National Institutes of Health
9000 Rockville Pike
Bethesda, Maryland

Master Plan 2003 Update
Main Campus - Bethesda, Maryland

National Institutes of Health

Master Plan *2003 Update*

Main Campus - Bethesda, Maryland

March 2005

❖ U.S. Department of Health and Human Services ❖ National Institutes of Health ❖
❖ Office of Research Facilities Development and Operations & Division of Facilities Planning ❖

National Institutes of Health

Master Plan
2003 Update

Main Campus - Bethesda, Maryland

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Dale and Betty Bumpers Vaccine Research Center

Clinical Research Center

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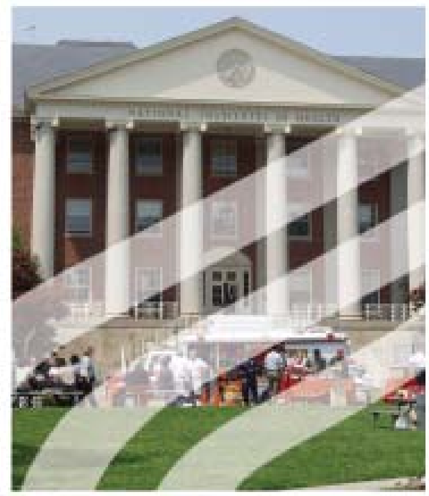


1.1 The NIH Bethesda Master Plan 2003 Update

James A. Shannon Building

The most recent Master Plan for the Bethesda Campus of the National Institutes of Health (NIH) was approved in 1996. Since then, significant growth in NIH space and personnel on and off the Bethesda campus has occurred. Furthermore, conditions imposed by the National Capital Planning Commission (NCPC), the federal government's central planning agency in the Washington, D.C. area, require periodic updates. This Master Plan Update has been developed for a 20-year planning period, and personnel and space estimates are arranged in four incremental phases covering a twenty-year period. The NIH intends to continue to update the Master Plan at approximately five year intervals.

The Master Plan seeks to create and maintain a campus environment conducive to accomplishing the NIH mission and to provide a physical framework for the changing character, nature and urgency of the NIH biomedical research programs. It provides a long-range planning envelope for the Bethesda campus, and outlines a strategy for accommodating potential campus development. It identifies the physical opportunities and limitations of the campus and defines population and associated facilities for planning purposes. However, actual program realization at any given time will depend on NIH and Department of Health and Human Services (DHHS) priorities, congressional and presidential policy decisions and federal budgetary realities. Although the proposed projects may not be required or carried out to the extent shown, the Master Plan will help ensure orderly future development on the Bethesda campus if and as it occurs.

The Master Plan is a reasonable guideline for future development and does not represent the pre-approval of any individual facilities projects since the financing of such projects will need to be addressed within the annual DHHS budget process and the DHHS Capital Investment Review Board mechanisms.

1.2 The NIH Mission

Begun as a one-room Laboratory of Hygiene in 1887, the NIH today is one of the world's foremost biomedical research centers. An agency of the Department of Health and Human Services, it is the federal government's focal point for health research.

EXISTING	SECURITY FENCE
PROPOSED	BUFFER LINE
GREEN/OPEN SPACE / RECREATION	
CENTRAL MALL/PRIMARY OPEN SPACE	
M METRO STATION	

NIH Master Plan 2003 Update

Bethesda Campus

Figure 1.1

Illustrative Master Plan

The mission of the NIH is to expand fundamental knowledge about the nature and behavior of living systems; to apply that knowledge to extend the health of human lives; and to reduce the burdens resulting from disease and disability. The NIH seeks to accomplish its mission by:

- fostering fundamental discoveries, innovative research, and their applications in order to advance the nation's capacity to protect and improve health;
- developing, maintaining, and renewing the human and physical resources that are vital to ensure the nation's capability to prevent disease, improve health, and enhance quality of life;
- expanding the knowledge base in biomedical and associated sciences in order to enhance America's economic well-being and ensure a continued high return on the public investment in research; and
- exemplifying and promoting the highest level of scientific integrity, public accountability, and social responsibility in the conduct of science.

In addition to the main NIH campus in Bethesda, Maryland, which is the subject of this Master Plan 2003 Update and associated Environmental Impact Statement (EIS), the NIH maintains installations in Poolesville, Baltimore and Frederick, Maryland; Research Triangle Park, North Carolina; Hamilton, Montana; and smaller facilities in other parts of the country. The NIH also leases space in over thirty locations in the Bethesda/Rockville area of Montgomery County, Maryland.

1.3 Planning Methodology

The Bethesda Campus Master Plan is one of a set of long range development plans for NIH installations. Each plan outlines a physical framework to support the NIH strategic research plan, the unique needs and character of the site, and the locale in which the installation is located. One of the primary benefits of the NIH master planning process is that it provides a consistent structure for NIH master plans - similar content, methodology, and level of detail. At the same time, the process recognizes differences among NIH campuses - different histories, physical resources, and community contexts - which result in distinctive programmatic requirements and physical forms for each campus.

Update of the Bethesda Campus Master Plan began with the review of relevant information about the mission, organization, personnel, programs and facilities at the NIH main campus and at other NIH leased and owned properties in the Washington-Baltimore area. The most important source of information came from new interviews of the leadership of the Institutes and Centers (ICs). ICs were asked to base their projections on research needs without considerations of possible limitations on available funding or unanticipated changes in government policies and priorities. Within an interview questionnaire format, each attempted to predict biomedical research requirements for their IC over the next twenty years, set forth the mission and program development they anticipated would be necessary to meet these requirements, and estimate personnel needed to staff these programs over the next five, ten and twenty year time periods.

At each stage of development of the NIH Master Plan 2003 Update, the master planning team coordinated with, and made progress presentations to NIH Management; the Community Liaison Council, a group representing neighborhood associations and organizations surrounding the Bethesda campus; and the staffs of the NCPC and the Maryland-National Capital Park and Planning Commission (M-NCPPC). At the same time, the environmental impacts of growth and change on the campus were investigated together with various options, and mitigation measures were developed. An EIS has been developed as a part of this process.

1.4 Program Basis

In order to develop a framework for the Master Plan Update, a projection of functional, personnel, and space needs was prepared by means of a new questionnaire and new interviews of the key personnel of the 27 Institutes and Centers that constitute the National Institutes of Health, plus key officials within the Office of the Director (OD) of the NIH.

The NIH Master Plan 2003 Update is based on several planning premises, chief among them is accommodating the anticipated scientific needs of NIH's biomedical research programs. For purposes of the Master Plan, the 2020 planned campus employment level is set below the level ideally desired to achieve these goals on site as estimated by the ICs because of natural, systems and community constraints on the Bethesda campus growth. This allows the Master Plan to satisfy its many purposes without compromising the basic tenets on which is based. As a consequence, the campus employment level used for planning purposes, which is substantially below the Institute projections, reflects a balanced response to meeting NIH's programmatic needs in the future.

Total potential population at the Bethesda campus in the next twenty years was projected by the ICs to be as high as 26,400. The primary growth at the campus was projected to be through consolidation of Intramural Research Program (IRP) personnel from other NIH sites to the Bethesda campus. Despite the pressure for personnel growth at Bethesda, NIH established a limitation on campus growth to 22,000 persons due to community, infrastructure, and traffic and transportation concerns.

The Master Plan 2003 Update identifies current and future pressures on building areas, parking, transportation systems and utilities infrastructure.

Over the 20-year period ending in 2020, the number of NIH personnel is projected to change as indicated in the following table.

Table 1.4 Projected 20-Year Personnel Growth

	Washington / Baltimore Area	Bethesda / Rockville Area	Main Campus
Year 2000	26,259	24,155	17,617
Current (2003)	27,990	26,141	17,511
Year 2020	N/A	N/A	22,000
Percent in Change 2000 to 2020	N/A	N/A	24%

The Master Plan 2003 Update provides a strategy for accommodating the space needs related to these IC personnel projections, while at the same time satisfying other campus goals and objectives, including decompression of overcrowded office and laboratory space, utility upgrades, and the addition of needed amenities. Based on the plan, NIH estimates that the space on the Bethesda campus will grow from approximately 7.4 million to nearly 10.7 million gross square feet, a net increase of about 3.3 million gross square feet of building area, not including parking structures.

Most of this growth is in replacement and modernization of intramural research facilities, and the completion of the Mark O. Hatfield Clinical Research Center (CRC).

IC Organization

The most significant organizational feature of most institutes - for purposes of the Master Plan 2003 Update - is their division into intramural and extramural research functions. The intramural basic and clinical research programs distinguish the NIH as an institution from all others in biomedical research. The NIH intramural research program enjoys unique interdisciplinary character, flexibility of the course of research and the freedom to pursue research without imposition of predetermined duration or, in some instances, scope. In the Clinical Center, patients are physically close to researchers, and the rapidity with which clinical trials of research findings can be applied is unique in biomedical research. On the other hand, the grant funding of extramural research, accounting for 80% of the total NIH budget, requires advance definition of objective, duration and cost, and grantee institutions often cannot access patients for clinical trials as readily as researchers at the NIH Bethesda campus.

Each IC has an Office of the Director which requires convenient access to the corresponding offices of the other ICs and to the Office of the Director of the NIH. Nearly all ICs, given the choice, state that most of their programs should be located on the Bethesda campus. Research and grant personnel now in locally leased space complain of the frustrations of having to travel to the campus for meetings, seminars, or other business because of the time taken to move between NIH facilities. Shuttle bus service is not practical at some sites, such as those in Baltimore, Frederick, and the NIH Animal Center (NIHAC) in Poolesville, Maryland.

The Clinical Center Complex

The heart of the intramural program is the Clinical Center Complex (CCC). The Clinical Center, which opened in 1953, has been the world's premier biomedical research facility, providing the basic clinical and patient proximities that have become the model for today's research, and it continues to play a major role in the missions of nearly all Institutes and Centers. However, age, condition of the infrastructure, and physical restrictions of the Clinical Center or Building 10, as it is known, itself threaten the performance of the facility overall and ultimately the vitality and creativity of the entire intramural program.

Warren Magnuson Clinical Center

The Clinical Research Center (CRC) to be completed in 2004, and the Building 10 Renovation, to be completed in several phases, will rectify many of the CCC's physical infrastructure problems discussed in the 1995 Master Plan.

Animals in Research

The use of animals in research by the intramural programs is extensive at the NIH, which has one of the larger veterinary resource programs for research. Animals are accommodated in various ways. Many are currently scattered among buildings on the Bethesda and Poolesville campuses. Some are in locally leased space. Others are at NIH's Frederick, Baltimore and satellite field locations. Although all NIH facilities are accredited by the American Association for Accreditation of Laboratory Animal Care (AAALAC), replacement of the existing Building 14/28 animal complex will ultimately be necessary. Because of severe infrastructure and environmental constraints that limit future construction at the NIHAC in Poolesville and scientists' desire to keep animals as close to the laboratories as possible, it does not appear feasible or desirable to move many more animals from Bethesda to the NIHAC or to transfer more laboratory activities to Poolesville to be near the animals already there. The trend in recent NIH research facilities has been to have large vivariums located in the laboratory buildings themselves.

Campus Amenities

Interviews of IC personnel revealed concerns about the character of the Bethesda site, the insufficiency of places offering opportunities for socialization and collegiality, and the lack of facilities for recreation, child care, dining and other services. While the general landscape character of the site was applauded, the intrusion of extensive surface parking and the visually confusing development of the campus suggest that many improvements in design and planning are necessary.

Parking and Transportation

Of all the Bethesda campus site issues, parking and transportation were of greatest concern to almost everyone interviewed. At the time, employees complained there were not enough on-site parking spaces to accommodate the number of people who felt they must drive and, therefore, needed to park on the Bethesda campus. Many members of the scientific community work irregular hours, and intramural investigators spend, on average, between 50 and 60 hours per week on campus, sometimes working until the early morning hours, leaving for home, then returning to the campus at midday, when a substantial amount of time is required to find a parking space, if one can be found at all.

On the other hand, concerns of the public and the official planning agencies about the increasing demands that traffic to the site makes on transportation infrastructure, the requirements for mitigation anticipated by the Clean Air Act, and the existing Memorandum of Understanding between the NIH, the Montgomery County Planning Board and NCPC have required extensive analysis of transportation issues in the 2003 Master Plan Update. The Update continues to rely heavily on NIH’s long range Transportation Management Plan which has been very successful in encouraging greater use of transit and ridesharing.

1.5 Planning Objectives

The academic campus model emerged as the appropriate tool to guide the modernization and modest growth of the NIH on the Bethesda campus. The model provides a flexible framework for phased construction of independent buildings in a rational, cost-effective way while maintaining functional relationships and efficient infrastructure and circulation systems. It also provides a structure for combining intelligent environmentally sensitive land use with a high quality environment.

Although the NIH is organizationally different from academic, campuses are places where thoughtful research and studies are pursued. Physically, the term “campus” implies an expression of density, scale and quality of environment which is consistent with the Master Plan goals. The campus model evokes a clear image to guide future development decisions and provides a visual identity for the NIH.

This model is coincident with the current perceptions of the NIH as a campus-like environment. This is true both in the minds of the researchers and staff and generally within the surrounding community.

Due to the extensive level of existing development, the Bethesda campus has certain constraints, but at the same time existing physical site features present opportunities that can be enhanced and incorporated successfully into the Master Plan.

The basic goals of the Master Plan continue to be:

- Foster innovative research strategies designed to advance the nation’s capacity to improve health.
- Provide a physical framework for the changing nature, technology, character and urgency of medical research and education.

- Provide a secure and supportive environment for the people involved in NIH activities.
- Enhance and respect the stability and integrity of the surrounding residential community.
- Protect and enhance the natural resources and environmental qualities of the NIH campus and the region.
- Foster communication about NIH goals and policies.

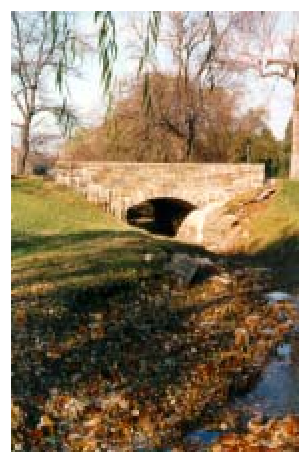
1.6 Description of the Master Plan Concepts

Although the Master Plan 2003 Update has made minor adjustments to the physical plan, it remains consistent with the 1995 Master Plan:

Functional Relationships
The Clinical Center Complex will continue to be the functional “heart” of the campus. Research functions will be contiguous to the Clinical Center to the east, west and south. Support functions, including storage and maintenance, will be primarily located in the campus center, though most buildings have their own shipping, receiving and other support. The administrative core will be located along the eastern side of the site relating to the more public side of the campus and closer to the Medical Center Metro station. A large portion of the laboratory complex at the center and south of the campus is also convenient to the Metro station.

Open Space Systems
These will comprise interconnected and defined quadrangle spaces as the basic structure of the campus. A central mall is proposed to organize the buildings surrounding it and maintain a north-south pedestrian connection. Secondary spaces will radiate from this central space and help connect the building groupings. A natural system of open spaces created by the NIH Stream and other existing landscape features at the four corners of the site will be integrated into the campus structure.

Building Patterns
Five existing building groups will remain and anchor the site: the administrative group (Building 31); the Historic Core (Buildings 1-5); the Clinical Center Complex; the west laboratory group (Buildings 35 - 37 - 40); and the NLM/Lister Hill - Natcher group. The core of the campus will be redefined by two new laboratory groups to replace the support and computer services Building 12/13 complex in the center and the existing animal facility in the Building 14/28 complex to the south. 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 Convent), and Building 62 (the Children’s Inn). Most new development is integrated into the orthogonal grid originally generated by the Historic Core.


The NIH Stream

Massing and Heights
The tallest structure - the Clinical Center Complex - will continue to be the focal point of the campus. Lower buildings will be placed along the perimeter, and to the extent possible, a transition in height will be made from the tallest building to the lowest. Building heights will be below a plane rising five degrees from horizontal at the perimeter of the site to maintain an acceptably low scale as seen from the residential surrounding areas.

Circulation
A primary interior roadway loop will become the organizing element for vehicular campus circulation. Secondary roads will connect to the loop, and seven major site entries will be emphasized. Also planned is a separate entry from Rockville Pike for

where pathways connect from the north of the loop road, through the central mall and the Clinical Center Complex to a site for central campus amenities to the south. A second pedestrian corridor will connect the central mall with the Metro station on the east and Old Georgetown Road on the west. The Master Plan 2003 Update continues to limit vehicle penetration inside the loop road to service and emergency needs.

Utilities

NIH's Updated Master Utility Plan (UMUP), was completed in 2000. The UMUP reassessed existing utility demands or usage and system capacities with emphasis given to the central utilities, steam and chilled water. Projections were based on the 1995 Master Plan. The UMUP also updated future major utility needs and the implementation scheduling on a concept planning basis. These projections have been further refined in conjunction with the campus Master Plan 2003 Update.

Parking

NIH anticipates that it will maintain an employee-to-parking ratio of no greater than 0.50 in the future as recommended by the Comprehensive Plan. However, depending on the extent of future regional transportation improvements, federal government policies regarding parking, and the level of success of the NIH TMP, NIH will try to reduce the ratio to 0.45. As a result, NIH's on-site employee parking could increase from 8,149 in 2003, to a maximum of 11,000 spaces at the 0.50 ratio (assuming NIH reaches its maximum population planning level) over the 20-year Master Plan period. The NIH intends to continue its traffic management program to reduce on-site employee parking even below the 0.45 level, if possible.

Security

At the request of the Office of the Inspector General of DHHS, NIH has begun implementing a perimeter security plan for the campus. Among the new measures planned are a perimeter fence with access control gates. As part of this plan, NIH will construct a Gateway Center at the main entrance to the campus near the Metro station to screen visitors arriving on foot, bicycle and vehicles, and a Commercial Vehicle Inspection Facility in the northeast portion of the site. These will not change the Planning Objectives or Planning Principles of the Master Plan.

Chapter Two
Introduction and Program Requirements

2.1 Introduction

The National Institutes of Health (NIH) is the focal point of the federal government for health research and is one of the world's foremost biomedical research institutions. The NIH mission is to discover new knowledge that will lead to better health for all. To achieve that mission, nearly eighty percent of the total NIH budget is expended in the form of peer-reviewed, competitively-awarded research grants, cooperative agreements, and contracts to nearly 50,000 principal investigators at more than 1,700 institutions across the country including universities, medical schools, and hospitals. In addition, some 2,000 research projects are conducted in the NIH intramural laboratories and at the NIH Clinical Center. Research is conducted at both the basic and clinical levels, encompassing studies related to the prevention, diagnosis, treatment and cure of the many diseases that afflict the men, women and children of the world. In addition, the basic research supported by NIH provides the foundation for the nation's pharmaceutical and biotechnology industries. As one measure of the agency's excellence in research, it should be noted that NIH-supported investigators won over 107 Nobel Prizes from 1939 to 2002.

2.2 Authorization & Applicability

The approved NIH 1995 Master Plan and EIS were supplemented by Amendments to the Master Plan and EIS in June, 1999**.**

This NIH Master Plan 2003 Update and the accompanying Environmental Impact Statement (EIS) are prepared pursuant to the policies contained in NCPC's Master Plan Submission Requirements. (Approved September 6, 1984 and amended November 7, 1985 and November 3, 1994).

Other federal regulations applicable to this NIH Master Plan 2003 Update and EIS are listed in Appendix A.

2.3 Purpose and Scope of the NIH Master Plan 2003 Update

The most recent Master Plan for the Bethesda campus was approved in 1996. The plan was amended in 1999 to accommodate development changes in the Northwest Quadrant of the campus. Since then, continued growth on and off the Bethesda campus has resulted in a need for further revisions to the campus Master Plan. As stated in the 1995 Master Plan, NIH intends to update the Master Plan at approximately five year intervals. This Update, although delayed by the NIH response to national security needs, is in keeping with that intention.

Late in 1992, NIH began the process of developing a new 20-year Master Plan. Campus population projections were derived from exhaustive interviews of the NIH Institutes, Centers and Divisions and campus needs were identified. A draft NIH Master Plan and EIS for the Bethesda campus were prepared and submitted for agency and public review in fall 1993. Traffic and other environmental concerns were raised by the community and the staffs of NCPC and M-NCPPC due to the population used for campus planning. In March 1994, following fundamental policy changes at the NIH and in the federal government, the draft Master Plan and EIS were withdrawn from the public review process. The NIH began a comprehensive review of the basic assumptions of the Master Plan to incorporate Administration and NIH policies related to streamlining efforts, and to provide for an enhanced involvement of the neighboring communities.

At the request of Congress, an External Advisory Committee was formed in late 1993 to review the role, size, and cost of the NIH intramural research program in view of prospective downsizing of the government and proposals to balance the federal budget. The Committee reviewed NIH intramural research policies, procedures, as well as facilities. Four options for the renewal of the Clinical Center Complex were considered, including the Total Replacement Facility. The External Advisory Committee concluded that construction of a new inpatient hospital on a smaller scale than previously proposed in the 1993 Draft Master Plan, and renovation of the remainder of the Clinical Center was more realistic than a total replacement. The committee report was published in April 1994.

After further consultation between NIH and high level government officials, it was determined that NIH faced personnel and budget constraints in the intramural research program, at least through the turn of the century.

All the above mentioned factors prompted significant changes in the direction of the Master Plan. Growth of the campus population in the next twenty years was therefore anticipated to be limited by mandated reductions in staff through the year 2000, offset by a small growth largely from consolidation of intramural staff on campus from locations off-site. The total increase of personnel on campus over the next 20 years was anticipated to be not more than 10% over the 1993 population of 16,350. This was the population premise for the 1995 Master Plan.

In actuality, campus employment has grown faster than previously anticipated. Over the decade, Congress and two Administrations have provided increased support for NIH programs at unexpected high levels. This has resulted in a growth of personnel on the Bethesda campus - despite increased leasing of off-campus space, to 17,639 in 2000 - a level expected in the 1995 Master Plan to be reached nearer to 2020.

In order to accomplish the NIH mission, it is imperative that NIH update its long range master plan to continue to address the issues of facility requirements, prudent land use, planning and orderly future development. This need has become even more critical in light of key projects and programs, planned, underway, or soon-to-be-completed including the Clinical Research Center (CRC), the Clinical Center renovations, new laboratories in the Neuroscience Research Center (Building 35), Laboratory Building 33, a new Fire Station (Building 51), the Family Lodge (Building 65), an addition to the Children's Inn (Building 62) and expansion of the Central Utilities Plant, (Building 11).

The objective of the NIH 1995 Master Plan and this 2003 Update is to provide a format for the reasoned and orderly development of the Bethesda campus that values and builds on existing resources, corrects existing deficiencies and meets changing needs through new construction that renews obsolescent facilities through renovation, and attempts to set forth implementation priorities and a logical sequencing of planned development.

It is not intended to be a specific design and construction program, but rather a framework within which design and construction can occur for actual projects over four phases in the next twenty years as the programmatic needs upon which the plan is based arise. Nor does it attempt to anticipate unpredictable budgets, or congressional and presidential priorities and mandates. The objective has been to base the Master Plan solely on the NIH's best estimate of where the science is going on the premise that the more inclusive the plan, the more receptive it will be to a variety of future development possibilities.

The ongoing pressures on campus facilities often mandate acquiring space before the federal construction appropriations process can be completed; the NIH's leasing of local off-campus NIH workplaces, therefore, will continue. The NIH is in the process of conducting a study of its strategies for locating and funding off-campus facilities simultaneously with this Update of the Master Plan for the main campus. The relationship of the main Bethesda site to these leased facilities and the NIH Animal Center (NIHAC) in Poolesville, Maryland, required a coordinated, broad assessment of future strategies and resulted in development simultaneously of a new Master Plan in 1996 for the NIHAC. Similarly, research activities at outlying installations such as the NCI Frederick facility at Fort Detrick, Maryland; the NIEHS facility at Research Triangle Park, North Carolina; and the NIAID Rocky Mountain Laboratories at Hamilton, Montana, have necessitated a coordinated planning effort to integrate future NIH programs and best utilize the Bethesda campus and these other NIH installations.

This NIH Master Plan 2003 Update has been developed for a 20-year planning period, beginning in 2003 and personnel and space estimates have been organized into four phases covering a twenty year period. The NIH intends to continue to update its master plans as required, at approximately five-year intervals.

2.4 Historic Overview and Background

2.4.1 Early Public Health Initiatives


U.S. Public Health Service

The origins of the NIH, and the federal government's involvement in public health issues, can be traced to the mid-nineteenth century in America. Today, the NIH, located on a 310-acre campus in Bethesda, Maryland, continues to serve the nation by providing state-of-the-art research and patient care facilities.

Because little was known about medicine or scientific methods in the eighteenth century, the Constitution includes no provisions for federal government involvement in public health. Although government provisions were made for marines and U.S. Navy officers and seamen in 1798-99, the health issues of the public were largely ignored. From the time the nation was founded through the early nineteenth century, illness was considered to be primarily an individual concern. When epidemics struck communities, local leaders would often form temporary committees to deal with the crises. By the mid-nineteenth century, as immigrants poured into America, slum conditions in major cities were thought to be the cause of many diseases and conditions. Squalid conditions encountered by troops and their effects on the soldiers' health during the Civil War also contributed to what was at the time termed "sanitary science."[1]

In 1872, various interested parties formed the American Public Health Association. Members hoped to assist the federal government in establishing a national bureau that would promote knowledge of the most recent advances in sanitary science. Other organizations, such as the American Medical Association, were also promoting a similar idea, citing the need for a central agency that could coordinate public health programs and provide funding and broad dissemination of knowledge.[2]

1 Victoria A. Harden, *Inventing the NIH: Federal Biomedical Research Policy, 1887-1937*, Baltimore and London: The Johns Hopkins University Press, 1984, pp 9-10.

2 Ibid,. p. 11.

2.4.2 Establishment of the National Institutes of Health

Dr. Joseph J. Kinyoun

Following the devastating yellow fever epidemic in the Mississippi Valley in 1878, Congress established a National Board of Health, which was the first government institution to award grants for medical research. However, the Board was short-lived, lasting only until 1883, when its appropriation expired. After a lapse of several years, the Marine Hospital Service (later renamed the Public Health and Marine Hospital Service) established the Hygienic Laboratory in 1887 in Staten Island, New York, with the express purpose of studying bacteriological disorders such as cholera. While the focus of the initial research was on disorders affecting seamen, the Laboratory assumed a large responsibility in 1890 for common ailments among the immigrant population.[3]

After four years, in 1891, the Hygienic Laboratory needed additional space for research and moved to Washington, D.C., in offices across from the U.S. Capitol. However, in 1895, once again more space was needed and the Laboratory moved to the Old Naval Observatory at 25th and E Streets, NW, a five-acre parcel that provided space to keep research animals. During this time, the Laboratory work focused on infectious diseases because of their powerful threat to public health.

In 1912, the governing agency of the Hygienic Laboratory, the Public Health and Marine Hospital Service, was renamed the Public Health Service, indicating that the primary concern of the agency was the public's health and well-being. Throughout World War I, research concentrated on the needs of military troops, but the public benefit of the research was also a goal.

Realizing the importance of the work of the Hygienic Laboratory, Congress passed the Ransdell Act in 1930 which designated the Laboratory as the National Institute of Health (NIH). Authorized to construct research facilities and create a system of research fellowships, the program at the NIH expanded rapidly, and space for conducting experiments as well as additional facilities to house experimental animals was needed.

2.4.3 NIH Moves to Bethesda

The philanthropy of Luke and Helen Woodward Wilson, who made a series of land donations to the federal government between 1935 and 1948, proved the catalyst for the NIH's move to Bethesda, Maryland, and its subsequent development into one of the world's leading biomedical research institutes.

During the Depression, in the mid-1930s, the Wilsons expressed an interest in donating a portion of their estate to the federal government, if a worthy use could be found. The Wilsons were directed to the National Institute of Health, which was then searching for a farm site on which to raise animals for research purposes. Initially, the new campus at Bethesda was meant to be simply one animal unit building, leaving the main research functions in Washington, D.C.[4]

Tree Tops, the Luke I. Wilson Estate

The Wilsons considered the proposed use in light of the impact it would have both on their remaining property and on the region. The Bethesda community was almost unanimous in its opposition, long having fought encroachments that would compromise the prestige of the area. Nonetheless, the Wilsons stood by their conviction and in August 1935 donated 45 acres of land, consisting of the southern portion of their

[3] Ibid., pp. 12-13

[4] Dorthey Pugh, "The National Instituues of Health, " excerpted from *The Montgomery County Story*, 1987, p. 3

estate, to the United States of America.[5] By coincidence, a few days later the Social Security Act was signed into effect providing, among other things, $2 million per year for the "investigation of disease and problems of sanitation." Since the Wilsons' original offer, senior officials at the Public Health Service had held the idea of moving the entire operation of the National Institute of Health out to Bethesda from its limited facilities in Washington, D.C. With the newly expanded emphasis on research supported by the Social Security Act and the enthusiasm of the new Surgeon General, Dr. Thomas Parran, approval was gained for a major building program on the new Bethesda campus. Therefore, the strategy and plan for the NIH campus was expanded before a single building had been erected.

James A. Shannon Building

The Public Health Service estimated that it would cost approximately $2,500,000 to construct an administration building, laboratory buildings, field offices, quarters for officers and attendants, a sewage disposal plant, road construction and necessary landscaping. On June 22, 1936, a total of $1,363,000 was appropriated for the construction of three buildings for the National Institute of Health at Bethesda. The funds were appropriated by the Emergency Construction of Buildings Act of June 22, 1936. Initial architectural sketches and space requirements for the expanded research center were begun within a month, and ground was broken for the new campus in February 1938. The first three buildings included the Administration Building (Building 1), an Industrial Hygiene Laboratory (Building 2) and a Public Health Methods and Animal Unit Building (Building 3). The buildings were occupied by the National Institute of Health by December 1938.

The leading architect for this project was Louis Adolphe Simon, at that time acting as Supervising Architect of the United States Treasury Department, an organization with which he was associated from 1896 to 1944. He was known for his severe and very conservative Colonial Revival-style structures.

Out of concern for the unique nature of the site and following the neighbors' protests over the nonresidential nature of the new NIH site in Bethesda, the National Capital Park and Planning Commission (now NCPC) involved itself with the design of the buildings. Frederic Delano, Chairman of the National Capital Park and Planning Commission, sent a letter in December 1936 to the Supervising Architect of the Treasury requesting that the Treasury Department employ a "high-grade consulting architect" to be in charge of this highly visible and important commission.

To fill this need, the Supervising Architect hired John Winthrop Wolcott as consulting architect. He was a Consulting Architect with the United States Treasury Department from 1933 to 1937. Mr. Wolcott later joined the noted architectural firm of Skidmore, Owings & Merrill in 1944, and formed his own practice, Finney, Wolcott & Associates in Baltimore, Maryland, from 1947 to 1955.

Mr. Delano later wrote on January 4, 1937 that, "in addition to the architectural problems involved there are difficulties in designing the approaches and fitting the buildings to the topography, which in this locality is quite rough,"[6] and requested the further assistance of a notable landscape architect to assist in the design of the project. Alfred Geiffert of the Landscape Architecture firm of Vitale and Geiffert, Gilmore D. Clarke, was hired to consult on the project. Mr. Geiffert is described as "one of eminent and national consultant capacity,"[7] and apparently was used often by the Supervising Architect of the Treasury as such.

5 Land Records of Montgomery County.
6 Letter from Frederic Delano to Wayne C. Taylor, dated January 4, 1937.
7 Notes by H.M. Boudier, dated February 13, 1937.

2.4.4 Construction of Early Buildings

The Surgeon General of the Public Health Service, Thomas Parran, was heavily involved in the concept and design of the first buildings at NIH. Very early in the process, he reflected on the anticipated use of NIH and the space needed. Initially, there were no plans for a separate administration facility. Instead, each Institute would have a set amount of laboratory and office space. Included in this estimate were the Industrial Hygiene Laboratory (with most space planned for labs), which was to be Building 1; Building 2 would contain Child Hygiene, Dental Studies, Heart Disease, Malaria, Milk and Dermatoses units, which would require an equal amount of laboratory and office space; and finally, Building 3 was necessary for Epidemiology, Public Health Methods and the Statistics division, which had a unique need for consolidated "tabulating space."[8]

Building 6

Building 6 was authorized as a separate appropriation in August 1937, when legislation was passed commissioning the construction of the National Cancer Institute (NCI). Using land donated by Helen Wilson, construction on Building 6 was begun soon after the funds were approved. The NCI building was occupied by NIH staff in 1939 and, until recently, continued to accommodate some activities of the NCI.

In June 1938, just six months into the first phase of construction at NIH, legislation was passed authorizing the construction of two additional buildings and the Officers' Quarters at NIH. Buildings 4 and 5 were completed in 1941, just in time for intensive research into the diseases which plague soldiers during wartime. Building 4 initially housed the research activities of the predecessors to the National Institute of Arthritis and Metabolic Diseases, while Building 5 housed the divisions which would later become the National Institute of Allergy and Infectious Diseases.

Building 8, completed in December 1946, was erected to house the expansion of the NCI staff, and over the years has served as overflow space for every Institute at the Bethesda campus.

Each of these buildings has the same very distinct design of institutional, brick, Georgian Revival architecture. Buildings 2 and 3 are identical brick structures. Buildings 4 and 5 were also identical, and were created with nearly the same design as Building 6 to expedite contracting for Buildings 4 and 5.

2.4.5 Research and Growth at NIH

During World War II, research at the NIH focused on the war effort, much as it had during World War I. Much of the new medical research and information disseminated during this period was connected with NIH, which was given bureau status within the Public Health Service in 1943. Although NIH was still responsible for much of the research relating to infectious diseases, its scope was enlarged to include fundamental medical research into cancers, heart conditions, stroke, and mental illness.[9] To reflect the diversity of NIH research, it was renamed the National Institutes (plural) of Health in 1948.[10] The Rocky Mountain Laboratory in Hamilton, Montana and the Biologics Control Laboratory, formed in 1902, merged with NIH's Division of Infectious Diseases and the Division of Tropical Diseases in 1948 to form the National Microbiological Institute which has been succeeded by the National Institute of Allergy and Infectious Diseases (NIAID). The Rocky Mountain Laboratories remains an active NIH/NIAID facility. It is one of the NIH facilities conducting biodefense research.

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8 Letter from Thomas Parran to the Supervising Architect, dated July 14, 1936.

9 J.E. Rall, "Epilogue," in *NIH: An Account of Research in Its Laboratories*, London: Academic Press, 1984, p. 537.

10 *National Institutes of Health 1995 Master Plan*, Chapter 2, p. 6

Over the second half of the twentieth century, NIH continued to expand, with new Institutes and programs established in response to public health demands. The Clinical Center, NIH's research hospital which once had 500 inpatient beds, was dedicated in 1953, the same year the Public Health Service became part of the newly established Department of Health, Education, and Welfare. The Bethesda campus itself continued to expand as well, with land acquisitions eventually reaching 310 acres, the present size of the site.

The 1960s was a decade of unprecedented growth for NIH. In 1962, the prestigious Library of Medicine moved to the NIH campus. Furthermore, land was acquired in Baltimore and Poolesville, Maryland, and in Research Triangle Park, North Carolina, for additional research and animal holding space.[11]

Stone House, Home of George Freeland Peter

Expansion within the Bethesda campus has also continued with the construction of new medical research and support facilities and the incorporation of pre-existing buildings such as the Wilson Estate, the George Freeland Peter Estate, and the Convent of the Sisters of the Visitation. Current construction continues to provide accommodations for patients, researchers, medical professionals, and support staff.

Each new building established on the Bethesda site represents a further commitment to medical research and national involvement in the health field. NIH is now part of the Department of Health and Human Services, and the campus currently houses 27 medical Institutes and Centers, each with its own mission.

2.4.6 The Warren Grant Magnuson Clinical Center

The Warren Grant Magnuson Clinical Center

The Clinical Center was authorized by Congress on July 1, 1944, and construction funds were appropriated in 1948 for what was to become Building 10.

Dr. Jack Masur, Director of the Clinical Center from 1948 to 1951, who participated in the planning and construction of the building, explained its concepts in an article for the Journal for the American Hospital Association:

> *In the basic planning the Public Health Service and the Public Buildings Administration sought to design a laboratory-hospital building which would provide twice as much space for research laboratories as for direct care of patients; afford proximity of scientific investigators and clinicians for free interchange of ideas and knowledge; localize the basic science and clinical research laboratories and nursing units for one disease category on each floor for a coordinated team approach.*

Building 10 originally comprised 1.2 million gross square feet of space and housed all patient care and clinical research functions. It was originally distinguished by the double-"Lorraine"-cross floor plan. A curved solarium bay element protrudes from the center at the southern elevation to vertically bisect the building. It provides a distinct image toward the southern portion of the campus.

Although Dr. Masur explained, "The most desired elements were utility and flexibility to meet the ever-changing requirements of laboratory research, patient care and administrative practices," the tremendous advances in technology and biomedical research since then put pressures on the building which could not have been forecast even by the visionary planners. Major additions such as Building 10A, built in 1959 to house surgery and now the central vivarium, the Ambulatory Care Research Facility (ACRF), built in 1980 along with an underground parking structure for approximately 1,555 cars, and countless interior modifications have attempted to adapt the building

[11] Ibid.

to new demands. Currently, the Clinical Center Complex comprises a total of 2,385,000 gross square feet (not including 560,000 gsf of garage).

Following the completion of the 1995 Master Plan, the NIH began construction of an 1,050,000 gross square foot addition to the Clinical Center, the Mark O. Hatfield Clinical Research Center, which is planned to be completed in 2004. The agency is also pursuing a multi-stage renovation of vacated and/or obsolete areas in Building 10 which is planned for completion in approximately ten years. The Clinical Center Complex continues to be the focus of intramural clinical research at the NIH.

2.5 The NIH Organization

Claude D. Pepper Building

The NIH is a component of the U.S. Department of Health and Human Services (DHHS). The NIH is composed of the Office of the Director and 27 Institutes and Centers (ICs) all of which either conduct or support scientific research. The ICs are managed and coordinated by the Office of the Director, NIH. The following is a list of the Office of the Director components:

The Office of the Director (OD)
The NIH Director provides overall leadership to NIH activities in both scientific and administrative matters. Although each Institute within the NIH has a separate mission, the NIH Director, appointed by the President and confirmed by the Senate, plays an active role in shaping the agency's research agenda and outlook. With a unique and critical perspective on the mission of the entire NIH, the Director is responsible for providing leadership to the Institutes for identifying needs and opportunities, especially those involving multiple Institutes. The OD includes the following functions:

Research Funding and Coordination

The Office of Extramural Research
Provides guidance to the research Institutes on the development and management of extramural (grant, cooperative agreement, and contract) research and training programs.

The Office of Intramural Research
Coordinates, implements, and provides scientific direction and authority over NIH intramural research policy and programs.

Policy and Communications

The Office of Science Policy
Advises the NIH Director and immediate staff on science policy, strategic planning, program planning and evaluation, health economics, legislative analysis, technology transfer, and special programs, and represents the NIH in these areas to the Department and Congress.

The Office of Legislative Policy
Advises the NIH Director, Deputy Director, OD staff, and the ICs on the full range of legislative issues, and provides leadership and direction for NIH legislative analysis, development, and liaison.

The Office of Communications
Plans and directs activities to communicate information about NIH programs and accomplishments to the general public, the scientific community, the medical

profession, and public advocacy groups.

The Office of Community Liaison
Advises the NIH Director and the Deputy Director on policies, programs, and issues involving the NIH and its community.

Administration and Services

The Office of Management
Advises the NIH Director and staff on all phases of NIH-wide administration and management.

Executive Office
Serves in both a staff and operational capacity for all administrative support activities for the Office of the Director, excluding the Office of Research Services.

The Office of Equal Opportunity and Diversity Management
Advises the NIH Director and staff on matters related to equal employment opportunity programs and policies of the NIH.

Center for Cooperative Resolution
Provides overall leadership, direction, and oversight on alternative dispute resolution (ADR) policies, programs, and activities at NIH.

Office of the General Counsel
Provides legal counsel to the Director and administers the ethics program for the DHHS.

Program Coordination

The Office of Disease Prevention
Coordinates the activities of disease prevention, rare diseases, dietary supplements, and medical applications of research.

The Office of AIDS Research
Develops a comprehensive strategic plan that identifies and establishes objectives, priorities, and policy statements governing the conduct and support of all NIH AIDS research activities.

The Office of Behavioral and Social Sciences Research
Advises the NIH Director and other key officials on matters relating to research on the role of human behavior in the development of health, prevention of disease, and therapeutic intervention.

The Office of Research on Women's Health
Advises the NIH Director and staff on matters relating to research on women's health.

Institutes

National Cancer Institute (NCI)
Conducts, supports, and coordinates research on detection, diagnosis, prevention, and treatment of cancer.

National Eye Institute (NEI)
Conducts, fosters, and supports research on the causes, natural history, prevention, diagnosis, and treatment of disorders of the eye and visual system and in related fields (including rehabilitation).

