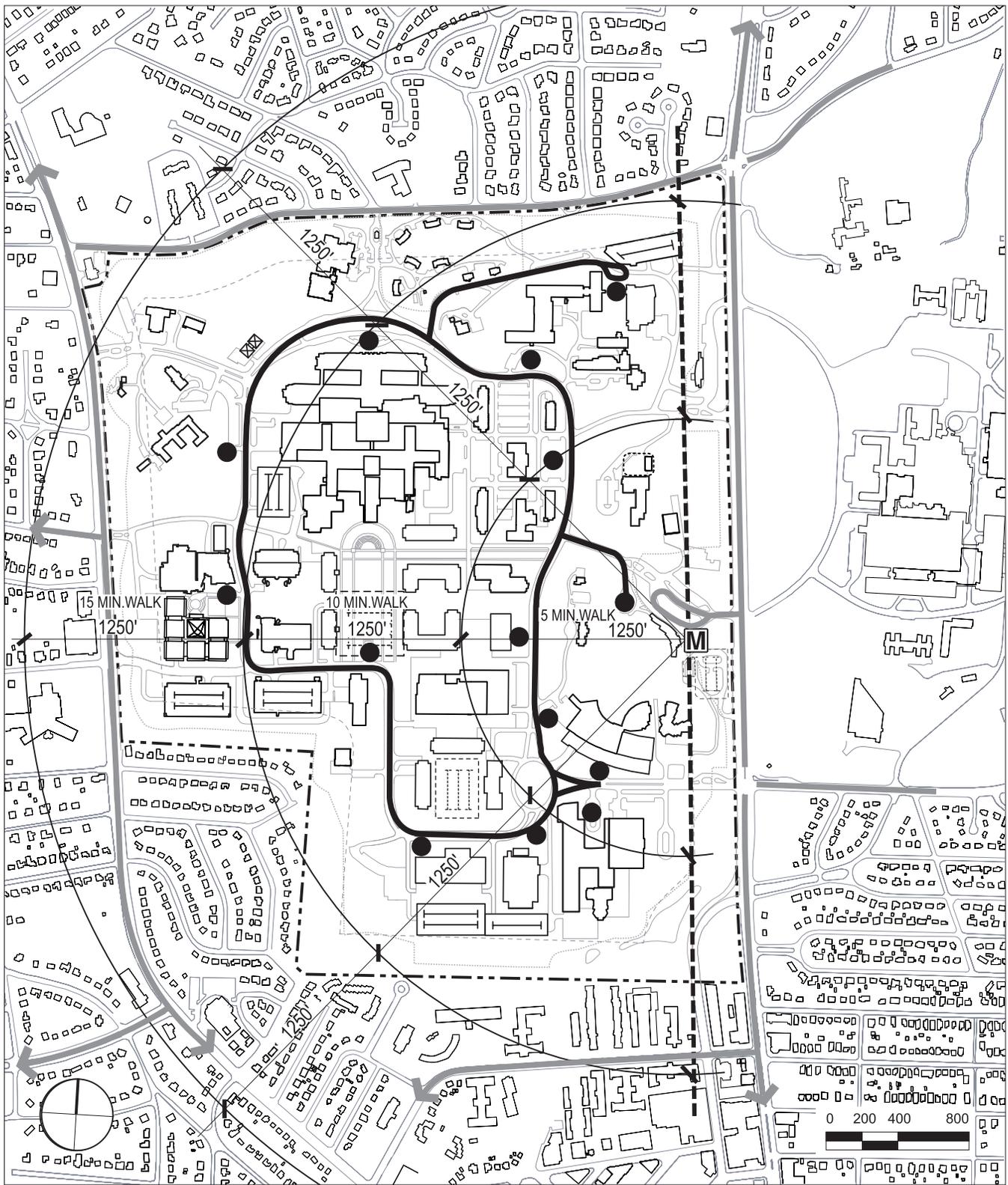
Due to the campus security plan, the NIH shuttle system will be divided into on-campus shuttle routes and off-campus shuttle routes. The on-campus shuttles will only circulate on-campus and never leave campus and the off-campus shuttles will only circulate off-campus and never enter onto campus. Both shuttle systems will connect at the NIH Visitor Center, where passengers will transfer between the two systems. The principal point of campus entry for public transit riders will be at the Medical Center station entrance, where they can transfer to the internal campus shuttle or walk to their destination. All visitors using transit will enter the campus at this point. Most of the NIH employees arriving by transit will use this entrance as well, but they can also enter the campus from other bus stops around the campus perimeter via employee pedestrian gates, public bus service will transfer to the NIH on campus shuttle system at the future NIH Visitor Center, as well, rather than directly serving on campus locations (see Figure 5.3.7). Improvements proposed to make public transit more viable as an option include: the addition of a transit information center located in Building 34/34A, enhanced and updated signage and information at the transit nodes; accommodation of bicycleMetro commuters throughout the campus, and improved NIH transit programs and publicity, in conjunction with the designation of a transit information center at the Clinical Research Center.

Public transit and NIH shuttle routes will continue to be coordinated with the Washington Metropolitan Area Transit Authority (WMATA) and the Montgomery County Department of Transportation (MCDOT) in the future to ensure that passenger transfers between the NIH on-campus routes, NIH off-campus, and off-campus Metro/Ride-On bus routes are as seamless as possible. The on-campus NIH shuttle routes will continue to follow the loop road to the Metro station and CRC transit nodes. NIH on-campus shuttles will also continue to circulate around the loop road system, with designated stops at key locations to reduce congestion at building entries and headways between shuttles. The Master Plan recommends that NIH shuttles stop at the berth closest to the Metro station entry as possible. Improving the ease of the shuttle/Metro connection will enhance visitor orientation to the campus and encourage greater employee use of public transit. All shuttle stops should be provided with covered waiting areas.

To maximize the use of the shuttle system, the NIH will continue to explore route options such as two way circulation or adding express routes to key destinations, as the need arises. In addition to shuttle services, which already exist, explorations may also be made of cooperative shuttle operations to the National Naval Medical Center campus and with Montgomery County for service to the Bethesda Central Business District.

### **5.3.8 Pedestrians and Bicycles**

Recommendations in the Master Plan regarding pedestrian and bicycle accommodation are intended to make the campus more pedestrian friendly and to make campus bicycle path connections to the off-campus Montgomery County bikeway network. Also, accessibility for persons with disabilities is considered as an integral part of the campus pedestrian network. It is envisioned that improving pedestrian and bicycle circulation and orientation on campus will encourage campus employees to consider alternatives to commuting by private vehicles and will improve the character of the campus. Figures 5.3.8-a and 5.3.8-b show the Master Plan recommendations for Pedestrian and Bicycle systems. For more detailed pedestrian and bicycle path design criteria, see Chapter 6.



**NIH  
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Bethesda Campus**

- NIH SHUTTLE LOOP
- SHUTTLE STOP
- M METRO STATION/TRANSIT NODE
- METROBUS & RIDE-ON BUS ROUTES
- FENCELINE

**Figure 5.3.7**

**Public  
Transit**

### ***Pedestrian Paths***

Pedestrian access to the campus will be limited, with the completion of the security fence around the campus perimeter. Pedestrian/bicyclist visitors will only be allowed to enter onto the campus through the NIH Gateway Center for Visitors which is to be located at the Rockville Pike/South Drive entrance and the West Cedar Lane entrance. Pedestrian/bicyclist employees may enter onto campus through any of the vehicular entrances and through any of five employee-only pedestrian/bicycle gates in the security fence, which are located strategically around the campus perimeter. Two gates will be located along the northern campus perimeter, two gates will be located along the southern campus perimeter, and one of the gates will be located along the western campus perimeter. All of the vehicular and pedestrian/bicyclist entrances will be ADA accessible. The installation of the campus security fence around the campus perimeter along with the accompanying pedestrian gates in the fence, will likely result in more defined pedestrian flows on campus.