National Heart, Lung, and Blood Institute (NHLBI)
Provides leadership for a national program in diseases of the heart, blood vessels, lungs, and blood, blood resources, and sleep disorders.

National Human Genome Research Institute (NHGRI)
Provides leadership for and formulates research goals and long-range plans to accomplish the mission of the Human Genome Project, including the study of the ethical, legal, and social implications of human genome research.

National Institute on Aging (NIA)
Conducts, fosters, and supports biomedical and behavioral sciences research and training pertaining to the aging process and related health fields.

National Institute on Alcohol Abuse and Alcoholism (NIAAA)
Conducts and supports biomedical and behavioral research, health services research, research training, and health information dissemination with respect to the prevention of alcohol abuse and alcoholism and the treatment of alcoholism.

National Institute of Allergy and Infectious Diseases (NIAID)
Conducts, fosters, and supports research and research training programs directed at finding the cause of and improved methods for diagnosing, treating, and preventing immunologic and infectious diseases.

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
Provides leadership for a national program in the major disease categories of arthritis and musculoskeletal and skin diseases.

National Institute of Biomedical Imaging and Bioengineering (NIBIB)
Conducts, coordinates, and supports research, training, dissemination of health information, and other programs with respect to biomedical imaging, biomedical engineering, and associated technologies and modalities with biomedical applications.

National Institute of Child Health and Human Development (NICHD)
Conducts, fosters, and supports biomedical and behavioral research through research grants, research contracts, and research performed in its own laboratories on: child health, maternal health, problems of human development with special reference to mental retardation; and family structure, the dynamics of human population, and the reproductive process.

National Institute on Deafness and Other Communication Disorders (NIDCD)
Conducts, fosters, and supports research and research training on the causes, prevention, diagnosis, and treatment of deafness and other communication disorders.

National Institute of Dental and Craniofacial Research (NIDCR)
Conducts and coordinates research to improve and promote craniofacial, oral, and dental health.

National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)
Provides leadership for a national program in the three major disease categories of diabetes, endocrinology, and metabolic diseases; digestive diseases and nutrition; and kidney, urologic, and hematologic diseases.

National Institute on Drug Abuse (NIDA)

Provides national leadership and conducts and supports biomedical and behavioral research, health services research, research training, and health information dissemination with respect to the prevention of drug abuse and treatment of drug abusers.

National Institute of Environmental Health Sciences (NIEHS)

Conducts, fosters, and coordinates (in its own laboratories and through contracts, grants, and support of Environmental Health Sciences Centers) research and research training on the biological effects of chemical, physical, and biological substances in the environment.

National Institute of General Medical Sciences (NIGMS)

Administers, fosters, and supports research in the basic and general medical sciences and in related natural or behavioral sciences which have significance for two or more Institutes, or are outside the general area of responsibility of any other Institute.

National Institute of Mental Health (NIMH)

Provides leadership for a national program to increase knowledge and advance effective strategies to deal with problems and issues in the promotion of mental health and the prevention and treatment of mental illness.

National Institute of Neurological Disorders and Stroke (NINDS)

Conducts, fosters, and supports research and research training on the causes, prevention, diagnosis, and treatment of neurological and muscle disorders.

National Institute of Nursing Research (NINR)

Provides leadership for nursing research and supports and conducts research, research training, and dissemination of results to build a scientific base for nursing practice and patient care and promote health and ameliorate effects of illness on the American people.

National Library of Medicine (NLM)

Assists the advancement of medical and related sciences through the collection, dissemination, and exchange of information important to the progress of medicine and health.

Centers

Center for Information Technology (CIT)

Provides leadership for the determination of NIH computational and telecommunications needs at all levels and oversees the development of appropriate infrastructure support to meet identified needs.

Center for Scientific Review (CSR)

Provides staff support to the Office of the Director, NIH, in the formulation of grant and award policies and procedures.

John E. Fogarty International Center (FIC)

Provides leadership in the development and conduct of research programs to improve the health of the people of the United States and of other nations through international cooperation, research, and research training in the biomedical sciences.

National Center for Complementary and Alternative Medicine (NCCAM)
Studies the integration of alternative treatment, diagnostic and prevention systems, modalities, and disciplines with the practice of conventional medicine and as a complement to such medicine and the integration of such alternatives into health care delivery systems in the United States.

National Center for Minority Health and Health Disparities (NCMHD)
Advises the NIH Director and Institute and Center Directors on the development of NIH-wide policy issues related to minority health disparities research, research on other health disparities, and related research training and serves as principal liaison with other agencies of the DHHS, and federal government.

National Center for Research Resources (NCRR)
Administers, fosters, and supports research for the development and support of multi-categorical research resources needed on an institutional, regional, national, or international basis for health-related research.

Warren Grant Magnuson Clinical Center (CC)
Provides patient facilities and services for clinical investigations in the Clinical Center. (See also 2.4.6 above.)

2.6 The Master Plan Goals and Objectives

This NIH Master Plan 2003 Update maintains the 1995 Master Plan goals to provide a realistic and orderly phased development of the Bethesda campus in furtherance of the mission of the NIH - *Science in pursuit of knowledge to improve human health*. This means pursuing science to expand fundamental knowledge about the nature and behavior of living systems; to apply that knowledge to extend the health of human lives; and to reduce the burdens resulting from disease and disability. The NIH seeks to accomplish its mission by:

- fostering fundamental discoveries, innovative research, and their applications in order to advance the nation's capacity to protect and improve health;
- developing, maintaining, and renewing the human and physical resources that are vital to ensure the nation's capability to prevent disease, improve health, and enhance quality of life;
- expanding the knowledge base in biomedical and associated sciences in order to enhance America's economic well-being and ensure a continued high return on the public investment in research; and
- exemplifying and promoting the highest level of scientific integrity, public accountability, and social responsibility in the conduct of science.

The Master Plan supports these mission implementation strategies with the following planning goals and objectives:

GOAL 1
Foster innovative research strategies designed to advance the nation's capacity to improve health.

- Establish a comprehensive and coordinated approach to physical development of NIH that is based on cost-effective, incremental options for growth while ensuring orderly development of the campus.
- Stimulate interaction and communications among scientists and staff to enhance quality of research and opportunities for interdisciplinary collaboration through adjacency of uses and creation of formal and informal meeting and gathering spaces on campus.

- Create a flexible development plan that will allow for changing program needs in the future.
- Consider potential impacts of changes in technology and advances in research processes.

GOAL 2

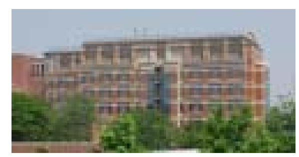
Provide a physical framework for the changing nature, character and urgency of medical research and education.

View Towards Convent

- Establish a comprehensive and coordinated approach to physical development at NIH that will ensure the orderly growth of NIH facilities.
- Develop building sites, open space, and transportation and circulation systems that will ensure appropriate campus facility utilization, functional land use and efficient accommodation of future program requirements.
- Identify short, mid, and long-term opportunities for phasing and implementation of the proposed policies and plans.
- Enhance campus function, efficiency and character through better definition of land use and functional relationships.
- Establish a coordinated land use strategy for the campus integrating plans for functions at off-campus sites.
- Define overall development capacity.
- Identify patterns of existing development and factors which potentially limit future development.
- Define an achievable development strategy.

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.



Louis Stokes Research

- Provide appropriate campus amenities such as child care, recreational resources, fitness facilities, convenience retail, etc.
- Facilitate the security, safety and well-being of those who work, visit, or reside at NIH by constructing site perimeter barriers, effectively screening for contraband and mitigating vulnerabilities through campus and building design.
- Enhance the quality of the research and work environment and overall campus quality.
  - o Preserve the integrity and build upon the character of the NIH campus.
  - o Provide guidelines for improving the quality of landscaping, open space, and architectural compatibility at NIH.
  - o Provide accessibility to campus facilities for persons with disabilities.
  - o Improve and enhance the pedestrian environment and linkages, and create a pedestrian scale within the larger site.
  - o Preserve and enhance structures with established historic and cultural value, and protect and document important archeological finds.
  - o Develop a recognizable system of landscape that enhances the quality and character of the campus.
  - o Increase the ease of orientation and direction-finding around the campus.
  - o Improve pedestrian and bicycle movement on campus.
  - o Define and communicate building character and scale to achieve a perceivable and attractive identity
  - .o Provide for the convenience and safety of employees and the neighborhood through site lighting and security.

GOAL 4

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

- Conserve, enhance, and increase the campus perimeter buffer zones, especially bordering the residential areas.
- Coordinate with and respond to various regulatory and review agencies.
- Engage the NIH, local agencies, and the community in an active dialogue concerning Master Plan premises and concepts by the establishment within the Community Liaison Council of Task Groups to work with NIH staff and consultants during development of the Master Plan Update.
- Establish the scale and height of future NIH facilities so that they have no adverse impact on adjoining neighborhoods or cultural resources.
- Minimize future construction near the adjoining residential neighborhoods.
- Protect adjoining neighborhoods from intrusion of NIH traffic, parking, noise, and intrusive lighting.
- Endeavor to ensure that the NIH and its activities do not contribute to security or safety issues in adjoining neighborhoods.
- Foster effective transportation solutions to minimize traffic and parking problems both external and internal.

GOAL 5

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


The NIH Stream

- Identify and build upon the unique environmental qualities of the campus and enhance existing landscaping and vegetation.
- Maximize the use of public transportation and shared transportation, and reduce the use of the single occupancy vehicle.
- Enhance campus design to encourage greater NIH employee use of bicycles and walking as commuting modes.
- Improve and enhance bikeways and bicycle circulation on the campus.
- Promote energy efficiency.
- Improve management of storm water runoff quality and quantity above minimal State requirements, where possible.
- Reduce noise in adjacent residential areas caused by campus sources.
- Improve facilities for storage and handling of hazardous materials.
- Encourage environmentally sound development sensitive to surrounding neighborhoods and responsive to optimizing the campus' close proximity to the Bethesda Central Business District.

GOAL 6

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

- Encourage active dialogue among NIH management, the scientific community and the NIH staff, to foster a better understanding of the ramifications of proposed policies and plans.
- Encourage continuing active dialogue among NIH and the surrounding community as well as local, state, and federal agencies to work together on issues that affect the community and region.

2.7 Planning Methodology/Format

This NIH Master Plan 2003 Update consists of six chapters. Chapter 1 is the Executive Summary. Chapters 2, 3 and 4 are oriented toward establishing background and broad guidelines, while Chapters 5 and 6 deal with specific development recommendations.

Chapter 1 - Executive Summary

Chapter 2 - Introduction and Program Requirements

This Chapter provides background and organizational information, defines the approach to the Master Plan Update, establishes the planning premises and identifies programmatic requirements in terms of personnel and physical facilities. It discusses the relationships between the NIH Bethesda Campus Master Plan and other long range NIH planning activities. It also places the Master Plan Update in the context of the federal government-wide focus on enhancing physical security at its facilities.

Chapter 3 - The Community Context of the Bethesda Campus

This Chapter provides an overview of the regional setting, places the Bethesda campus in the context of existing and future land use patterns and discusses critical relationships among the Bethesda campus and off-campus sites. It discusses the context of Bethesda-Chevy Chase, the Bethesda Central Business District, the Washington-Baltimore Metropolitan Area and the Master Plan 2003 Update's relationship to local and regional plans. The context is updated to reflect the latest NIH statistics and, where available, data from the 2000 Census and other official sources. Important aspects of the regional transportation systems, utility services, population and economy, cultural assets, and other research facilities are identified.

Library of Medicine

Chapter 4 - Existing Conditions on the Bethesda Campus

The existing resource analysis determines the major development features on the NIH campus. Natural and man-made elements which affect potential uses, such as physical features of the site, climate, environmental features, existing land use, utilities, historic/archaeological features, amenities and visual quality, and constraints and opportunities are identified. Changes to the existing conditions since 1995 are documented.

Chapter 5 - The NIH Master Plan 2003 Update for the Bethesda Campus

This Chapter outlines the specific objectives, concepts and standards for future development, land use, buildings, utilities, open space, circulation and traffic management for the next twenty years.

While primary emphasis in the plan update is placed on clarifying long-range development patterns, short- and mid-range opportunities are also identified. Sufficient refinement is provided to determine the character and significance of these projects.

Chapter 6 - Development Guidelines

This part presents specific site element recommendations that will improve overall campus continuity and character, including guidelines for density, bulk, circulation, walks, furniture, lights, signage and landscaping generally as originally provided in the 1995 Master Plan. It also reaffirms policies and procedures for implementing and controlling development in accordance with the goals and objectives of the Master Plan.

2.8 Summary of Program Findings

2.8.1 Introduction

As part of this update, functional and personnel needs over the next 20 years that were projected by Institutes, Centers (and former Divisions) for the 1995 Master Plan, in responses to the questionnaire and interviews of key personnel, were revisited through new interviews and questionnaires. A copy of the questionnaire used is included in Appendix B. New personnel projections were also made by the current Institutes and Centers. Space needs for buildings not yet in the programming or planning stages were estimated based on the personnel projections. The projections are based on the

William H. Natcher Building

scientific programs and missions of the Institutes and Centers and were not limited by expectations of funding or future priorities.

The expected down-sizing of federal government agencies in the early 1990s did not materialize at the NIH. To the contrary, congressional and administration support of NIH programs over almost a decade has actually resulted in a growth of personnel that approximates projections by the ICs for the 1995 Master Plan. Therefore, the year 2000 campus population of 17,681 and 2003 population of 17,511, validated the original projections but defied the effects of restraints on government growth assumed in the 1995 Master Plan. These restraints led to the assumption that the Bethesda campus would not grow beyond a population of 18,000, even by 2020.

While the Master Plan 2003 Update provides a framework to accommodate the estimates for growth and change in campus population and facilities over the next 20 years, actual development on campus will, as always, depend on future congressional and presidential policy decisions, as well as federal budgetary constraints. Also, vast changes in national health policy are expected to continue over the next decade as they did over the previous one, and NIH's mission could be significantly affected as a result. The Master Plan Update continues to provide guidance on how change and development would take place on the Bethesda campus, when and if it occurs over the next 20 years and beyond.

Using the structure of the 1995 Master Plan findings and those coming from the latest questionnaire and interview responses, the following summarizes the findings:

2.8.2 Mission

Institutes generally can be categorized by the orientation of their funding of biomedical research:

- by disease; for example, the National Cancer Institute (NCI); the National Institute of Allergy and Infectious Diseases (NIAID); or the National Institute of Neurological Disorders and Stroke (NINDS). In recent years, NIH has developed "Centers" for research on a disease or disorder where multiple ICs participate, such as the Neuroscience Research Center and the Vaccine Research Center. Future centers are also planned.
- by body organ or system; for example, the National Heart, Lung and Blood Institute (NHLBI); the National Eye Institute (NEI); or the National Institute of Dental and Craniofacial Research (NIDCR).
- by population group; for example, the National Institute on Aging (NIA); the National Institute of Child Health and Human Development (NICHD); or the National Institute on Drug Abuse (NIDA).
- by research discipline; for example, the National Institute of General Medical Sciences (NIGMS); the National Human Genome Research Institute (NHGRI); or the National Institute of Nursing Research (NINR).

The , NHGRI, mentioned above, is an Institute created not long ago from a former Center. Three Institutes returned in late-1992 to the NIH from their affiliation with the former Alcohol, Drug Abuse and Mental Health Administration (ADAMHA); these are the National Institute on Alcohol Abuse and Alcoholism (NIAAA), the National Institute of Mental Health (NIMH), and the National Institute on Drug Abuse (NIDA).

Centers provide services to the Institutes. For example, the Warren Grant Magnuson Clinical Center (CC) and the Mark O. Hatfield Clinical Research Center (CRC) will provide the environment for clinical researchers in the intramural research programs of most Institutes. The National Center for Research Resources (NCRR) has the multidisciplinary resources to biomedical investigators across the spectrum of research activities supported by the NIH.

The Office of the Director of the NIH (OD) provides general management and policy direction for the NIH as well as specific services such as procurement, planing, design, construction, maintenance and operations.

Most ICs anticipate that changes to their missions will be minor in the foreseeable future, except as new avenues of research may be revealed or as public or congressional pressure may dictate. Advances in technology and major emerging public health concerns may also influence future mission definition such as has already been the case for the Human Genome, Neuroscience, AIDS vaccine, and women's health programs.

2.8.3 Organization and Programs

The most significant organizational feature of most Institutes - for purposes of master planning - is their division into intramural and extramural research functions. Intramural research is performed by NIH scientists in NIH facilities, whereas extramural research is done under NIH grants, cooperative agreements, and contracts by other researchers in other institutions nationwide. Centers may be similarly divided or may have organized their services to the Institutes to correspond to the extramural/intramural functions.

All ICs have an Office of the Director which requires convenient access to the corresponding offices of the other ICs and to the Office of the Director of the NIH. All of these have offices on campus, generally in Building 31, including the Director of NIEHS and the Director of NIA. Most of NIEHS' staff is at Research Triangle Park in North Carolina, while most of the NIA staff is in Baltimore, Maryland.

Most Institutes have strong relationships between their Director's office and their intramural program and typically feel the need for both to be centered at the Bethesda campus while extramural programs can continue to be located off campus.

Extramural programs account for the preponderance of institute research budgets - about 80% of a $27.2 billion NIH budget in FY '03.

Nevertheless, it is almost unanimously felt that the intramural basic and clinical research programs are what distinguish the NIH as an institution from all others in biomedical research. NIH intramural research enjoys unique interdisciplinary character, flexibility of the course of the research and the freedom to pursue research without imposition of pre-determined duration or, in some instances, scope. With the Clinical Center, patients are physically close to researchers, and the rapidity with which clinical trials of research findings can be applied is unique in biomedical research. The grant funding of extramural research, on the other hand, requires advance definition of objective, duration and cost, and grantee institutions often cannot access patients for clinical trials with the alacrity found at the NIH Bethesda campus.

Neuroscience Research Center Phase I

The relationships between each IC's intramural and extramural programs vary. Most ICs however, require that extramural scientific personnel keep in touch with their intramural colleagues and scientists of other ICs as a matter of staying current with scientific progress. Intramural scientists may, at times, also be a resource to extramural grant personnel in evaluating the scientific merits of research proposals and in coordinating research in allied areas.

2.8.4 Locations and Proximities

On the matter of what functions should be located on the Bethesda campus, nearly all ICs, given the choice, expressed a preference that most of their intramural research programs remain on the Bethesda campus or be relocated to the campus from currently leased locations. Extramural research grant administration personnel, most of whom are now in locally-leased space, are generally comfortable with their off-campus situation, but a few complained of intellectual isolation, lack of opportunities that foster innovative scientific interrelationships and collaboration, and the frustrations of going to the campus for meetings, seminars, or other business because of the time taken to travel between NIH facilities, the limited parking at the Bethesda campus, and the need for dependency on shuttle services. Some sites such as Research Court near Shady Grove and the NIHAC in Poolesville are not served by shuttle service because the NIH presence in those locations is too small and the demand insufficient to make shuttles economical or workable.

Of utmost importance to nearly all ICs was the perpetuation of the “heart” of NIH - the Clinical Center Complex - with the associated intramural clinical and basic research conducted by nearly all Institutes. See 2.8.7 below for further discussion.

A number of programs are already established elsewhere for reasons related to those locations such as the National Institute on Aging (NIA) at the Baltimore Gerontology Research Center (GRC) and the National Institute on Drug Abuse (NIDA) at the Baltimore Addiction Research Center (ARC). Both of these will be consolidated into a new NIH Bayview Research Center in Baltimore -a long term commitment to the location. Portions of the NCI and to a lesser degree, NIAID are located at NCI Frederick; behavioral and neuroscience research by NICHD, the NEI, and the NIMH are permanently located in Poolesville, Maryland; NIAID has a long standing presence in Hamilton, Montana where a new BSL4 laboratory dedicated to biodefense research is planned. The NIEHS is entirely located in Research Triangle Park, North Carolina.

2.8.5 Training

Training biomedical research personnel is a major part of the NIH mission, and training programs exist in most ICs within both intramural and extramural programs. On the Bethesda campus extensive seminars, lectures, and conference programs conducted within all ICs generate a need for conference space. There was consistent need expressed by ICs for conference space of 50-100 persons for training and continuing education programs, lectures and seminars, as well as large conference facilities. Some of this need has been addressed with the construction of the William H. Natcher Building, and by new buildings such as Building 40 (the Dale and Betty Bumpers Vaccine Research Center) and Building 50, the Louis Stokes Research Building, which have small conference centers on their ground floors available to NIH as a whole. The increased proportion of NIH employees off campus requires more of these facilities near their users.

2.8.6 Animals in Research

Animal use in research by the intramural programs is extensive at the NIH which has one of the largest veterinary resource programs for research anywhere. For intramural research, animals are scattered among buildings on the Bethesda and Poolesville campuses, in some locally-leased space, and in Frederick, Baltimore and other satellite installations. To one degree or another, most Institutes procure, house, breed and manage some inventory of their own animals, while other animals are under the management of the Division of Veterinary Resources (DVR). Although all NIH animal facilities are accredited by the American Association for Accreditation of Laboratory Animal Care (AAALAC), replacement of the campus' sprawling and aging Building 14-28 Complex with a more modern and compact structure housing common functions such as procedure, holding and isolation facilities in an Animal Research Center (ARC) is planned for occupancy in the second development phase of the campus. Fewer large animals are being used in biomedical research in most programs, and scientists strongly prefer having the smaller research animals near the laboratory whenever possible. Newer laboratories at NIH, such as Buildings 40, 49, and 50, reflect this in their design.

Silvio O. Conte Building Building 49

Because of severe infrastructure and environmental constraints on further construction at the NIHAC in Poolesville and the requirement to keep a number of animals as near the laboratories as possible, it does not appear feasible or desirable to transfer laboratory activities from Bethesda to Poolesville only to be near the animals that are there. However, enhancements to the research already there are desired. Specialized animal holding facilities, and improved laboratories for a modest increase in the number of biochemists, immunologists and neurobiologists could be supported in furtherance of the neuroscience focus at the NIHAC. Quarantine facilities for newly acquired animals should remain in Poolesville and other NIH installations.

2.8.7 The Clinical Center Complex

Mark O. Hatfield Clinical Research Center

The Clinical Center Complex (CCC) continues to play a major role in the missions of nearly all Institutes. Except for the NIEHS which plans to conduct research in the CCC in the near future, and the NIDA, all Institutes have research programs in the Clinical Center Complex. The intramural research scientists consider the proximity of their laboratories to the patients to be at the core of their success in bringing research findings into more rapid applications, and they anticipate continued or increased presence in the Clinical Center. All Centers likewise serve the Clinical Center except the National Library of Medicine (NLM), the National Center for Research Resources (NCRR), the Center for Scientific Review (CSR) and the John E. Fogarty International Center (FIC).

The newer ICs, the National Center for Complementary and Alternative Medicine (NCCAM) and the National Center for Minority Health and Health Disparities (NCMHD), the National Institute of Biomedical Imaging and Bioengineering (NIBIB), do not have programs in the Clinical Center Complex at this writing.

The completion of the Mark O. Hatfield Clinical Research Center will occur in 2004 when the facility becomes home to new inpatient units, day hospitals and research labs. Together, the existing Warren Grant Magnuson and Hatfield Centers will serve a dual role –providing the environment that today's clinical researchers need for advancing clinical science as well as a setting for humane and healing patient-care .

The Clinical Research Center, named in honor of Senator Mark O. Hatfield of Oregon, who supported medical research throughout his career in Congress, will promote translational research –process of transforming laboratory research into applications for the benefit of patient health and care. This "bench-to-bedside" proximity in the new Clinical Research Center provides a crucial link in rapidly moving biomedical findings in the laboratory into the mainstream of medical practice.

The new center will connect to the existing Warren Grant Magnuson Clinical Center, which opened its doors to patients in 1953. The 1,050,000 gross square foot complex plans to open with 240 beds and 90 day-hospital stations. This arrangement can be easily adapted to allow more inpatient beds and fewer day-hospital stations or vice versa, as the new facility's design is highly flexible. The facility is designed to facilitate interaction and collaboration among the clinicians and researchers. Their work will clearly benefit from this new structure. The ultimate beneficiaries, however, are undoubtedly the patients and families who receive the care and cutting-edge technology that is the expected signature of the NIH.

2.8.8 Growth

The support of current and past Administrations as well as Congress over the past decade has overcome a slower campus growth rate than anticipated in the early 1990s. As a result, the NIH has received funding and support that has contributed to increasing local NIH employment to over 26,000 and the campus to 17,511. The primary growth at the campus is expected to be in intramural research personnel.

The growth in personnel on campus has not been matched by the addition of new space, so the NIH has continued to seek space on the commercial market where the NIH currently leases approximately 3.2 million square feet of space at thirty locations in the Montgomery County, Maryland area. The leases cover 13 of the 18 Institutes, 4 of the 6 Centers, and the Office of the Director.

Following is a summary of Population Trends in Local NIH Facilities:

Year	Bethesda/Rockville Area Population	Campus Population		Population in Locally Leased	
1993	21,583	16,350	76%	5,233	24%
1995	21,309	16,326	77%	4,983	23%
2000	24,155	17,617	73%	6,538	27%
2003	26,141	17,511	67%	8,630	33%

Although IC personnel projections for the campus, based on the interviews, exceed 22,000 in the aggregate, the Master Plan Update is based on a campus population ceiling of 22, 000 based on several factors:

While NIH can maintain its peak hour trip generation at or below 1992 levels to meet the Memorandum of Understanding with planning agencies conditions at higher campus population levels, the traffic volumes generated by a campus population greater than 22,000 may produce unacceptable levels of congestion at the intersections around the campus periphery.

The ICs indicated in the interview process that concentration of intramural research on the Bethesda campus, was preferable to administrative functions. Research requires more space per employee, and generates more utility demand per unit of building space than most other occupancies. If research facilities are maximized on the campus, there is insufficient room for expanding the central heating and cooling plants in Building 11 beyond a level of 22,000 employees when research functions are emphasized. While individual buildings with independent heating and cooling systems could be built, such systems would not have the same operating reliability and efficency, nor cost effectiveness.

The NIH has, therefore, determined that the practicable capacity of the Bethesda campus is 22,000 persons at this time, and the balance of any growth beyond this level will have to move off campus to locally-leased or other types of facilities. If the NIH needs to change the employee population basis of its planning for the Bethesda campus, it will initiate a new master plan and NEPA process.

Figure 2.8.8 Bethesda Campus Growth

Phase	Building Numbers	Description of Event	Change in Occupiable Area (Gross Sq Feet)	Total Occupiable Area (Gross Sq Feet)	Total Personnel Capacity
		1995 Master Plan		7,036,700	
		Changes and corrections up to Year 2000:	**-146,668**	**6,890,032**	**17,617**
Existing (completed prior to Dec. 31, 2003)	10	NMRs	11,135	6,901,167	
	50	Louis Stokes Research Building	290,000	7,191,167	
	40	Vaccine Research Center - Phase I	84,600	7,275,767	
	64	East Child Care Center	21,000	7,296,767	
	11	Power Plant Phases I and II	82,400	7,379,167	
	35	Demolish Building 35	-50,463	7,328,704	
	63	Substation	10,030	7,338,734	
	51	Fire Station	22,000	7,360,734	
	11	Building 11 Cogeneration	0	7,360,734	
		Remove Surface Parking Lots 31 C, D, E, G and J	0	7,360,734	
	3	Begin renovation of Building 3	0	7,360,734	
		Current Existing		**7,360,734**	**17,511**
First Phase	65	Family Lodge	26,500	7,387,234	
	62	Childrens Inn Expansion	34,000	7,421,234	
	35	Neuroscience Research Center (NRC) - Phase I	265,000	7,686,234	
		Perimeter Fence + Gates	0	7,686,234	
	10	Clinical Research Center	1,050,000	8,736,234	
	MLP-10	MLP-10	0	8,736,234	
	MLP-9	MLP-9	0	8,800,758	
		Remove Surface Parking Lots 31F and 31H	0	8,736,234	
	66A	CVI - Commercial Vehicle Inspection Facility	6,719	8,742,953	
	10	Building 10 Core Renovation - Patient Care Units, Floors 2-13, out-of-service	-297,756	8,445,197	
	36	Demolish Research Building 36	-236,285	8,208,912	
	66	Gateway Center (Visitor Center/Visitor Vehicle Inspection Station)	20,528	8,229,440	
	MLP-11	Gateway Center MLP-V	0	8,229,440	
	33	Research Building 33	150,000	8,379,440	
	6C	Addition to Building 6	16,500	8,395,940	
	10	Building 10 Renovations - no additional space.	0	8,395,940	
	35	Neuroscience Research Center (NRC) - Phase II	335,000	8,730,940	
	10	Building 10 Central Core Project, Transition Program and Penthouse	49,227	8,780,167	
	3	Complete renovation of Building 3	0	8,780,167	
	29/29A	Reassign Research Buildings 29A and 29B	0	8,780,167	
	10	Renovate Building 10 E&F Wings	-147,000	8,633,167	
	NW CC	Northwest Child Care Center	21,000	8,654,167	
	T-39	Demolish T-39 Fitness Center	-5,160	8,649,007	
	25-Rep	Construct Replacement for Building 25 near Building 21	12,000	8,661,007	
	(22,22A,25)	Demolish 22, 22A, 25	-20,255	8,640,752	
	T-23/T2	Demolish Building T-23	-5,871	8,634,881	
		End of First Phase		**8,634,881**	**18,510**
Second Phase	ARC/42	Animal Research Center	335,000	8,969,881	
	(14/28)	Demolish Buildings 14/28,18,32	-288,071	8,681,810	
		Southern Loop Road	0	8,681,810	
	M	Research Building M, South Quad	178,500	8,860,310	
	11	Building 11 Phase III Expansion (Boiler 7; Chillers 26-29)	35,000	8,895,310	
	40	Vaccine Research Center - Phase II	50,000	8,945,310	
	N	Research Building N, South Quad	137,700	9,083,010	
		MLP C, South Quad	0	9,083,010	
	10	Building 10, Reoccupy E & F Wings	444,756	9,527,766	
		Remove Portions of South Surface Parking Lot 41B/T1 and 41C	0	9,527,766	
		MLP E - Phase I	0	9,527,766	
	10A	Demolish Building 10A	-56,000	9,471,766	
		Demolish MLP-7	0	9,471,766	
	R	Addition to the National Library of Medicine	389,370	9,861,136	
	(12,12A,12B)	Demolish 12, 12A, 12B	-156,236	9,704,900	
		MLP E - Phase 2	0	9,704,900	
	P	Research Building P, South Quad	183,600	9,888,500	
		Remove Remaining Portions of South Surface Parking Lots 41B and 41C	0	9,888,500	
	(34-34A)	Reassign Building 34/34A (Campus Center)	0	9,888,500	
		End of Second Phase		**9,888,500**	**19,951**
Third Phase	29	Demolish Building 29	-89,949	9,798,551	
		MLP D, Central Mall Parking	0	9,798,551	
	7, 9	Demolish Research Buildings 7 and 9	-81,360	9,717,191	
		Central Mall	0	9,717,191	
	J/K	Building J/K - Research Services	212,175	9,929,366	
	-13	Demolish Building 13	-212,690	9,716,676	
	(T14)	Demolish T14	-4,000	9,712,676	
	(T46)	Demolish T46 - Child Care Center	-3,000	9,709,676	
	-30	Demolish Research Building 30	-93,940	9,615,736	
	I	Research Building I	249,900	9,865,636	
	G	Research Building G	112,200	9,977,836	
	F	Research Building F	149,600	10,127,436	
		End of Third Phase		**10,127,436**	**20,409**
Final Phase		Remove Surface Parking Lot 45 (Natcher)	0	10,127,436	
	Q	Office Building Q (Natcher Addition)	190,000	10,317,436	
	D	Research Building D	168,700	10,486,136	
	H	Research Building H (includes decompression of existing Research Buildings)	229,500	10,715,636	
		End of Final Phase		**10,715,636**	**21,878**

The ICs themselves identified many stimulants to growth over the history of the NIH such as new public health concerns, new technologies and new avenues of research such as the human genome. All ICs agreed that limitations of funding, staffing and space restrict growth.

Though future areas of research are difficult to predict, research is either investigator-initiated or congressionally-mandated in response to public concerns. A certain level of prioritization, therefore, comes from the public, the Congress, and the White House. Since all Institutes receive their own appropriations, congressional priorities are, of course, reflected in the budgets provided to the ICs. There is an element of unpredictability as to what may occur, but usually according to the ICs, the public's and Congress' concerns and priorities are coincident with their own.

Table 2.8.8 Shows the phased construction that could accommodate a campus population of up to 22,000 over a period of twenty years.

2.8.9 Long Range Plans

Nearly all of the ICs have formal long range strategic plans in place or under development, and these can be viewed on the individual IC web sites through http://www.nih.gov/about/NIHoverview.html.

2.8.10 Technology

Biomedical research is technology intensive, and, in addition to complex scientific and medical technologies, all components of the NIH use computers extensively. The Center for Information Technology (CIT) not only provides one of the computer mainframes central to the NIH, it also assists many ICs in computer use, training, adaptation of off-the-shelf software and development of new applications. It also provides computer services to 30 other federal agencies. The degree to which information technology has become a central part of research at the NIH is seen by the wide range of services provided by CIT to the research community:

- Applications Support
- Application Hosting
- Computing Services
- Desktop User Services
- Networking and Telecommunications
- Research and Scientific Support
- Web Resources

NIH Fire House

Videoconferencing technology has evolved to a standards-based architecture whose potential is being exploited throughout NIH to improve processes, save time and money, attract higher level review participation, and increase the exchange of information. Videoconferencing has removed some of the inconvenience of the scatterings of NIH employees throughout the region. Current applications include grants reviews, Executive Officer meetings, staff meetings, town meetings and special events originating from NIH auditoriums. In-progress and planned applications include telemedicine videoconferencing between the Clinical Center and research institutions for NIH medical trials and Center for Scientific Review grant reviews that currently require 450 two-day meetings of 15 participants each, plus travel time.

The Natcher Building Conference Center, with its state-of-the-art technology in two rooms equipped for this purpose, will further facilitate and expand the use of videoconferencing.

Robotics applications are already apparent in molecular biology labs in gene sequencing. The expansion of robotics as a research aid was not predicted by the ICs to be significant, but the use of robotic bio- pharmaceutical manufacturing of new drug therapies for trials and robotic surgical procedures, is already in limited use, and could continue to increase and become a subject for research at the NIH.

2.8.11 Functional and Operational Relationships

Relationships Within Each IC

The most important organizational considerations within most ICs are the intramural/extramural relationships and the relation of their Offices of the Director (ODs) to these programs. Most ICs place a premium on locating their Directors in proximity to the intramural program, but at the same time close to the Office of the Director of the NIH and to other IC ODs.

Relationships Between ICs

There are many complex interrelationships between and among the ICs. For the most part, scientists with Institutes and some Centers conduct and/or support investigator-initiated research and any congressionally mandated research on both clinical and basic issues, while certain Centers such as the Clinical Center and CIT and one Institute, the National Institute of Biomedical Imaging and Bioengineering (NIBIB), provide research support in many forms to the Institutes and other Centers. The Centers do, however, conduct their own research, and many collaborate with Institute scientists. In addition, all ICs provide consultative services in areas of expertise within the Clinical Center where most Institutes have laboratories and most Centers provide services or have a presence. Many of the collaborations and parallel investigations are most effective on the Bethesda campus where researchers have access to the Clinical Center and to each other.

Cross-Institute or multi-Institute research has recently resulted in a new facility, Building 35, the Neuroscience Research Center, now under construction, which will consolidate this research in a single facility.

2.8.12 Campus Quality

Mary Lasker Woodard Center Garden Wall

The interviews for the Master Plan 2003 Update asked personnel of each IC to address quality of life issues on the Bethesda campus, such as the character of the site; the size, character and location of buildings; the availability of places offering opportunities for socialization and collegiality; and facilities for recreation, child care, elder care and dining.

Findings show that these issues directly affect the NIH on two levels: individually, through morale and productivity, and collectively, by the ability of each IC to achieve its mission by being able to compete with academia and industry for the best research talent. Most persons interviewed appreciate the landscaping and other natural features of the site and regret the loss of much of this to surface parking. The construction of several new multi-level parking structures is realizing the goal of restoring the campus buffer zones to landscape. Concerns about inadequate site lighting and poor site way-finding that did not serve patients, contractors and other visitors to the campus well, will be addressed by the NIH in a campus streetscape master plan.

Another important issue raised by all ICs concerned amenities both on and off campus. There is a lack of adequate, convenient, attractive and reasonably priced dining facilities on campus and at many leased facilities, though newer buildings, such as Building 40, the Vaccine Research Center, have included small “cyber cafes” to supplement the larger, traditional cafeterias on campus. More such places would provide increased opportunity for scientists to meet informally and benefit from better awareness of each other’s pursuits. An environment that encourages this kind of collegiality is necessary for exchanges of ideas.

Additional physical fitness centers, dispersed throughout the campus, would help accommodate some of the personal health and recreational needs expressed by many IC staff. Although many commercial fitness centers are available in retail areas such as the Bethesda CBD, Rockville Pike area, and elsewhere, NIH - the nation’s icon of health, should have available, convenient, comprehensive fitness facilities such as are now provided in most academic and many industrial campuses.

Conference facilities, ranging in size from an occupancy of 20 to 100 persons and located adjacent to office area, are required to facilitate the normal course of business. More of these have been provided since the 1995 Master Plan in newer buildings, including Buildings 40 and 50, and in extensive renovation programs. Two large auditoriums in the Clinical Center, a floor of conference rooms in Building 31C and the state-of-the art conference center in Building 45, the William H. Natcher Building, provide excellent large and medium scale facilities for campus-wide and community conference and presentation purposes. Extramural program offices located in locally-leased space have been able to include much-needed conference space.

One of the most important demands on the extramural programs is the conferencing needs of the Advisory Councils which now meet mostly in the existing conference rooms in Building 31C and the Wilson Hall in Building 1. Many of these require seating of 100 - 150 persons, plus public and media attendees. The large auditoriums in the Natcher Building and Building 10 are not suitable because of their arrangement and excessive size, while the conference spaces in the Natcher Conference Center are not appropriate because they are not large enough. Besides, the Natcher Building is booked heavily for other purposes. Off-campus locations at hotels, etc. can be and are used, but this is not satisfactory since it removes the entire operation from the campus or the host IC's programs. The Advisory Councils meeting to review extramural grant programs are mandated by statute and occur each year during three, 6 - 7 week periods (i.e., from late-May to early-July; mid-January to end of February, and early-September to mid-October). These must be convened during the same period for all 27 Institutes and centers, all competing for the space now available. When the conference rooms in Building 31 undergo renovation, all of the conferences will need to be off-site probably in hotels, and the demands will be intensified. Timing of these conferences is extremely important and any delays can have a ripple effect on the legislative and grant award/fiscal year calendars.

Convenience amenities, such as a bookstore, dry cleaner, quick market and fast food retail outlets were also mentioned as amenities that would be welcomed on the Bethesda campus and at other NIH employment centers.

NIH is preparing guidelines for development of adequate amenities for all employees.

2.8.13 Parking and Transportation

Of all the Bethesda campus site issues, parking and transportation remain a source of dissatisfaction to personnel from every IC as well as to all types of visitors. The issues of transportation and parking are addressed in more detail elsewhere in the Master Plan Update, but some of the points raised by the ICs will be mentioned here.


Typical Surface Parking Lot

At the time of the interviews for this Update, people continued to complain that there were not enough on-site parking spaces to accommodate the number of people who must drive and therefore need to park on the Bethesda campus.

Since the interviews for the 1995 Master Plan were conducted, the Multi-Level Parking structure, 8, (MLP-8) was opened. Completion of MLP-10 and 9 in 2004 and 2005, respectively, will result in the removal of significant amounts of surface parking, and will not lead to a permanent increase in total spaces on the campus. In addition, the success of the Transportation Management Plan, including increases to the NIH TRANSHARE subsidy, has resulted in a significant decrease of peak hour trips to the campus, and decreased use of the single-occupant vehicle.

Many employees adjust their work schedules to arrive early in the morning to improve chances of finding a parking space. Although this may work for employees with regular work hours, it does not always work for the many members of the scientific community who work irregular schedules. ICs report that Intramural investigators spend, on average, between 50-60 hours per week on campus, sometimes working until the early morning hours, leaving for home, then returning to the campus at mid-day. This reflects the nature of laboratory science which knows no convenient routine. At mid-day, researchers reported, it required a substantial amount of time to find a parking space, if one could be found at all.

Investigators requiring travel to off-campus locations for seminars or meetings may curtail activities simply because they cannot find a parking space upon their return to the campus. Conversely, personnel working at off-campus locations with no shuttle service such as those working in Poolesville, Research Court or Baltimore find it very difficult to participate in any activity on the Bethesda campus because of the lack of transient parking. Shuttle bus service is available to most locally-leased properties and to the NCI Frederick campus, but waiting times, lengthy routes and frequent stops make the shuttle bus service unattractive to many, and the ridership is therefore unpredictable and difficult to serve efficiently. If the service is not as convenient as using the private automobile, employees will try to drive to the campus, so improved shuttle service is a constant goal of the NIH.