The Master Plan proposes three categories of pedestrian paths. Primary paths will carry the highest volumes of pedestrians and should be designed as wider paths with special lighting attention. Primary paths should be provided in the core of the campus, to serve as connections to the Metro station/NIH Visitor Center, to major building groups outside of the campus core. Secondary pedestrian paths will carry less volume, may be narrower than primary paths, and should be safely but less intensely lit. Secondary paths occur primarily as connections from the campus core to smaller building groups or to off-site locations. The third type of pedestrian path shown is for mixed pedestrian and bicycle traffic. This type of pathway is proposed for areas around the Central Mall. These specially designated areas should be designed as illustrated in Section 6.4.4.

### ***“Motorized” Bikeways***

In the future, people may start to use “motorized” bicycles and scooters as popular means of transportation throughout the Washington, D.C. area. federal legislation does not prohibit the use of motorized bicycles and scooters on federally funded, Class I and Class II bikeways, and delegates the authority regarding this use to state and local legislative bodies. Montgomery County is currently being asked to consider allowing these uses on facilities within the county. The planned bikeways in this Master Plan may be able to serve motorized bicycle/scooter traffic with a top speed of no more than 20 MPH, but there are currently no standard design guidelines for motorized bicycles/scooters, so further study and planning will be required before allowing these transportation modes on the NIH Bethesda campus.

“Non-Motorized” Bikeways “Non-Motorized” bicycles shall be considered to be bicycles with no artificial (non-human) means of propulsion. (For the purposes of this discussion, “Non-Motorized bicycles will be referred to hereafter as, “Bicycles”.) Bicycle paths proposed for the NIH campus are divided into several categories consistent with the 1978 Montgomery County Master Plan of Bikeways. The current county bikeway plan shows proposed future Class I, off-road bike paths along the perimeter of the campus, which connect to existing and proposed local or regional bikeways around the site. Bike paths on the east and west perimeter of the campus may be located on NIH property, as long as the paths are not deemed to diminish campus security, and should be separated from the adjoining roadway. Due to on-campus space limitations and difficult topography, it is recommended that the bike path on the north side of the campus be located adjacent to the roadway on the south side of West Cedar Lane. On the south side of campus, the recently constructed southern bike path has three connections to the Battery Lane neighborhood that are shown in accordance with the County Master Plan of Bikeways, one at Woodmont Avenue, one at N. Brook Lane and the third one located adjacent to the Spring House building. The southern path, which is shown in Figures 5.3.8-a and 5.3.8-b, reflects the alignment included in the Perimeter Security Fence project. While the route does differ

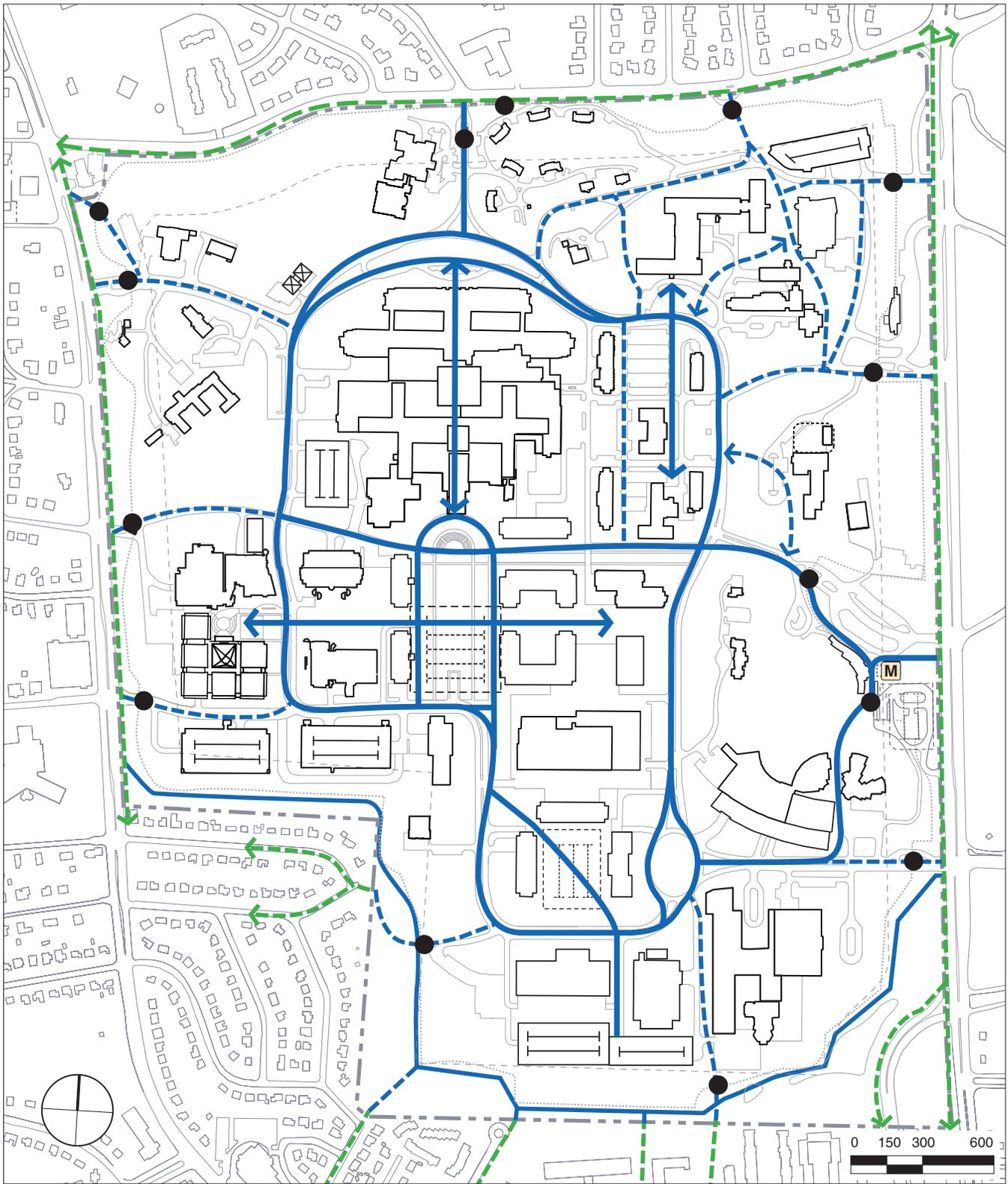


Figure 5.3.8-a

**NIH  
Master Plan  
2003 Update  
Bethesda Campus**

- PUBLIC PEDESTRIAN PATH
- NIH PRIMARY PEDESTRIAN ROUTE
- - - NIH SECONDARY PEDESTRIAN ROUTE
- FENCELINE
- ENTRY POINT

**Pedestrian  
Circulation**

from the alignment shown in the county's 1978 approved bicycle plan, NIH is prepared to consider realigning the path should the county decide to develop its county trail system through the NIH campus.

Bicycle access from the east edge of the campus is proposed via a Class II bikeway (designated bicycle lanes within the roadway) along East Center Drive, East South Drive, and North Drive. Bicycle access from the west edge of the campus is proposed via a Class II bikeway along West Center Drive. The west portions of South Drive, as well as West Drive, are proposed as Class III bikeways where bicycles operate in mixed traffic with motor vehicles. Within the campus, both of the loop road cross-sections (Section B and Section D) allow bicycles to operate alongside parked cars during off-peak periods and vehicular traffic during peak periods, in 13-foot and 14-foot lanes, respectively. Shared use of roadways by bicycles and vehicles is generally safe at speeds of less than 30 m.p.h., which is anticipated for campus roadways, in conjunction with wider (13-14'), mixed-use outside lanes.

Inside the loop road, bicycles will be mixed with pedestrians on both the eastwest and northsouth pedestrian spines. These mixed pedestrian/bicycle areas should be designed with wide sections and appropriate bicycle control and warning signage. Bicyclists should be encouraged to walk their bicycles in congested areas. Bicycle use of walkways other than the major campus spines should be discouraged, as walkway widths may be too narrow for safe pedestrian/bicycle mixing. Wherever feasible, NIH intends to provide all internal campus bikeways and connections to the county bikeway network around the site. Additionally, space will be provided on site outside the perimeter fence for the county Class I bikeways on the east, west, and (if needed) north perimeters of the site.

The only section of the loop road, which would not be designed for bicycle traffic, will be Section E, with a 40-foot width (four 10-foot lanes), located in front of Building # 1. This is due to a steep slope along the east side of the loop road, between East South Drive and Wilson Drive. Due to the narrow planned cross section at this location, bicycles would have to operate in the same lanes with motorized vehicular traffic. As a result, bicycle traffic will be encouraged to enter the Campus core at the South Drive or Wilson Drive intersections, or to potentially continue along a separate, widened sidewalk located along the west side of the loop road.

Adequate bicycle storage and provision of facilities for showering and changing should be addressed in the implementation of future development of the campus. The Master Plan recommends that covered and secure bicycle parking be located at nodes serving each major building group on campus. This bicycle parking may be freestanding shelters or incorporated into new buildings or parking structures, such as the new Clinical Research Center. Other bicycle parking may be provided on a building-by-building basis. Likewise, shower and changing facilities should be provided for each major building group.

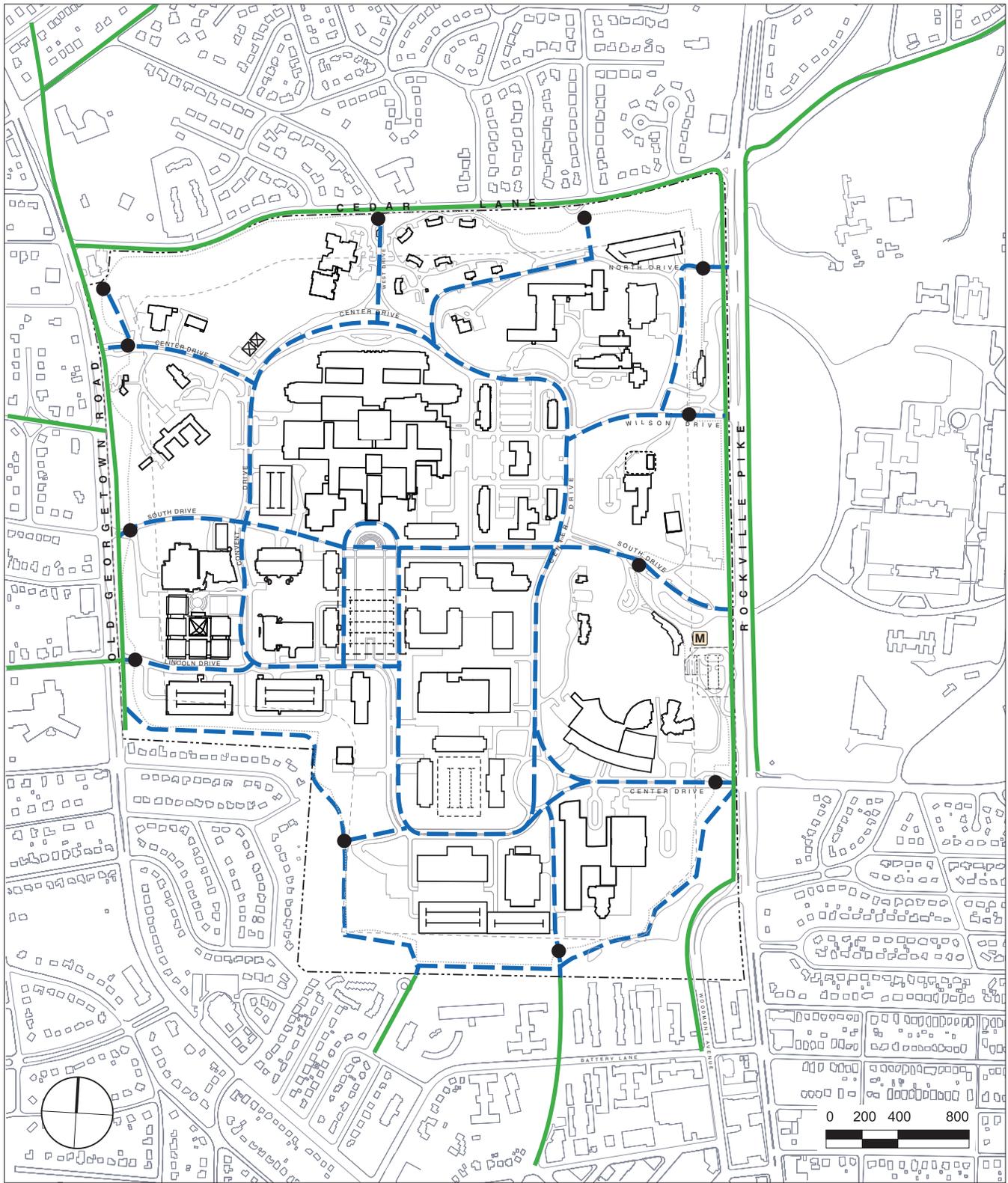


Figure 5.3.8-b

**NIH  
Master Plan  
2003 Update  
Bethesda Campus**

- COUNTY-DESIGNATED BIKE PATH/ROUTE
- - - NIH BIKE ROUTE
- - - FENCELINE
- ENTRY POINT

**Bicycle  
Circulation**

### **5.3.9 Access for Persons with Disabilities**

The NIH has an approved a Management Plan that addresses access for persons with disabilities and has conducted an overall site accessibility study within the past few years. In general, due to the size of the site and topographic conditions, persons with disabilities are accommodated through enhanced shuttle service and provision of close-in parking spaces. New campus buildings and spaces are designed to meet accessibility requirements set forth in the Americans with Disabilities Act Accessibility Guidelines (ADAAG). The Uniform Federal Accessibility Standards (UFAS) apply to all existing buildings and associated renovation or construction projects.

To maximize the use of the shuttle system, NIH will continue to explore route options such as two way circulation or adding express routes to key destinations, as the need arises. In addition to shuttle services, which already exist, explorations may also be made of cooperative shuttle operations to the National Naval Medical Center campus and with Montgomery County for service to the Bethesda Central Business District.