2.9 Summary of Site Data

The following information summarizes data gathered during the 2003 master planning effort. All areas and parking indicated as “proposed” represent what would be needed to accommodate the population used for planning purposes on the campus.

	2000	Existing (2003)	Final Phase	
Site				
Developed Area		approximately 124 Acres (40%)	approximately 102 acres (33%)	
Open Area		approximately 186 Acres (60%)	approximately 208 acres (63%)	
Population	17,617	17,511	22,000	
Building Areas (in Gross Square Feet)				
Occupiable Building Area	6,890,032	7,360,734	10,715,636	
Total Building Area including Utility and Parking Structures	11,519,081	11,989,783	12,212,611	
Changes in Areas at end of Final Phase:				
Proposed Demolition of Occupiable Area			-1,226,209	
Proposed New Construction of Occupiable Area			4,561,111	
Proposed New Construction of Parking Structures			445,842	
Parking Spaces			**Proposed Off -Peak**	**Proposed Peak**
Surface (off-street)	4,801	4,801	1,508	1,508
Structured	4,468	4,468	10,741	10,741
On-Street	87	87	406	0
Total	9,356	9,356	12,655	12,249

NIH
Master Plan
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Bethesda Campus

Table 2.9

Summary of Site Data

2.10 Planning Premises

2.10.1 Population Growth

Stone House Garden and William H. Natcher Building

- Total population used for planning at the Bethesda campus is anticipated to be approximately 22,000 by 2020. The primary growth at the campus is expected to be in intramural research personnel.
- If the demand for research and other facilities causes the resultant population to exceed the 22,000 population planned for on campus, NIH will consider additional off-campus facilities at other NIH sites or in commercial developments.

2.10.2 Building and Land Use

- The current proportions of the three basic personnel categories at the Bethesda campus (intramural, extramural, other) has been evaluated from time to time and future ratios established as appropriate. The “intramural” category includes all personnel, both scientists and administrative staff, related to basic and clinical scientific research. The “extramural” category includes all administrative and scientific staff who administer the extramural program of each IC. The “other” category includes the administrations of NIH and each IC, and staff providing specialized support to the ICs such as NCRR, CIT, CSR, NLM and others.
- Residential use will be limited to low-density quarters and will not be expanded on-campus. The Children’s Inn is constructing an addition planned for occupancy in 2004. A new Family Lodge for adult Clinical Center patients and their families will be completed in 2004 also.
- Although not specifically identified in the program areas, employee service facilities, such as facilities for fitness and recreation, will be increased to meet guidelines now in development and distributed in convenient locations on the campus to provide for employee needs wherever it is possible to include amenities in new construction budgets. Child care facilities have been a high priority, and the East Child Care facility was completed in 2001. A Northwest Child Care Center is proposed for the Second Phase of campus development, and both have been included in the program areas.
- Similar land uses and building functions will be concentrated in adjacent areas, wherever possible, to promote efficiency and collegiality.

2.10.3 Open Space

- A continuous open space system will continue to be developed to enhance the sense of unity, order and scale on the campus. A central mall area will be created for informal as well as organized outdoor activities.
- The buffer zone around the periphery will be retained at a width of 250 feet from the NIH property line. The perimeter security elements including a fence, vehicle barriers, gates, a visitor vehicle inspection facility and parking garage, and a commercial vehicle inspection facility will be introduced in such a way to generally preserve the landscaped buffer zone. Completion of multi- level parking structures will remove extensive surface parking from the buffer zone.
- Landscaped elements of special value will be preserved and additional landscap-ing, signage, and street furniture will be developed to enhance the working environment under a separate campus streetscape Master Plan.
- Historic resources and their environmental settings will be respected.

2.10.4 Architectural Principles

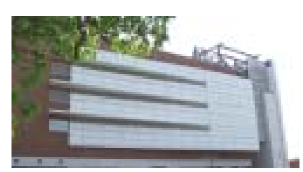
- Future development will reflect historic patterns and priorities. Architectural policies and criteria will be developed and used to ensure compatibility with the built environment in terms of materials, style, massing, scale and color.
- Development will simplify and clearly reflect overall patterns; it will promote a sense of order, quality and unity throughout the campus. Sub-campus areas will have their own identity while simultaneously contributing to the overall campus order.

2.10.5 Transportation / Circulation

- Placement of buildings and design of pedestrian pathways and bicycle routes will favor the Metrorail/Metrobus/Ride-On station on Rockville Pike to encourage use of mass transit as much as possible.
- A well-defined road system with a primary distributor network carrying the bulk of users and a network of secondary roads providing service accessibility will be established to increase efficiency, orient the visitor and protect both open space and pedestrian corridors.
- The primary campus visitors' entry focal point will be the South Drive entrance at Rockville Pike where the Metro station is located and where a new Gateway Center for visitors will be constructed. A secondary gate for Clinical Center patients and visitors is planned at West Cedar Lane and West Drive.
- Provision of parking spaces on campus for NIH employees will continue to be integrated with the Transportation Management Plan to reduce the use of the single occupancy vehicle as a transportation mode to and from the campus. Employee parking will be located strategically inside the site in or adjacent to major building groups, but not in the 250-foot wide buffer zone. Employee parking will favor multi-occupant vehicles and disabled drivers and will provide for NIH employees traveling from other NIH sites not served by shuttle bus.
- Visitors' parking will be concentrated in a new structure in association with the Gateway Center. Clinical Center patients will be screened at the West Cedar Lane entrance to the site and will proceed to the Clinical Center parking garage where a second vehicle screening will be performed. Some additional visitor parking for vendors, contractors, and service personnel will be maintained at scattered designated locations within the interior of the campus.
- Traffic impacts of future campus development will be mitigated on the surrounding roadways serving the NIH campus to the maximum extent possible.
- Shuttle bus service will be improved to on- and off-campus sites.
- Non-NIH traffic using the NIH campus roads for through-passage between Old Georgetown Road and Rockville Pike has been eliminated since institution of perimeter access control and will continue to be restricted.
- The pedestrian character of the campus will be promoted and emphasized to employees.

2.10.6 Infrastructure

- Major deficiencies in the NIH infrastructure are being corrected in order to maintain the quality of research conducted at the NIH. This includes the generation and distribution systems, in addition to programmatic functional requirements. (See Section 2.14) Impacts of utility upgrades, such as noise, will be mitigated.
- Utility and service uses will be concentrated in one area of the campus in so far as possible.
- Future office, laboratory, and animal buildings will be designed with maximum



Building 11 - Power Plant

flexibility/adaptability to facilitate change as science dictates.
- NIH has initiated a program to improve the sustainability of all future construction.

2.10.7 Animal Programs

- The NIH Animal Center's (NIHAC) role in the future development of the Bethesda campus was reevaluated as part of the 1995 Master Plan and the simultaneous master planning of the NIHAC.
- The Building 14/28 complex will be replaced with a more compact, Animal Research Center (ARC) and research facility, and more of the research animals will be dispersed to be nearer to the laboratories and the researchers using these animals. Still more animals may be housed off-site by contractors.

2.10.8 Management

- The NIH plans to ensure continued management awareness and involvement, and personnel participation in the implementation of the Master Plan 2003 Update.
- The Master Plan 2003 Update is based on a staff population of 22,000 on the campus.
- The NIH Office of the Director has established the Office of Community Liaison (OCL) for addressing continuing or new mutual NIH-Community concerns. The OCL supports the Community Liaison Council (CLC).

2.11 Program Premises

2.11.1 Space Programs

Existing and proposed building areas categorized by building and use type are presented in The Campus Growth Table 2.8.8.

The ***Clinical Center Complex*** building areas reflect no growth in overall programs and, subsequent to the 1,050,000 gsf Clinical Research Center (CRC) addition in 2004, are shown as remaining constant through all Master Plan phases, although portions of the area vacated by the patient care functions will be converted to decompressed laboratory and support spaces as part of the Building 10 renovation programs in Phases II and III of the Master Plan. The Clinical Center (Building 10) renovations phase are shown as area removed from the campus inventory and restored after renovation is complete.

Based on personnel projections, required ***Office Space*** is computed by applying General Services Administration (GSA) net and gross area standards of 273 gross square feet per occupant. Existing usable area is credited against the total.

Laboratory Space is computed by applying net and gross area standards (derived from an analysis of a variety of recently constructed laboratory buildings) to Intramural

Research Program (IRP) personnel projections. Again, existing usable laboratory area is credited against the total to yield the estimated total new laboratory space that will be required. The area per researcher (i.e. principal investigators, research assistants, post-doctoral students, technicians and graduate students) used in the computation is 540 gross square feet, and this includes laboratory, laboratory office, laboratory support, shared support, ancillary, animal and building gross areas.

Support Space requirements for IC components, including OD/NIH, Biomedical Engineering and Instrumentation Program (BEIP) and CIT, are from interviews with affected components. ORS/DVR space anticipates the eventual location of more animal holding facilities with research laboratories and a replacement of the Building 14/28 Complex. A proposed new Animal Research Center, will house holding and procedure rooms, certain research programs, quarantine, limited breeding, and other central support activities.

Also included in this category are security-related support facilities such as the Gateway Center for visitors and a Commercial Vehicle Inspection Facility which will complete the perimeter security system. Associated guard houses at the various gates are not tabulated in the areas.

Campus Amenities consisting of employee services and site features have been included in the Master Plan 2003 Update. These are in four categories:

The first category of amenities is in specifically programmed space. This includes the 21,000 gsf East Child Care Center and the 21,000 gsf Northwest Child Care Center. An additional child care center is planned for the Campus Center at the south end of the Central Mall. Child care has been identified by NIH as an increasingly important employee amenity. GSA standards and common practice indicate that limiting the size of each child care facility to a minimum of 74 and a maximum of 150 children is optimal, and would result in a total of three child care centers on campus.

The second category consists of uses which are not specifically programmed, but may be absorbed within the gross area allocated to space programs of major buildings. Within this group are small scale employee and business services and convenience and support retail. The employee and business services include credit unions, banking facilities, post office, express mail, etc. The convenience and support retail for weekday use includes food, books, news articles, cards, gifts, dry cleaning, shoe repair, travel agency, etc. At similar federal facilities these uses are provided at a rate of two to four square feet per employee, which would equal 50,000 to 100,000 gsf on the NIH campus, subject to availability of funding. Existing retail and employee services would be enhanced at present locations.

The third category of amenities includes facilities recommended to be built on site but not specifically programmed by space allocation. Included in this category are outdoor site amenities, such as an amphitheater to accommodate NIH ceremonies and events.

The Master Plan 2003 Update proposes renovating a portion of Building 34/34A at the south end of the Central Mall for the strategic concentration of a core of amenities within a Campus Center. The facility, similar to a “university center,” would combine meeting and conference rooms, food services, selected retail, and the relocated “temporary” fitness center (T-39).

The fourth category of amenities is of an outdoor recreational nature. Included in this category are a variety of outdoor spaces for patient and employee health and use; areas for active recreation, including the retention or replacement of tennis courts in the southwest corner of the site; a campus bike path system with bicycle storage provided in appropriate locations; a jogging/exercise path; stream area enhancements; and outdoor eating/picnic facility enhancements.

The amenities under study in the NIH Campus Amenities Guidelines include:

- Conference Centers
- Video Conference Rooms
- Dining Centers with Kitchens
- Concession Stands (to include various types and sizes)
- Coffee Bars
- Vending Machines
- Credit Unions/Banking
- ATMs
- Lactation Rooms
- Fitness Centers
- Shower and Locker Rooms
- Exercise Rooms
- Child Care Centers
- Other Retail Opportunities

2.12 Security Considerations

The NIH Bethesda campus is a federal installation, and though perhaps not as likely a target for terrorism as some other federal properties in the metropolitan area, it is, nevertheless, potentially vulnerable to various kinds of threats. The NIH campus has maintained its open, academic-like character in deference to the spirit of intellectual interaction, and access to the large public with which the ICs do business must continue. The Clinical Center receives hundreds of persons from the general public daily, as outpatients, inpatient visitors and volunteers, very much as any hospital does. Other buildings are frequented by visiting scientists, scholars, and an array of tradespeople, messengers, contractors and others throughout the business day. The campus is also the site for meetings of researchers, academicians and others.

Following the April 1995 bombing of the Alfred P. Murrah Federal Office Building in Oklahoma City, the Department of Justice was tasked with developing a "Vulnerability Assessment of Federal Facilities" which was released in June 1995. Immediately thereafter, former President Clinton in a Presidential Directive, ordered all agencies to begin a security upgrade process, and in October of the same year, by Executive Order 12977, established the Interagency Security Committee to develop and ensure compliance with government-wide physical security criteria.

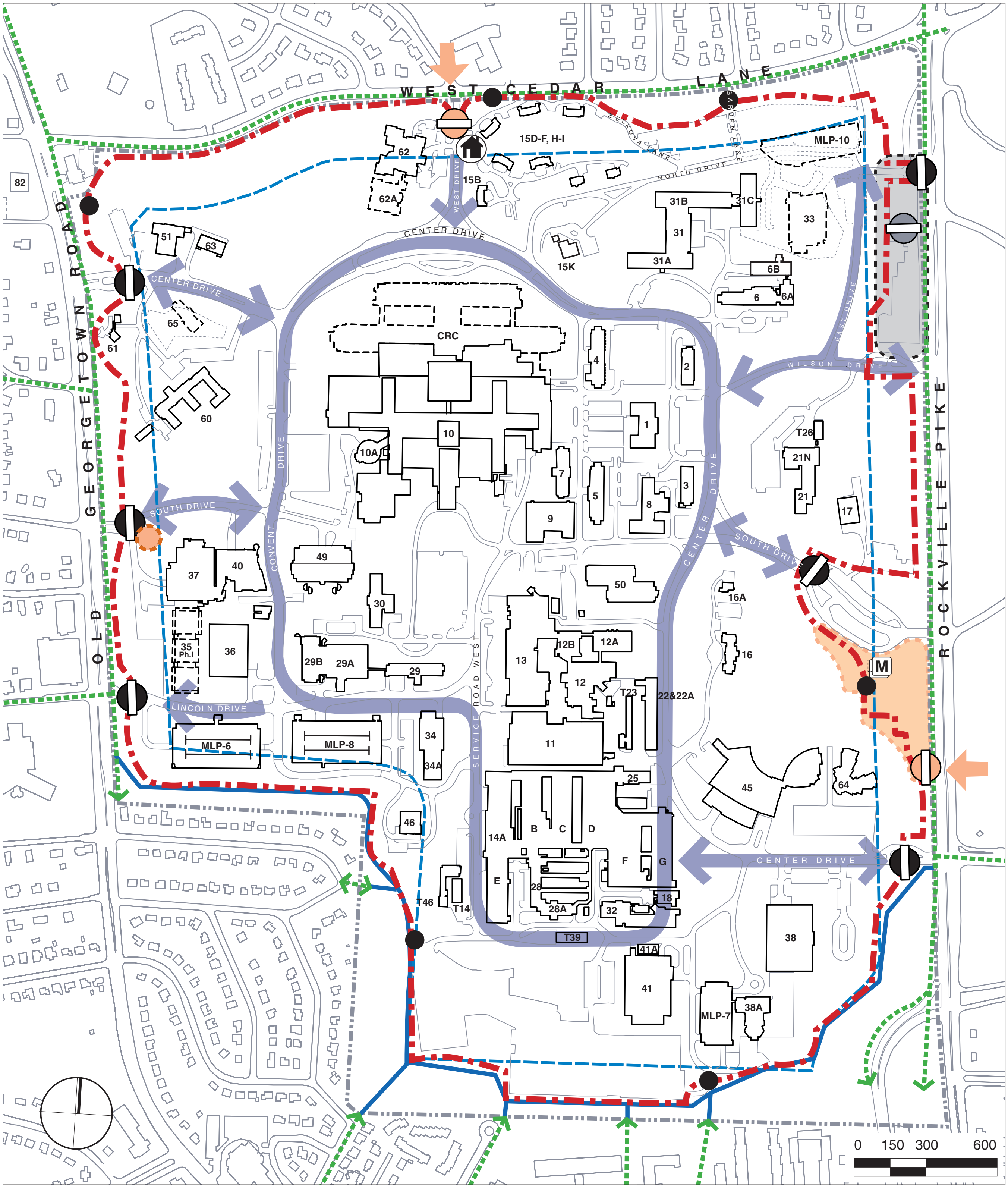
NIH developed its Security Assessment in response to the Presidential Directive in August 1995, but the absence of significant new physical security funding delayed action by nearly all federal agencies. In summer 2001, the DHHS Office of the Inspector General (OIG) reviewed the NIH Bethesda campus physical security and made the following recommendations:

- improve perimeter security by: installing a perimeter fence with a limited number of controlled entry and exit points; constructing a visitors center and parking facility; installing additional surveillance and new barriers;
- improve staffing of security and construct a centralized shipping, receiving and storage facility;
- improve interior building security;
- improve security planning.

The attacks of September 11, 2001 and subsequent attention to physical security needs of the federal government by the Congress and public brought new urgency and significant funding for the measures required by the DHHS.

The NIH is addressing all of these recommendations which are in various stages of completion. For example, the NIH either has submitted or is in the process of submitting the physical security projects to NCPC for its review. The projects include:

- A perimeter fence surrounding the entire campus, and with vehicular and pedestrian gates has been completed. Gates provide access for employees on foot or bicycle at 13 points around the perimeter, and for employees in vehicles at six locations plus an employee vehicle egress-only at one location. Employees and their vehicles are screened in various modes depending on the Alert Level issued by the Department of Homeland Security (DHS). The main access for visitors arriving by foot, transit, bicycle or vehicle will be at the Gateway Center at the Metro bus and rail station on Rockville Pike and South Drive where a visitor parking structure will be constructed for most visitors' vehicles. Most visitors arriving at this location will proceed to the interior of the campus after screening and walk or use internal shuttle service to their destinations. A secondary access for Clinical Center patients and their visitors arriving by foot, bicycle or vehicle is provided at West Cedar Lane and West Drive where vehicle and personal



NIH Master Plan 2003 Update

Bethesda Campus

- 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 2.12

Security Improvements Plan

SmithGroup

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

screening will occur. Visitor vehicles proceeding to the Clinical Center parking garage are screened also at the entrances to the garage.

In the future, and within security constraints, pedestrian/bicycle access may be provided to the general public to permit access between the Metrorail station and the areas to the west of the campus. A screening/pass system applicable to each transit of the campus would be needed. It is expected that one gate entrances on Old Georgetown Road will be redesignated as the western portal.

- Protective barriers of various kinds against vehicle ramming have been provided at entrances and other areas of potential vulnerability
- A centralized shipping, receiving and storage facility with screening capabilities, as recommended by the DHHS OIG, has been studied for both on and off-campus locations. On-campus locations could not be found which provided adequate queuing for the volume of commercial vehicles serving the campus, adequate space for screening, receiving and storage, and at the same time, sufficient stand-off from other occupied buildings to mitigate potential blast charges that could be concealed in a commercial vehicle. Off-campus locations also could not be found that met the same requirements and could at the same time intercept vehicles coming to the NIH campus from multiple directions, especially via Interstates I-270/70 from the west and north; I-66 from the west; I-95 from both north and south and from the District of Columbia and other local points-of-origin.
- Instead of a centralized shipping, receiving and storage facility, the NIH is planning a commercial vehicle inspection facility with a dedicated access from Rockville Pike (MD 355). Over 90% of the commercial vehicles approach the campus from the Beltway (I-495) to the north and will be able to enter the facility with a right turn. Adequate queuing space and screening operations will avoid congestion on the surrounding roads. The screening process will be integrated with the loading dock management at each destination building so that arrivals, especially at the Clinical Center, can be modulated.
- By controlling access and performing screening at the site perimeter, the NIH has been able to reopen most of its buildings' entrances to allow resumption of free passage from one to the other. Exceptions to this include critical buildings such as the central utility plant, Building 11, and the main frame computer in Building 12 which will have permanent staffed access controls.
- Improved security planning, staffing and operations has been assured by the creation of a Security and Emergency Response service cluster under the Office of Research Services in the Office of the Director of NIH.

The impact of the physical security measures - the perimeter fence, Gateway Center, and commercial vehicle inspection facility - on the Master Plan is mostly in the change in traffic patterns for vehicle accessing the campus, including a significant reduction in the on-campus traffic due to elimination of cross-campus travel. The level of restriction and screening of persons and vehicles arriving at the campus will vary in accordance with the Alert Level as established by the Homeland Security Advisory System.

The NIH Bethesda campus will retain its openness within the perimeter and will increase protective measures for buildings and other facilities to ensure the safety of the people and programs on campus and within the adjacent neighborhoods.

All physical security programs of the NIH are addressed through and by organizational entities in the Office of Research Services (ORS) Security and Emergency Response (SER) service cluster.

The SER combines emergency management, security planning and management, police, fire fighting and prevention, and crime prevention activities within a single, full-service organization which ensures that all emergency incidents are coordinated and controlled through and by a single entity, sharing available resources to provide optimal services to the NIH nation-wide.

The ability of the NIH to deal effectively with emergencies is supplemented on the Bethesda Campus by formal mutual aid agreements with the Montgomery County Department of Fire and Rescue Service, the National Naval Medical Center Fire Department, and the Montgomery County Department of Police as well as other federal, state and local law enforcement agencies, including the U.S. Federal Protective Service and the FBI.

2.13 Relationship to the Environmental Impact Statement

The National Environmental Policy Act (NEPA) of 1969, as amended, 42 U.S.C. §§ 4321 et seq., commits federal agencies to utilize a systematic, interdisciplinary approach which will ensure the integrated use of natural and social sciences in planning and decision-making that may have an impact on the human environment. Prior to major actions, alternatives must be identified and addressed, real and significant environmental issues and alternatives analyzed, economic and social impacts included in the analysis, and all environmental information made available to the public.

In view of the unique federal presence in the Washington, D.C. area, additional effort is required in the National Capital Region to implement the National Environmental Policy Act. Procedures developed pursuant to the National Capital Planning Act of 1952 administered by the National Capital Planning Commission (NCPC) prescribe the way the NCPC, beginning at the earliest possible point, considers the planning and environmental aspects of proposed actions. The Commission states that its goal is to avoid or minimize adverse environmental effects.

The 1995 Master Plan Final Environmental Impact Statement (FEIS) was prepared in accordance with these directives and is a companion document to the 1995 Master Plan. As part of the 1995 Master Plan NEPA process, scoping meetings were held with jurisdictional review agencies, the general public and NIH employees. Public hearings were held to present the Draft and Final Master Plan and environmental documents, and to invite comments and questions. The Final 1995 Master Plan and Environmental Impact Statement (EIS) were published in December 1995 and the Master Plan was approved by NCPC on February 1, 1996.

Exigencies unforeseen in the 1995 Master Plan created the need to amend the northwest sector of the plan in 1998. Design development for the Mark O. Hatfield Clinical Research Center ultimately required the realignment of Center Drive northward from its existing location. Subsequently, this required the rearrangement and reconfiguration of other building facilities proposed for the area in the northwest corner of the campus between West and South Drives. NIH prepared an Amendment to the 1995 Master Plan with an accompanying Supplemental EIS (SEIS) that covered the proposed revisions. Draft documentation was circulated to jurisdictional agencies and community organizations, and presented to and discussed with the NIH Community Liaison Council (CLC) at a series of meetings. The Final Northwest Sector Amendment and SEIS were published on August 25, 1999, and the Amendment was approved by NCPC in September 1999.

It is the intent of NIH to update the Bethesda campus Master Plan at approximately five-year intervals. NIH initiated this process in March 2000 for the Master Plan 2003 Update. Since the existing conditions and potential environmental impacts were identified in the 1995 Master Plan EIS and 1999 Amendment SEIS, and the impacts After resolution of Building 10 renovation issues that could have significantly affected the direction of site planning, environmental impact studies were initiated. The results were expected to be of the same order of magnitude as given in those documents, scoping for the Master Plan 2003 Update was accomplished by letter inviting comment to jurisdictional agencies and surrounding communities.

of these studies are given in the Draft Master Plan 2003 Update EIS. The Draft Master Plan 2003 Update and EIS will be published and circulated to review agencies, local community organizations, and the general public for comment. A public hearing will be held.

2.14 Relationship to the NIH Master Utilities Plan

The NIH established a Facilities Revitalization Program which consists of ten interrelated programs:

- The NIH Master Plans, including the 1995 Master Plan for the Bethesda main campus, the 1995 Northwest Sector Amendment to the 1995 Master Plan, and this Master Plan 2003 Update:

  - the Infrastructure Modernization Program (IMP);
  - the Master Plan and Design Services Central Infrastructure Utility Systems Report, (MUP I);
  - NIH Bethesda Master Utility Plan, (MUP 2); and
  - NIH Central Utility System Updated Master Utility Plan, (UMUP).

- The NIH established the IMP (formerly known as the Infrastructure Modernization and Improvement Program (IMIP)) as its major infrastructure planning program. The IMP provided for the replacement and expansion of central utility equipment and the distribution systems on the NIH Bethesda campus. The IMP also provides for the programmed restoration, renovation, replacement and expansion of the campus mechanical and electrical utility systems. Specific central utility services include chilled water, steam, electrical power, compressed air, domestic water, stormwater, and sanitary sewerage and natural gas. Equipment includes chillers, boilers, control and monitoring systems, pumps, switchgear, and other ancillary apparatus.

- The 1995 Master Plan for the NIH established the growth expectations at the Bethesda campus incorporating all diverse elements. It also established building types and potential sites for future growth. The IMP interacted with the 1995 Master Plan in two basic ways. First, the IMP provided the supporting utilities for the planning framework depicted in the 1995 Master Plan and second, the IMP imposed constraints on near-term growth projected by the 1995 Master Plan.

- In order to meet the needs of this interdependency, the NIH developed a Master Utility Plan (MUP). MUP 1 was completed in September 1992 and MUP 2 was completed in December 1994. A major goal for the MUP was to develop a comprehensive and integrated plan for maintaining and improving utility services for the current, near-term, and long-term requirements of the Bethesda campus. The MUP will be used within the IMP to manage the overall infrastructure program. The MUP will have to evolve into a multi-year effort as future needs are established by the Master Plan. Four groups of tasks comprise the MUP:

  Task 1 Central Plant and Site CAD Documentation: This task consolidates and documents onto a computer aided drafting (CAD) system existing utility systems and configurations.

  Task 2 Central Plant Equipment and Site Distribution Condition Assessment: This task builds on the information generated under Task 1 and provides a baseline assessment of the capabilities and useful life of the existing equipment.

Task 3 Utility Systems Analysis: This task defines the existing and future utility load requirements and develops various alternatives for upgrading the systems.

Task 4 Master Utility Plan (MUP): This task summarizes the findings and provides recommendations, estimated costs, and schedules for improving and upgrading the various utility systems.

The MUP 1 emphasized central plant systems: chilled water, steam generation and distribution systems, and future electrical loads and distribution.

The chilled water, steam, and electric power utilities planning efforts have emphasized three considerations:

- Central plant system capacity requirements to provide reliable service based on current loads and future projects,

- Distribution utility capacity requirements to provide reliable service also based on current loads and future projects, and

- Utility corridor planning coordinated with the NIH overall site and building renovation and expansion plans that were presented in the1995 Master Plan.

The MUP 2 addressed the secondary utility systems, such as domestic water, sanitary (waste water), storm, natural gas, compressed air, and electrical distribution. Detailed analysis of the current conditions and requirements of the secondary systems was accomplished in the MUP 2 planning effort. Both MUPs included estimated capital costs for the IMP and essential related projects, and construction project planning and scheduling.

Numerous physical changes have occurred at NIH Bethesda since 1995, or are currently underway. Building projects include the Building 50 Laboratory, the Building 40, (Vaccine Research Center), Laboratory Building 33, the Clinical Research Center and subsequent Building 10 renovations, the Neuroscience Research Center, Building 51 (Fire Station), Building 64, (East Child Care Center), Building 65, (Family Lodge) and Building 62A (Children's Inn expansion). Campus population has increased at a rate faster than anticipated in 1995. Similarly, on the utility infrastructure side, projects proposed in the IMP, MUP 1, and MUP 2 such as the Building 11 Phase I Chilled Water System Phase I expansion, east-west utility tunnel, north electric power substation, Boiler 5 installation, and 23 MW PEPCO COGEN unit, have been or are being implemented.

In view of these rapidly developing conditions, NIH prepared the NIH Central Utility System, Updated Master Utility Plan (UMUP), which was completed in 2000. The UMUP reassessed existing utility demands or usage and system capacities with emphasis given to the central utilities, steam and chilled water. Projections were based on the 1995 Master Plan. The UMUP also updated future major item utility needs and implementation scheduling on a concept planning basis. These projections have been further refined in conjunction with the campus Master Plan 2003 Update.

2.15 Relationship to the Clinical Research Center and Clinical Center Stabilization and Clinical Research Core Stabilization

The Clinical Research Center, on schedule to be completed in 2004, is the response to needs discussed in the 1995 Master Plan.

The Master Plan 2003 Update planning team has coordinated with the recommendations and the policies of the NIH management in the redevelopment of Building 10 following completion and occupancy of the Clinical Research Center in 2004. The intention of the Clinical Research Core Renovation program is to optimize the use of vacated space in Building 10 as modern laboratory space replacing obsolescent and sub-standard space. No consequent growth in on-campus personnel is required and none is shown in the Bethesda Campus Growth Table (Table 2,8.8).

2.16 Relationship to the NIH Animal Center Master Plan

The NIH Animal Center (NIHAC), originally named the Poolesville Animal Farm, was purchased in 1960 when it became necessary to relocate NIH farm animals from the rented Casey Farm in central Montgomery County. The new farm property was chosen because it most closely met the objectives of adequate space and essential rural privacy for NIH farm activities. It also had reasonable accessibility to the NIH Bethesda campus, combined with the practical reality of a cost low enough to be purchased with available funds at a time when the value of farms in areas closer to Bethesda had risen precipitously due to their potential subdivision value.

A Master Plan for the NIHAC in Poolesville was developed simultaneously with the 1995 Master Plan, and the two were closely interrelated. It is not anticipated that any more facilities can be placed at the NIHAC beyond those already programmed and confirmed in the NIHAC Master Plan. The site cannot be considered as a location for functions now at the main campus in Bethesda or at any of the other NIH locations.

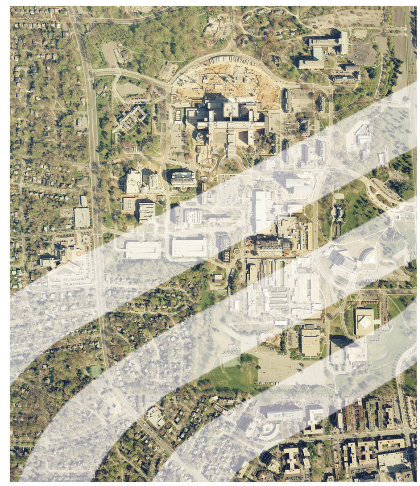
2.17 Sustainability

NIH is in the process of completing a sustainable design initiative. This study, which was begun in 2002, focuses on how NIH can realize through the design of its buildings, its facility operations, and the policies and processes it establishes a sustainable campus environment, one that conserves natural resources and reduces pollution. Policies stemming from the Sustainability initiative are expected to be broad and comprehensive and will be applied to new and existing development within the Bethesda campus, and possibly off-campus as well. As a participant in the Federal Green Building Council, NIH complies with all federal policies and regulations related to sustainability, including Executive Order 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition, and Executive Order 13123, Greening the Government Through Efficient Energy Management.

The NIH Design Policies and Guidelines, which apply to programming, planning; designing and constructing new buildings, major and minor alterations, Volume 4, Part B, "Sustainable Design," states,

> "Sustainable Design decisions cross disciples. Building products, components, and systems must be intergrated and concieved holistically rather than as a series of independent decisions and componants. Design decision-making must follow the goals and principles of sustainability as required by Executive Order (EO) 13123, *Greening the Government Through Efficient Energy Management*, dated June 3, 1999."

Chapter Three
The Community Context
of the Bethesda Campus



3.1 Location of the NIH Bethesda Campus in the Region

3.1.1 General

The NIH main campus is located in Montgomery County, Maryland, one of the largest jurisdictions in the Washington, D.C. region. As a result of expansion of the urbanized area, cross-commuting patterns, and other economic interrelationships, the federal government designated a broader Consolidated Metropolitan Statistical Area (CMSA). A CMSA is a geographic entity defined by the Federal Office of Management and Budget for use by federal statistical agencies. An area becomes a CMSA if it meets the requirements to qualify as a metropolitan statistical area, has a population of 1,000,000 or more, if component parts are recognized as Primary Metropolitan Statistical Areas, and if local opinion favors the designation.

This CMSA encompasses both the Baltimore and Washington metropolitan areas, embracing an area of nearly 9,600 square miles circumscribed by a 75-mile radius around downtown Washington, D.C. It includes communities from the Pennsylvania border to Calvert and Charles Counties in southern Maryland and on southward in Virginia to Fredericksburg and Spotsylvania County (nearly to the edge of metropolitan Richmond). From Queen Anne's County, Maryland, on the eastern shore of the Chesapeake Bay, the CMSA extends westward beyond the City of Hagerstown and Washington County in western Maryland to Berkeley and Jefferson Counties in West Virginia.

The area is expanding at a very rapid rate - with a 2000 Census population of 7,608,070 - with communities and employment spreading over an ever-widening geographic area. This spread can also be seen in the residential location patterns of NIH employees and the broad area benefitting from NIH's procurement of goods and services.

See Consolidated Metropolitan Statistical Area Map, Figure 3.1.1

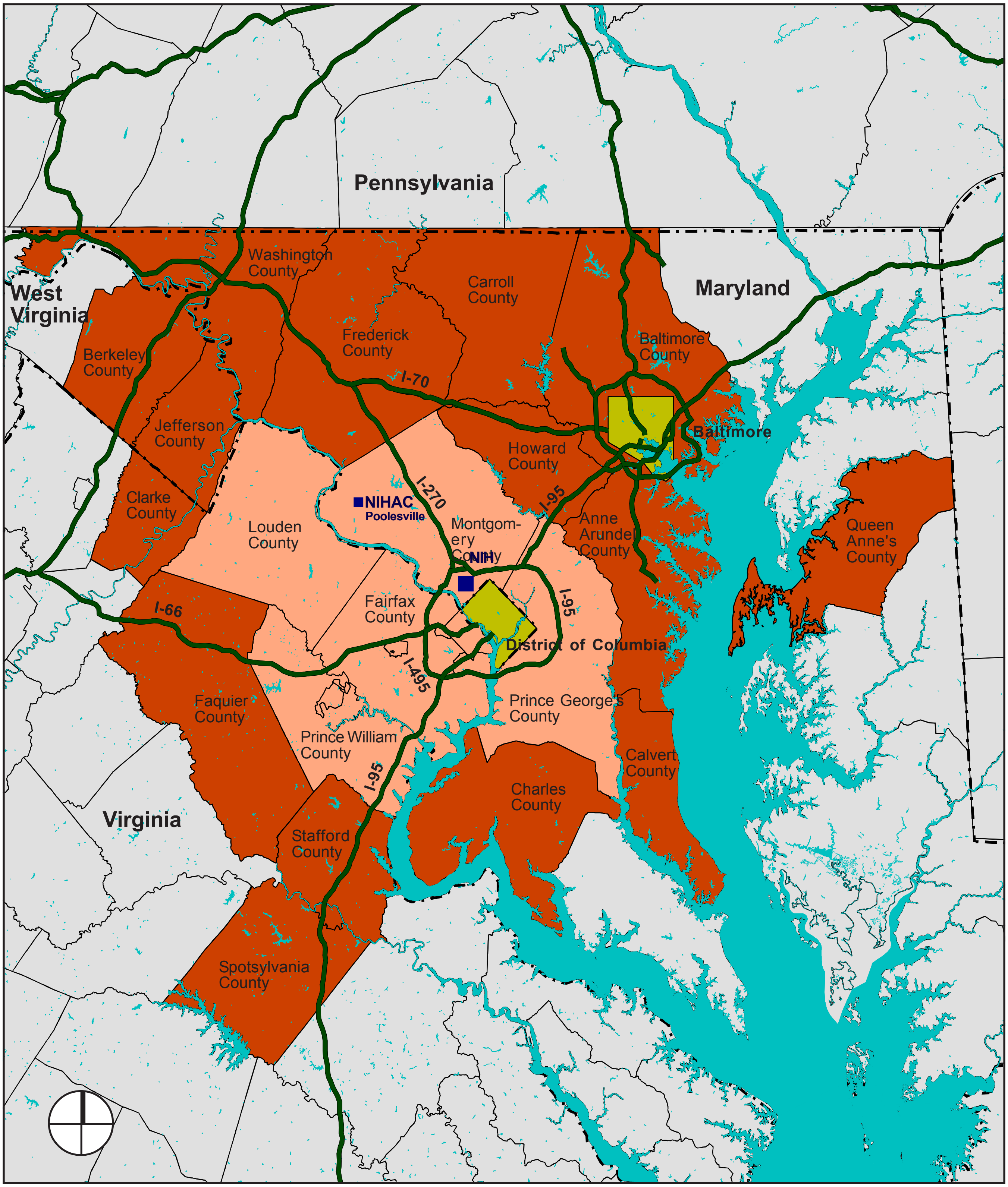
3.1.2 The Region

The NIH Bethesda campus is also within the National Capital Region (NCR), as defined in the National Capital Planning Act of 1952, as amended. The jurisdictions within the NCR include:

- The District of Columbia;
- Montgomery and Prince George's Counties in Maryland;
- Arlington, Fairfax, Loudoun, and Prince William Counties in Virginia;
- All cities now or hereafter existing in Maryland or Virginia within the geographic areas bounded by the outer boundaries of the combined areas of said counties. (40 U.S.C. ' 71(b))

The campus is located in southern Montgomery County, Maryland and at the southern end of the highly developed Washington, D.C./Rockville, Maryland Corridor following I-270 and MD Route 355 (Rockville Pike).

See National Capital Region Map, Figure 3.1.2



NIH Master Plan Update 2003

Bethesda Campus

Figure 3.1.1

Consolidated Metropolitan Statistical Area

ORF-DFP

Oudens + Knoop, Architects, PC

Smithgroup

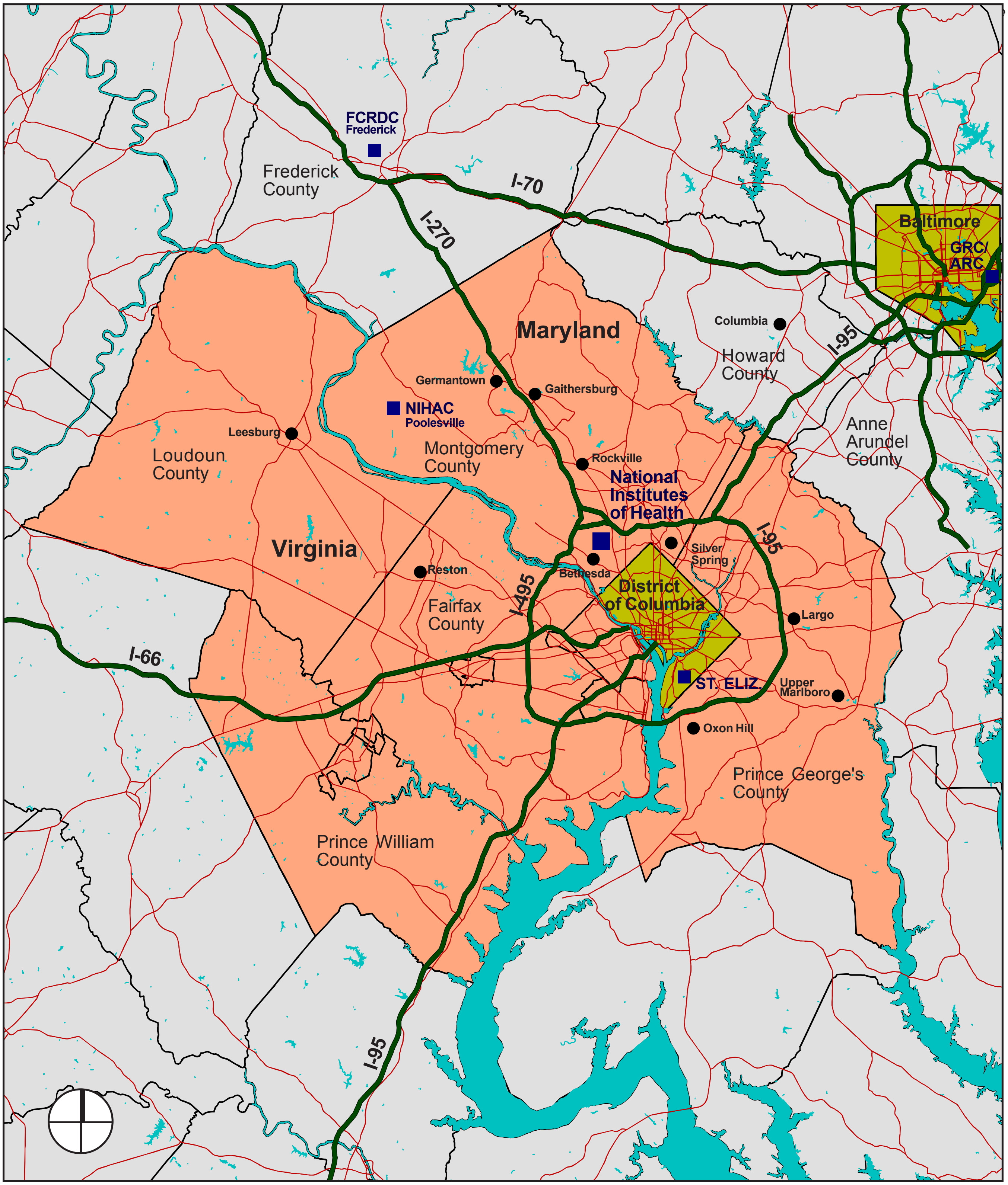


Figure 3.1.2

NIH
Master Plan
2003 Update
Bethesda Campus

National Capital Region Map

3.1.3 The Vicinity

The NIH Campus is situated within the boundaries of the Bethesda - Chevy Chase Master Plan, April 1990. It is located within the Bethesda-Chevy Chase/North Bethesda Planning Area 2 boundaries, adjacent to and to the north of the Bethesda Central Business District (CBD).

Recent master plans and sector plans in this Community-Based Planning area acknowledge the established and stable nature of local residential neighborhoods. These plans also recognize that the central business districts of Bethesda and Friendship Heights, the transit station areas of Grosvenor, White Flint, and Twinbrook, and the commercial centers of Westbard and Wildwood serve as community focal points for the surrounding residential neighborhoods. The National Naval Medical Center and the NIH campus serve as major employment areas for both the area and region. The MD Route 355 (Wisconsin Avenue/Rockville Pike) county and regional buses, and the Metrorail system provide major transportation links within this geographic area.

The Bethesda-Chevy Chase/North Bethesda Work Program, a part of the master planning process for this Planning Area, emphasizes the coordination of development within the commercial centers and employment areas through regulatory review to assure that individual projects cohesively fit into development patterns envisioned by the sector and master plans. It also continues the work to protect and maintain the residential neighborhoods throughout the area.

See Vicinity Location Map, Figure 3.1.3

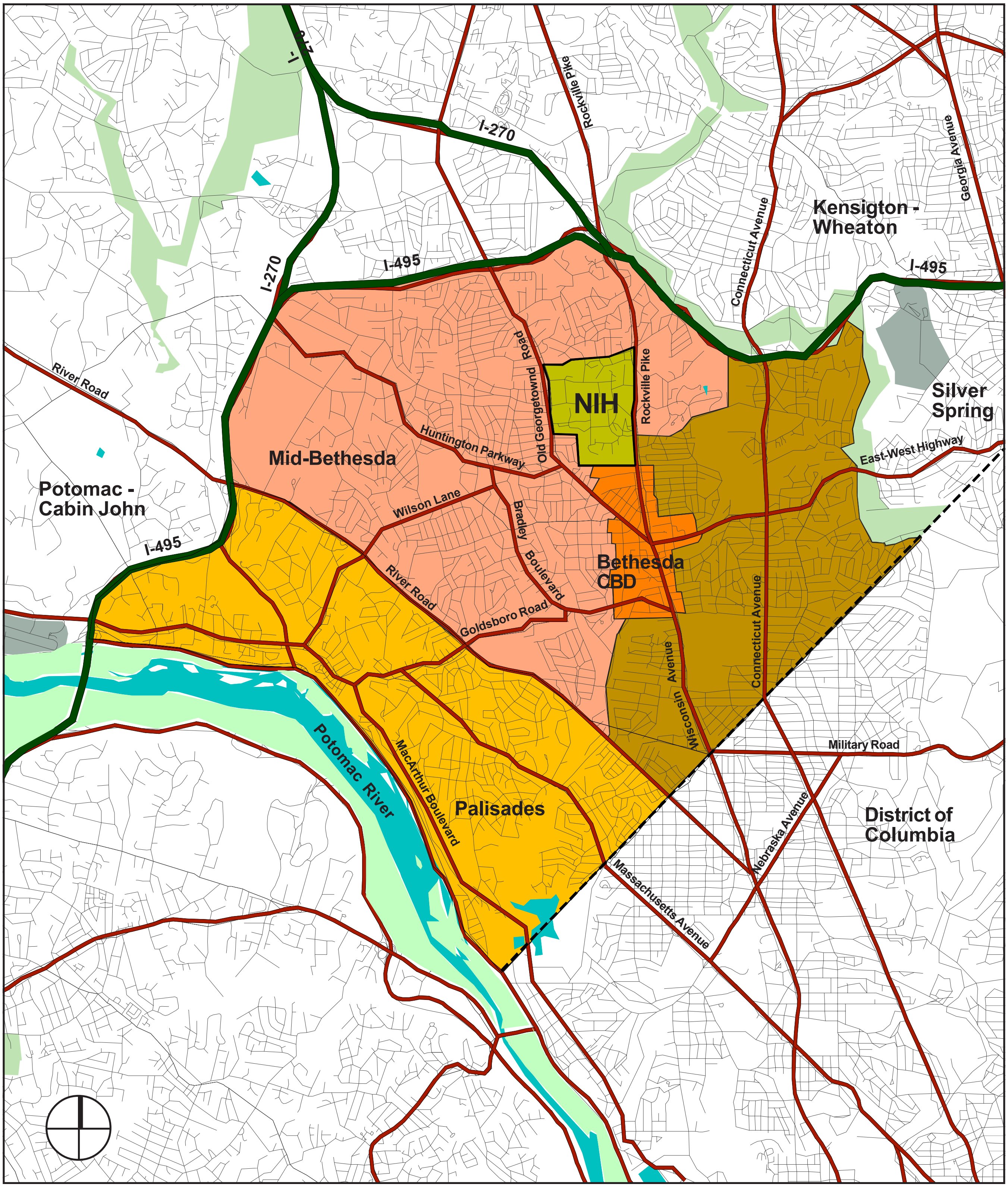
3.1.4 The Immediate Residential Neighborhood

Seven predominantly single-family neighborhoods and one multi-family neighborhood are immediately adjacent to the NIH. These include Edgewood/Glenwood, East Bethesda, Huntington Terrace, Maplewood, Sonoma, Locust Hill, and Ayrlawn. One predominantly multi-family neighborhood adjoins the campus to the south, Battery Lane District.

Only one of these single-family neighborhoods - Glenwood, the eastern portion of Edgewood/Glenwood - adjoins the NIH campus directly, along with the Battery Lane District. The other six are separated from the campus by major roads.

In the 2000 Census, the neighborhoods immediately surrounding the NIH were included in five census tracts. These tracts are somewhat more extensive than the neighborhoods themselves. Nevertheless, census data, coupled with information from interviews and observations in the neighborhoods, help create a picture of the neighboring residential area. Vicinity Census Tracts, Figure 3.1.4, shows outlines of these census tracts and their numerical designations.

Most of this area (64.4% of Bethesda-Chevy Chase Households) is developed with single-family detached homes on relatively small lots - one quarter acre or less. The oldest homes date from the 1920s when this was a summer cottage area for residents of the District of Columbia. These were supplemented over the years by a varied assortment of additional summer houses, and then by permanent homes. The last major group of homes was built after World War II in the late 1940s and 1950s. Home building continues on the remaining vacant land in the area, including a recently completed cluster of townhouses across Rockville Pike from NIH south of Jones Bridge Road, and several detached houses opposite the Center Drive entrance on Old Georgetown Road.



NIH
Master Plan
2003 Update
Bethesda Campus

Figure 3.1.3

Vincinity Location Map

This segment of Bethesda has not experienced the extensive tract house construction seen further north and west in Montgomery County. It is filled with an eclectic assortment of housing styles and sizes, set on relatively narrow, tree-lined streets. These varied houses, with their convenient down-county location and good schools, command sale prices in the upper price ranges for their respective size and categories, and they tend to sell relatively quickly when they come on the market. There are some isolated pockets of new construction on vacant parcels or lots where more expensive new homes are replacing smaller older models around them.

A significant concentration of apartment buildings lies immediately south of the NIH campus. Along both sides of Battery Lane are over 1,600 apartments, many of them rental units. Most are in mid-rise buildings built 40 to 50 years ago, but there are a few newer high-rise towers. Phoenix House, a private assisted-living residential tower for the elderly, is also located on Battery Lane.

Most homes in the area are owner-occupied. However, rental units account for 26% of households, the market for which is supported, in part, by NIH employees. 2000 Census data indicate that in the surrounding Census Designated Places (CDPs) where almost all the homes are single-family detached, about 30-40 percent of the total housing stock is occupied by rental tenants. Vacancy rates are about 3%-4%.

As is typical for Montgomery County as a whole, residents of this portion of Bethesda are relatively mobile. 2000 census data indicated that about half the residents had moved to the vicinity of NIH within the previous five years. About 9.96% of the NIH neighborhood residents had moved from overseas, versus 11.9% in the County as a whole and 9.5% in Bethesda. This may have been due in part to the impact of NIH visiting scientists as well as the area's attraction for foreign diplomats and returning U.S. foreign service officers.

3.1.5 The Bethesda Central Business District

The Bethesda Central Business District (CBD), adjoining the southern boundary of the campus, is one of the largest suburban business centers in the region (See Figure 3.1.5). In the decade ending in 2000, over 960,000 square feet of office and 280,000 square feet of retail space were completed. There are 7 major projects under construction in the Bethesda CBD, including multi-family and mixed-use projects such as the Bethesda Theater, the Residences of Rosedale Park, the Edgemor, the Palisades and the Whitney. A new complex, the Chevy Chase Bank Headquarters, at the northeast corner of Wisconsin Avenue and East-West Highway was completed in autumn 2001, adding 750,000 rentable square feet of space to the Bethesda CBD. The largest mixed-use complex in the CBD, Metro Center, is built directly over the Bethesda Metrorail station and bus terminal which handles more than 15,000 passengers on the average weekday.

In 1990, the CBD contributed 5% of Montgomery County's property tax revenues, and 15% of the yield from commercial properties. Unlike most suburban downtowns, which are predominantly office complexes, the Bethesda CBD contains extensive retail space and many apartment buildings and hotels. The several hotels host NIH-oriented conferences, visitors, patients, and patients' families.

The Bethesda Urban Partnership organizes events and undertakes maintenance of streets and sidewalks utilizing funds from a special tax levied on property owners.

Total employment in 2000 in the CBD was estimated to be 43,000, of which 31,800 were office workers. Between the CBD, the NIH, and the National Naval Medical Center

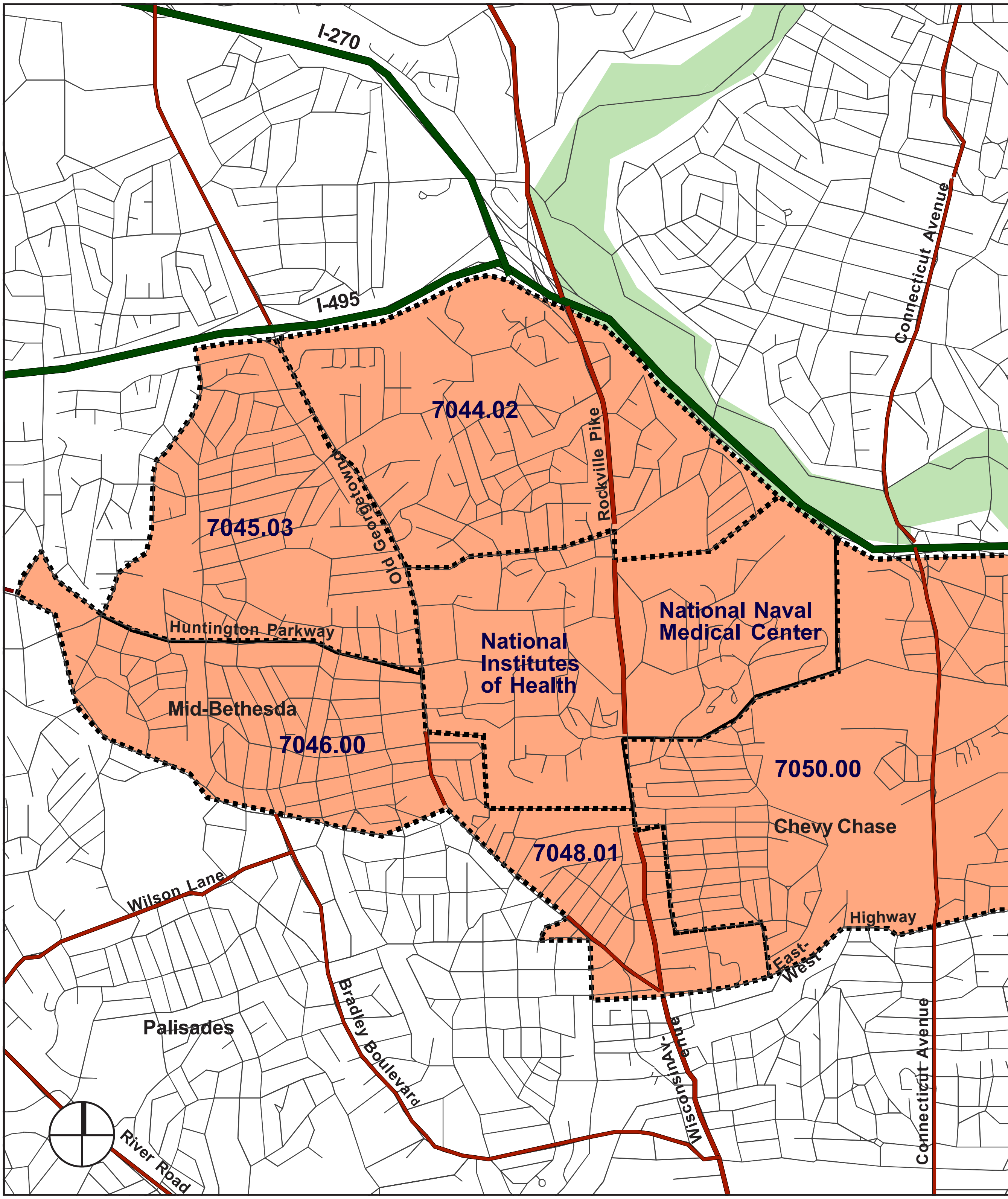


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Figure 3.1.4

Vicinity Census Tracts

(NNMC), the area has one of the largest employment concentrations in suburban Maryland.

Residential development within the business district includes 5,200 units, almost ninety percent of which are high-rise or garden apartments, many completed over the last decade. The 2000 population of the Bethesda CBD was 8,035. Projects range from moderate income rentals to luxury condominiums. In a survey of housing in Bethesda, managers of several apartment complexes said the NIH was an important source of tenants. Battery Lane, the first major east-west street south of the NIH campus, has garden apartment buildings on both sides that cater to NIH personnel. Employees living in this area can access the NIH by a pedestrian path/bikeway extending from Battery Lane, past the Phoenix elderly housing project, to an employee gate leading to the south campus. Singles, young couples, and elderly also comprise the population mix in the CBD. Median housing value is $396,400, and estimated average household income is $99,102

Montgomery County has a number of public facilities within the CBD, including a satellite government center, a police station, a library, and the Bethesda-Chevy Chase High School.

One of the most striking characteristics of the CBD is the partnership among business interests, county government, and residents in the surrounding single-family neighborhoods. This has prevailed throughout recent redevelopment and dates back to the early World War II period. Unlike areas where citizen/government/developer clashes have been frequent, the three groups have good communications and a complex, though positive, working relationship. In addition to the Urban Partnership Board which includes business, county government and local citizen members, a Citizens' Advisory Board, appointed by the county government, meets regularly to review events and issues. Organizations such as Bethesda Evergreen which plants trees in the CBD involve a variety of interests. Other active groups support performance and visual arts in Bethesda, and there are street festivals in the CBD several times a year.

3.1.6 Land Use in Montgomery County

Montgomery County's land area is approximately 497 square miles, or about 321,300 acres. Between 1960 and 1991, the amount of developed land in the county more than tripled. As of 1960, about 49,000 acres (15 percent) of the county's land area had been developed; by 1991 a total of about 155,000 acres (48 percent) was urbanized.

In 1995, land devoted to Research and Development consisted of 1,113 acres (0.3 percent); and for offices 6,276 acres (2 percent). Farming still accounts for 92,466 acres (29 percent), and public space - primarily for parks and recreation, accounted for 45,350 (14 percent).

Residential land uses have continued to grow rapidly, with single family dwellings in 2003 continuing to occupy the largest portion of the expanded urbanized area. In 1960, single-family use comprised 23,700 acres (7.5 percent) of the land area and by 1991, 86,800 acres (26.7 percent) of the county's land area. As of January 2003, single-family dwelling comprise 149,637 acres (51.5%) of zoned land. Multi-family residential land use has been clustered in relatively few locations, utilizing far less land — 700 acres in 1960, 6,700 acres in 1991, and 3,318 in 2003, the latter scarcely over 1.1 percent of the county's land. One of the largest concentrations of multi-family housing in the county is in Bethesda.

The NIH campus is situated at the southern end of the highly developed "Technology Corridor" in Montgomery County. The County General Plan, called "On Wedges and

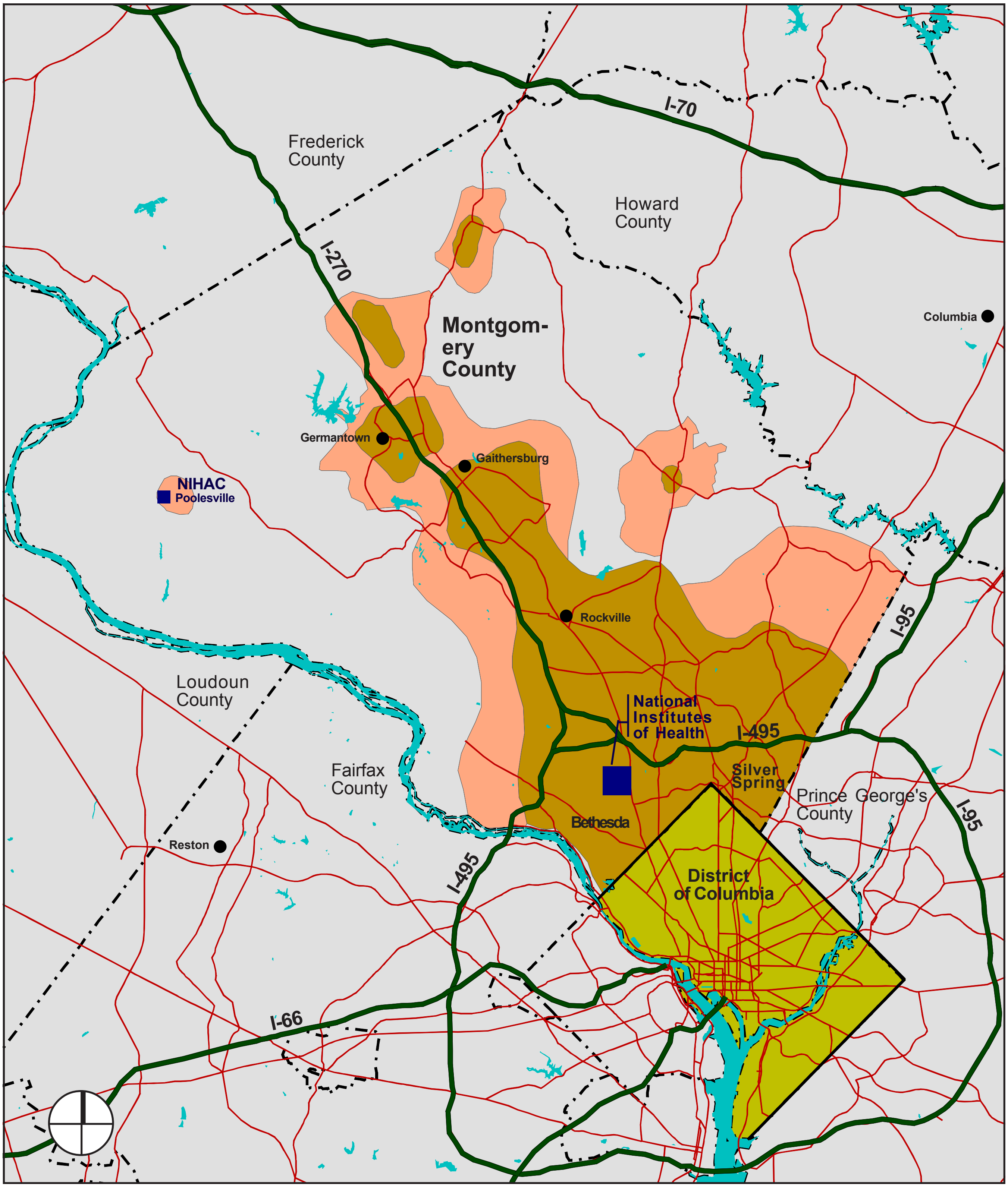
Figure 3.1.5

Bethesda CBD Zoning Plan

Corridors", as it was updated and revised in 1970, calls for growth centers and corridor cities along the concentrated growth corridor of I-270 and Rt. 355 (Rockville Pike), and low-density "wedge" areas east and west of the corridor. Most of this corridor is devoted to residential land uses with clusters of commercial, institutional and industrial land uses along the corridor and wide expanses of agricultural and low-density residential uses in the wedges. The satellite communities of Clarksburg and Damascus to the north, Olney to the east, and Poolesville to the west are interspersed through the low-density wedge areas.

The I-270 corridor is the location of numerous high-technology companies, non-profit organizations and federal agencies, such as the National Institute of Standards and Technology (NIST) and Department of Energy (DOE), housed in large office buildings, office parks and complexes. These groups specialize in telecommunications, biomedical research, computer science, electronics and aerospace just to name a few. The 165-acre Shady Grove Life Sciences Center is in a setting resembling the NIH. Large office-park complexes in the region include the 200-acre Quince Orchard Office Park, the 61-acre Park 270 and the 60-acre Corporate Center. Two major developments which include office, retail and residential activities are the 211-acre Washingtonian and the 210-acre Shady Grove Executive Center. NIH has leased a number of properties in this area. (See Figure 3.7.1)

See County General Plan –Wedges and Corridors, Figure 3.1.6



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Concentrated Growth Centers, Corridor Cities
Low Density "Wedge" Areas

Figure 3.1.6

County General Plan - Wedges & Corridors

3.1.7 Bethesda/Chevy Chase Vicinity Non-Residential Land Use

Predominantly low-to mid-density residential uses, as discussed in Section 3.1.4, comprise the Bethesda-Chevy Chase area surrounding the NIH campus. In addition, however, a limited number of clearly defined, high-density commercial and residential precincts are near the campus as well. Numerous institutional, private and public facilities are dispersed throughout the surrounding area. Several large land holders include federal installations, country clubs, private schools and institutional services. These large land holders, combined with a broad park system and low-density wooded sites, create a strong sense of openness that adds to the special character of the community.

The National Naval Medical Center (NNMC) and the Uniformed Services University of the Health Sciences (USUHS), to the east of the NIH campus, are military installations, which also maintain a campus setting. NIH leases facilities on the NNMC grounds.

Another federal employment center in the area is the National Imagery and Mapping Agency at the southern end of Bethesda-Chevy Chase. Other federal installations, located close by but outside of the Bethesda-Chevy Chase planning boundary, are the Forest Glen Section of the Walter Reed Army Medical Center, 2.5 miles east of the NIH, and the Naval Surface Warfare Center on MacArthur Boulevard.

The Naval Surface Weapons Center on the border of Montgomery and Prince George's Counties at White Oak is currently under development as a campus for the Food and Drug Administration (FDA) which will include new space for relocation of the Center for Biologics Evaluation and Research (CBER) now located in Buildings 29, 29A, and 29B on the NIH campus.

Directly west of the NIH is Suburban Hospital. The hospital, a private not-for-profit facility, currently has 217 inpatient beds, including 31 for long-term care, according to the Public Relations Department at Suburban Hospital. This facility is currently planning a renovation and expansion.

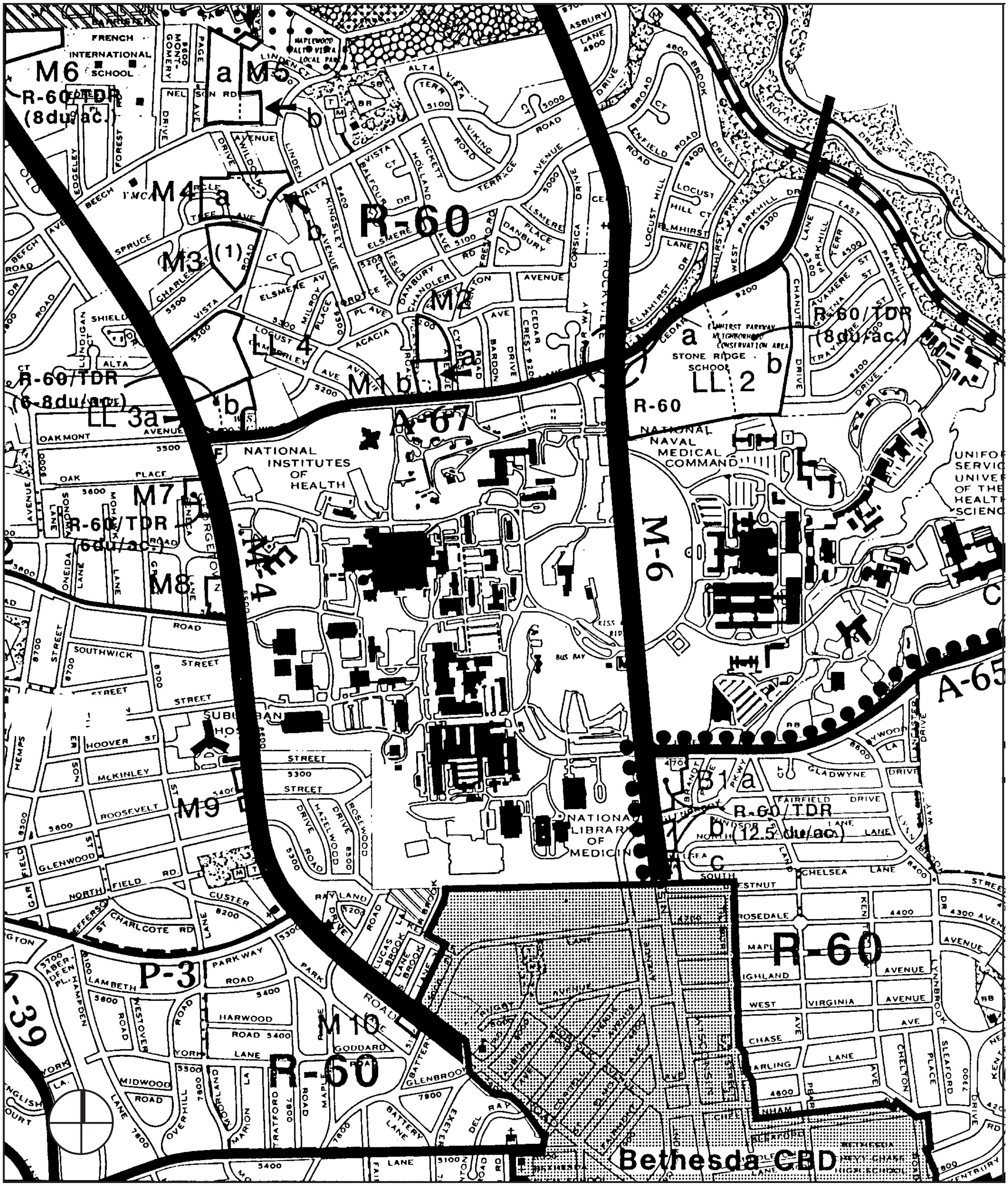

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Figure 3.1.7-a

Local Zoning

Old Georgetown Road, which constitutes most of the western border of the NIH Bethesda campus, contains a variety of uses, including residential properties, schools, churches and synagogues, fire and rescue services, as well as a number of professional office uses. Nearly all of the non-institutional uses along Old Georgetown Road resulted from special (zoning) exceptions for conversions of residences to professional offices. These conversions have impacted both the visual quality and traffic along Old Georgetown Road. The 1990 Bethesda-Chevy Chase Master Plan recommends reinforcement of the area's residential character and the protection of the adjacent single-family neighborhoods from further encroachment by special exception uses, except those that are community-serving.

Old Georgetown Road is an important connector to major NIH leased facilities on Executive Boulevard, Democracy Boulevard and the Rockledge area.

Rockville Pike, on the eastern border of the NIH Bethesda campus, is a major artery which, in the vicinity of the site, features a mix of institutional and commercial uses, in addition to recently developed town house residential units. Several NIH leased office functions are in Rockville in office parks along Rockville Pike north of the Bethesda campus, especially along Executive Boulevard at the Twinbrook and Parklawn complexes or in North Bethesda in the Rock Spring Park office park. The NIH also leases space in the Gateway building on Rockville Pike's southern segment, Wisconsin Avenue, in the Bethesda CBD.

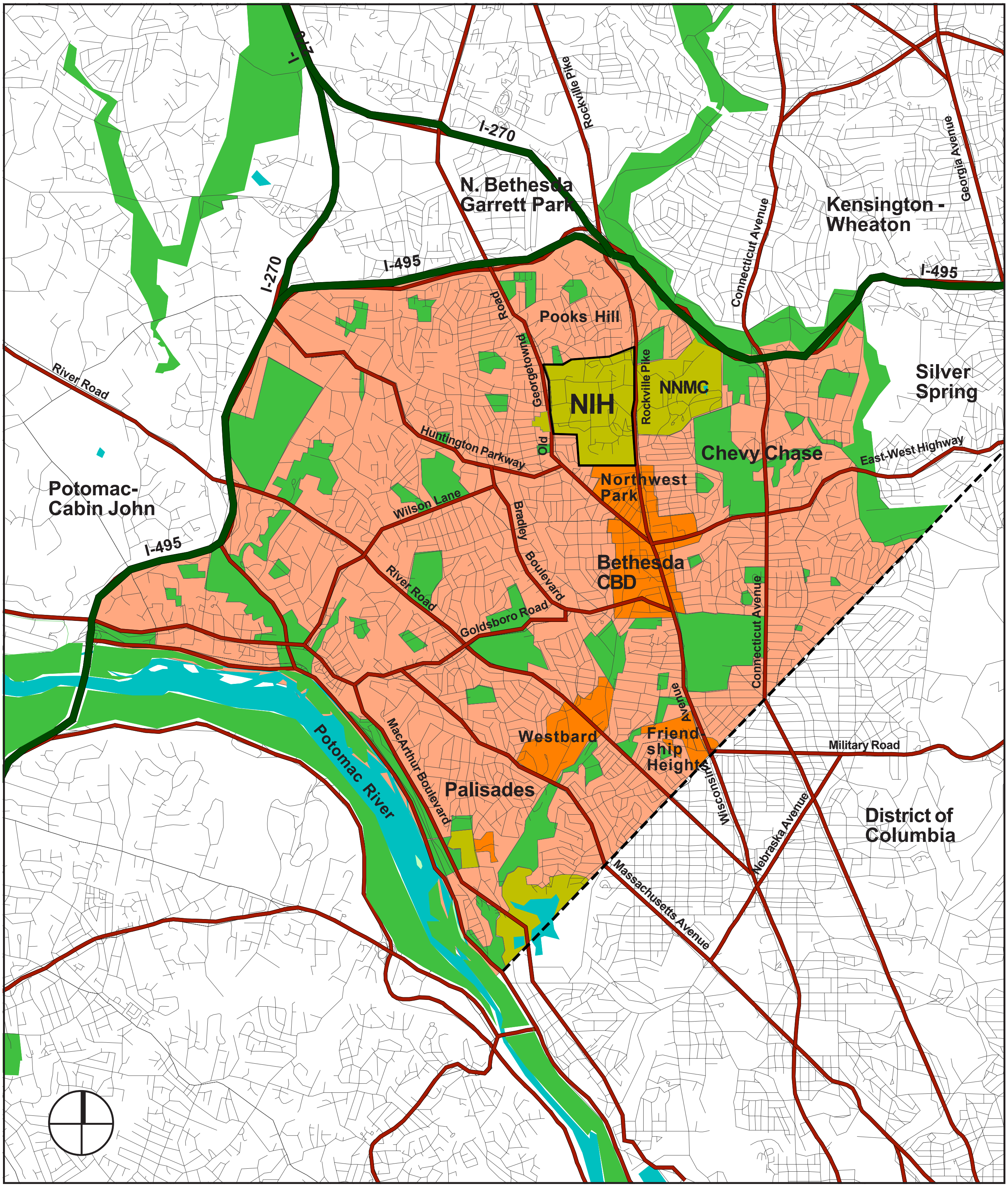
Two major private school properties are on Rockville Pike, the 95-acre Georgetown Preparatory School and the 35-acre Stone Ridge School of the Sacred Heart.

As federal agencies, the NIH and the National Naval Medical Center are exempt from local zoning ordinances. The NIH borders the Bethesda CBD to the south. The CBD contains high-density, multiple family residential (R-10) and townhouse (RT.-12.5) zones. On all other sides of the campus, except the NNMC to the east, is R-60 one-family residential zoning. As noted above, however, there have been a number of special exceptions granted along Old Georgetown Road, especially between McKinley Street and Beech Avenue, a practice the Bethesda-Chevy Chase Master Plan seeks to discourage.

See Local Zoning Map, Figure 3.1.7-a

The Friendship Heights Business District, at the intersection of Wisconsin and Western Avenues bordering Washington, D.C., is a compact, high-density urban area containing a mix of regional department stores, high-rise office buildings, corporate headquarters, specialty retail shops and high-rise housing. The Sector Plan for Friendship Heights was approved and adopted by M-NCPPC in March of 1998. This plan recommends adding up to 1,979,286 square feet of new office, retail, hotel and residential development in the Sector, including as many as 4,490 dwelling units. The area currently has 6,799,814 square feet of space.

Friendship Heights, like the Bethesda CBD, straddles the Wisconsin Avenue corridor which is heavily used as a main artery from Montgomery County to employment centers in the District of Columbia and depends heavily on the WMATA's Red Line Metrorail service to mitigate the additional volume of trips to and from the area. Friendship Heights is also experiencing major development of 313,848 square feet of office and retail under construction on the Chevy Chase Land site.



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- Residential
- Commercial
- Institutional/Government
- Recreational/Open Space

Figure 3.1.7-b

Vicinity Land Use

The Westbard area to the west of Friendship Heights contains a variety of retail-commercial uses, both regional and local. The area includes and is surrounded by single-family and townhouse neighborhoods. It is located on the edge of the environmentally sensitive Palisades district on the Potomac River.

Two other high-density residential neighborhoods are located near the NIH, Pooks Hill to the north and Northwest Park to the south of the campus.

See Vicinity Land Use Map, Figure 3.1.7-b

3.2 Transportation

See Regional Transportation Map, Figure 3.2

3.2.1 Major Thoroughfares

The campus is located at the southern end of the I-270 Corridor which provides an immediate access via Maryland Route 28 west to the NIHAC in Poolesville, Maryland, and to northern parts of Montgomery County, as well as Frederick County and the NCI Frederick research center at Ft. Detrick. I-270, which connects with Interstate 70, provides access to western Maryland, West Virginia and Pennsylvania.

The NIH campus is situated one mile south of I-495, the Capital Beltway, and is served primarily by three Beltway interchanges: Old Georgetown Road, Rockville Pike, and Connecticut Avenue via Jones Bridge Road to the Center Drive campus entrance.

Other major highways that provide indirect connections to the NIH area, through Beltway interchanges, are:

- I-95, U.S. Route 29, and the Baltimore-Washington Parkway to and from Howard County and Baltimore, Maryland.
- U.S. Route 50 to and from Prince George's County, Anne Arundel County and Annapolis, Maryland;
- I-66 in western Virginia;
- I-95 in southern Virginia; and
- Numerous other routes to and from the suburban Northern Virginia communities.

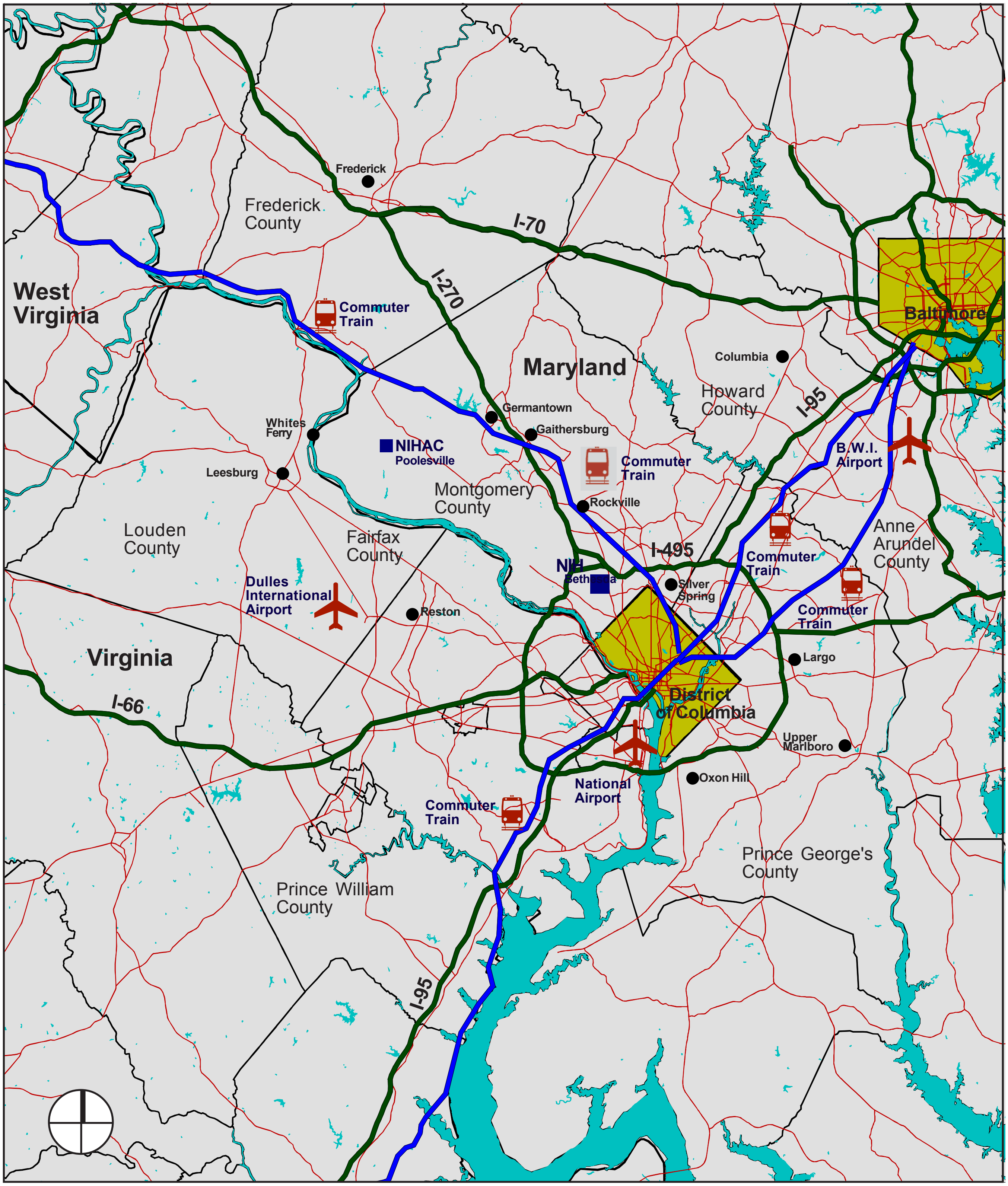
Jones Bridge Road connects the campus to Maryland Route 410, East-West Highway, via Jones Mill Road. East-West Highway is a major thoroughfare to Silver Spring. Rockville Pike/Wisconsin Avenue and Connecticut Avenue provide primary access from the Bethesda campus to the District of Columbia.

NIH employees live and/or work in all the locations served by the major thoroughfares described above.

3.2.2 Airports

Three major airports serve the Washington, D.C., metropolitan area, including the NIH campus:

- Ronald Reagan Washington National Airport, Arlington County, Virginia, 14 miles south. Ground transportation from the NIH is available by Metrorail, Metrobus, and the Washington Flyer airport coach.
- Washington Dulles International Airport, Chantilly, Virginia, 22 miles west.



Cities

Hospitals

Airports

Commuter Train

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Figure 3.2

Regional Transportation

Ground transportation from the NIH is available by Washington Flyer and by Metrorail to the Vienna, Virginia station and shuttle to the airport from there.
- Baltimore-Washington International Airport (BWI), Maryland, 35 miles northeast. Ground transportation from the NIH is available by Metrorail to Union Station, then AMTRAK (intercity rail) or MARC commuter train.