## **5.4 Utilities**

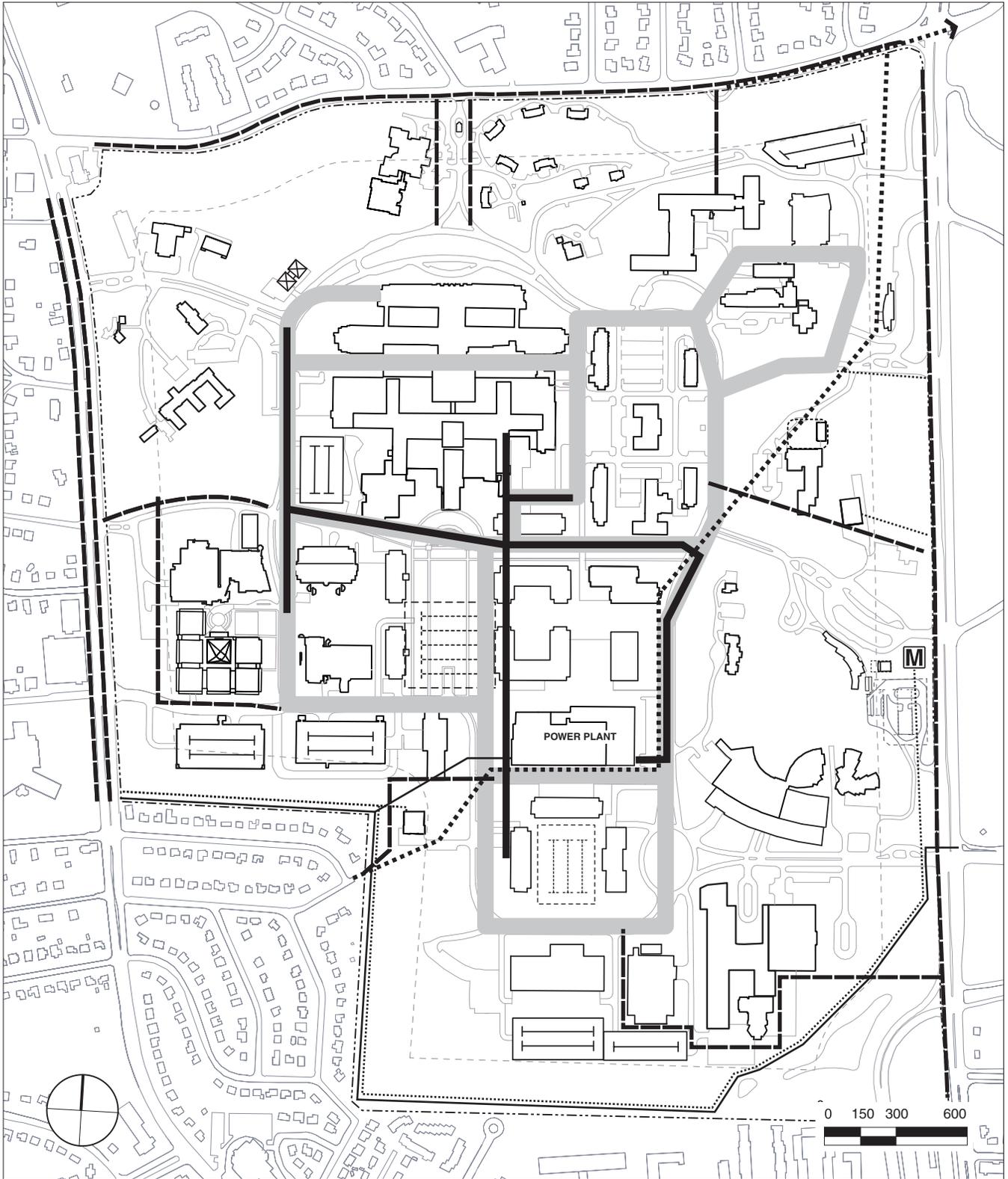
### **5.4.1 Utility Distribution System**

As noted in the Master Plan Component Concepts (Section 5.2.2), the utility distribution scheme proposed by the Master Plan is a grid system for steam, chilled water, water, and electric power that provides a high level of service reliability or availability. Service can be maintained even if there is a major disruption in one area of the distribution system.

The core of the distribution grid is a utility tunnel system containing the larger steam and chilled water distribution mains, and other pressurized or electrical systems to serve the more densely developed center of the campus. This tunnel system will be composed of the existing (or reconstructed) north-south tunnel connecting the Power Plant to both the Clinical Center and the South Quad; the existing east-west tunnel connector following the axis of South Drive between Center and Convent Drives; and a future east side tunnel under Center Drive between the east-west tunnel and Building 11. This last section would complete a central tunnel loop providing redundant service from the east and west side s of the Power Plant. Comparatively short tunnel stubs would extend from the loops where it is cost effective to do so. In general, these tunnels would be about fifteen feet wide and twelve feet in depth. Branching off from this central core, the remainder of the utility corridor distribution grid roughly follows the proposed Loop Road. Utility trench sections are proposed for connections to the northeast, northwest, and south portions of the campus. Major utility corridors would be extended to the north, west, and around the Building 6 cluster to research building 33 to complete the pattern of the campus, which are composed of direct, buried utility lines.

In addition to these proposed systems, there is an extensive network of existing directly-buried secondary utility distribution lines on the NIH Bethesda Campus. Many of these lines, which are relatively small, serve individual buildings and can reasonably be relocated for future construction. There are certain areas, however, where major feeder lines exist and create additional utility corridors connecting to building groups or to the perimeter of the campus.

Figure 5.4.1 indicates the locations where NIH utility lines are proposed to be concentrated or where major lines owned by public and private utilities cross the campus. The Master Plan recommends that future development of buildings avoid these major existing and proposed utility corridors where practical. To avoid



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- UTILITY TUNNEL
- MAJOR UTILITY CORRIDOR
- SANITARY SEWER
- GAS
- ELECTRICAL
- WATER

Figure 5.4.1

**Major Utility**  
**Corridors**

disruptions to NIH functions, it is important that all roadway and building construction programs be closely coordinated with proposed utility tunnel and distribution line construction. The Master Plan also recommends that utility dedications be as narrow as possible and lie within roadway limits where practical. Where this is not possible, a minimum 12-foot wide area adjacent to roadway curbs should be reserved as a landscape "easement", with utilities being placed beyond that zone. The long term Master goal is to relocate all utility distribution lines to the utility corridors, with the exception of individual building services.

## **5.4.2 Power Plant Expansion**

According to the Master Utilities Plan and its 2000 Update, the central Power Plant capacity must be expanded to meet future growth projections. Expansions proposed include increased boiler capacity and chiller capacity, electrical equipment, a cogeneration facility, utility tunnels, and enhanced office/shop space. Projects currently underway include the installation of a 23-megawatt PEPCO cogeneration unit that will also generate steam for PEPCO and NIH use, and the Phase II expansion of the chilled water plant through Chiller Unit 27.

Later chilled water plant expansion phases will accommodate new chillers to replace chiller capacity in Building 34 as those chillers reach the end of their useful life. Beginning with Chiller 28, further expansion of the plant would occur on the east side of the Building 11. Complete consolidation of chiller capacity to Building 11 is not expected to occur until the later phases of the Master Plan period.

The expansion of the Power Plant is constrained by many factors. Due to the proximity of Building 14 (the Animal Facility) to Building 11, expansion toward the south is currently limited. A minimum of 30 feet of clearance should be maintained between the two structures until Building 14 is demolished to provide for fire separation and emergency vehicle access, as well as to provide space for the many major utility lines that pass through this corridor. Greater horizontal clearances will be available when Building 14 is demolished.