3.2.3 AMTRAK Intercity Rail

Three train stations with AMTRAK terminals are located in the vicinity of the NIH campus:

- Rockville Station, in Montgomery County;
- Union Station, in the District of Columbia; and
- New Carrollton Station in Prince George's County

Other AMTRAK regional terminals are located at the Baltimore-Washington International Airport; Penn Station in Baltimore, Maryland; Rockville, Maryland; Alexandria, Virginia; Lorton, Virginia; Woodbridge, Virginia; Manassas, Virginia; and Quantico, Virginia.

3.2.4 Commuter Trains

Three commuter train lines serve the Washington D.C. metropolitan area from Maryland and provide access via Metrorail connections to the NIH Campus:

- The MARC Camden Line provides commuter service between Baltimore, MD and Washington, D.C. at 20-to 45-minute intervals, during rush hours only.
- The MARC Penn Line provides commuter service between Baltimore, MD and Washington, D.C. at 15 to 40-minute intervals during rush hours, and at 60 minute intervals throughout the remainder of the day.
- The MARC Brunswick Line provides commuter service between Brunswick, MD (and two trains between Martinsburg, WV) and Washington, D.C. (Union Station), with intermediate stops in Montgomery County, including Gaithersburg, Rockville, and Silver Spring, MD at 20-30 minute intervals, during rush hours only.

The Virginia Railway Express offers rail service that connects Manassas and Fredericksburg, Virginia and intermediate points in Northern Virginia with the District of Columbia at several Metrorail stations. Both the Manassas and Fredericksburg lines have four trains on-line and both lines terminate at Union Station with stops at L'Enfant Plaza, Crystal City and Alexandria.

3.2.5 Intercity Bus Service (Greyhound)

Two Greyhound Bus terminals are located near NIH in the metropolitan area:

- Sligo Avenue and Fenton Street in Silver Spring, Montgomery County; and
- 1st and L Streets, N.E., in the District of Columbia, north of Union Station.

3.2.6 Water Traffic

The last surviving ferry on the Potomac River, White's Ferry, carries 24 cars per trip from Dickerson, Maryland to Leesburg, Virginia and back.

3.2.7 Local Roadway System

Immediate north-south access to the NIH campus is provided by two major highways:

Wisconsin Avenue/Rockville Pike and Old Georgetown Road.

From the east, access from Connecticut Avenue and East-West Highway (MD 410) to the NIH campus is provided by Jones Bridge Road, an arterial road. Access from the west is provided by two primary residential streets, Greentree Road and Huntington Parkway. Other important east-west roads are West Cedar Lane, an arterial road to the north of the site, and Battery Lane to the south, within the Bethesda CBD.

See Local Roadway System Map, Figure 3.2.7

3.2.8 Mass Transit

The Washington Metropolitan Area Transit Authority (WMATA) operates Metrobus and Metrorail service throughout Montgomery County and the Washington area. The Medical Center Metrorail station, on the Red Line, serves commuters to and from the campus. The station is served by Metrobus routes J-1, J-2, J-3, and J9. The Montgomery County Department of Transportation operates the Ride-On bus system which provides service from Metrorail/Metrobus stations, including the on-campus Medical Center Station, to points throughout the county. Mass transit is further augmented by NIH shuttle buses that move people to and from designated on-site pick-up locations and to off-campus locations.

Transit Routes Serving the Campus and Service Frequency:

Metrobus Routes

J-2/3: Silver Spring Metro rail Station; East-West Highway and Grubb Road; East-West Highway and Connecticut Avenue; Bethesda Metro Station; Medical Center Metro; Democracy Boulevard and Old Georgetown Road; and Montgomery Mall; 10-to 30-minute intervals.

J-1: Silver Spring Metrorail Station; East-West Highway and Grubb Road; Jones Bridge Road and Connecticut Avenue; Medical Center Metro; Democracy Boulevard and Old Georgetown Road; Peak period service at 20-minute intervals.

J-9 I-270 Express Line: Lakeforest Transit Center; Naval Medical Center; Medical Center Metro; Old Georgetown Road/Battery Lane; Bethesda. Peak period service at 20-to 25-minutes.

Metrorail

Red Line:
Shady Grove to and from Glenmont stopping at Medical Center; 3-to 10-minute intervals.
See Metrorail System Map, Figure 3.2.8

Ride-On Routes

Ride-On is a public bus service operated by the Montgomery County Department of Transportation. Routes serve many county areas and usually run at 3-minute intervals. Following are the routes that best serve the NIH campus:

#34:	Bethesda Metro rail - Bethesda/Wheaton/ Aspen Hill
#42:	Medical Center Metro rail - Bethesda/Friendship Heights Metro rail
#30:	Medical Center Metro - Bethesda Metro
#33:	Medical Center Metro - Kensington/Bethesda/Layhill
#46:	Medical Center Metro rail - Montgomery College Rockville
#70	Germantown - Bethesda Metro/Milestone Park + Ride

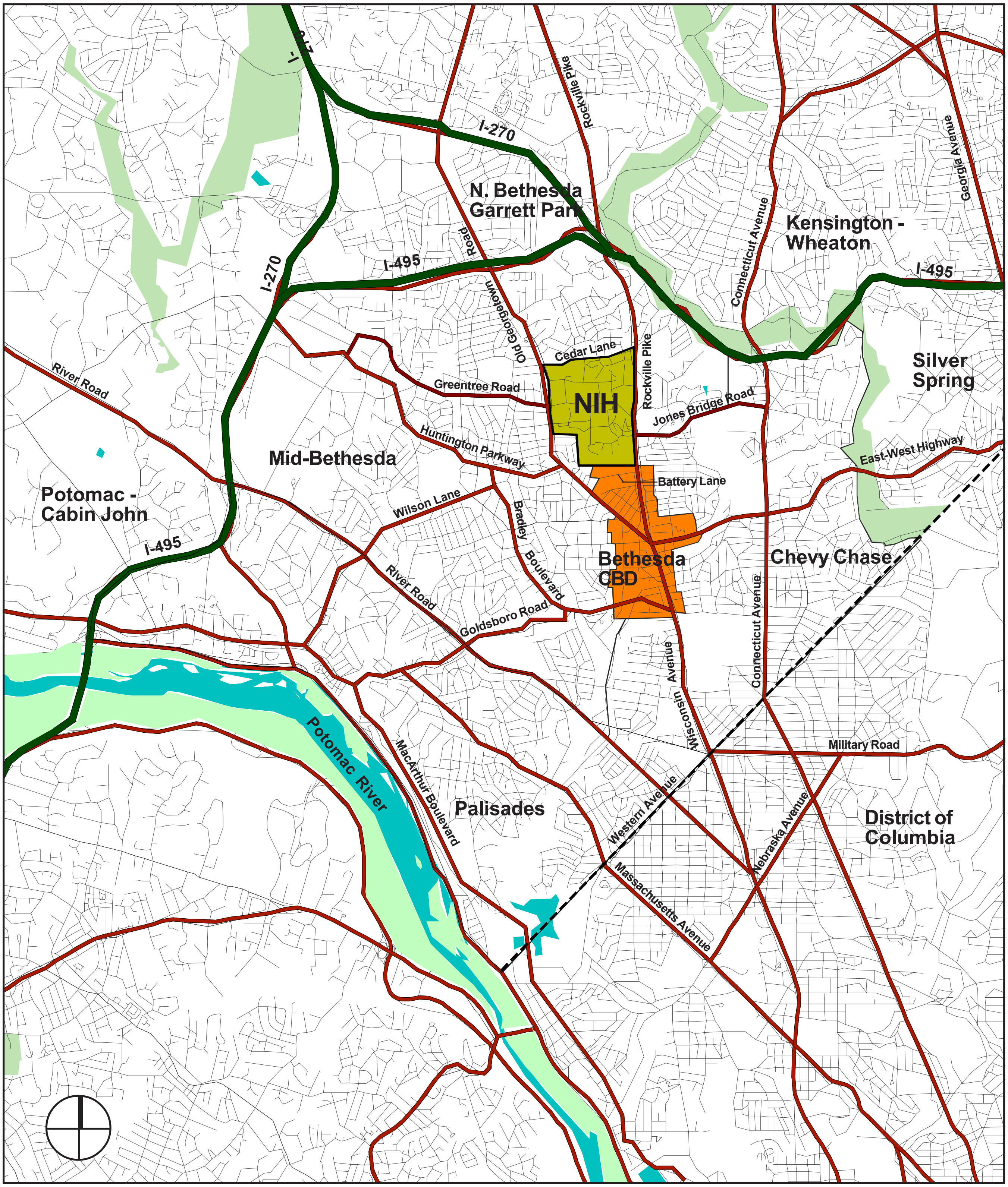

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Figure 3.2.7

Local Roadway System

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Metro Station

Under Construction

Transfer Stations

Figure 3.2.8

Metrorail System

3.2.9 Taxis

Montgomery County has licensed over 550 taxicabs, which includes wheelchair accessible vans available 24 hours, 7 days a week. There are a number of taxicab companies with radio dispatch. Although there is not a taxicab stand on campus, there is one at Old Georgetown Road and West Cedar Lane. In addition, direct telephone lines to taxicab companies are at various campus locations, including Building 31 and the Clinical Center Complex.

3.2.10 NIH Shuttles

The NIH provides shuttle bus services circulating among selected locations on-campus; to the Gateway Building; Executive Plaza, and Rockledge. Shuttle bus service is also provided between the campus and the satellite parking lot at Mid-Pike Plaza on Rockville Pike, and an FDA route between Woodmont and Parklawn. Shuttle service between the campus, National Naval Medical Center, and NCI-Frederick is also available. Shuttle service is regularly reviewed and adjusted to meet increasing needs of off-campus NIH personnel.

3.2.11 Bicycle Accommodations

The Montgomery County Master Plan of Bikeways is designed to meet recreational and transportation needs of the area. There is bicycle access to and around a portion of the perimeter of the NIH campus, but much of the network remains to be developed. A pedestrian and bicycle path along the south border of the campus connects neighborhoods on the west side to Rockville Pike and the Metrorail station. NIH employees using bicycles to access the campus are able to enter the campus through several pedestrian/bicycle entrance gates as well as through vehicle entrance gates using their NIH ID and card keys. Visitors with bicycles will be screened at the Gateway Center for visitors at the South Drive and Rockville Pike entrance. Bicycle paths and routes are provided within the campus and bicycle racks and lockers are provided for cyclists' use at the Medical Center Metrorail Station and at most major buildings. The NIH has biycle facilities capable of securing over 600 bicycles on the campus, including bucycle racks and lockers. Several buildings have showers and lockers for bycyclists. An active NIH Bicycle Commuter Club recommends bicycle facilities needs to the NIH management.

3.3 Utilities

3.3.1 Water

Water is supplied to the NIH by the Washington Suburban Sanitary Commission (WSSC), and the Bethesda campus is surrounded by the WSSC transmission and distribution grid. WSSC maintains 12-inch and 24-inch diameter mains under Old Georgetown Road and a 24-inch main under West Cedar Lane. The water main along Rockville Pike is 12-inch in diameter between West Cedar Lane and South Drive, and 8-inch in diameter to the south. The system head or pressure elevation is 495 feet. Area mains are fed by water from the WSSC Patuxent and Potomac Water Filtration Plants.

In its review of the Draft EIS for the 1995 Master Plan, WSSC indicated that there was

3.3.2 Gas

Natural Gas is supplied to the NIH Power Plant by the Washington Gas Light Company from gas mains along West Cedar Lane and Old Georgetown Road.

In the event additional natural gas service is needed in the Bethesda area in the future (i.e., after 2011-2012) to serve NIH or others, NIH believes all affected parties within the service area, including itself, other government authorities, County officials, and local communities should be involved in discussions regarding this new service.

NIH, as it has done in the past, will continue to reexamine its utility requirements on the campus on a regular basis and alert the appropriate authorities, as well as the community, in the event our requirements dramatically change. The master plan will continue to be updated on a regular basis and if new proposals come forward that would introduce a new utility requirement, not identified in the Master Plan 2003 Update, these proposals will be reviewed, shared with the community, and go through the established environmental and other review processes with the federal state authorities that presently oversee development on the Bethesda campus. If NIH would require a new natural gas line in the future dedicated solely to NIH use, it will follow the NEPA process. If area natural gas demands (Bethesda CBD, NNMC, residential growth, etc.) require expansion of the oublic system, NIH will follow and participate, as appropriate, in all applicable environmental review processes.

3.3.3 Sanitary Sewer

NIH is in the WSSC sanitary sewer service area. WSSC maintains an 8-to 12-inch diameter sanitary collection main under Old Georgetown Road, and a 15-inch main under West Cedar Lane on the north side of the campus. Beginning at Rockville Pike, an 18-inch sanitary relief sewer runs parallel to the 15-inch Cedar Lane main. The 15-inch main carries an estimated 80,000 gallons per day of sanitary waste from sources outside NIH.

3.3.4 Stormwater

With the exception of a 32-acre area in the southeast corner and 5-acre area along Old Georgetown Road, all of the NIH campus drains to the northeast toward the West Cedar Lane/Rockville Pike intersection. The drainage area upstream from this point is 455 acres, including 57 acres in the Edgewood/Glenwood neighborhood to the southwest of the campus, 55 acres north of West Cedar Lane in Maplewood, and 25 acres east of the NIH along Rockville Pike and on the National Naval Medical Center property.

The second drainage area covers the northern sector of the campus. The dry channel of the North Branch of the NIH Stream is the main drainage system for this area. Flows occur in the branch only during wet weather. The branch flows in a 48-inch diameter culvert under the residential area between West and Zelkova Drives. Elsewhere it is confined to a concrete-lined channel as it crosses the campus. Campus drainage occurs via overland flow, and through small individual collection networks serving building roofs and street and parking lot inlets. Stormwater drainage from West Cedar Lane and the western two-thirds of Maplewood also flows to the channel by direct pipe connections.

The third drainage shed is independent of the other two, covering the southeast corner of the campus. Most drainage is overland. A small storm drain network collects flows from the vicinity of Buildings 38, 38A and MLP-7 and directs them to a small dry stormwater pond to the southeast of these structures.

The storm drainage system on the Bethesda campus has sufficient capacity for the 10-year storm event. During the 100-year storm event some flooding occurs in the vicinity of Building 46 and the Child Care Center. This area of flooding will be alleviated during implementation of the Master Plan 2003 Update.

Stormwater management (SWM) for the campus is regulated by the State of Maryland Department of the Environment. Recent construction projects have been bringing the "project site" areas into compliance with the State requirements for quantity and quality control of stormwater runoff. Insofar as possible, the NIH will attempt to meet county stormwater management criteria as well.

NIH has prepared a Draft NIH Bethesda Institutional Stormwater Management Plan (ISMP), which has been submitted to the Maryland Department of the Environment (MDOE) for review. The ISMP proposes management on a campus-wide basis.

A North SWM facility, shown as an open pond in the 1995 Master Plan, has recently been completed and consists of underground fields of large diameter pipe laid side-by-side in rows about 50 to 100 feet in length. The facility will capture runoff from the entire North Branch watershed, as well as roof top drainage from the new CRC and Building 10 that lie within the NIH Stream basin. Release of stored runoff is controlled through a single smaller diameter outlet pipe for each buried field.

NIH and Montgomery County have signed a Memorandum of Understanding (MOU) wherein the NIH is willing to consider granting an easement for and implementation of a new county SWM facility, provided that certain conditions are met and issues are satisfactorily resolved.

The proposed county Stormwater Management Facility, or Stony Creek Pond, will have three elements. The first is an underground screening facility to trap trash and sediments. Access would be provided through the roof for clean-out and maintenance. Runoff would then flow into a small forebay water pool, about 60 feet in diameter, where settlement of suspended material would occur. Outfall from the forebay pool would then flow into the main pool, which would be one acre in extent under dry weather conditions. The pools would have water depths up to 5 or 6 feet in the center. Montgomery County requires fencing around all wet ponds greater than two feet in depth.

3.3.5 Electrical Power

Power is supplied to the campus by the Potomac Electric Power Company (PEPCO) via two PEPCO substations. PEPCO Substation 80 is located in Building 17 to the northwest of the Rockville Pike/South Drive intersection. Primary distribution to the substation is via four 35 kilovolt (KV) lines from Rockville Pike. PEPCO operates four 20,000 kilovolt-amp (KVA) transformers in Building 17. PEPCO Substation 167 is located in Building 46 on the southwest side of the campus. It is served by three 35 KV lines, extending from Old Georgetown Road, that supply three 20,000 KVA transformers.

A third PEPCO/NIH substation Building 63, the North NIH Substation, was completed in 2003. The purpose of the station is to not only provide needed additional capacity, but also increase service reliability. The substation has space for three 30,000 KVA, 35/13.8 KV transformers. Only two of the transformers have been installed initially. They will be dedicated to NIH service.

Cogeneration: Boiler 7, which is planned for 2007 installation, would supply steam to drive a small 5 MW electric power generating turbine or COGEN unit. The power generated would be used by NIH in Building 11 and elsewhere on campus as a back-up in case of loss of outside power. When not serving this purpose, the power could be used to drive the cooling towers, auxiliary pumps and equipment supporting the steam-driven chillers. This load is estimated to be about 4,650 KW (4,900 KVA).

3.4 Cultural Assets

See Cultural Resources Map, Figure 3.4.1

3.4.1 Educational Assets

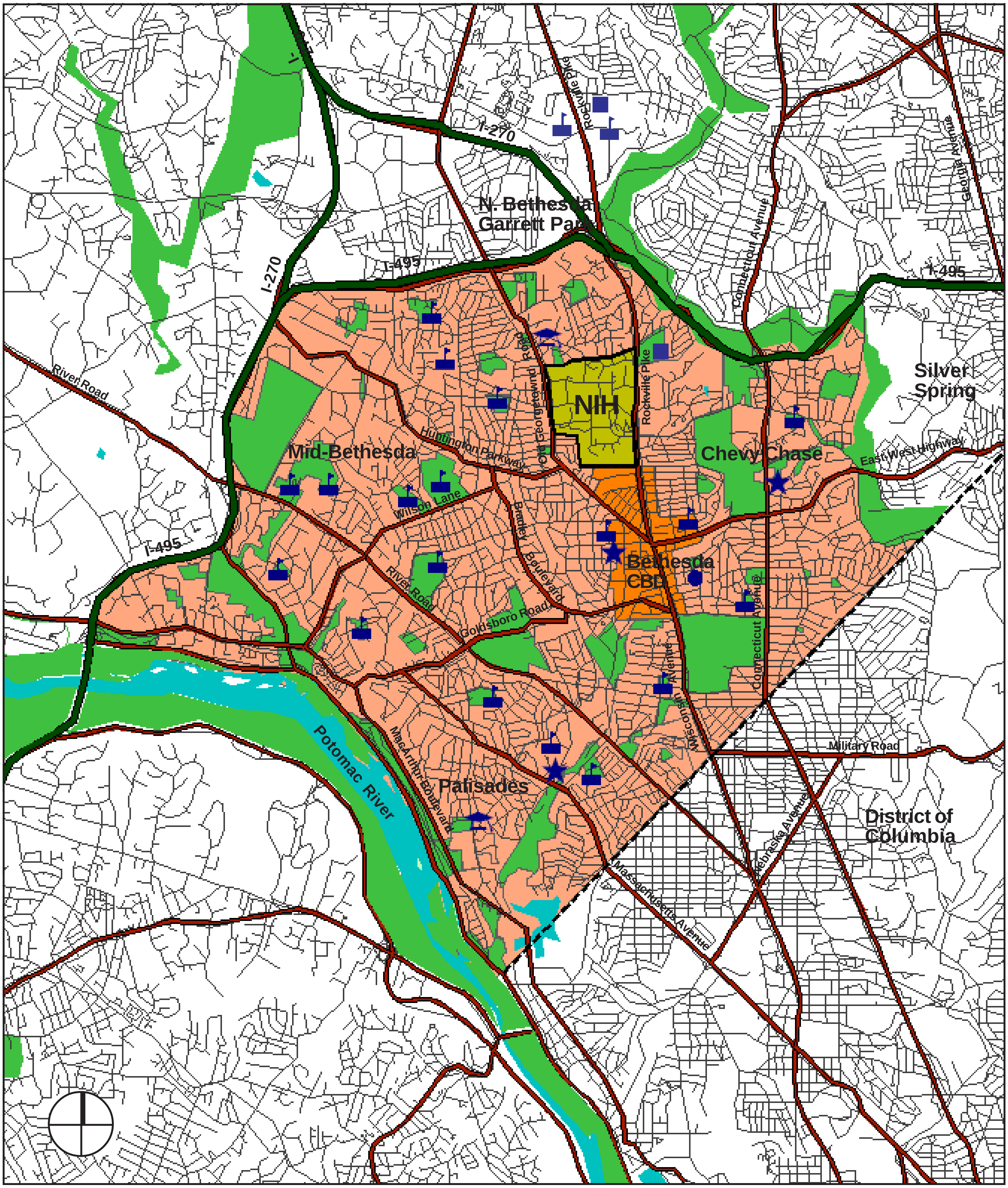
- The Montgomery County public high school districts serving the neighborhoods near the Bethesda campus are the Walt Whitman, Walter Johnson, and Bethesda-Chevy Chase clusters. These are served by three high schools, five middle schools and nineteen elementary schools. The 1990 Bethesda-Chevy Chase Master Plan endorses the use of public school sites as flexible resources for a range of recreational, civic, and educational purposes that meet community and neighborhood needs.

- The Stone Ridge School of the Sacred Heart is a Roman Catholic college preparatory day school for girls located on a 35-acre site on Rockville Pike and Cedar Lane opposite the NIH.

- The Georgetown Preparatory School is a Roman Catholic, Jesuit day and boarding school for boys on a 95-acre site on Rockville Pike at Strathmore Avenue, opposite Strathmore Hall about 2 miles north of the NIH campus.

- Academy of the Holy Cross is a Roman Catholic day preparatory school for girls on a 3-acre site adjacent Strathmore about 2 miles north of the NIH campus on Strathmore Avenue.

- The Uniformed Services University of the Health Sciences (USUHS), located on the site of the National Naval Medical Center and accessible from an entrance on Jones Bridge Road, is a military institution and medical school with no current community program or formal relations with the NIH. Other local medical schools are located at Johns Hopkins University and the University of Maryland in Baltimore, Maryland and Howard University, Georgetown University and George Washington University in Washington, D.C.



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	Parks/Recreation
X	Schools
\	Colleges
?	Libraries
$	Community Centers
■	Performance Arts

Figure 3.4.1

Cultural Resources

- The American College of Cardiology (ACC), located on Old Georgetown Road north of the campus is a professional society of over 25,000 cardiovascular physicians and scientists from around the world that support ACC's mission, "to foster optimal cardiovascular care and disease prevention through professional education, promotion of research, leadership in the development of standards and guidelines, and the formulation of health care policy."

- The Foundation for Advanced Education in the Sciences (FAES) is located at 9109 Old Georgetown Road. The beginnings of FAES can be traced back to the early 1950s, when a Graduate Evening Program was formed at NIH to permit members of the science and medical community to supplement laboratory training with advanced formal education. By 1959, FAES was incorporated as a non profit organization with a mission "to foster and encourage scientific research and education, and to facilitate communication among scientists, by whatever means may be practical."

  Each year approximately 3,000 individuals participate in the courses offered by the FAES Graduate School at NIH. Courses are offered at both graduate and undergraduate levels. The majority of the school's faculty is made up of NIH staff, making their specialized knowledge available to a wider audience. Although the primary recipients of the school's programs have always been members of the NIH scientific staff at all levels, courses are also open to other federal employees and the general public.

  There are presently almost 184 courses at the school, each certified by the Maryland Higher Education Commission and accepted for credit at most universities. The majority of the classes are in the biomedical field. However, there is strong representation in the physical and behavioral sciences, and in English and foreign language studies.

- The Howard Hughes Medical Institute (HHMI) at 4000 Jones Bridge Road in Chevy Chase, MD, is a nonprofit medical research organization that employs hundreds of leading biomedical scientists working at the forefront of their fields. In addition, through its grants program and other activities, HHMI is helping to enhance science education at all levels and maintain the vigor of biomedical science worldwide.

  The Institute is one of the world's largest philanthropies, with laboratories across the United States and grants programs throughout the world. HHMI's endowment in early 2002 was approximately $11 billion.

- On the NIH campus is the Mary Woodard Lasker Center for Health Research and Education of theHHMI.

  The Institute offers medical students a one-year sabbatical to do research in an NIH laboratory in the hope that students with first-hand experience in the laboratory will be more likely to carry out research after they graduate.

  The program, now eight years old, has placed over 230 students from 73 medical schools in various NIH laboratories. It has proved so popular that HHMI has slowly expanded the class size from 23 to 50, and some students, absorbed in their research, elect to stay a second year.

Students can put their medical background to the test in one of almost 300 NIH laboratories under the guidance of a tenured investigator. Some participants start and complete their own projects during their stay, while others take over experiments already in progress. Students spend 40 to 80 hours per week in the laboratory and must give a presentation of their work to their fellow students. Participants live on the NIH campus in a former convent built in the 1920s by the Sisters of the Visitation.

The NIH itself has an extensive educational and training program for pre- and post-doctoral students, totaling over 12,000 appointments per year. The NIH also runs an annual educational series of lectures for the public called “Medicine for the Public” given in the Masur Auditorium of the Clinical Center. Most of the Institutes participate in an outreach educational program, Adopt-a-School, through which speakers from the Institutes go to local high schools or groups of high school students are brought to the NIH. Institutes have also assisted schools with donated furniture and equipment and provided volunteers to read to students and provide other educational assistance.

3.4.2 Libraries

- The Bethesda Regional Library and two community libraries, the Chevy Chase Library and the Little Falls Library, serve the Bethesda-Chevy Chase area.

- The National Library of Medicine (NLM), located on the southeast corner of the site, is open to and used by the worldwide medical community as well as the public at-large, and is the world’s largest research library in a single scientific and professional field. It has an expanding collection of 5.8 million books, journals, audiovisuals, microforms, historical items, manuscripts, etc. Begun in 1836, the Library today has a statutory mandate from the Congress to apply its resources broadly to the advancement of medical and health-related sciences. Traditionally, this advancement took the form of collecting, organizing, and making available its immense collections. In addition to continuing to provide these traditional services, the Library is in the forefront of the Information Age creating and providing access to the Medical Literature Analysis and Retrieval System (MEDLARS) which represents a family of over forty medical information databases available to individuals and institutions throughout the world. The most famous and most frequently used database is MEDLINE®.

  The NLM also conducts research and development in the uses of computer, communication and audiovisual technologies to improve the organization, dissemination, and utilization of biomedical information.

- Other libraries on the NIH campus are the National Institutes of Health Library and the Patients’ Library, both in the Clinical Center, and a small library in Building 12A. In 1995, the NIH established an Environmental Reading Room in Building 31 to permit community residents access to documents related to construction, waste management, master planning and environmental management.

3.4.3 Community Centers

The Chevy Chase Community Center is the only public center in the area.

3.4.4 Parks and Open Space

There are approximately 30,000 acres of parks in Montgomery County and 700 acres of parkland within the Bethesda/Chevy Chase area, with 193 acres in community use parks. The remaining acreage is in the county-wide parks: Rock Creek Stream Valley Park is the eastern boundary of the planning area; Cabin John Park and Booze Creek Park are located in the western portion of the stream valley; Little Falls Park starts in the central portion of the area and runs to the southern boundary. These parks are interconnected along major stream valleys and provide public access to streams and trails for jogging, hiking and bicycling.

The recreational facilities within the parks include 30 ball fields, 42 tennis courts, 8 recreation centers, 35 playgrounds, hiker-biker trails and an outdoor swimming pool.

The NIH campus itself is used by the NIH employees for walking, biking, and passive and active recreation on the lawns. The surrounding community also enjoys the space outside the perimeter fence.

3.4.5 Recreation

An important private open space resource for the largely developed area of Bethesda-Chevy Chase are the private country clubs, which provide many recreational functions and serve the needs of the surrounding community as well:

- Chevy Chase Country Club
- Kenwood Country Club
- Burning Tree Country Club
- Burning Tree Recreation Center
- Columbia Country Club

3.4.6 Historic Resources

The architectural heritage of the Bethesda/Chevy Chase area is quite significant, and includes historic structures ranging from early farmhouses to grand estates. Numerous sites within the boundaries of the Bethesda-Chevy Chase Planning Area are listed in the National Register of Historic Places, including: Bethesda Meeting House; Bethesda Naval Hospital; Chevy Chase Historic District; Woodend; Chesapeake and Ohio Canal National Historical Park, including Locks #7, 8, and 10; Clara Barton House; Glen Echo Chautaqua; Milton Loughborough House; Cabin John Aqueduct; Wiley-Ringland House; Robert Llewellyn Wright House; and the David W. Taylor Model Basin.

Montgomery County's Master Plan for Historic Preservation (1979) contained in Chapter 24A of the Montgomery County Code (1979, rev'd. 1989) and the Historic Preservation Ordinance of Montgomery County are designed to protect and preserve the county's historic and architectural heritage. The George Freeland Peter Estate is the only site on the NIH campus listed on the County's Master Plan for Historic Preservation.

The following historic sites listed on the Master Plan for Historic Preservation are

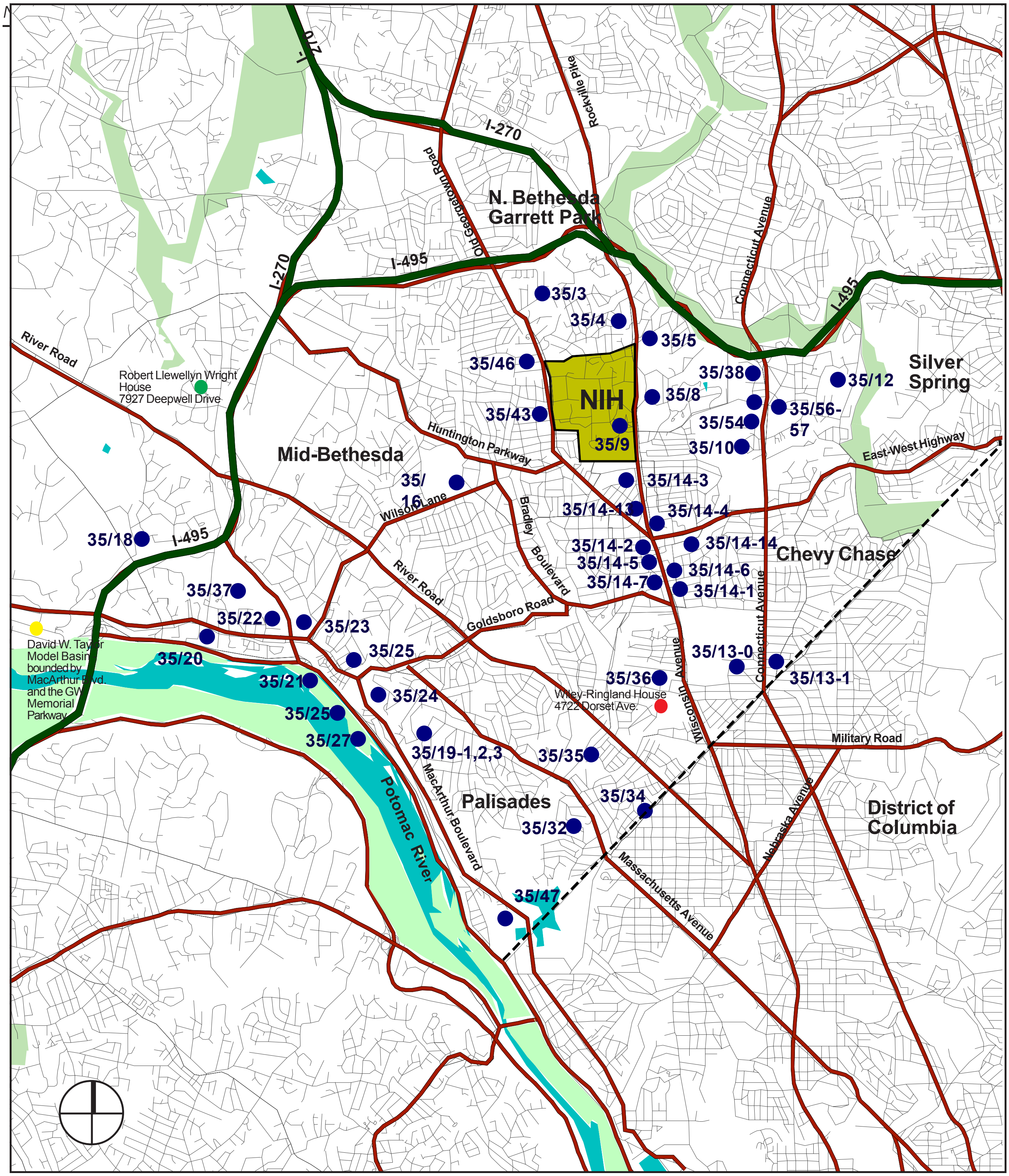

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Figure 3.4.6

Historical Resources

located within the boundaries of the Bethesda/Chevy Chase planning area:

(35/3)	Alta Vista
(35/4)	Samuel Perry House
(35/5)	Bethesda Meeting House
(35/8)	Bethesda Naval Hospital Tower Block
(35/9)	George Freeland Peter Estate (NIH)
(35/10)	Hayes Manor
(35/11)	Chevy Chase Lake/Trolley Station (moved out of the county)
(35/12)	Woodend
(35/13)	Chevy Chase Historic District and numerous individual sites located in Chevy Chase Section 3, Section 5, and in the vicinity of Martin's Additions.
(35/13)	1 - Corby Mansion
(35/14)	1 - Farm Women's Market
	2 - Madonna of the Trails Statue
	3 - Little Tavern
	4 - Bethesda Theater Complex
	5 - Bethesda Post Office
	6 - Brooks Photographers
	7 - Community Paint & Hardware
	13 Leslie Beall House (Mrs. Wither's House)
	14 Bethesda-Chevy Chase High School
(35/16)	C. W. Landsdale House/Landon School
(35/18)	W. Lynch House
(35/20)	Lock #10 & Lockhouse
(35/21)	Lock #8 & Lockhouse
(35/22)	Oakmont/Rammed Earth House
(35/23)	Cabin John Hotel Gas House
(35/24)	Reading House
(35/25)	Clara Barton House
(35/26)	Glen Echo Chautaqua [Historic District]
(35/27)	Lock #7 & Lockhouse
(35/29)	1 - Baltzley Castle
	2 - R. A. Charles Castle
	3 - Kimmel House
(35/32)	Civil War Earthworks
(35/34)	DC/MD Boundary Stones
(35/35)	Milton House
(35/36)	Somerset Historic District
(35/37)	Cabin John Aqueduct
(35/38)	"In the Woods"
(35/43)	Bethesda Community Store
(35/46)	Walter Johnson House
(35/47)	Bonfield's Garage
(35/54)	Hawkins Lane Historic District
(35/56)	Hurley -Sutton House
(35/57)	Gilliland-Beloom House

See Historical Resources Map, Figure 3.4.6

3.4.7 Other Cultural Assets

- Strathmore, an 11-acre arts facility centered on the Strathmore Hall mansion with a new 2000-seat concert hall is scheduled for completion in 2005 and will become the summer home of the Baltimore Symphony Orchestra.

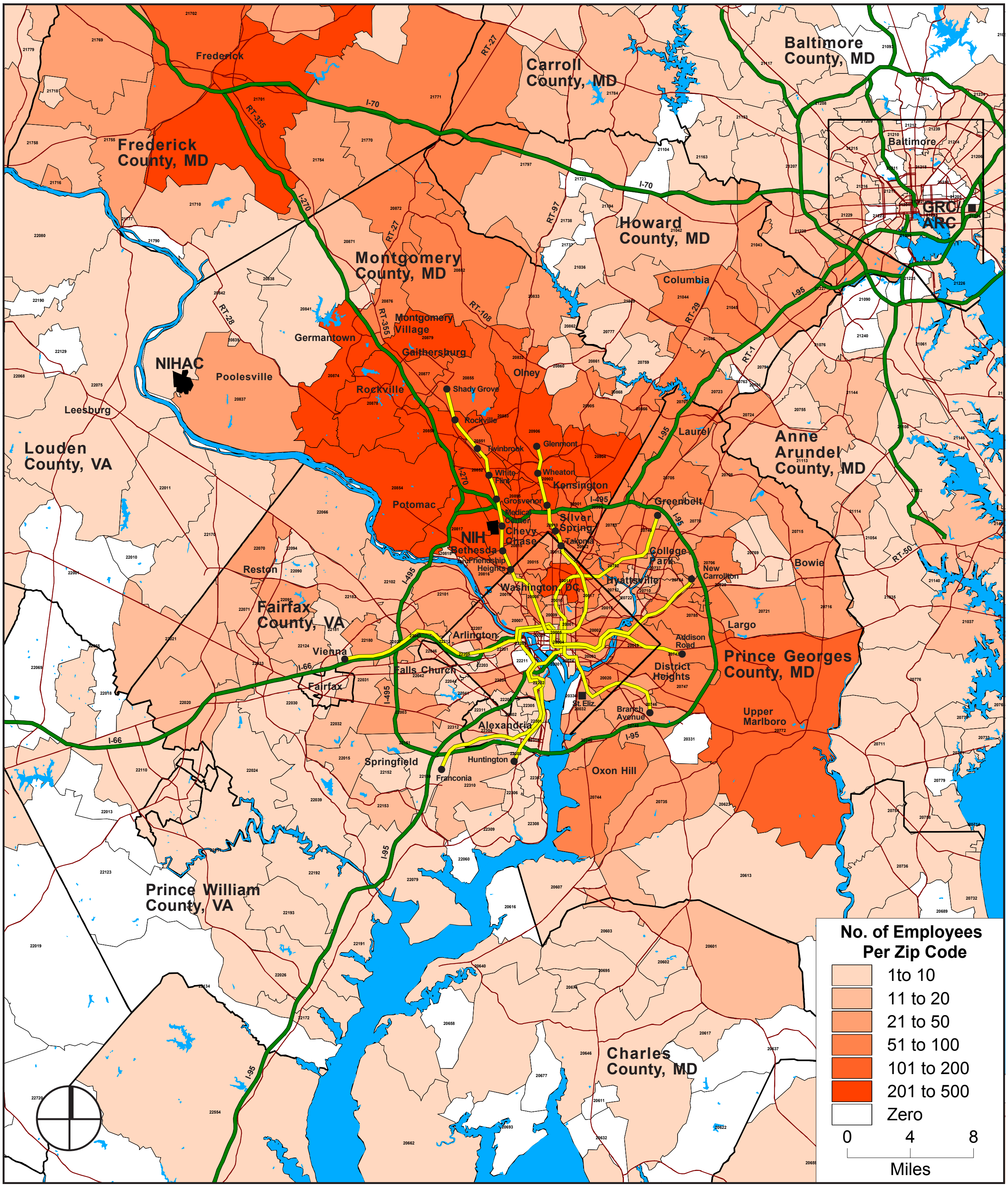

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Figure 3.5.2

NIH Employee Distribution

3.5 Population

3.5.1 Population Trends

The population of the Washington-Baltimore Consolidated Metropolitan Statistical Area (CMSA) in 2000 was 7.7 million, making it the fourth largest CMSA in the nation. It is also one of the most rapidly growing of the larger urbanized areas, with a population increase of more than 13% since 1990. The MD-VA-DC Metropolitan Area portion had 4.9 million people in 2000, an increase of 16.6% over 1990. The Baltimore region's population increased 7.2% in the 1990s, reaching 2.6 million by 2000.

Fairfax County is the largest jurisdiction within the Washington-Baltimore region, and with 969,749 people in 2000, it has increased by 18.5% within the last nine years. Prince George's County ranked third, with 801,515. Fairfax County's population represents about 18% of the total MD-VA-DC Metropolitan Area population, and about 13% of total CMSA population.

Although Loudoun County has grown at a much faster rate that its sister county since 1990, Fairfax County has been one of the most rapidly growing of the larger jurisdictions in the region over the same period. Population increased by 151,165 over this period, or 18.4%. During this same time, Montgomery County grew by 116,314 or 14.5%, and Baltimore County by 62,158, just 9%. Several newly urbanizing jurisdictions on the urban periphery posted larger percentage gains: Howard and Calvert counties in Maryland grew by 32.3% and 45.1%, respectively, and Spotsylvania and Loudoun Counties, Virginia increased their population, by 57.5% and 96.8%.

Projections call for Montgomery County to continue to grow, albeit at a somewhat slower rate than over the past decade. By 2010, Montgomery County is expected to increase by about 105,500 people, bringing its total population to 975,000; by 2020 the total population is expected grow by another 75,000, passing the 1 million mark.

Though the average household size in Montgomery County declined from 2.77 persons in 1980 to 2.65 persons in 1990, it has increased slightly since then, by 0.4%, to 2.66 persons in 2000. The total number of households has increased from 203,800 in 1980 to 324,565 in 2000 or an increase of 60%. The number is expected to rise to 370,000 in 2010 and to 405,000 in 2020. Multi-family households make up 30% of the total households, whereas single-family households account for 70% of the total.