The Master Plan locates a significant pedestrian path and the Loop Road at the west end of Building 11, requiring the relocation of loading functions to other areas of the facility and/or the incorporation of loading functions within the design of the east expansion with possible access from the south.

Any expansion planned for the east end of the complex should be set back substantially from Center Drive to avoid becoming an overwhelming mass on the entry side of the campus. Marshalling of Medical Pathological Waste (MPW) for off-campus disposal will be relocated to the Building 25 Replacement near Building 21.

The Master Plan strongly recommends that the Power Plant expansion be closely coordinated with proposed adjacent development to ensure functional and aesthetic integration. As new construction occurs near the Power Plant, each project should incorporate in its design analysis and recommendations for maintaining stack emission standards. Completion of a full boiler plant stack plume dispersion analysis beyond the screening level to check for down drafting potential is recommended prior to or concurrent with the design of the implementation of the initial Master Plan building (H, J/K, or M) located adjacent to Building 11.

The Master Plan recommends minimum 90 to 100 foot horizontal clearances between Building 11 and adjacent Master Plan buildings in the east and south quads. These clearances are needed to ensure that there will be no down drafting of boiler stack gases to ground level, to cover the contingency for replacement of boilers, chillers, or cooling

towers, and to provide space for relocation of the fuel oil tanks and major utility lines. The intervening surface area would be occupied by Building 11 service courts.

The south service court will provide access to Power Plant equipment and loading areas, primarily at the east and west ends of the buildings. A similar service area is proposed on the north side of the Power Plant.

### **5.4.3 Sanitary Sewer System**

A sanitary sewer main crosses the campus on a southwest-northeast axis. While NIH maintains this main on the campus, it enters and leaves the site as a WSSC main. The line serves the Edgewood/Glenwood community to the southwest of the campus. It returns to WSSC ownership in the northeast corner of the campus after receiving flows from a NNMC outfall. The line passes between Buildings 11 and 13, then runs along the west and north sides of Building 12.

A second NIH sanitary main services nearly all the buildings directly to the south of Building 11. It runs along the east side of Building 11 after passing under Building 14, and joins the southwest-northeast main on the north side of Building 11. The net result is campus sanitary mains run close and parallel to three sides of Building 11 (all but the south side) and Building 12 (all but the east side).

Implementation of the Master Plan will require relocation of sections of these sanitary lines. The NIH main serving the south sector of the campus must be relocated to clear space for the Building 11, Phase III eastward expansion, as well as for Building P and possibly MLP-C in the South Quad. The alignment would be shifted to follow the Loop Road utility corridor.

Several options are available for the southwest-northwest main. It could continue to follow its existing general alignment through the Building 12 and 13 area, although individual sections would have to be shifted laterally to clear future Building I and J/K footprints. Alternatively the alignment could run parallel to the north or south sides of Building 11 between West Service Drive and Center Drive.

Relocation of sanitary mains in the northeast corner of the campus will also be necessary. Construction of the North Storm Water Management Facility will require realignment of the main serving the Clinical Center Complex and the northern most sector of the campus in the North Branch drainage basin.

Since the southwest-northeast main is connected to the WSSC system at both ends, design and construction will need to be coordinated with WSSC.

The Master Plan proposes a sanitary sewer monitoring station in the northeast corner of the campus. Monitor samples are now collected at the manhole where the NIH outfall joins the WSSC system. The monitoring station would be a small underground structure providing easier access to the main. The capacity of the WSSC system downstream from NIH has adequate capacity to support the levels of development in the Master Plan.

### **5.4.4 Storm Drainage**

With minor exceptions, campus stormwater drainage can be divided into three general areas (Figure 5.4.4).

- The North Branch channel which drains the northern tier of the campus as well as a comparable area within the Maplewood residential neighborhood to the north.

Flows to the channel are either overland or through short pipe connections to impervious areas.

- Three short, independent systems that run parallel to one another in the area between Building 10 and the NIH Stream.
- A short pipe system that drains impervious areas around Buildings 38 and 41, and flows to Stony Creek.
- A three branch network that drains the campus area within the NIH Stream drainageshed south of South Drive.

The three branches flow from the west, southwest, and south. Until recently, they converged at a manhole near the northeast corner of Building 50. The main stem of the west branch is 48-inches in diameter. The line was realigned as part of the South Drive tunnel project. The southwest branch, which ranges up to 96-inches in diameter, and the south branch cross the future East Quad. The Master Plan recommends rerouting these lines to the perimeter of the quad as individual building projects in the quad are implemented. The best alignment would pass south of Building 11 to Center Drive, and then proceed north to reconnect to the existing line.

### **5.4.5 Stormwater Management**

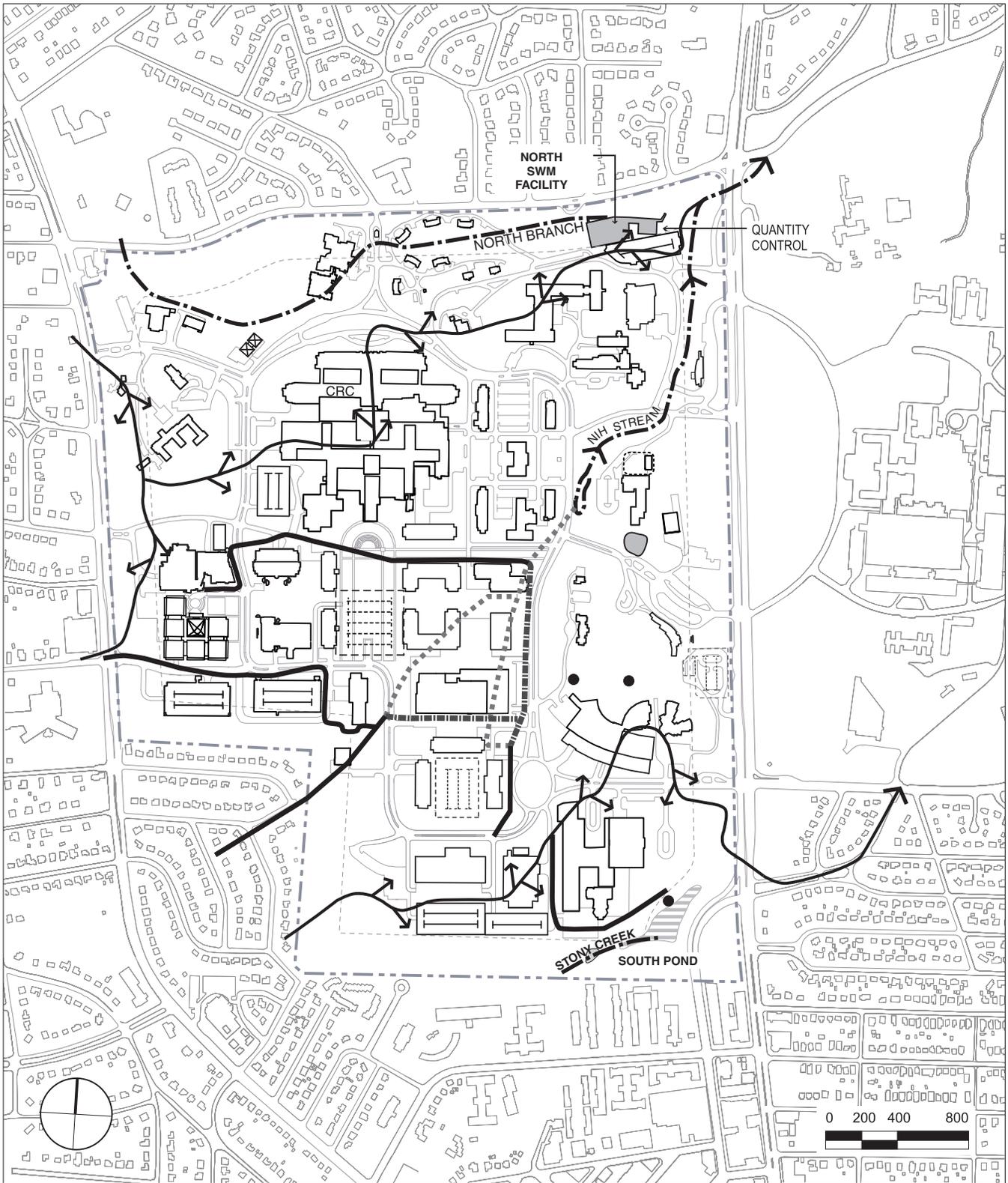
Future stormwater management will be conducted through an NIH Bethesda Institutional Stormwater Management Plan (ISMP), which is an element of the Master Plan. Components of the ISMP include both management procedures and physical facilities. Management will be completed on a campus-wide or “regional” basis. Quantity and quality control of runoff are included in the plan. More detail is in the Master Plan Environmental Impact Statement.