A noteworthy amount of growth in the population was accounted for by persons 65 years of age or older, reflecting national trends. Their percentage of the total population increased from 8.7% in 1980 to 11.2% in 2000, whereas those aged under 20 years decreased from 29.7% to 27.2% in 2000.

Montgomery County residents are well-educated. In 2000, 54.6% of residents 25 years of age and older completed 4 or more years of college. Potomac and Bethesda contain the greatest concentration of persons with highest college and graduate degree attainment.

3.5.2 The NIH Employee Distribution

The people working at the Bethesda campus, locally-leased sites, and at Poolesville, Frederick and Baltimore live in every jurisdiction of the Washington-Baltimore CMSA and beyond in Pennsylvania, Delaware and West Virginia. They are widely scattered, with no more than 700 in a single zip code.

The 2003 population of 17,511 workers at the Bethesda campus consist of two broad categories:

- Approximately 14,200 NIH employees, that is, staff on wage grade schedules, clinical associates, staff fellows and senior staff fellows, visiting associates and scientists, and stay-in-schoolers. The distribution of most of these has been determined through records of the NIH Office of Human Resources Management,(OHRM) and they are widely dispersed in 420 zip codes in various densities.

See NIH Employee Distribution Map, Figure 3.5.2

- Approximately 3,300 non-employees, including Intramural Research Training Award (IRTA) Fellows, visiting fellows, guest researchers, volunteers, consultants, contractors and auxiliary personnel. The distribution of most of these has also been determined through records of the OHRM, but nearly a third, particularly volunteers and contractor personnel, are distributed throughout the region in a way unknown to the office.

The distribution of NIH employees by state is 7.8% in Virginia, 7.5% in the District of Columbia, and 84.3 % in Maryland, primarily in Montgomery County.

There are 23 Zip Codes in Maryland with 95 or more resident NIH employees comprising 6,869, or 53% of the NIH Bethesda campus population, and 14 Zip Codes, each with 200 or more NIH employees, comprising 5,315 or 30% of NIH Bethesda campus employees: The largest of these are:

Table 3.5.2

Zip Code	Community	Number of Employees
20814	Central Bethesda	693
20817	Mid-Bethesda	630
20878	Gaithersburg / Quince Orchard	626
20906	North Silver Spring	424

Bethesda-Chevy Chase/Cabin John/Kensington contain 15.5% of the NIH population, which are the most likely areas from which NIH employees who walk or bike are drawn.

The Gaithersburg and Germantown areas together account for 1,701 employees, or 9.6% of the NIH total, greater even than the District of Columbia's total (955). The two jurisdictions have similar land areas (71.2 sq. mi. & 68.52 sq. mi., respectively), but while D.C. is served by 41 Metrorail stations, the other area has none - the nearest being Shady Grove in Rockville. Virginia accounts for only 1,002 employees.

The largest concentrations of NIH employees in the District of Columbia are in Zip Code 20011 (157) near the Ft. Totten-Takoma Metrorail stations, in northeast D.C. The next greatest is Zip Code 20008 (103) around the Woodley Park-Zoo-Adams Morgan, Cleveland Park and Van Ness-UDC Metrorail stations in Northwest D.C..

The largest concentration of NIH employees in Virginia are in Zip Codes 22904/22102 (78) in McLean, and the next greatest is in Zip Codes 22180, 22181 and 22182 (64) in Vienna.

3.6 Economy and Housing

3.6.1 The Consolidated Metropolitan Statistical Area (CMSA)

The Washington - Baltimore DC-MD-VA-WV CMSA was created by the Bureau of the Census in 1992. The CMSA has a total 2000 population of 4,923,153 living in 1,848,064 housing units of which 64% are owner-occupied and 36% are renter-occupied.

The total labor force (over 16) in 2000 was 2.7 million, with 48.6% in management, professional and related occupations. The median household income was $62,206. A little over five percent of families were below the poverty level.

3.6.2 Washington D.C. Primary Metropolitan Statistical Area (PMSA)

The industrial bases in the Washington, D.C. metropolitan area are not typical when compared with those of the nation as a whole. Employment in the manufacturing sector in Montgomery County, for example, is small relative to that of the nation, or 4.3% compared with almost 14.1% nationally. Not surprisingly, government employment is much more important, accounting for 21.7% of jobs.

The dominant non-government employment sector in the area is the services sector, which covers occupations from unskilled to highly professional. The major sub-categories are business services and health services. Total employment in 2000 for the metropolitan area was well over 2,500,000 persons.

Job growth has generally kept up with the population dispersion, especially around the Beltway corridors. By the year 2000, more than half of the region's employment was in Montgomery, Prince George's and Fairfax Counties. The District of Columbia's employment share has dropped from 43% to 30% of regional jobs.

In 2000, NIH employees represented over 3% of all government employees in the Washington D.C. metropolitan area.

3.6.3 Montgomery County

Income Levels
Montgomery County had a higher median household income in 1999 ($71,551) than the state ($52,868) and the nation ($41,994), as well as a higher percentage of households with an income over $50,000 per year (68% in Montgomery County).

Employment
Montgomery County's status as a major employment center in both the region and the state is reflected in the size of its at-place employment. The county had 545,000 jobs in 2000 and close to 58% of the county's residents who are employed work in Montgomery County. No other jurisdiction in the State employs so large a share of its own residents. With 42% of its jobs filled by commuters from surrounding jurisdictions, Montgomery County is also an important employment center for the region and the State. It represents 22% of all jobs in the State and a similar share within the PMSA, although its share in the metropolitan area economy has been declining due to the more rapid growth in Fairfax County, Virginia. Montgomery County has been the major generator of new employment in the State of Maryland with a gain of 80,000 jobs since 1990. Montgomery County's employment base (i.e., total number of jobs) and number of private sector jobs are larger than that of any other jurisdiction in Maryland. The

county is projected to add about 130,000 jobs over the next 20 years, increasing employment to 630,000 in the year 2010 and 675,000 by 2020.

The county's fastest growing employment sector since 1970 has been the service sector, which grew from 21% of the county's jobs in 1970 to more than 55% in 2000.

Despite substantial growth in federal employment over the past twenty years, federal government employment as a share of total employment in Montgomery County has been steadily declining due to the diversification and expansion of the county's employment base. In 1970, about 20% of employees in the county worked for the federal government, but by 2000, this had decreased to 17.5%. Nonetheless, federal employment continues to be an important component of the county's economic base with nineteen federal agencies located in the county.

Because of Montgomery County's significance in the regional and State economic picture, important components of the local economic base are also important to the region and State.

Impacts of the Federal Government on the County Economy

A study, *Economic Forces That Shape Montgomery County*, *Annual Update 2001* (the 2003 update does not include the federal Impact as of this writing), prepared by the Research and Technology Center of the Montgomery County Planning Board, M-NCPPC, offers some measures of the role of the federal government, in general, and particularly, the NIH as it focuses sharply on these elements in characterizing impacts of the recession and prospects of the early 1990s for the future:

> ***Federal Impact***
>
> *The federal government plays three very important roles in Montgomery County's economy: it is an employer, it is a tenant and landowner, and it is a purchaser of goods and services. As an employer, the federal government is a major source of income for Montgomery County residents and workers in the County. During Fiscal Year 1999, the federal government paid workers in the County $2.7 billion in wages and salaries. It also paid County residents $2.3 billion in direct payments to individuals for retirement and other benefit programs.*
>
> *Employment levels are rising. According to a survey of 12 federal agencies, jobs in federally-owned and leased space increased by 4,200 from February 2000 (54,800 jobs) to February 2001 (59,000 jobs), an increase of 7.7 percent. Most of the increase came in the Department of Health and Human Services (H&HS). The National Institutes of Health (NIH) reports 2,300 more workers than a year ago, reporting increases on their campus and in leased space. H&HS, other than NIH and the Food and Drug Administration (FDA), reports 2,000 more workers than a year ago all in leased space. Collectively, the agencies surveyed anticipate job levels increasing by another 7 percent (4,000 jobs) through 2005 and then anticipate job increases of 3 percent between 2005 and 2015 when workers at these agencies will number about 64,700.*
>
> *Given the federal policy of shifting workers from leased space to owned space, workers at federally owned space are expected to increase by 12,100 between 2001 and 2015, and workers in federally leased space are expected to decline by 6,400. The main shift from leased to owned space will be the FDA's consolidation at their facility in White Oak.*
>
> ***Federally Leased Space***
>
> *Federally leased space has remained relatively unchanged since December 1999. The General Services Administration (GSA) leases 6.5 million square feet of*

space in Montgomery County, about 12 percent of the County's existing rentable office space.

Over half of this space, 65 percent or 4.2 million square feet, is leased by the Department of Health and Human Services. The Department of Commerce is the only other agency leasing more than 1 million square feet. Its 1.1 million square feet of leased space is 17 percent of GSA's inventory in the County.

Over half of GSA's leased space is in the Rockville area, which includes most of North Bethesda. GSA leases 3.5 million square feet of space in the Rockville area, 54 percent of their County inventory. Two other areas have over 1 million square feet of GSA leased space: Silver Spring has 1.3 million square feet (20 percent) and Bethesda has 1 million square feet (16 percent).

Federal Procurement

Fiscal Year 2000's $3.8 billion procurement spending in the County is the County's all time high, an increase of 10 percent over FY1999. During the same period, federal procurement rose by 11.7 percent in the Washington Area and by 11.2 percent nationally. Over the past ten years, the County's federal procurement increased at a respectable annual compound growth rate of 7.2 percent, though lower than the Washington Area's annual compound growth rate of 8.6 percent. During most of the 1990s, about two-thirds of the Washington Area's procurement growth has gone to Northern Virginia. The trend has been to shift procurement dollars from purchasing products and research and development activities to purchasing services. Northern Virginia had an established information technology base, located near major defense installations, that was well positioned to capitalize on this shift in procurement purchasing.

The Departments of Health and Human Services and Defense are the source of over half the procurement dollars spent in the County. H&HS spent $1.25 billion, 33 percent of total procurement, and Defense spent $1.16 billion, 31 percent. H&HS had the biggest gain in procurement spending surpassing last year's total by $351 million, a 39 percent increase. Procurement spending by the Department of Commerce more than doubled over the past year, increasing by $217 million, up 152 percent. The biggest drop in procurement spending was by the Department of Transportation who spent $247 million less than last year, a drop of 88 percent.

More than half the federal procurement spent in the County in FY2000 was spent on Business Services, 31 percent or $1.2 billion, and Engineering and Management Services, 23 percent or $856 million. Almost 90 percent of the Business Service procurement was spent on computer related services, such as systems design, computer maintenance and repair, facilities management, data processing, and programming services. Almost 80 percent of the Engineering and Management Services procurement was spent on management services, engineering services, management consulting services, and commercial physical research.

A study by the Maryland Department of Economic and Employment Development published in December 1994 studied the economic impact of the NIH on Maryland and the U.S. (No subsequent study has been identified) The following is from the Executive Summary:

In FY 1993, the NIH obligations in the U.S. totaled $10.3 billion. Nationwide, over 30,000 extramural research awards, fellowships and other extramural obligations represented over 81 percent of the NIH FY 1993 budget, or about $8.3 billion. The intramural research and administrative support expenditures, on the other hand, represented the remaining 19 percent of the NIH obligations, or about $1.9 billion.

In Maryland, the NIH spending obligations in FY 1993 amounted to about $1.7 billion or nearly 17 percent of the total nationwide obligations. The bulk of the NIH spending in Maryland, about $1.2 billion, is on intramural research and administrative support programs, representing nearly 68 percent of the NIH obligations in Maryland. The extramural research programs of NIH, amounting to about $550 million, accounted for the remaining 32 percent of expenditures in Maryland. The Johns Hopkins University in Baltimore is the largest single recipient of the NIH extramural research grants and contracts in the U.S. In FY 1993, the university received over $259 million for medical research from the NIH.

In relation to the U.S., Maryland accounts for over 59 percent of intramural and administrative support expenditure and about 7 percent of total extramural obligations. However, despite a considerably smaller share of extramural obligations, Maryland ranks fourth in the nation — behind California, New York, and Massachusetts — in total research grants awarded by the NIH in FY 1993.

NIH is a significant contributor to the economies of Maryland and the United States. Through its various procurement programs, research and development contracts, and grants and fellowships, NIH significantly enhances business development opportunities, creates jobs and increases the tax bases of the federal, state, and local governments. However, the importance of the NIH to Maryland and the nation extends well beyond its measurable impact arising from a wide array of extramural, intramural, and administrative support programs. An important example of NIH's diverse economic impact is the U.S. biotechnology industry. This industry, which is currently a world leader in generating new production processes and new products is highly dependent on NIHs biomedical research. By promoting collaboration between government, industry, and academia, the NIH is fostering the growth of the nation's biotechnology industry.

Although NIH's input in spurring the development of the biotechnology industry can only be assessed indirectly, this study estimates the overall economic impact of NIH based on those variable that can be measured directly. As such, this study is a conservative estimate of NIH's economic value to the state of Maryland and the nation.

This study estimates, for the first time, the economic and fiscal impacts of NIH within Maryland. Since the overall economic impact of NIH extends beyond Maryland borders, this report also presents a summary of its impact on the United States economy. This study also quantifies the extent to which the annual contractual obligations of NIH affect supplier networks within Maryland, where the suppliers are defined as both primary contractors and a host of other Maryland industries and services that, in turn, provide the input needs of those contractors.

Economic Impact of NIH in Maryland

The annual economic importance of the National Institutes of Health to Maryland is the sum of several major components that impact through those extramural, intramural, and administrative support expenditures specific to Maryland. In FY 1993, NIH obligations in Maryland resulted in $1.7 billion of direct expenditures. These direct expenditures, in turn, generate a substantial secondary economic impact in Maryland.

The overall annual economic impact of NIH, or the total impact, is the sum of direct expenditures plus the ripple effects of indirect and induced spending in Maryland directly attributable to the direct spending by NIH.

The total or overall annual economic impact of NIH in Maryland is an estimated

$3.6 billion in gross sales, $1.9 billion in employee income, and about 62,900 jobs. The intramural and administrative support programs represented the bulk of the economic impact — nearly 62 percent of the total gross sales ($2.2 billion), 68 percent of the total employee income ($1.3 billion), and 60 percent of the total jobs generated statewide (37,700 jobs). The extramural expenditures of NIH in Maryland generated the remaining $1.4 billion of gross sales, $615 million of employee income, and about 25,200 jobs.

Fiscal Impact of NIH in Maryland

The fiscal impact represents annual state retail sales tax and personal income tax receipts from the expenditures generated at all levels — direct and secondary — in response to the NIH expenditures in Maryland. The fiscal impact also includes local receipts from the personal income surtaxes. State retail sales tax receipts include tax revenues from direct expenditures generated by the employees of NIH, its contractors and their suppliers spending their disposable incomes on taxable purchases in Maryland.

In FY 1993, NIH spending in Maryland generated a total of $17 million in state retail sales tax receipts, $70 million in state personal income tax receipts, and about $35 million in local personal income surtaxes. As a result, the combined state and local tax receipts as a consequence of the NIH annual activities in Maryland amounted to an estimated $122 million in 1993 dollars.

The intramural and administrative support programs with an estimated $83 million in total selected state and local tax receipts generated the bulk of the fiscal impact (about 68 percent of the total). Extramural programs with an estimated $39 million in state and local tax receipts comprise the remaining 32 percent of fiscal impact.

Economic Impact of NIH in the U.S.

Nationwide, NIH obligations in FY 1993 resulted in over $10.3 billion of direct expenditures on extramural, intramural and administrative support programs. These direct expenditures generate a significant secondary impact in the U.S. The total economic impact of NIH is the sum of direct and secondary economic benefits.

The total annual contribution of NIH to the U.S. economy, sum of direct and secondary economic benefits, amounts to an estimated $44.6 billion in gross output or sales, $17.9 billion in employee income and over 726,000 jobs. The extramural awards, fellowships and obligations represent the bulk of the economic impact — nearly 86 percent of the total gross sales ($38.2 billion), 84 percent of the total employee income ($15.1 billion) and 87 percent of the total jobs generated nationwide (631,000 jobs). The intramural and administrative support programs of NIH represent the remaining $6.4 billion in gross sales, $2.8 billion of employees income, and over 95,000 jobs.

The NIH has further impact in the community through a number of special hiring programs with educational thrust or through targeting of special needs groups. The 1992 regular summer program employed 444, of whom 172 were members of minority populations. Summer AAides@ numbered 57, and 15 were hired in 1992 under the Summer Disabilities Program. There were 9 Junior Fellows in 1992 and 202 hires under the Intramural Research Training Award Program. The Commissioned Officer Student Training and Extern Program (CO-STEP) included 25 that summer. Participants in the year-round STAY-IN-SCHOOL Program employed at the NIH totaled 850. Altogether, these various programs provide unique educational opportunities and work experience for 1,602 individuals in 1992 alone.

Moreover, the presence of the NIH in Montgomery County, along with the National Naval Medical Center, helps to create a critical mass of health-related interests and support groups that, together, attract additional organizations and enterprises. Over 50 associations in the health, bioscience and related technical fields have located in Montgomery County, as have other institutions such as the Howard Hughes Medical Institute and the American College of Cardiology. The State of Maryland has published a 1992-93 directory of biotechnology/medical companies in the state. Of 135 entities listed, in addition to research units of the University of Maryland and Johns Hopkins University, 62 firms have Montgomery County addresses. Another roster, published by Montgomery County's Office of Economic Development in early 1992, identified another 64 biological and medical science-related industries in the community that were not included in the State's directory.

The fact that no more than one in six or one in ten of these companies listed in the county or state directory, respectively, appears on the list of 1992 NIH contractors, is evidence that the influence of the NIH is far broader than their direct contract expenditures alone would suggest. The NIH is, indisputably, at the core of a health sector that is very important not only to the local economy and critical to the community's future economic development, but it is also significant in national terms.

Ernst & Young ranks Maryland's concentration of biotech companies as the third largest in the nation, surpassed by only California and Massachusetts. The volume of product sales was estimated by this source at $4 billion, up from $750 million in 1989. A tenfold increase is projected by the turn of the century.

The number of biotechnology workers in these private companies (which include firms from around the world) is estimated at 5,000. By no means is such a constellation of businesses and industries running on NIH expenditures alone. Clearly, they produce for national and international markets. But without the reputation of the NIH and the role it plays in attracting, training and stimulating the human resources so essential to the intellectual vitality of this health sector, there is question it would be here at all.

3.6.4 Bethesda-Chevy Chase

Income

Bethesda-Chevy Chase residents enjoy a high household income level which has risen more rapidly than that of the nation. In addition, only 4.5% of the area's residents have income levels under $15,000 compared to 15.8% nationally.

Employment

Bethesda-Chevy Chase is an established but growing employment center. The Bethesda CBD is the largest single area of employment in the Planning Area, followed closely by the NIH and the National Naval Medical Center.

The number of jobs in Bethesda-Chevy Chase in 2000 (97,688) exceeds the number of households (35,655). Based on development approved to-date, this proportion of jobs to households will rise in the future. Office employment dominates job opportunities in Bethesda-Chevy Chase.

Future Development

The 1990 Bethesda-Chevy Chase Master Plan endorses a moderate level of development. The recommended level of development could result in about 18,000 more jobs than in 1988 within the Planning Area by the year 2010. The level of job development endorsed by the B-CC Master Plan is projected to be shared among the major employment centers within the Bethesda and Friendship Heights Central Business Districts, the NIH and the National Naval Medical Center. The B-CC Master Plan recognizes the continued importance of biomedical and medically-oriented development and employment, and it places less emphasis on large-scale office projects. Development levels must remain within the transportation system capacity constraints of the Bethesda-Chevy Chase area.

3.6.5 Housing

Montgomery County had a total of 334,632 housing units in 2000, having added over 6,400 dwellings per year in the decades since 1980. Over this period, the average annual growth of 5,358 households amounted to a 2.1 percent gain, practically matching the 2.2 percent average annual rate of population increase.

Housing Types
During this period of rapid growth, the County's housing stock also changed significantly. Single-family detached housing declined in share of the market from 68 percent to 51.2 percent, while townhouses accounted for 17.9 percent (59,951 units) in 1997, and multi-family units -had a 30.9 percent share of the mix.

Development Patterns
Growth in housing supply has generally followed the patterns established in the county's General Plan, known as *Wedges and Corridors*. The plan seeks to avoid suburban "sprawl" by channeling growth into the county's radial transportation corridors - particularly I-270/MD 355 and I-95/U.S. 29, and into the more densely developed down-county area nearest the District of Columbia, known as the urban ring, while preserving the wedges in between the corridors for rural land use and open space.

The Zoning "Envelope"
Residential zoning under the General Plan has been "pegged" to growth projections for the year 2000. The land planned for residential use is close to being "built-out". Less than 10 percent of the total future residential development potential is in areas within walking distance of the county's Metrorail stations.

Housing Costs
Montgomery County is one of the highest priced housing markets in the nation. The median price of new single-family homes (attached and detached) increased from $170,000 in 1990 to $217,500 in 2000. Montgomery County's housing prices were 31% percent above the national median price of $166,000.

Median household income in Montgomery County in 1999 was $71,586, 71.5% higher than the national median income of $41,994. Despite these income levels, a recent analysis by the County Planning Department of the price ranges of the county's housing stock relative to household incomes of residents indicated the affordability of new housing in the county to its residents has declined substantially since the mid-1970's. The county's most affordable for-sale housing is located primarily in the northern up-county I-270 Corridor, and the U.S. 29 corridor, and some portions of the urban ring. Moderate-Priced Dwelling Units (MPDUs) are available in all parts of the county under the 1973 law which requires 15 percent of all new developments with 50 units or more to be MPDUs.

Future Supply
Household growth forecasts anticipate a slowing rate of increase in Montgomery County. Housing production is expected to average 4,000 new units annually .

As the demographic composition of the county changes, housing demand and the types of housing needed will change as well. Elderly population is increasing, household sizes have been declining, and the number of single-person households increased dramatically, constituting more than one out of four households in 2000. Similarly, non-family households which can be described as a group of unrelated persons living together, have been increasing from 16 percent in 1970 to 31 percent in 2000. New products are expected to be offered by the housing industry to meet the changing needs of these market segments. Corresponding changes in zoning and locational patterns can be expected as well.

Women are continuing to enter the labor force in record numbers. At the same time more children are being born than in any period since the post-World War II *baby boom*. Dual-income family households will likely continue as a strong market element. However, land for the single-family detached homes preferred by these types of households will be more scarce, more costly and farther from the down-county employment sites developed during the past two decades.

3.7 Other Relevant Federal Research Facilities

3.7.1 NIH Off-Campus Facilities and Installations

Gerontology Research Center (GRC), NIA, Baltimore, MD
Initially part of the National Heart Institute, the Gerontology Research Center (GRC) was transferred to the National Institute of Child Health and Human Development (NICHD) in December 1965 and to the National Institute on Aging (NIA) after its establishment in July 1975. It is the setting for the bulk of the NIA intramural research programs. The Institute's Laboratory of Neuroscience operates basic research and clinical programs out of the NIH Clinical Center on the Bethesda campus. The GRC laboratories are located on the grounds of the Bayview Medical Center campus, at the Johns Hopkins Medical Institution. A multimillion-dollar GRC building was completed and opened in 1968. The facilities and resources available at this center are the most comprehensive in the country, committed to research in aging, and it is the site of the most extensive longitudinal study of a single population segment over a period of 35 years. The center serves as a regional and national focal point for research in aging, and training in gerontology and geriatrics.

Addiction Research Center (ARC), of the National Institute on Drug Abuse (NIDA), Baltimore, MD
The ARC is located on the Bayview Medical Center Campus, proximate to the Francis Scott Key Medical Center, in Baltimore, Maryland. The mission of the ARC is to plan, develop, and conduct intramural preclinical and clinical research on the causes, hazards, treatment, and prevention of drug abuse and addiction, the nature of the addiction process, and the addiction liability of new drugs by drawing on the biomedical, neuroscience, psychological, and behavioral sciences. The ARC provides in-house research scientist training in a variety of disciplines for work in drug abuse-related research; and develops preclinical and clinical research studies and procedures for protection of human subjects from research risks and monitors the provision of medical care to these subjects.

NIH Animal Center (NIHAC), Poolesville, MD
The Division of Veterinary Resources (DVR) operates a specialized laboratory animal center situated on 513 acres of farm land located 8 miles southwest of Poolesville, MD, near the Potomac River. The land was purchased in 1960, and a construction program to provide permanent buildings and facilities began in 1963. The first phase was ***NIH***

completed in May 1965 and included a farm animal building, a kennel building, and a central utility plant, together with necessary water wells, sewage treatment, electric power, steam, chilled water, and paved access roads. Two dwellings were also constructed for resident personnel. A building for research holding as well as quarantine and conditioning of non-human primates was completed in May, 1971. Also completed were buildings used by the National Institute of Mental Health (NIMH) for its Laboratory of Brain Evolution and Behavior.

The NIHAC is a major extension of the animal holding and production facilities at Bethesda. Programs of the Institutes include studies of animal behavior, conduct of immunologic procedures and sampling, and surgical investigation of larger animals. The size and character of the animal population varies in response to changes in research programs. The species kept at the NIHAC (in descending order of inventory size) are non-human primates, rodents, dogs, sheep, swine, cats, fowl, goats, horses, and cattle.

Rocky Mountain Laboratory (RML), National Institute of Allergy and Infectious Diseases (NIAID), Hamilton, MT

The earliest studies of Rocky Mountain spotted fever were begun at this laboratory in 1902, and it was formally established as a Public Health Service field station in 1921. Although the Rocky Mountain Laboratoy remains a center for the study of medically important tick-borne diseases and diseases transmissible from animals to man, a recent reorganization has diversified the laboratory focusing research on the basic cellular level.

In March 1979, three new laboratories were established at the RML facility. These capabilities allow RML scientists to become involved in the diagnosis and treatment of a variety of important infectious diseases. Facilities and a biomedical research program to address the problems of diagnosis, prevention and treatment of AIDS have also been developed at the Rocky Mountain Laboratories.

Frederick Cancer Research and Development Center (FCRDC), Frederick, MD

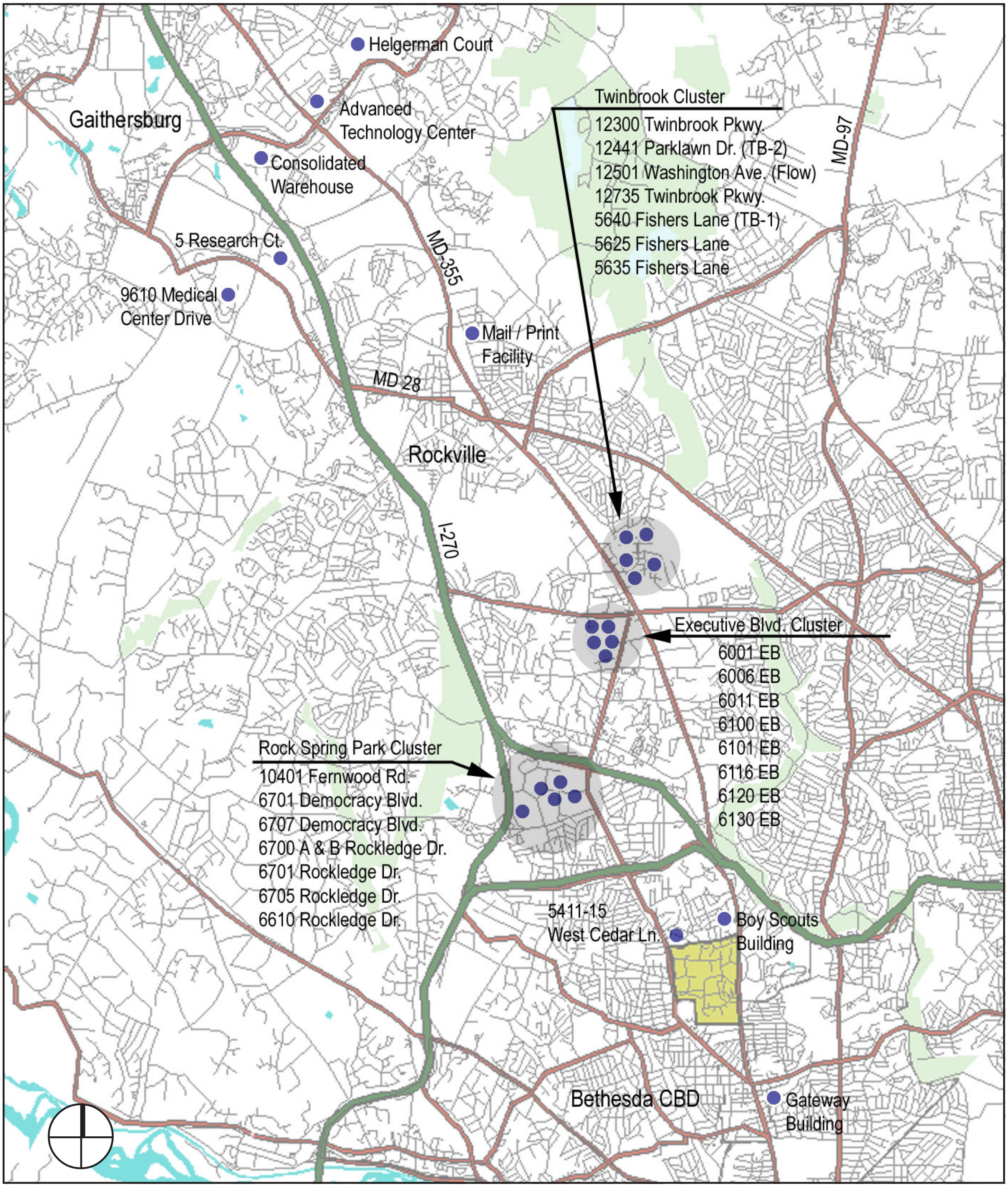
This center consists of 74 buildings located on 68.61 acres of land in Frederick, Maryland. The primary Institutes located there are the National Cancer Institute (NCI), the National Institute of Allergy and Infectious Diseases (NIAID) and the National Institute of Neurological Disorders and Stroke (NINDS) whose activities include cancer and non-cancer research, molecular virology studies and rodent breeding.

National Institute of Environmental Health Services (NIEHS) Research Triangle Park (RTP), Research Triangle, NC

This facility consists of 28 buildings located on 453.2 acres in Research Triangle Park, North Carolina. The primary Institute located there is NIEHS which conducts intramural research and administers extramural programs. The Environmental Protection Agencies also has a major research facility at this location.

New Iberia Research Center, New Iberia, LA

This center consists of one building located on 28.85 acres of land in New Iberia, Louisiana. The NCI and NCRR use this facility for animal research and breeding.



NIH
Master Plan
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Bethesda Campus

Figure 3.7.1

NIH Leased Facilities

May 5, 2003

Leased Facilities

Locally leased facilities (rentable sq. ft.) include the following in the Bethesda/ Rockville/Gaithersburg area as of March 16, 2004:

Table 3.7.1 NIH Leased Facilities

	Admin & Support		Labs		Total
Rock Spring Park Cluster, Bethesda, MD					
10401 Fernwood Road	Office	159,079 SF			
6701 Democracy Blvd	Office	83,723 SF			
6707 Democracy Blvd.	Office	216,457 SF			
6700 A & B Rockledge Drive	Office	152,587 SF			**1,183,822 SF**
6701 Rockledge Drive	Office	242,071 SF			
6705 Rockledge Centre	Office	199,606 SF			
6610 Rockledge Drive	Office	130,299 SF			
Sub-Total		**1,183,822 SF**		**0**	
Executive Blvd. Cluster, Rockville, MD					
Executive Plaza North & South	Office	302,491 SF			
6001 Executive Blvd.	Office	250,846 SF			
6006 Executive Blvd.	Office	18,870 SF			
6006 Executive Blvd.	Child Care	25,985 SF			**1,036,666 SF**
6011 Executive Blvd.	Office	90,462 SF			
6100 Executive Blvd.	Office	133,595 SF			
6101 Executive Blvd.	Office	42,577 SF			
6116 Executive Blvd.	Office	171,840 SF			
Sub-Total		**1,036,666 SF**		**0**	
Twinbrook Cluster, Rockville, MD					
12300 Twinbrook Parkway	Office	5,775 SF			
12441 Parklawn Dr.			TB-2 Lab	52,003 SF	
12501 Washington Ave.			Flow-Lab	26,597 SF	
12735 Twinbrook Parkway			TB-3-Lab	68,081 SF	**442,103 SF**
5640 Fisher Lane			TB-1-Lab	24,500 SG	
5625 Fisher Lane			Lab	153,385 SF	
5635 Fisher Lane	Office	111,762 SF			
Sub-Total		**117,537 SF**		**324,566 SF**	
Other Local Area Locations					
5413 & 5415 West Cedar Lane, Bethesda, MD	Office	8,100 SF			
7201 Wisconsin Ave., Bethesda, MD	Office	46,344 SF			
9610 Medical Center Drive, Rockville, MD			Lab	12,717 SF	
8424 Helgerman Court, Gaithersburg, MD	Office	7,075 SF			**323,702 SF**
8717 Grovemont Circle, Gaithersburg, MD			ATC- Lab	133 SF	
5 Research Court, Rockville, MD			Lab	43,950 SF	
16050 Industrial Drive, Gaithersburg, MD	Warehouse	150,000 SF			
301 N. Stonestreet Ave., Rockville, MD	Mail/Print	55,383 SF			
Sub-Total		**266,902 SF**		**56,800 SF**	

See NIH Leased Facilities Map, Figure 3.7.1

3.7.2 Additional DHHS Regional Installations

Other Department of Health and Human Services (DHHS) installations within the National Capital Region which administer and fund health research programs for the nation are:

The **Substance Abuse and Mental Health Services Administration (SAMHSA)**, located in Rockville, MD, and formerly the Alcohol, Drug Abuse and Mental Health Administration (ADAMHA), administers and coordinates national programs to improve understanding and prevention of mental illness and of alcohol and drug abuse.

The **Food and Drug Administration (FDA)**, administers and coordinates activities directed toward the protection of the health of the nation against impure and unsafe foods, drugs, cosmetics and other potential hazards. The majority of FDA activities are housed in Rockville, MD (Fishers Lane); however, a number of FDA employees are housed in Buildings 29/29B at the NIH Bethesda Campus.

The **Health Resources and Services Administration (HRSA)** provides leadership and direction to programs and activities designed to improve the health services for all persons in the United States. The installation is on Fishers Lane in Rockville, MD.

The **Agency for Health Research and Quality (AHRQ),** located on Fishers Lane in Rockville, MD., funds, administers, and conducts health services and outcome research and evaluation.

The **Centers for Disease Control and Prevention (CDC),** headquartered in Atlanta, Georgia, but with local offices in Hyattsville, MD., is responsible for disease prevention and health promotion programs.

3.7.3 Additional Federal Research Facilities

Other federal research facilities in the Washington suburban area include:

The **Department of Energy (DOE)**, Washington, D.C. - The DOE is responsible for long-term, high-risk research and development of energy technology; the marketing of federal power; energy conservation and efficiency; the nuclear weapons program; energy regulatory programs; and a central energy data collection and analysis program.

The **National Institute of Standards and Technology (NIST),** Gaithersburg, MD - The NIST is an agency of the U.S. Commerce Department's Technology Administration. Its mission is to help U.S. industry invent and manufacture superior products reliably, ensure a fair marketplace for consumers and businesses, and promote acceptance of U.S. products in foreign markets.

The **Walter Reed Army Medical Center (WRAMC)**, Washington, D.C. - The medical center is located on 113 acres and has approximately 300 active inpatient beds. More than 88 specialty clinics are located on campus and four are located at satellite sites. The number of personnel located there now exceeds 7,000, including 640 physicians and 448 registered nurses. Tenant activities at Walter Reed include the Armed Forces Institute of Pathology (AFIP), and the Henry M. Jackson Foundation, which specializes in HIV research.

The **WRAMC, Forest Glen Section**, Silver Spring, MD - This section is an auxiliary service, support and research area located in Montgomery County, Maryland, approximately three miles from the WRAMC Main Section. The facility includes laboratories of the Walter Reed Army Institute of Research, equipment and maintenance shops, storage and animal housing and breeding.

The **National Naval Medical Center (NNMC),** Bethesda, MD - The NNMC's primary mission, in addition to research and education, is the care and treatment of active duty military personnel, dependents and military retirees on a space-available basis and government officials including the President and Vice President and their families, members of Congress, Supreme Court Justices, foreign embassy personnel, and other designated beneficiaries. The Medical Center, comprised of ten adjoining buildings, has an operating capacity of over 427 beds, expandable to 779 in an emergency, employs more than 3,300 people and has more than 50 outpatient clinics that treat approximately 2,500 patients daily.

Located on the grounds of the NNMC in approximately 500,000 sq. ft. is the Uniformed Services University of the Health Sciences (USUHS). The university has a full range of laboratories, teaching halls, seminar rooms and a library. In addition to a doctor of medicine degree, USUHS also offers graduate education in the basic medical sciences. Doctoral degrees are available in fields such as biochemistry, anatomy, microbiology, pharmacology and nursing.

The **Naval Surface Warfare Center (NSWC), Carderock Division**, Potomac, MD, formerly the David Taylor Research Center (DTRC) in Carderock, Annapolis, and the Naval Ship Systems Engineering Station (NAVSSES) in Philadelphia. - The Carderock Division researches, develops, tests and evaluates the new concepts and technologies to be applied in creating the Navy's surface and undersea vehicles of the 21st century and beyond. The Carderock laboratory is located 12 miles northwest of Washington, DC.

The **Beltsville Agricultural Research Center,** Beltsville, MD - The mission of the Agricultural Research Service in the Beltsville area is to conduct basic and related applied research on problems of broad scope and high national priority in agricultural production and marking, environmental quality, family economics and human nutrition.

In addition, the Beltsville area serves to educate the American public and international visitors concerning natural resources, plant and animal life, food and agricultural technologies, human nutrition, family economics and research concepts and methods.

The **Patuxent Wildlife Research Center (PWRC)**, Laurel, MD - As the only national wildlife refuge and research center, PWRC is charged with protecting and conserving the nation's wildlife and natural environment through research on critical environment problems. Its extensive forest, meadow, and wetland habitats are managed for habitat biodiversity for both resident and migratory wildlife and provide a unique outdoor laboratory for management-related research in a rapidly urbanizing area.

The **U.S. Army Research Laboratory (ARL)**, Adelphi, MD - The U.S. Army Research Laboratory is charged with executing fundamental and applied research to provide the Army the key technologies and the analytical support necessary to assure supremacy in future land warfare.

ARL's two primary missions are research and technology development, and analysis of weapon system performance. ARL does technical and analysis work in 6 areas: computational and informational sciences, sensors and electronic devices, survivability/lethality analysis, weapons and materials research, human research and engineering, and vehicle technology.

Currently, at the Adelphi campus, research and technology development is primarily in the area of sensors, signatures, and signal and information processing.

The **National Aeronautics and Space Administration (NASA),** Goddard Space Flight Center, Greenbelt, MD - The mission of the Goddard Space Flight Center is to expand knowledge of the Earth and its environment, the solar system, and the universe through observations from space. To assure that the nation maintains leadership in this endeavor, the Center is committed to excellence in scientific investigation, in the development and operation of space systems, and in the advancement of essential technologies. Also, Goddard is the lead Center in NASA's Mission to Planet Earth program.

The **Naval Research Laboratory (NRL),** Washington, D.C. - NRL's mission is to conduct a broadly based multi-disciplinary program of scientific research and advanced technological development directed toward maritime applications of new and improved materials, techniques, equipment, systems and ocean, atmospheric and improved materials, techniques, equipment, systems and ocean, atmospheric and space sciences and related technologies.

NRL provides primary in-house research for the physical, engineering, space, and environmental sciences; broadly based exploratory and advanced development programs in response to identified and anticipated Navy needs; broad multi-disciplinary support to the Naval Warfare Centers; and space and space systems technology, development, and support.

3.8 Review Agency and Community Coordination

3.8.1 Relationship of the NIH Master Plan 2003 Update to the Federal Elements of the Comprehensive Plan for the National Capital

The Comprehensive Plan sets forth goals of the federal government and means of achieving them. This 2003 Master Plan Update is consistent with those goals:

Foster a Capital worthy of a great nation.
Though the NIH is located outside the National Capital, the NIH Master Plan 2003 Update, when implemented, will give the campus the order and dignity associated with the Mall and other distinguished federal sites.

The NIH occupies a unique position in training biomedical researchers from around the world. The success of this program will be strengthened by improvement of campus facilities and the scholarly environment.

The NIH enjoys an esteem nationally and internationally for its contributions to science in the service of health. The Master Plan seeks to support the quality of science through development of NIH facilities and preservation of the relationships that have made the NIH unique.