For the purpose of stormwater management (SWM), “existing” or baseline conditions are defined as those present just prior to the start of Hatfield Clinical Research Center construction. The computed campus impervious area at that time was 129.6 acres. Although the Master Plan would add over three million gross square feet of floor space, there would be minimal change in site impervious area, because many existing one to three story structures will be replaced by five to seven story buildings, and more than 4,000 surface parking spaces will be consolidated in parking structures.

The required minimum campus-wide stormwater management quantity control or channel protection volume for the campus is 3.14 acre-feet. This requirement is met by the recently constructed North SWM Facility located on the North Branch in the northeast corner of the campus. The facility is composed of three underground fields of large diameter perforated pipe connected in series. Release of stored runoff from the facility is controlled through a single small diameter pipe. Detained runoff can percolate through the pipe perforations to the subsoil below. Under one year, 24-hour storm runoff conditions, the detained facility volume will be 3.30 acre-feet.

Campuswide stormwater runoff quality control requirements were determined in consultation with the Maryland Department of the Environment. Although the impervious ground cover is expected to remain relatively constant, even under full master Plan buildout, it was assumed, for the purposes of computing required SWM quality control volumes only, that 43 acres of the campus would be converted from pervious to impervious surface. All development in impervious areas, as defined by pre-Hatfield CRC conditions, is considered to be “redevelopment” for determining project level SWM quality control requirements.

NIH and Montgomery County have signed a Memorandum of Understanding for the construction of a county SWM facility, the South Pond. It will capture runoff from the Woodmont Triangle area to the south of NIH, and areas within NIH that are in the Stony Creek watershed. For County purposes, the Pond will provide SWM quantity control. The



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- |                                    |                                |
|------------------------------------|--------------------------------|
| EXISTING MAJOR STORMWATER ROUTE    | EXISTING DRAINAGE CHANNEL      |
| STORM SEWER TO BE ABANDONED        | RELOACTED STORM SEWER          |
| WATERSHED BOUNDARY                 | PROPOSED STORMWATER MANAGEMENT |
| STORMWATER CONTROL AREA - OPEN     |                                |
| STORMWATER CONTROL AREA - ENCLOSED |                                |

**Figure 5.4.4**

**Stormwater  
System**

channel protection volume will be 5.52 acre-feet. For NIH purposes, the facility will provide 4.61 acre-feet of SWM quality control storage.

The Bethesda campus is dynamic with construction and demolition continually underway. The situation will be covered by an ISMP SWM tracking or “banking” system. The overall campus quantity and quality control volumes at the North SWM Facility and South Pond, respectively, supplemented by smaller individual campus facilities, represent “account” levels for the campus as a whole. The quality and quantity control volumes for individual projects would be computed as they are implemented. These individual project control volumes would be charged or credited to the campus account values listed in tracing system at the time of project implementation to determine the status of management at any given time.

The U.S. EPA design goals for stormwater management/low impact development should be incorporated into individual project site development to the extent that is feasible. See the U.S. EPA Region III letter in Appendix H of the Master Plan 2003 Update Final EIS for details. The U.S. EPA design goals should be considered within the framework of the campus ISMP.

#### **5.4.6 Natural Gas**

The peak recorded steam demand in 2003 was 532,000 lb/hr. The computed 2003 short term peak demand at 0 F is 585,000 lb/hr. Assuming 85 percent boiler plane efficiency, the amount of natural gas needed to generate this short term steam demand is 684,000 cf/hr, and the short term gas demand is projected to increase to 1.26 million cf/hr under full master plan build out conditions beyond 2020. The 2003 projected 2020 master plan average winter demands (December-February) are 340,000 lb/hr and 563,000 lb/hr, respectively.

In the past, NIH has been subject to gas supply curtailment by Washington Gas (WG) during the coldest periods of the year when steam demands are highest. Curtailment or reductions in the amount supplied may be partial or complete, and NIH switched to fuel oil to satisfy steam generation energy demands during curtailment. However, maximization of natural gas as boiler fuel is important to NIH in reducing boiler plant stack emissions and meeting plant operating nitrogen oxides (NOx) permit emission limits. Fuel oil generates 2.6 to 3.8 times as much NOx per pound of steam generated than natural gas depending on whether Boilers 1 through 5 or the COGEN unit are used. In May 2004, NIH signed an agreement with WG that guarantees a minimum supply of 380,000 cf/hr, which would generate 325,000 lb/hr of steam, at all times throughout the year. Additional steam demand during periods when the gas supply is curtailed to 380,000 cf/hr would continue to be generated using fuel oil, but the amount of steam produced using oil under the new agreement is markedly reduced. Assuming campus growth at the rate projected in the Master Plan 2003 Update, it is projected that the NIH will be able to satisfy steam demands, natural gas demands, and permit NOx limits through the years 2011 or 2012.

#### **5.4.7 Strategic Central Plant Operating Program**

Management of the NIH central plant steam, chilled water, and electric power generation operations is rapidly increasing in complexity. Recently, or soon to be, installed equipment create options for running the plant. However, these options introduce new relationships among the utilities as well as boiler plant stack emissions. The amount of pollutants emitted by the plant on an annual basis is limited or constrained. An important consideration in choosing an operation option on a given day, or strategically for the next

few months or remainder of the year, is the cumulative amount of pollutants that have been emitted when the decision is made compared to the annual emission limits.

Selecting an option evolves the evaluation of many factors including (but not limited to) generation of steam and chilled water, potential sources for electric power, projected utility rates, and the anticipated changes in utility demands created by scheduled new buildings, demolitions, and space use changes.

These and other factors become increasingly important during those periods when campus demands approach plant capacity, i.e. just before new chillers or boilers go into service, or when annual emissions approach annual limits.

To resolve the situation, the Master Plan recommends the development of a Strategic Central Plant Operating Program (SCPOP). It is visualized as a computer program that would give the status of plant operations and emissions over any selected period of time. Input would include information on steam, chilled water, and power production, fuel and utility usage, and prices and estimated stack emissions based on monitoring data. The status information could be used for preparing reports to regulatory agencies and internal NIH records. The program could also be tied to plant or distribution system metering or monitoring.