The NIH Master Plan 2003 Update seeks to improve the identity of the NIH to the public by developing its image as an institution that by its existence and programs, commemorates the achievements of its founders, leaders, scientists and supporters.

As the NIH Master Plan 2003 Update is realized, the architectural and natural environments will be improved by design guidelines that seek to bring harmony to all parts of the campus while respecting historic buildings.

Provide for the efficient and effective operation of the federal establishment while contributing to the general order and beauty of the National Capital.
The NIH Master Plan 2003 Update proposes an orderly development of the NIH campus that will increase efficiency by improving adjacencies and by providing for long term improvement to the research environment. The creation of defined and protected open spaces within the campus core and on the perimeter, together with removal of surface parking and with new design goals, will contribute to the beauty of the facility.

Deploy the federal work force in a manner that enhances the efficiency and productivity of federal agencies and strengthens economic development and expands employment opportunities in the National Capital Region.

The NIH Master Plan 2003 Update has as its rationale the estimated personnel needs to fulfill the scientific mission of the NIH over the next twenty years. The plan has taken into account the infrastructure capacities serving the Bethesda site.

Facilitate the efficient exercise and satisfactory performance of diplomatic and international functions in harmony with the planned development of the National Capital.

The NIH, through its international fellowship, research, awards, and studies programs, has trained thousands of the world's biomedical researchers. The Fogarty International Center at the NIH assists the many foreign personnel that come to the NIH every year, and hosts foreign visitors, including heads-of-state, by conducting tours and receptions, usually at the historic Stone House.

Preserve the important historic features of the National Capital while permitting new development which is respectful of these features.

The NIH Master Plan 2003 Update protects identified historic resources and their settings, while at the same time permitting the NIH to achieve its programmatic goals. The following resources on the Bethesda campus have been recognized as historically significant: Buildings 1,2, and 3, Building 6, the Wilson House (Tree Tops), the Peter Estate (Stone House and the related Caretaker's House), and the Convent.

Conserve the natural features and resources of the National Capital and enhance cultural and recreational opportunities and open space of the region.

The NIH Master Plan 2003 Update seeks to restore as much of the natural quality of the site as possible by removing surface parking and placing it in structures; restoring and enhancing the perimeter landscaped buffer zone around the site; enhancing the NIH Stream at the northeast corner of the site; and retaining and acknowledging the site's key hills on which Tree Tops and the Stone House are located.

Conserve energy resources.

The NIH has undertaken a far reaching Master Utilities Plan that is directed at improving the quality and efficiency of its entire utility generation and distribution system.

The NIH has begun a master plan sustainability study.

The NIH has also been in the vanguard of federal agencies in developing and implementing a comprehensive Transportation Management Plan that is directed at reducing dependency on the single occupancy vehicle.

Promote adequate systems for the transportation of residents, employees, visitors, and goods to, from, and within the National Capital Region.

In addition to the Transportation Management Plan already begun by the NIH, the NIH Master Plan 2003 Update maximizes the increased use of mass transit by NIH employees through greater concentration of large employee groups toward the middle and south portions of the campus closer to the Medical Center Metrorail-intermodal transit stop.

The NIH already operates extensive internal and inter-site bus transportation services to supplant use of private vehicles, and the Master Plan supports and improves these services.

Accommodate visitors to the National Capital in an efficient, attractive, and informative manner.

The NIH already attracts many visitors each year, many for educational purposes such as those engaged in research fellowships, high school students, the general public seeking continuing education, and patients and families participating in clinical trials at the Clinical Center.

Promote intergovernmental cooperation and public participation in federal planning of the National Capital.

This NIH Master Plan 2003 Update itself is evidence of the NIH's commitment to achieving this goal. The development of this plan has involved extensive coordination with other interested government agencies through meetings with staff of the NCPC and the M-NCPPC. The NIH has , since 1995, consulted the Community Liaison Council (which meets monthly and consists of representatives of over 30 communities) on its master planning and building programs.

3.8.2 Local Development Criteria

As a federal agency, the NIH Bethesda campus is not subject to the Montgomery County Zoning Ordinance. The site, however, is considered low-density by zoning criteria:

- With 7,360,734 square feet of gross building area, (excluding 1,480,000 square feet of parking structures) and approximately 283 acres of land, excluding roadways, the Floor Area Ratio (FAR) of 0.60, nearly that of the lowest density commercial zone, C-T. With the projected maximum gross building area for the Final Phase (excluding parking) of 10,716,636 square feet, it would, at 0.86 FAR, be considerably less dense than allowed under a moderate-intensity office building zone (O-M).
- With only 10% of the land in building coverage (approximately 1.4 million square feet), the site is less dense than allowed in an R-60 zone (such as exists in the adjoining Edgewood/Glenwood residential area to the southwest of the site) which permits 35% of the lot area to be developed. The projected maximum building coverage for the Final Phase would be about 19% of the site.

Steadily increasing development in Montgomery County and especially in Bethesda has raised concerns of the community and planning agencies over the capacities of the roads and intersections, and the impact that increased automobile traffic might have on nearby neighborhoods.

The NCPC in the Comprehensive Plan For the National Capital - federal Elements, has adopted a federal Parking Policy that encourages maximum use of public and shared transportation and establishes a maximum ratio for the Bethesda area of one space for every two employees. Because the demand for parking at the site continues to exceed supply, nearby neighborhoods have complained of overflow NIH parking on their streets in spite of residential parking permit controls.

On May 14, 1992, the NIH negotiated a Memorandum of Understanding (MOU) with the NCPC and the Montgomery County Planning Board in which the NIH agreed to implement and monitor a Transportation Management Plan (TMP) developed in 1991 that has the goals of improving availability of parking on-campus and mitigating the impact on roadways from future growth at the NIH. Among other things, the TMP and MOU adopted a ratio not to exceed 0.5 parking spaces for each employee plus 16% additional spaces for visitors and patients in conjunction with continued efforts to reduce the future parking demand to the extent practicable. This Master Plan adheres to the terms of the MOU, and recognizes the need to continue to lease space off-campus locally to moderate growth and consequent pressures on traffic and parking.

3.8.3 Relationship to Local Development Plans

The NIH Bethesda campus is located in the Mid-Bethesda sector of the Bethesda-Chevy Chase Montgomery County Planning Area 35, the southernmost in the county with 20.1 sq.mi. (Figure 5-1). The applicable planning document for the area is the Bethesda-Chevy Chase Master Plan, M-NCPPC, 1990, which was approved and adopted by M-NCPPC in April 1990. The purpose of the plan is to establish a policy framework that will guide the direction of Bethesda-Chevy Chase for the next 20 years.

Bethesda once was a rural village, a focal point for shopping and community services on a limited scale. Now, it is the "downtown" or Central Business District (CBD) of the planning area with the greatest concentration of commercial and office development within Bethesda-Chevy Chase. Planning for the Bethesda CBD is conducted in much greater detail, nearly on a parcel-by-parcel basis, in the Bethesda CBD Sector Plan.

Planning for the two areas is coordinated and complementary, since the Bethesda CBD adjoins the southern boundary of the NIH campus. The CBD covers 405 acres, an area about one-third larger than the NIH campus.

The NIH Master Plan 2003 Update is compatible with the land use recommendations of the Bethesda-Chevy Chase Master Plan. The Plan neither requires nor applies pressures to change existing and future recommended land use and zoning. The NIH campus provides a buffer between the Bethesda CBD and residential communities to the north and west of the campus. The Plan is complementary to the Bethesda-Chevy Chase Master Plan and Bethesda CBD Sector Plan, which proposes R-60 and R-10 land uses around the periphery of the campus, offering opportunities for non-vehicle employee home-work trips between the NIH and the surrounding community.

3.8.4 Coordination with Local Planning Agencies

The planning agency with jurisdiction over the Bethesda area is the M-NCPPC. Representatives of the NIH have been in frequent communication with M-NCPPC staff and the Montgomery County Planning Board over the years as various capital projects have been reviewed by NCPC and referred to M-NCPPC.

Continuing the practice developed for the 1995 Master Plan, informal meetings and interviews were held with government agencies, local jurisdictions, citizen associations, and individuals. NIH representatives and the master planning team established initial contact with NCPC and M-NCPPC staff members. In addition, representatives of NCPC and M-NCPPC were present at nearly all Community Liaison Council meetings devoted to the NIH Master Plan 2003 Update.

There has also been on-going coordination and cooperation between NIH and the Montgomery County Department of Transportation regarding transportation management.

3.8.5 Community Participation

In the development of the 1995 Master Plan, NIH conducted a rigorous and active public involvement program that included consultation with and review by jurisdictional government agencies and participation by the surrounding communities and general public. Separate scoping meetings identifying issues were held with the agencies, NIH employees, and the general public. Introductory and progress meetings were held with the M-NCPPC, and the NCPC.

In the scoping process, the importance of the buffer area around the periphery of the campus was stressed nearly unanimously by residents from the surrounding neighborhoods. Continuing NIH growth in facilities and employees; and related traffic generation and construction impacts, also were identified as concerns. In response to community concerns over the Master Plan and environmental issues on the Bethesda Campus, Dr. Harold Varmus, Director of theNIH at that time, met with community leaders on May 11, 1994 and made a public commitment on behalf of NIH to involve community members in Master Plan development. In September 1994, Dr. Varmus established the NIH Office of Community Liaison to provide policy oversight and monitoring of community-related activities, including development of the 1995 Master Plan.

Subsequently, NIH, through the Office of Community Liaison extended invitations to 77 citizen associations and community groups to send a representative to join a working group to provide advice and guidance in the Master Plan development. The first meeting of the Master Plan Core Working Group was held in January, 1995. Nineteen communities were represented. Regular participation expanded to 22 communities along with members from NCPC, M-NCPPC, the Maryland Office of Planning, and the Bethesda-Chevy Chase Chamber of Commerce.

Subgroups covering specific issues were formed. Presentations of concepts, drafts, working papers and other Master Plan material for review and comment were made to the Subgroups and Working Group. Discussion and comment resulted in revisions and modifications throughout the process. Interaction between the NIH staff and community members enabled cooperative resolution of issues and concerns. Community representatives reported to their respective community organizations on the progress of the Master Plan Core Working Group and returned to the working group with further comments.

After completion of the 1995 Master Plan, NIH decided to make the Master Plan Working Group a permanent organization, the Core Community Working Group. It would serve as a conduit for information about day-to-day NIH activities and community issues. It would also provide the surrounding community the opportunity to review and comment on Master Plan projects as they were implemented during the design and construction phases. In 1998, the group's name was changed to the NIH Community Liaison Council (CLC). The CLC meets monthly, although August meetings are sometimes omitted.

In 1998, modifications to the 1995 Master Plan were required in the northwest sector of the campus because of an unanticipated design configuration for the Mark O. Hatfield Clinical Research Center. NIH prepared an amendment to the 1995 Master Plan and a Supplemental Environmental Impact Statement to cover the proposed revisions and their potential impacts. As part of the NEPA process, the draft documents were circulated to government agencies and the general public for review and comment. Presentations were made to the CLC at its July and November 1998, and April and June 1999 monthly meetings.

The established ongoing community participation has continued through the development of the NIH Master Plan 2003 Update. Meetings were held with the NCPC and M-NCPPC to inform them of the projections for the future number of campus employees as indicated by programming, and the initiation of the planning phase of work. Subsequent briefings of the two Commissions' staff were held in January 2003.

In a manner similar to that used in 1995, three CLC working groups covering construction impacts, environmental issues, and transportation related to the Master Plan Update have been formed. Each group held a series of meetings between July and October 2002 to discuss specific issues in detail. Recommendations from the environmental and transportation work groups were adopted by the full CLC in November 2002.

Chapter Four
Existing Conditions on the NIH Bethesda Campus

4.1 Site Overview

4.1.1 Site Size and Condition

The NIH Bethesda site is a 310-acre parcel adjacent to the Bethesda Central Business District, with buildings and uses arranged in a campus-like setting. The principal boundaries of the site are Rockville Pike (Wisconsin Avenue) on the east, West Cedar Lane on the north, Old Georgetown Road on the west, and the Edgewood/Glenwood neighborhood as well as the Battery Lane residential district on the south. Also part of the NIH Bethesda Campus, but not included as part of this Master Plan Update, is Building 82, the Bloch Center, which is located on the southwest corner of Oakmont Avenue and Old Georgetown Road.

The principal impression from the edge of the campus is of clusters of buildings placed in a rolling, wooded landscape. This character is created by major topography changes (a drop of over 150 feet across the site), and by the existence of mature trees and tree groupings around the perimeter of the site. There is a strong landscaped buffer at the perimeter of the campus, which is mostly undisturbed or being restored, and a more intensely developed core at the center of the site. Although most buildings are laid out on an orthogonal grid, there is little sense of coherence among building groups, open spaces, or circulation patterns.

4.1.2 Existing Land and Building Use

The largest land use on the site is undeveloped open space. Landscaped, wooded, and open areas account for approximately 181 acres or 58% of the campus. The largest undeveloped open areas occur at the perimeter of the site in four primary locations: the northwest corner of the campus; along Rockville Pike between Wilson and Center Drives; the southeast corner of the campus near the Library of Medicine (Building 38); and the area southwest of the Animal Facility Building (14/28 complex). Of the total 181 acres, approximately 66 acres (21% of the site) lie within the current perimeter landscape/open space buffer. The buffer zone is shown in drawings as a light dashed line running at a constant width of 250 feet along the campus perimeter.

The second largest category of land use on the site is circulation and parking, with approximately 85 acres (28%) being used for roads and surface or structured parking areas. Although this is a significant land area allocation, the development of multi-level parking structures has reduced the amount of surface parking which would otherwise have been required. Also significant is the amount of space dedicated to circulation alone, with 54 acres (18%) of the site used for roadways, walks, and service areas.

A variety of other land uses contained within built areas on the site make up the final 44 acres (14%) of the campus. For a breakdown of the primary land uses on the Bethesda site, see Table 4.1.2a.

Figure 4.0

NIH
Master Plan
2003 Update
Bethesda Campus

Aerial Photograph

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

SmithGroup

Table 4.1.2a - Exsiting Land Use

Land Use	Acres *	Site
Under Developed Open Space	181	58%
Buffer Zone**	66	21%
Other Open Space	115	37%
Circulation	85	28%
Parking	32	10%
Roadways / Walks / Service	54	18%
Buildings	44	14%
Total Land Area	**310**	**100%**

* All areas are approximate

** The entire buffer zone area encompasses 82.1 acres

The 66 acres denote green or impervious area

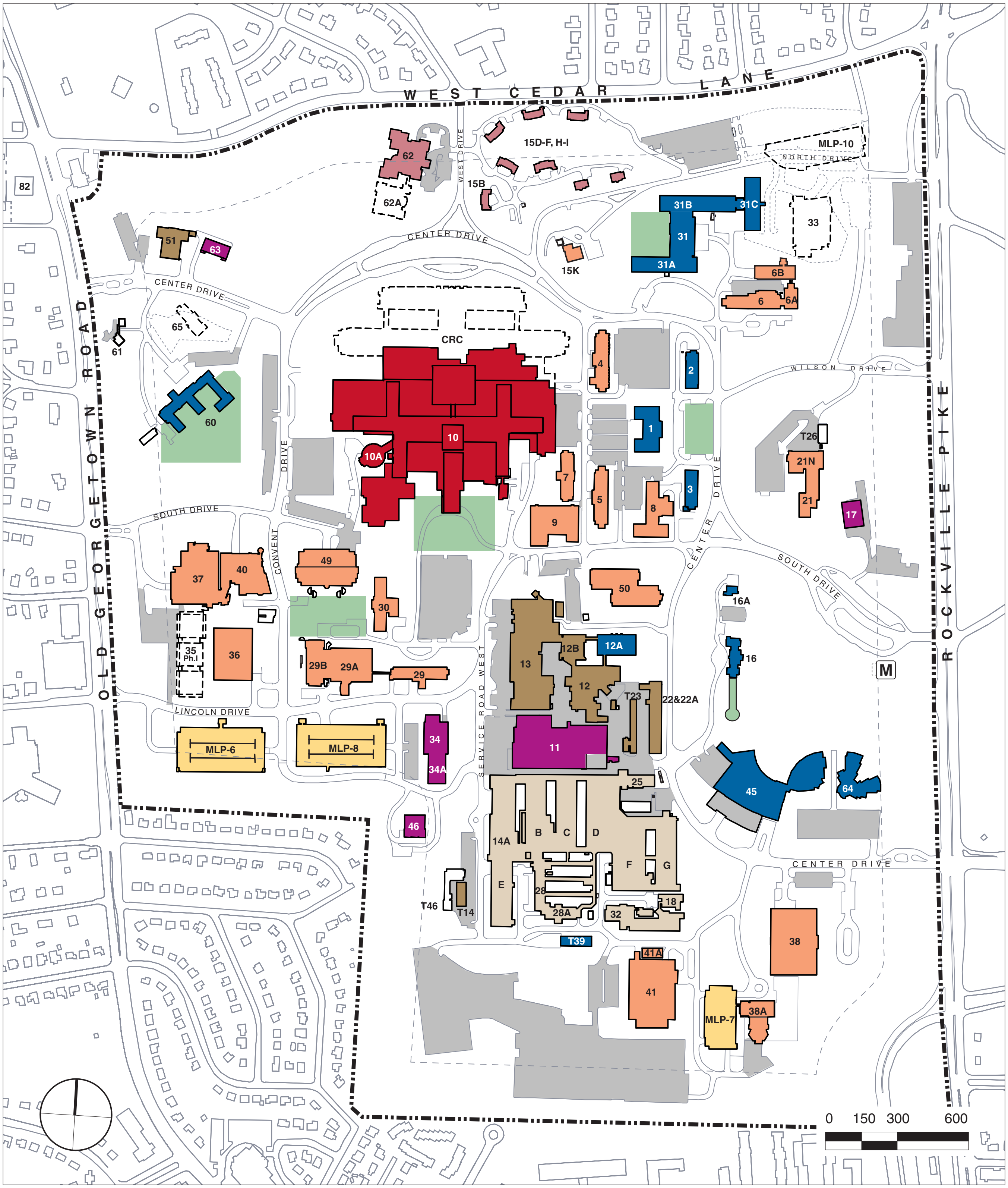
There are seven major functional building uses on the NIH Bethesda Campus: Clinical Center Complex/Patient Care; Research; Administrative/Special Function; Service/ Support Utilities; Animal Services; and Residential.

Clinical Center Complex/Patient Care includes uses that relate to clinical/basic research and patient care. Research includes research laboratory, laboratory office, laboratory support, shared support and ancillary service space; Administrative/Special Function are activities which pertain to NIH administration or which primarily take place in an office setting. Service/Support include design and engineering offices, shops, loading areas, grounds maintenance, fire station, and other general campus support activities. Utilities include campus central boilers and chillers, and related infrastructure or equipment. Animal Services include areas for animal care, holding, and research procedures. Residential include residential structures used for NIH employee housing. Figure 4.1.2 shows the campus buildings by major use. Table 4.1.2b is the associated building key and directory.

Figure 4.1.2b Key - Existing Building Directory

Building Number	Primary Use
1	Central Administration
2	Administration
3	Administration
4	Research
5	Research
6, 6A & 6B	Research
7	Research
8	Research
9	Research
10	Clinical Research Complex
10 / CRC*	Mark O. Hatfield Clinical Research Center
11	Central Power Plant
12	Support Services
12A & 12B	Offices
13	Support Services
14A - H	Animal Facilities
15B	Offices
15C - I	Residences
15K	Research
16 & 16A	Office (Stone House)
17	Substation
18	Research
21 & 21N	Research / Radiation Safety
22 & 22A	Grounds Maintenance
25	Waste Management
28 & 28A	Animal Facility
29	FDA Research
29A	FDA Research
29B	FDA Research
30	Research
31A - C	Offices
32	Research
33*	Research
34& 34A	Refridgeration Plant
35*	Porter Neuroscience Center (NRC) - Phase 1
36	Research
37	Research
38	National Library of Medicine
38A	Lister Hill National Center
40	Vaccine Research Center
41 & 41A	Research
45	Offices / Conference Center (Natcher Building)
46	PEPCO Substation
49	Research
50	Louis Stokes Research Building
51	Fire Station
53	Electrical Power Vault
54	Electrical Power Vault
60	Mary Woodard Lasker Center (Convent Building)
61 & 61A	Offices / Storage
62	Children's Inn
62A*	Children's Inn Expansion
63	Substation
64	East Child Care
65*	Family Lodge
T2	Storage
T14	Storage
T23	Storage
T39	Fitness Center
T46	Daycare Center
T26	Storage / Service
MLP 6	Southwest Multi-Level Parking
MLP 7	Southeast Multi-Level Parking
MLP 8	Southwest Multi-Level Parking
MLP 10*	Northeast Muilti-Level Parking

* Buildings currently under construction



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Bethesda Campus

CLINICAL RESEARCH CENTER
RESEARCH
ADMIN/SPECIAL FUNCTION
SERVICE/SUPPORT
UTILITIES
ANIMAL FACILITY
RESIDENTIAL
MULTI-LEVEL PARKING
SURFACE PARKING
DEFINED OPEN SPACE
BUILDINGS CURRENTLY UNDER CONSTRUCTION
METRO STATION

Figure 4.1.3

Existing Building Uses

4.1.3 Functional Districts

The seven major functional land uses on the NIH Bethesda Campus are clustered on site and can be grouped for analysis purposes into functional districts. See Figure 4.1.4.

Clinical Center Complex/Patient Care

The Clinical Center Complexis centrally located and is the functional heart of the campus, housing a variety of uses that relate to clinical/basic research and patient care. Because of its wide range of activities and overwhelming size (32% of total campus occupiable gross square feet), the Building 10 complex can be considered as a functional district unto itself.

Research

Research facilities are primarily located in two clusters on either side of the Clinical Center Complex. To the east, small research spaces are located in buildings, which include the original NIH campus quad. To the west where the most recent growth has occurred are large, more modern laboratory buildings. Since most institutes have some form of clinical research occurring in Building 10, there is both a functional and "psychological" relationship between the research districts and the Clinical Research Center. Other significant research facilities include the National Library of Medicine (Building 38).

Administrative/Special Function

Within this functional category are activities which pertain to NIH administration (Buildings 1 and 31), or which primarily take place in an office setting (Building 45 (the William H. Natcher Building), and Building 60 (the Convent Building)). Most of these uses occur north and east on the campus, with a strong functional relationship between activities in Buildings 1, 31, and the Clinical Center.

Often associated with buildings within this functional use category are special function areas. These areas include conference and auditorium facilities, reception areas (Building 16), and the Mary Woodard Lasker Center in the Convent Building (Building 60).

Service/Support

Campus support services include a central mainframe computer, design and engineering offices, shops, loading areas, grounds maintenance, fire station, and other support activities. This group of buildings is currently located near the geographic center of the campus in the Building 12/13 Complex.

Utilities

Located in proximity to the support service functions is the central utility district of the campus. Within this district are the campus central boilers and chillers, and related infrastructure or equipment, generally in Building 11.

Animal Services

This district is a large footprint composed of a series of interconnected small buildings (the Building 14/28 complex). Within this complex are areas for animal care, holding, and research procedures. This district has a functional relationship to all research areas of the campus that use animals in research.

Residential

On the north side of the campus is a less densely developed residential district. This area includes the residential structures of the Wilson Estate, the Children's Inn (Building 62), and several other residential structures used for senior NIH employee housing (Buildings 15C-15I). Some of these structures have been renovated for use as NIH offices or research facilities.

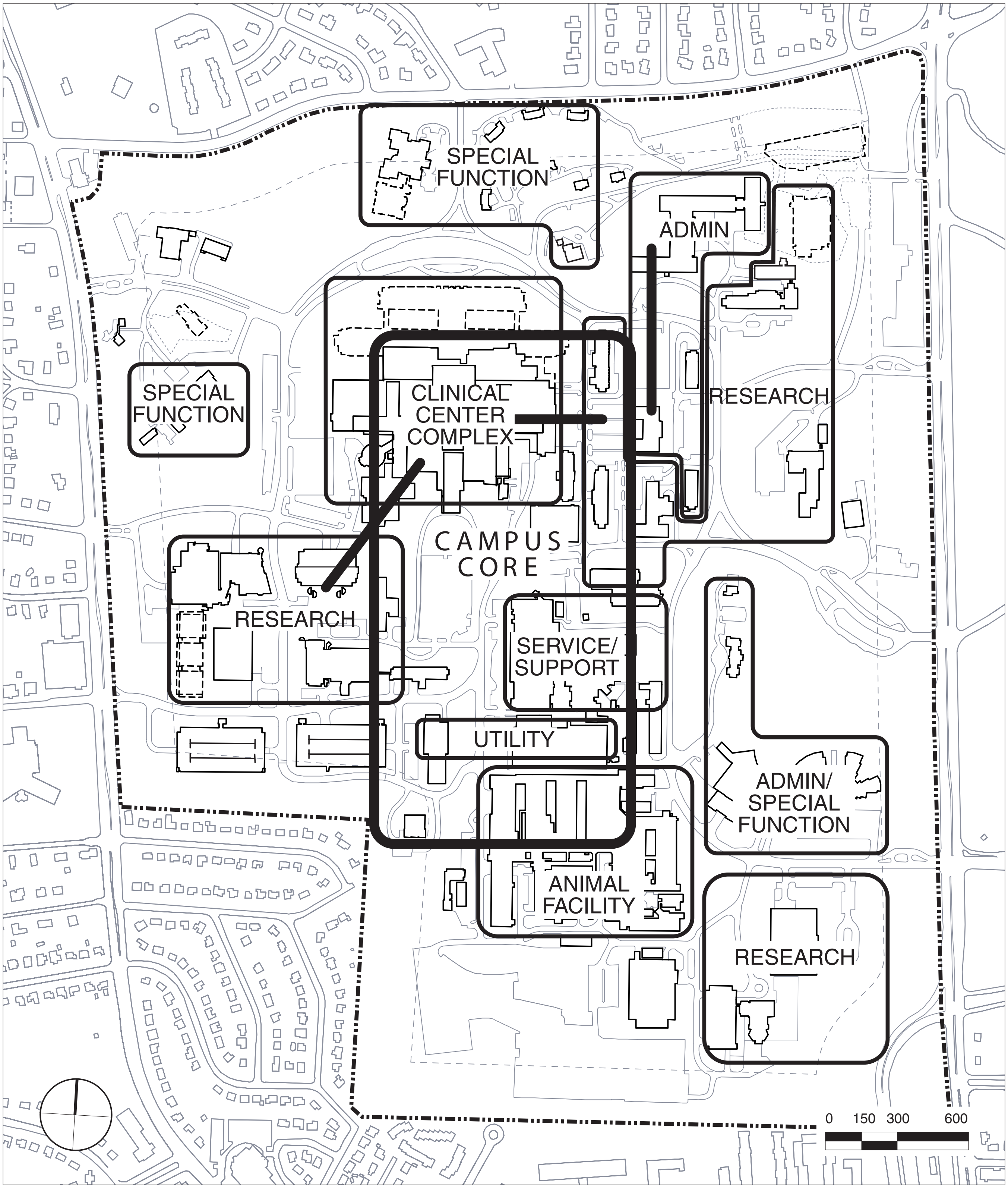

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Figure 4.1.4

Existing Functional Zones

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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Campus Core

Though not formally defined, the campus has a strong functional core. This core is defined by the relationships, which exist between the Clinical Center Complex, and Central Administration uses on the north, and the utility/support functions on the south. The Campus Core overlaps several of the other districts, which generally cluster around the perimeter of this central core.

4.1.4 FAR/Population Density

The floor area to site area ratio (FAR) for the NIH Bethesda Campus is currently approximately 0.55 excluding parking garage and utility spaces. The allowable FAR in the Bethesda Central Business District is 1.5 - 4.0, and in the residential areas surrounding NIH 0.20 - 0.30. The NIH campus is a transition in development density between the Central Business District and the surrounding neighborhoods.

With 17,500permanent employees currently on campus, NIH has an employee population of 56 persons/acre. This is less than the potential full-occupancy staff and resident population of 125 persons/acre for the Central Business District[1] and more than the resident population of 8-12 persons/acre[2] in the surrounding neighborhoods.

4.1.5 1995 Master Plan Observations

As a result of the 1995 Master Plan review by the National Capital and Planning Commission (NCPC), it was required that NIH update its Master Plan approximately every five years. The NIH Master Plan 2003 Update is the first of the series, and it follows the principles and goals established in the 1995 Master Plan. The updated Master Plan design is essentially the same as that in the Amendment to the 1995 Master Plan (Figure 4.1.6-b), published and approved by NCPC in June 1999. The 2003 Update takes into account both implemented and planned projects from the 1995 Master Plan, while also responding to changing NIH requirements and development, and integrating federal mandates into the plan.

General Observations

The 1995 Master Plan is shown in Figure 4.1.6-a. One major observation of the 1995 Master Plan is that the capacity was set at 18,026 employees for the year 2015. The current (year2003) population is at 17,511, and the Update provides an ultimate capacity of 22,000 employees.

Specific Implementation

Specific major developments, which have occurred on-campus since the 1995 Master Plan, including Master Plan modifications, are listed below and are shown in Figure 4.1.6-c.

Proposed Construction — Implemented

- Construction of Building 40, Vaccine Research Center Phase I (VRC)
- Construction of Building 50, Louis Stokes Research Building
- Building 63, North Electric Power Substation (PEPCO Facility)
- Building 64, East Child Care
- Building 11, Power Plant – Chiller Plant Expansion < Phase II
- Building 11, Cogeneration (COGEN) Facility
- Building 51, Fire Station

[1] Bethesda Central Business District - Approved sector Plan, July 1994. Montgomery County Planning Department. 38,500 - employment capacity. 5,600 housing units x 2.21 - 12,376. CBD area = acres.

[2] Assumes an average household size of 2.21 persons as of 1990. Based on 1988 Trends & Conditions Report - M-NCPPC.

Proposed Construction — Under Development

- Addition to Building 10, Mark O. Hatfield Clinical Research Center (CRC)
- Building 62A, Children's Inn Expansion
- Building 35, Neuroscience Research Center (NRC) - Phase 1
- Building 65, Family Lodge
- Research Building 33
- MLP-10

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Bethesda Campus

- EXISTING BUILDING
- PROPOSED BUILDING
- PROPOSED MULTI-LEVEL PARKING
- CENTRAL MALL/PRIMARY OPEN SPACE
- PLAZA/PEDESTRIAN CIRCULATION
- OPEN SPACE/RECREATION

Figure 4.1.6-a

1995 Master Plan

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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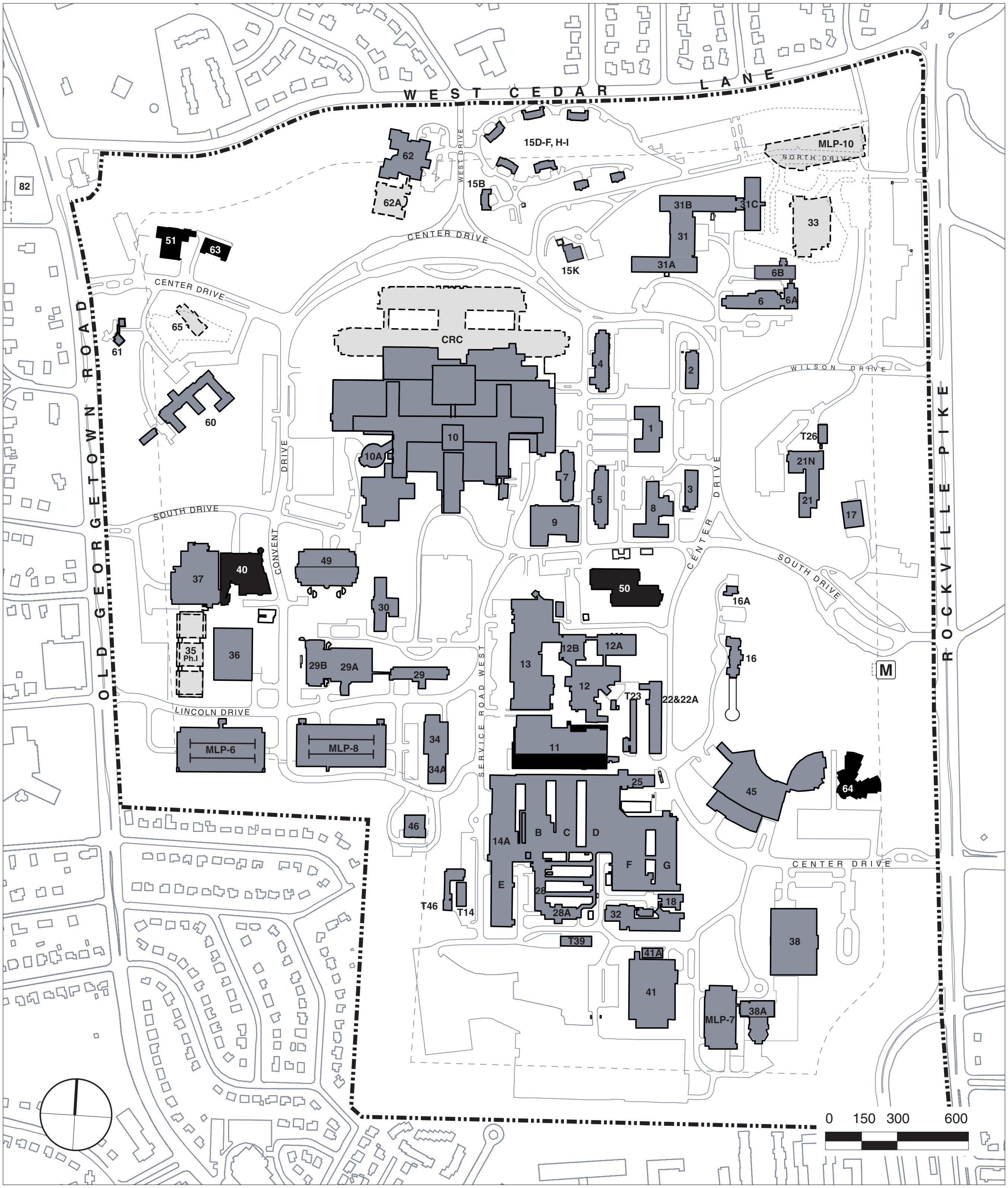
Bethesda Campus

EXISTING BUILDING
PROPOSED BUILDING
OPEN SPACE

Figure 4.1.6-b

1999 Amendment to Northwest Sector



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Bethesda Campus

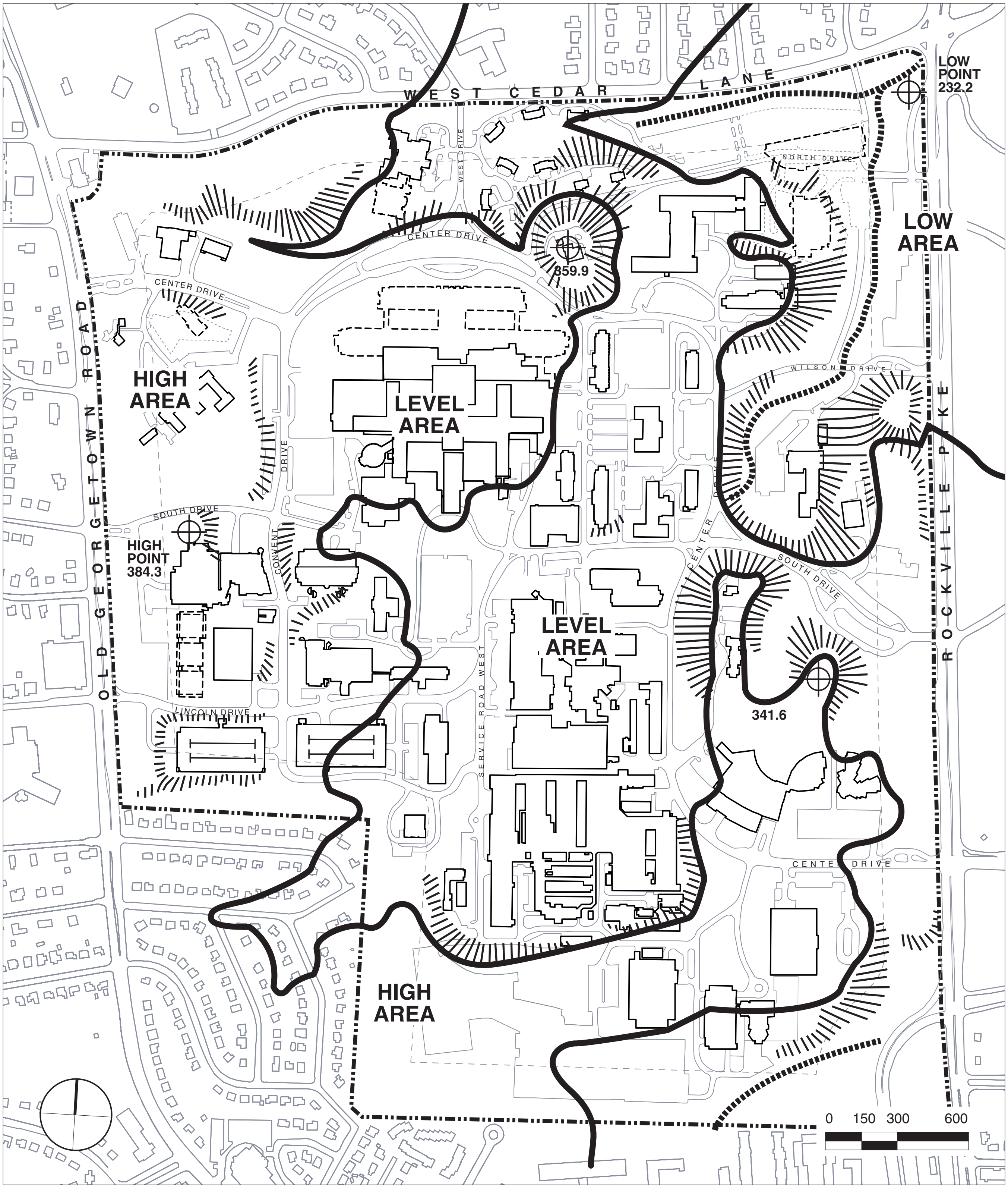
EXISTING BUILDINGS

CURRENTLY UNDER CONSTRUCTION

IMPLEMENTED

Figure 4.1.6-c

1995 Master Plan Implementation



STEEP SLOPES (OVER 15%)

HIGH POINT/LOW POINT

STREAM

NIH
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Bethesda Campus

Figure 4.2.1

Existing Site Topography Characteristics

4.2 Natural Features

4.2.1 Topography Characteristics

Elevations on the NIH campus range from a low of 232 feet above sea level at the northeast corner (Rockville Pike and West Cedar Lane) to a high of 384 feet above sea level north of Building 37 near Old Georgetown Road.

The site is divided into three zones with the highest area being along the west and south sides, the lowest area surrounding the NIH Stream in the northeast quadrant, and generally level areas in the center of the campus. Within this overall pattern there are several prominent hilltops, which are usually the locations of significant campus buildings. Site topography is more likely to be near its natural condition at the perimeter of the site than near the center.

Steep slopes (over 15%) primarily exist along the north and east perimeters of the NIH site and must be considered prior to construction and expansion. Steep slopes cover large portions of land along the margins of the NIH Stream and the NIH tributary stream, and a large area to the north of Stony Creek is very steeply sloped. Convent Drive is flanked by steep slopes along both its east and west margins. See Figure 4.2.1.

4.2.2 Hydrology and Floodplains

Subsurface Hydrology
The decomposed crystalline rock that underlies NIH is a type 1 aquifer as classified by Maryland standards. This type of aquifer normally produces less than 10,000 gallons per day and is considered a poor source of water. NIH presently has two wells for emergency supply, which have both been capped. These wells extend to 250 and 300 feet depths, respectively.

Surface Hydrology
The NIH Stream and Stony Creek, both tributaries of Rock Creek, convey surface runoff. The site drains from west to east, with the NIH Stream and its northern tributary receiving most of the campus watershed. The NIH Stream enters the site in a storm sewer from the Edgewood/Glenwood community and flows northeasterly until it emerges in an open channel near Building 21. Its tributary originates in the northwest corner of the site and flows toward the east in concrete drainage ditches or in storm sewers until its confluence with the main NIH Stream in the northeast corner of the site. Stony Creek, whose watershed covers about 32 acres (10%) of the NIH campus, enters and exits the site at the southeast corner. The ridge that separates these two watersheds crosses Rockville Pike just north of Jones Bridge Road. See Figure 4.2.2.

The fall of the main NIH Stream is 75 feet on site, and the total fall from entry onto the site to confluence with Rock Creek is 112 feet. The average stream gradient across the site is about 1.5%. The north tributary to the NIH Stream falls about 106 feet from the high point on the watershed to the confluence with the main NIH Stream with a gradient of about 5%. Stony Creek traverses the site for a short distance at its southeastern corner before crossing under Woodmont and Wisconsin Avenues and entering the National Naval Medical Center (NNMC). On the NIH site this stream receives storm waters from the National Library of Medicine (Building 38) and from the area around lab Building 41. The stream drops only 9 feet as it passes through the site over a distance of 1,040 feet for an average gradient of about 0.3%.