However, to be of maximum value, the program should also be a tool for strategic planning of operations over a future period of time. This can be done by creating a computer model of the plant. The annual cycle of demands can be projected or synthesized on a daily basis from past record. Equipment fuel, and emission characteristics can be modelled mathematically. The program should also have the ability to test various potential future operating scenarios on a user interactive basis, i.e. the user should be able to change all the variables involved. For example for a desired test scenario, the user should be able to turn equipment on or off, run chillers on steam or electric power select type of fuel to be used or add an anticipated demand, change the price of oil or gas, all on any given day or period.

## **5.5 Environmental Considerations**

For more detailed discussion of topics in this section, refer to the Environmental Impact Statement for the NIH Master Plan 2003 Update , Bethesda Campus.

### **5.5.1 Energy Conservation**

In accordance with Executive Order 13123, the NIH prepares annual Energy Management and Implementation Plans that focus on its accomplishments and future objectives toward meeting the twenty-percent (20%) energy reduction per gross square foot goal established for laboratory facilities at federal facilities when compared to 1990 consumption rates.

The NIH has already taken measures to significantly reduce the rate of energy consumption per building square foot. The new 5000 ton chillers installed in Building 11 require 32 percent less electric power than the chillers they replaced to generate a ton of refrigeration. The COGEN turbine in delivers power generated directly to the PEPCO substation in Building 34, eliminating the distribution line power losses incurred between outside power stations and the campus. Executive Order 13123 also calls for reductions in greenhouse gas emissions. Though modernization of the boiler plant and the switch from diesel oil to natural gas in 1992, stack nitrogen oxides and volatile organic carbon emissions have been reduced by about 80 percent. The Master

Utility Plan 2000 update notes and recommends that upgrades to the steam and chilled water distribution systems could further increase delivery efficiencies by 10 to 15 percent.

Over the course of the Master Plan period, overall energy consumption will unavoidably increase significantly as campus building space increases. Energy use per square foot will also increase, because a greater proportion of campus space will be used for research, i.e. laboratories and animal care or holding. Research space requires about six times more steam per square foot than general or office space.; uses more than three times the chilled water, and nearly double the amount of electric power.

The reasons for this are twofold. First, in addition to heating and cooling, biomedical research space uses steam and chilled water for direct or process uses such as at the laboratory bench and cleaning animal holding spaces. Second, national mechanical building codes for laboratories, and AAALAC codes for animal care facilities require a high rate of building air exchange per hour compared to other building uses. The typical air exchange in a commercial building is about five or six per hour. Laboratory and animal holding spaces require 15 to 20 exchanges. Building air, which must be heated or cooled from ambient outdoor temperatures, is therefore resident for only three or four minutes.

The above implies that, while the building envelope is still important, the most cost effective energy conservation measures are those applied to the air stream flowing through the research building. Building designers should evaluate measures that conserve or reuse the energy within the building exhaust airflow. Examples are energy recovery heat wheels, or heat exchangers.

However, there are also opportunities to offset this increase by implementing energy conservation measures for the approximately 5.2 million square feet of new or renovated space which is proposed to be constructed over the twenty year period. A Strategic Energy Conservation Plan is also being developed to provide a structured approach toward energy management and conservation. To help the NIH meet and/or exceed its conservation goal, the following energy conservation project and measures will be implemented as identified under the Energy Management Plan:

- energy efficient designs for building envelopes and fenestration components, including establishment of energy design criteria such as required insulation values;
- installation of energy monitoring and control systems to provide for night time and off-peak hour energy cutbacks to non-critical areas;
- submetering of steam, chilled water, and electrical distribution systems for evaluation of implemented energy savings measures;
- computerized control and monitoring of steam and chilled water production and distribution systems;
- installation of new low energy or low wattage light fixtures. Design of interior spaces to utilize task lighting concepts; and
- installation of new lighting controls to automatically trigger on-off switches or adjust light levels to accommodate daylight contributions.

Other recommendations or current actions for the conservation of energy include:

- siting and orientation of buildings to take maximum advantage of daylighting and climatic conditions;

- use of landscaping to provide direct shade to reduce building heat gain, and to reduce ambient air temperatures by shading large paved areas;
- the design of building fenestration to provide thermal insulation, shading of unwanted solar heat gain in summer, and capture of passive solar heating in winter;
- replacement of existing steam lines as necessary to solve leakage problems as recommended by the Master Utilities Plan;
- installation of new energy efficient chillers to replace older, less efficient equipment as proposed in the Master Utilities Plan;
- efficiency improvements in chilled water distribution temperature differentials, as proposed in the Master Utilities Plan;
- conversion or replacement of the NIH vehicle fleet with alternative fuel vehicles.
- use of fuel-cells under economically feasible applications; and
- establishment of public relations program to educate consumers on how to conserve energy.

## 5.5.2 Air Quality

There are three emissions sources, which may affect the air quality of the NIH, including vehicular traffic on roadways, vehicles at parking structures, and central Power Plant boiler stack emissions.

The National Ambient Air Quality Standards (NAAQS) pollutant concentration most likely to be exceeded by vehicular traffic generated emissions is carbon monoxide (CO). On a regional level, the NIH Master Plan traffic will have little or no influence on CO levels. On a local or microscale level, projected NIH-generated traffic at the worst case scenario locations, the intersections of Rockville Pike with West Cedar Lane and Jones Bridge Road, will not exceed the NAAQS. A worst case analysis was also conducted to determine the highest CO concentrations generated by campus parking. The parking location with greatest potential impact is at MLP-6 and MLP-8 because of their proximity to Edgewood/Glenwood; however, analysis indicates that existing and future Master Plan CO concentrations at the residences along the north side of McKinley Street are well below the NAAQS limits.

The main point source of emissions on the NIH campus is the central boilers housed in Building 11. The existing boilers have been upgraded to dual gas-oil fuel feed with low NO burner technologies. These improvements have resulted in significant reductions in sulfur dioxide (SO<sub>2</sub>), particulates, volatile organic compounds (VOC), and nitrogen dioxide (NO<sub>2</sub>).

Summer ozone concentrations in the Washington metropolitan area exceed the NAAQS, i.e. the region is in non-attainment for ozone. In January 2003, the U.S. EPA downgraded the area's non-attainment classification from "serious" to "severe", and required regional attainment in 2005. Regional officials must identify additional abatement or control measures that may be needed. These measures have not been determined yet.

Emission requirements for new boilers or sources are established when project implementation occurs through Maryland Department of the Environment permit processes. Separate permits are required to construct, test, and operate new facilities. Requirements for future NIH boiler emissions will be determined at the time of implementation within the context of regional conditions. NIH will use appropriate technologies for emission control to meet permit requirements.

### **5.5.3 Water Conservation**

In an effort to reduce impacts on regional water resources and comply with Energy Policy Act of 1992, all new construction and renovation at the NIH Bethesda campus should employ water conservation technologies in plumbing and mechanical systems. All campus buildings should be considered of retrofit with low-flow fixtures by 2005. Additionally, NIH currently recycles ground water pumped from excavations for landscaping irrigation, and the Master Plan recommends the use of drought-tolerant plant materials and limiting high-maintenance landscape areas in an effort to conserve water (see Section 5.2.5, Open Space and Landscape Concepts).

### **5.5.4 Noise**

The dominant noise source in the NIH vicinity is traffic on Rockville Pike and Old Georgetown Road. Exterior traffic noise dominates noise levels for about 500 feet to either side of these roadways. Traffic generated by the Master Plan implementation will not appreciably impact the surrounding neighborhoods. It is estimated that traffic noise levels will remain unchanged or increase by 1 dBA over the next 20 years regardless of growth at NIH. A 1-dBA increase is not perceptible to the human ear.

Within the core of the campus, typical daytime noise levels range from 55-60 dBA. Among NIH facilities the dominant noise sources are the roof top cooling towers associated with chillers located in Buildings 11 and 34. Noise from cooling towers is seasonal, with noise levels in summer months when temperatures exceed 90°F increasing sharply. Cooling tower noise is most obvious at night when background noise levels fall.

NIH has committed to mitigating chiller plant nighttime summer noise to 55 dBA.. A sound attenuation screen has been installed along the full length of the south side of Building 11 to reduce noise levels generated by the cooling towers on the roof. Adjacent neighborhoods will be partially screened by new structures, topography, and enhanced landscaping. Sound attenuation in adjacent structures should be accomplished through minimization of wall openings, careful treatment of fenestration, and exterior wall detailing.

Individual building exterior or roof top, air, exhaust fans and emergency electric power diesel generators are, additional campus noise sources. New facilities should abate or mitigate excessive noise and vibration impacts to nearby NIH facilities, and the neighborhoods surrounding the campus. Mitigation can be achieved through physical shielding equipment silencers or project design configuration. Maximum building operational Leq noise levels should meet the Maryland or Montgomery County noise criteria given in EIS Section 5.5.1.

### **5.5.5 Waste and Recycling**

Waste of many types is generated on the NIH Bethesda Campus. The NIH tightly controls the monitoring, control, collection, and disposal of waste in accordance with federal and State of Maryland regulations through its Division of Environmental Protection. In many cases, procedures developed by the NIH are used throughout the U.S. biomedical industry. For all of the types of waste listed below, NIH will continue to assess ways to effectively prevent or reduce the generation of such waste as a first step in preventing pollution. Waste materials, which can be recycled, are discussed in section 5.5.6. The means of safe treatment and disposal of other waste is discussed below. All new projects should include a waste minimization assessment as part of their environmental analysis.

**Solid Waste**

At the NIH, solid waste is composed of general waste, yard waste, and construction waste. General waste is composed of general trash, garbage, and refuse. General waste is collected by contractors at about 60 dumpsters around the site and hauled to the Montgomery County Transfer Station by a private contractor. Over the last five years, the average general waste generated at NIH Bethesda is 9,921 tons per year. However, the NIH has an extensive general waste recycling program. Recycling amounts have more than tripled at NIH since 1995 primarily through the introduction of new recycled material streams. Recycled materials in 2003 included white, mixed, and shredded mixed paper; cardboard; wood pallets; plastics; small electronic equipment; aluminum cans; batteries; and toner cartridges as well as other materials. As a result, the average general waste sent to disposal over the last five years is only 7,921 tons, or a reduction of 20 percent.

Yard waste includes materials generated by grounds maintenance. To the extent feasible, grass clippings and tree trimmings are recycled by conversion to mulch. Disposed yard waste is handled separately from general waste.

Construction waste disposal is the responsibility of the construction contractor. The amount of waste varies considerably from year to year depending on ongoing construction activity. Hazardous construction waste is handled separately from general construction debris. All buildings to be demolished or renovated undergo a survey by specialist contractors to determine the presence of hazardous materials such as asbestos, lead, or PCB's. These materials are removed prior to general demolition.

**Medical Pathological Waste (MPW)**

MPW is defined as waste that because of actual or perceived presence of pathogenic agents requires containment or treatment to prevent occupational or environmental exposure. MPW is packaged at the point of generation according to established procedures in clearly labeled packaging. More than half of the MPW generated by the the NIH Bethesda comes from the Clinical Center Complex. MPW is generally stored under refrigerated conditions at each designated area, collected by a private contractor, and marshaled in Building 25 for subsequent transport to off-site disposal. A rigorous MPW minimization program established in 1994 has resulted in a 45 percent reduction in MPW generation despite an increase in the number of researchers, and additional future reductions are possible. Future MPW generation levels are not expected to increase at full Master Plan buildout.

Medical/pathological waste should continue to be marshaled or treated at an intermediate point between the largest MPW generators, which are the Clinical Center on the north side of the campus and the Animal Research Facility on the south. The Master Plan proposes that the Building 25 function be relocated to the east side of campus in the vicinity of Building 21. The replacement building would not only be the central MPW storage facility, but also may contain facilities for treatment of MPW to further minimize the amount sent off-campus to disposal. Adequate space for maneuvering trucks in the loading dock area is essential.

**Radioactive Waste**

NIH is licensed by the U.S. Nuclear Regulatory Commission (NRC) to use, store, and dispose of radioactive materials which functions are under the Division of Radiation Safety. The NRC inspects all NIH facilities that handle radioactive materials on a regular basis. All personnel involved in the handling, transport, and use of radioactive materials will continue to be trained in accordance with NRC requirements. Nearly all radioactive material used at the NIH involves quantities with very low levels of radioactivity, and most have a half-life of less than 100 days. Radioactive waste amounts are expected to remain relatively constant under the Master Plan. The NIH

has a rigorous radioactive waste minimization program. Experimental protocols are reviewed to determine if alternative methods not using radioactive materials are available. If not, then the absolute minimum amount of radioactive materials are used. The Master Plan proposes that the radiation safety, treatment, and storage functions remain in Building 21.

**Chemical and Multi-hazardous Waste**

Chemical waste that is not regulated under federal or state regulations as hazardous, but which have toxic or hazardous characteristics are considered to be hazardous waste by the NIH. Multi-hazard waste is an NIH definition for a waste that meets the definition and properties of more than one of the restricted types of waste, which include MPW, radioactive waste, and chemical waste. These types of waste are subject to strict waste minimization and segregation procedures.

The Master Plan assumes a larger gross area per researcher in new research space than in existing space, but the projected number of researchers on campus is only expected to increase moderately over the next twenty years. Further, a greater proportion of the research is expected to be at the microbiological level, which, in general, produces lesser quantities of chemical waste. For these reasons, chemical waste is expected to remain relatively constant under the Master Plan. Chemical and multi-hazard waste will continue to be picked up by contractor from around the campus (and from leased facilities off-site) and delivered to the corresponding waste management facilities (currently housed in Building 21) for treatment, processing, or packaging for subsequent disposal. The Master Plan proposes that the central chemical and multi-hazard waste handling facility remain in Building 21.

**Animal Waste**

Animal waste is classified as solid waste, MPW, or sanitary waste as determined by waste management procedures. It is disposed of according to its assigned category. It is assumed that there will be little or no growth in animal waste generated at NIH Bethesda; however, the system of separation and disposal will remain the same.

**5.5.6 Recycling/Building Materials**

The Master Plan recommends that all new construction provide sufficient loading dock spaces for roll-off containers to separate, compact, and store recyclable materials and provide rooms adjacent to the loading docks to further process recyclables and store related materials, as has recently been provided in the construction of Buildings 45 and 49. Areas within the buildings to locate recycling collection containers should also be designated. The Master Plan also recommends that building materials used for new construction or renovation be selected with the following criteria in mind.

- increase the purchase of EPA–designated items with recyclable content, except when not available competitively at reasonable prices or that do not meet performance standards;
- low energy consumption in manufacture or production of materials;
- limited use of non-renewable resources;
- energy conservation characteristics of the material or application selected;
- life-cycle cost and maintenance characteristics of material or application selected that reduce energy consumption for the planned building; and
- all building related goals established in Executive Order 13148, Greening the Government through Leadership in Environmental Management.