Floodplains
Floodplains of the two principal streams on the NIH site reflect the differences in the geo-morphology of these streams. Stony Creek, with its gentle gradient, has a wider floodplain

than that of the NIH Stream with its steep gradient and slopes through the site. Studies of site obstructions or impediments to flow indicate that the existing storm sewer system is adequate to accommodate storms up to the 10-year recurrence level, with the only possible impediment being in the Rockville Pike culvert on the NIH Stream. This culvert reaches capacity somewhere above the 25-year storm recurrence. Flooding that occurs on-site for 50-year and 100-year frequen-cy storms is generally contained within the low areas adjacent to the streams and does not reach the Rockville Pike eleva-tion. See Figure 4.2.2 for floodplain delineations.

4.2.3 Geology

Montgomery County geology reflects the differential erosion rates in a series of crystalline and sedimentary rocks. The NIH site is in the Piedmont Physiographic Province. To the southeast of the campus, much younger rocks occur; pre-Cambrian rocks outcrop northwest of the Fall Line, which marks the general boundary of the Piedmont Province.

NIH is underlain by the Lower Pelitic Schist of the Wissahickon Formation. This schist is relatively soft mica overlain by 10 to 30 feet of weathered rock materials (Saprolites) and residual soils. The major structural feature in the rocks is a set of northeast trending joints. The strikes of these joints appear to be the major factor in the alignment of the on-site streams.

An old fault zone in Howard County is associated with the orogeny of the Baltimore Gneiss dome 12.5 miles to the north-east of Bethesda. The region has been seismically quiet since Triassic time with only minor earthquake activity reported in Montgomery County. The age of the bedrock materials together with the stability of the structural features provides a local setting of geologic integrity.

4.2.4 Soils

Surface Soils

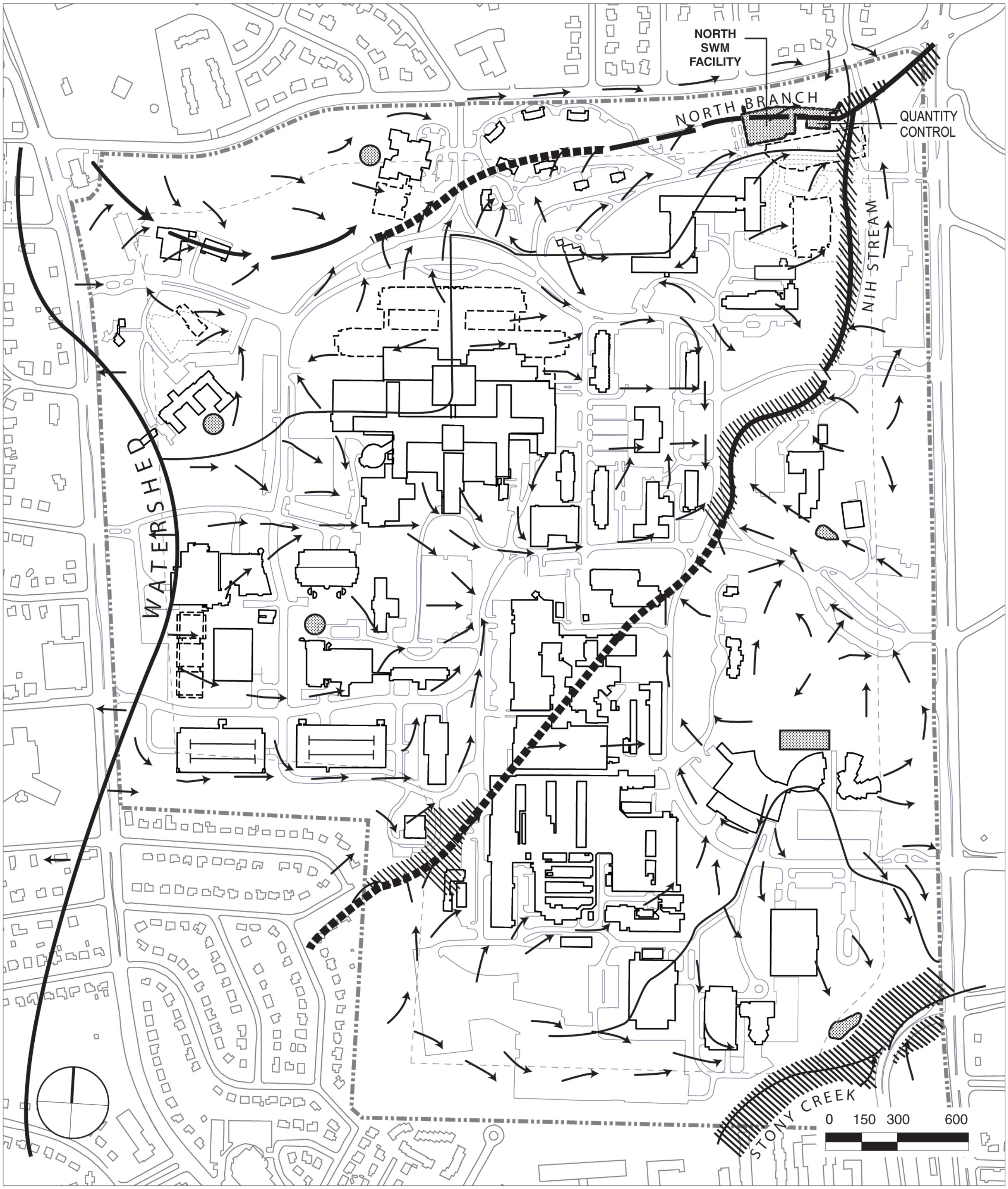
The two major surface soil series at the NIH site are Glenelg and Manor. Both are derived from residual rock with the Glenelg Series more deeply weathered. Soils of limited distribution include the Worsham, Glenville and Neshaminy Series. The soils found on the NIH site are well-drained upland soils, moderately eroded. Because of the relatively good fertility, gently sloping nature, and deep character of these soils, they are well suited to suburban development.

Sub-Surface Soils

The term “Saprolite” is used for the in-place mantle of residual silty clay and weathered bedrock overlying all types of crystalline rocks in the Maryland piedmont. Based on the parent rock and the derived soil, the Saprolite group is generated from six different parent rocks. Three of these are found on the NIH site and are categorized as follows:

- Saprolite 5B - on schist, micaceous, well drained;
- Saprolite 5D - on gneiss, silty, bouldery, well drained;
- Saprolite 5F - on mafic rock, clay rich, poorly drained.

The bedrock underlying the Bethesda campus is igneous, metamorphic and consolidated rock, fresh, hard, unaltered, and locally overlain by Saprolite and organic surface soils. Due to erosion in the NIH Stream valley, this bedrock is only lightly overlain in the northeast corner of the site. Additional areas of known bedrock include the southwest corner of site, specifically between Buildings 41 and MLP 7. See Figure 4.2.4.



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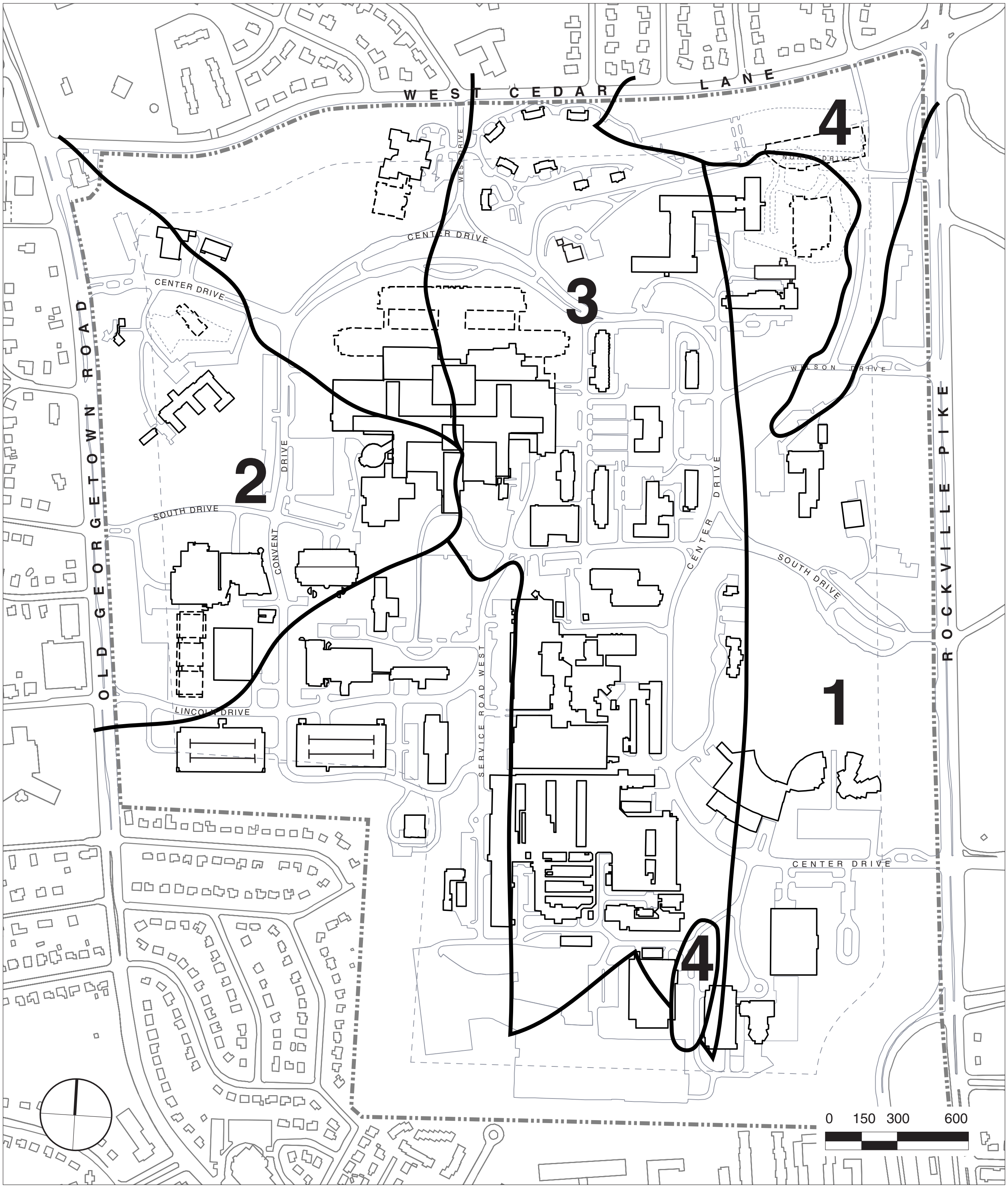
Bethesda Campus

100-YEAR FLOODPLAIN
PIPED DRAINAGE
OPEN STREAM
STORMWATER RETENTION

Figure 4.2.2

Existing Hydrology



1 SAPROLITE ON SCHIST, WELL DRAINED
2 SAPROLITE ON MAFIC ROCK, POORLY DRAINED
3 SAPROLITE ON GNEISS, WELL DRAINED
4 BEDROCK

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Bethesda Campus

Figure 4.2.4

Existing Subsurface Soils

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Structural Stability

The physical character of the Saprolite soils, such as those found at NIH, is that they are composed of sand, silt, clay, angular rock fragments, and a residual deposit of soft red-brown to gray earthy porous material derived from decomposed crystalline rock.

With light power equipment, the material is easy to work near the surface. With heavy power equipment, the material becomes moderately difficult to work below 20 feet. Achievable compac-tion is 90 to 95 percent of maximum density.

This soil is fair to good for support of heavy structures. With bearing strengths ranging from 3 to 4 tons per square foot near the surface, increasing to 5 tons per square foot at greater depths. Soil is stable in near-vertical cuts to as much as a 15 feet depth.

In the Saprolite mantle, disintegrated rock occurs between 20 and 60 feet below the surface, with hard rock usually at 40 to 50 feet below the surface or deeper. Boring data indicates that the water table is approximately 15 to 30 feet below the surface throughout the site.

4.2.5 Vegetation and Ground Cover

Tree cover on the Bethesda Campus is of two distinct types: woodland stands found around the perimeter of the site, and formal plantings associated with development of the interior portions of the property.

Predominant species in the woodland stands are Oak, Tulip Poplar, Sycamore, and Maple. Tulip Poplars and Maples occupy the lower portions of the site with Oaks and Sycamore dominating the upland areas. Trees are of mature or maturing stature and range in size from 18" to 36" diameter at breast height (DBH) with some specimens up to 48" DBH. Species generally occur in near pure stands of similarly aged trees of even density, with little of no understory planting. Most woodlands are maintained as tree lawns.

Tree cover on the interior of the site is predominantly street tree and parking lot plantings. Trees are young by comparison to the woodlands and often in a stressed condition.

Evergreen species are found throughout the property, generally in small stands of similar species, most often White Pine, Austrian Pine, or Scotch Pine concentrated around the perimeter of the property

.

4.2.6 Plant and Animal Communities

Plant Community

The regional woodlands in the vicinity of the Bethesda campus have been largely modified by the increasing urbanization of the area. Small remnants of the original local woodland communities still exist on the grounds of the National Naval Medical Center and further to the east in Rock Creek Park. In these communities, as at NIH, the Tulip tree and the White Oak are the two most important native woodland tree species on the grounds, followed by the Northern Red Oak.

Aquatic vascular plants are absent along the NIH Stream courses because of general incompatibility with current landscape practices. There are no designated wetlands on the Bethesda campus. The only threatened species in Montgomery County, the Small Whorled Pogonia, has not been identified on the NIH campus.

Animal Community

Wild mammals at NIH are limited to those species that can tolerate the urban park setting and concentrated vehicular and pedestrian activity. Those, which may be found on-site, include the Raccoon, Cottontail, Fox Squirrel and/or Gray or Black Squirrel. The habitat in the area is appropriate for a variety of small mammals including the House Mouse, White-footed Mouse, Deer Mouse, Least Shrew, Short-tailed Shrew and the Norway Rat.

With the elimination of the majority of understory habitat, nesting sites for bird species such as the Meadowlark, Kill-deer, Sparrow, Thrasher, Wren and many Warblers are currently absent. The few remaining groupings of tall trees on the site may provide some nesting habitat for Woodpeckers, Vireos, Tanagers, Thrushes, Chickadees and Titmice. Large areas of open space or buildings isolating the nesting sites from feeding areas limit the flight paths to and from these trees for these latter species. NIH provides artificial bird houses for cavity nesters throughout the campus to supplement the loss of habitat due to hazardous trees that are removed. There are presently fifty-one artificial bird houses on the campus and others are added as necessary. Migratory or seasonally abundant birds include such common varieties as the Tree Sparrow, House Sparrow, Starling, Robin, Common Crow and Blue Jay. The one endangered species listed in Montgomery County is the Bald Eagle, which has not been identified on the NIH campus.

A habitat survey conducted in preparation for planning of the William H. Natcher Building noted an absence of aquatic wildlife in the waters of NIH.

4.3 Built Environments

4.3.1 Landscape Patterns

The existing site landscape patterns are shown in Figure 4.3.1. At the macro scale the campus landscape falls into two distinct categories: the Landscape Dominant Zone of the perimeter of the campus and the Building Dominant Zone of the interior.

Natural rolling topography of fairly fine grain, and mature woodland cover of even age and density in certain areas characterize the Landscape Dominant Zone. Buildings are set within and are generally absorbed by the landscape. Four corners, which distinguish themselves from each other and from the landscape, anchor this zone. In the northeast area of the site, the NIH Stream, specimen trees and small footbridges create a quiet, internalized, and picturesque setting. In the southeast corner open landscape, rolling turf, and groupings of mature trees allow open vistas into the campus. The southwest corner, the only corner without a public edge, is a commanding site on high ground with long views to the north. Its aged, gnarled Sycamores and continuous sweep of lawn create a classic park setting. The northwest corner is an impressive woodland of mature, large Tulip Poplars.

Collectively, the corners of the Landscape Dominant Zone provide a rich, memorable, and valuable structure for the campus as a whole, while the Zone in its entirety provides an important buffer and edge to surrounding uses. Other prominent landscape features of this zone include the tree and lawn edges along Rockville Pike and Old Georgetown Road.

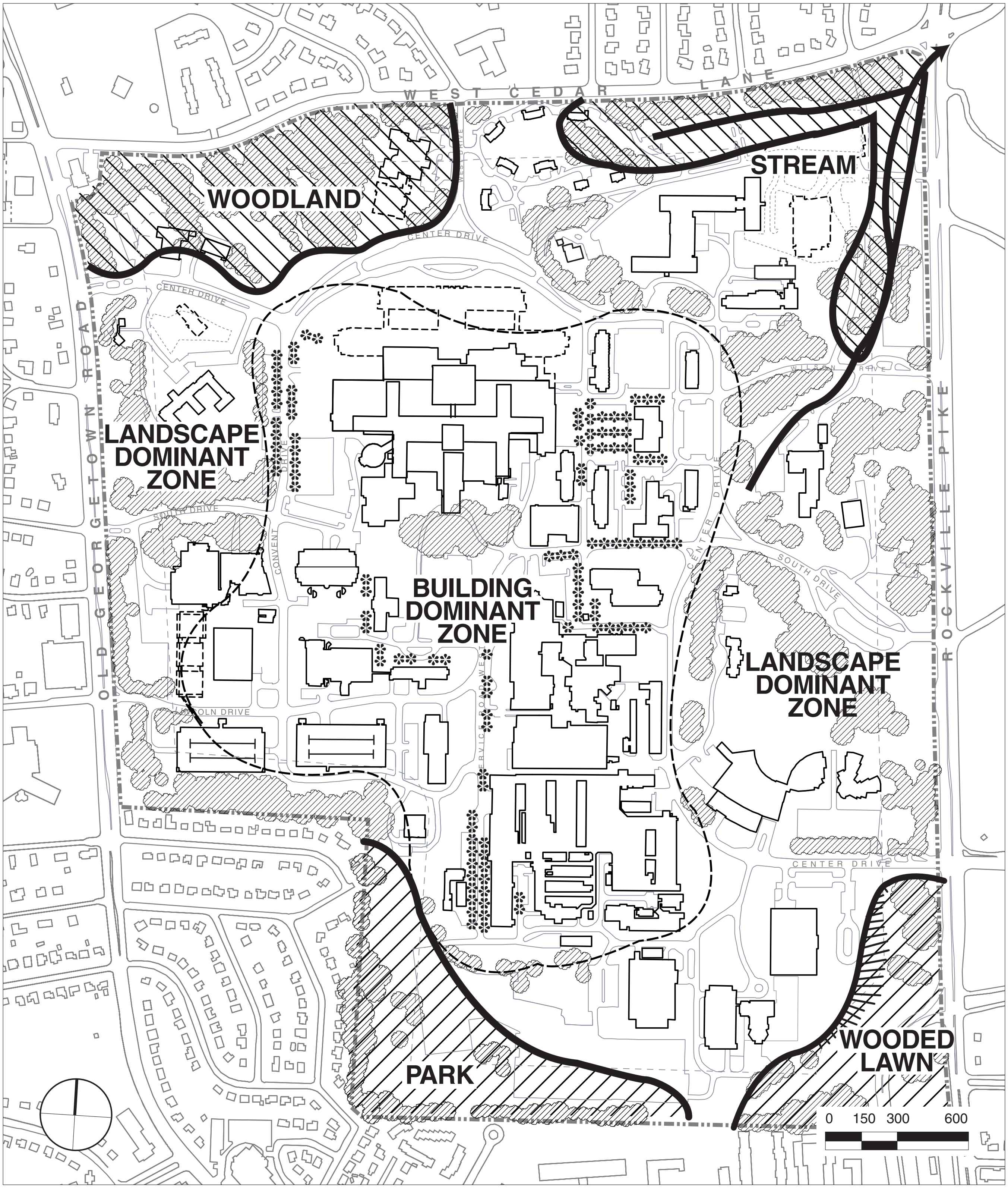
The Building Dominant Zone on the interior of the campus is characterized by terraced topography and planted landscapes typified by street trees, parking lot plantings, and defined ornamental plantings without apparent campus-wide patterns.

4.3.2 Building Patterns

Buildings on the NIH Bethesda Campus are laid out predominantly on an orthogonal grid, which is derived from the formal quad created by the original buildings of the campus (Buildings 1-5). A few structures do not conform to the grid, including the Convent Building (Building 60, whose construction predates the NIH Bethesda Campus), the William H. Natcher Building (Building 45, which responds to the curve of Center Drive), the residential buildings at the north end of the campus and now the East Child Care facility along Rockville Pike (Building 64) and the Fire Station (Building 63 in the northwest corner campus). Building patterns on the NIH site do not relate directly to building patterns of the surrounding area. See Figure 4.3.2.

While there is no formal structuring which relates all campus buildings to each other (such as a central lawn or mall), buildings on campus tend to be organized in clusters. These groups of buildings are related by formal structure, shared open space, or common uses. While most building groups open outward toward the rest of the campus, some groups, such as the Support Services cluster and the Animal Facilities, have a more inward focus and have less prominent building frontages. Due to its very large scale, the Clinical Center Complex should be considered a building group unto itself.

Within the overall structure of the grid there are important axes, which relate to significant buildings. These include the axial relationship between the central administration building (Building 1) and the tower of the National Naval Medical Center across Rockville Pike; the orthogonal relationship of the buildings within the historic core (Buildings 1-5); the axis created by the symmetrical composition of the original Clinical Center (Building 10), particularly toward the southern part of the campus; and the panoramic view from the Stone House (Building 16) over the entire campus.



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FORMAL LANDSCAPE
INFORMAL LANDSCAPE
SPECIAL CORNER

Figure 4.3.1

Existing Landscape Character

4.3.3 Places and Open Spaces

There are relatively few identifiable "places" on campus, and most outdoor open spaces are not well defined by enclosure, landscape, or character. Most open space on the site is treated as residual, with an emphasis on buildings as objects. Where identifiable places exist on campus, there is usually a relationship to a significant building or building entry. As with building patterns, there does not appear to be an organizing concept or system relating the individual places and open spaces to each other.

Three specific places deserve mention for their individual, collective, and contrasting qualities: the NIH Stream Valley with its connection to nature; the Stone House hilltop (Building 16) with its connection to history; and the Metro Station area with its regional connections. See Figure 4.3.3.

4.3.4 Building Heights

Building heights (above grade) on campus range from ±15 feet, one-story structures such as the Animal Facility Building 14, to a high of ±200 feet of the Clinical Center Complex (Building 10). As a general pattern, lower buildings (0-35 feet in height) are located at the perimeter of the campus, while medium height buildings (35-100 feet) occupy the center of the site. The taller of these medium height buildings include research Buildings 37 and 49, Building 11 (the power plant), and the William H. Natcher Building (45). These zones are punctuated by tall buildings (>100 feet), including the Clinical Center Complex, general office Building 31 (±190 feet), and the Lister Hill National Center (Building 38A, ±150'). See Figure 4.3.4.

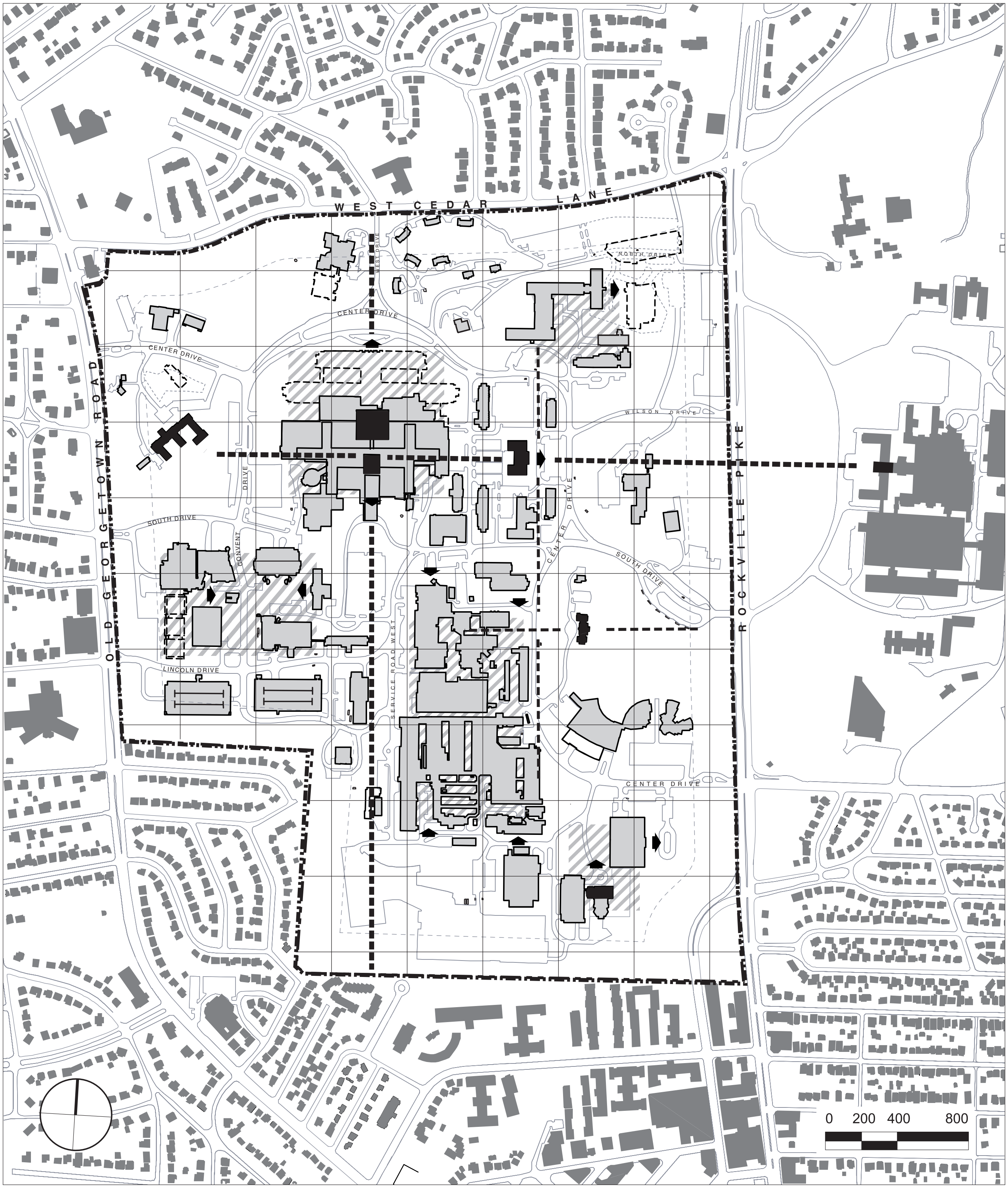
Because the site has such varied topography, building heights in relation to site elevation can be an important factor in the perception of building masses. Low buildings, except for the Lister Hill building and Building 31 Complex whose prominence is enhanced by its hilltop setting, occupy most hilltop sites on campus. Many buildings in the center of the campus are not highly visible from outside areas because they are at lower elevations than the perimeter landscaping, while structures on the western edge of the site (research Buildings 35 (NRC), 36, 37, and 49) appear to be taller from inside the campus because of their higher topographical elevations.

4.3.5 Views and Prominent Features

Natural prominent features of the site include significant hilltops around the campus, the NIH Stream Valley, and the numerous stands of mature trees around the perimeter. Man-made prominent features are structures which act as landmarks because of their height, size, age, or location.

The most prominent structure on site is the Clinical Center Complex, which is the major landmark for the campus. Other significant buildings on the site occur in conjunction with prominent natural features, such as the Building 60 (Convent Building), Building 16 (Stone House), and Building 38A (Lister Hill National Center). Other prominent buildings on site include Building 31 (general office), Building 1 (central administration), Building 45 (William H. Natcher Building), and Building 38 (National Library of Medicine), which is the most prominent campus building from outside the site.

An analysis of views around the site shows that visibility into the center of campus from surrounding streets and neighborhoods is mostly blocked by topography and landscape. Major views into the site tend to occur at the corners of the campus, at new research Building 35 (NRC - Neuroscience Research Center) on the Old Georgetown Road side, and along the south edge of the site. Axial views are created between the central administration Building 1 and the tower of the National Naval Medical Center, and to the



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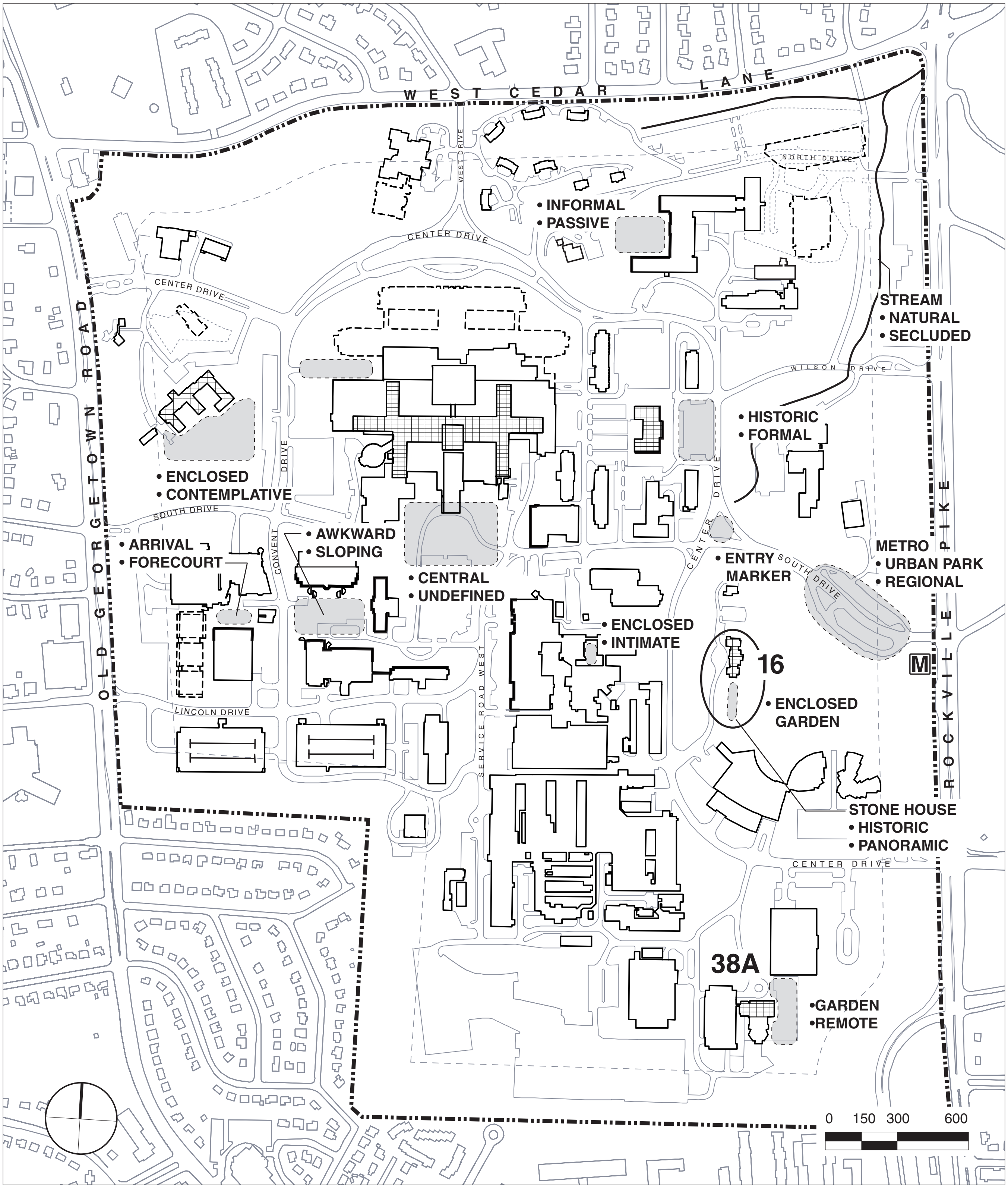
FOCAL ELEMENTS
BUILDING GROUPS
MAJOR AXES
BUILDING ORIENTATION

Figure 4.3.2

Existing Building Patterns



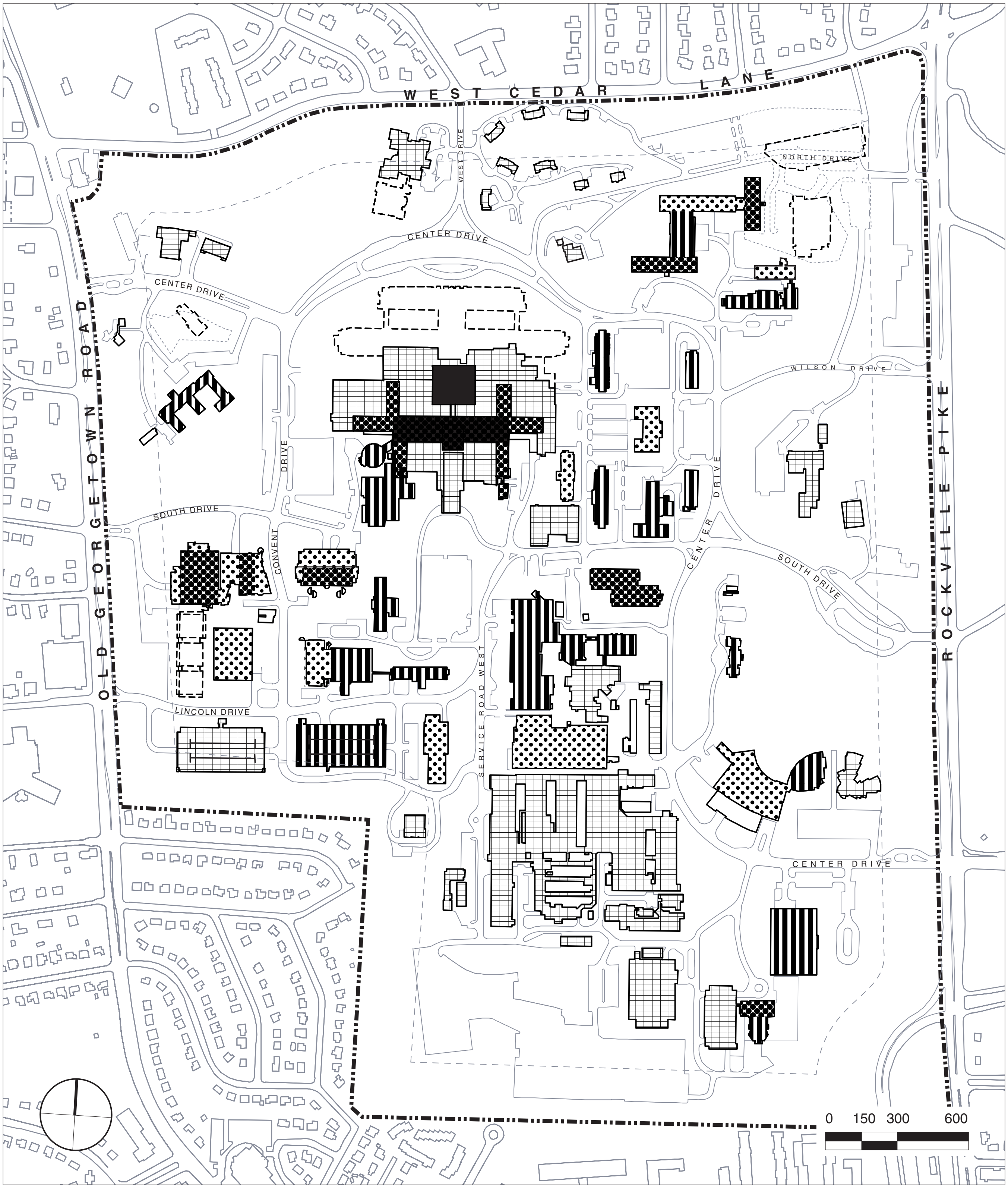
KEY SPACES

KEY BUILDINGS

IMPORTANT EDGE

Figure 4.3.3

Existing Places & Open Spaces



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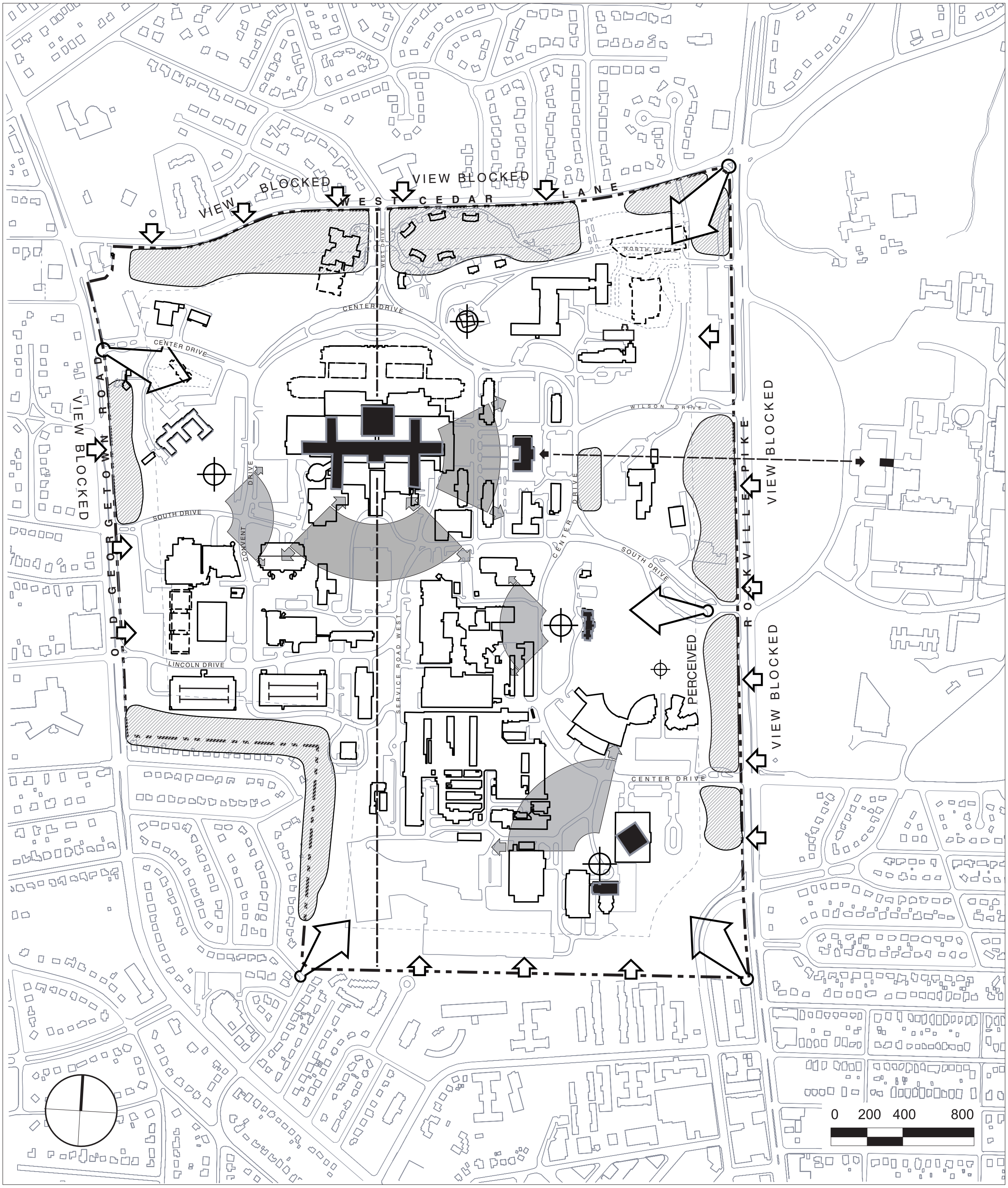
(0-35' symbol)	0 - 35'
(35'-65' symbol)	35' - 65'
(65'-100' symbol)	65' - 100'
(100'-200' symbol)	100' - 200'
(200'+ symbol)	200' +

Figure 4.3.4

Existing Building Heights



TREE BUFFER
HIGH POINTS
VIEWS
PROMINENT FEATURES

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Figure 4.3.5

Existing Views & Prominent Features

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Clinical Research Center primarily from the south end of the campus. There are also panoramic vistas over the entire campus from the elevated areas in front of Building 16, Building 38A/41 and behind the Building 60. See Figure 4.3.5.

4.3.6 Building Areas Summary

The current gross square footage of occupiable structures on the NIH Bethesda Campus is 7.36 million gross square feet (gsf). The total built area including structured parking facilities is approximately 8.26 million gsf. See Table 4.3.6.

Excluding parking structures, there are sixteen buildings on campus, which have over 100,000 gsf of space, the largest of which is the Clinical Center Complex (Building 10). With approximately 2,260,000 gsf (excluding parking), this building complex contains 30%of all campus occupiable built space. The second largest building on campus is the general office Building 31A, B and C complex with over 580,000 gsf. Table 4.3.6 shows all existing building areas with their primary use identified.

Outside the Clinical Center/Patient Care category, the largest primary use category on campus is Research functions with approximately 2.8 million gsf of space, followed by Administrative/Special Function areas with approximately 1.2 million gsf of space.

4.3.7 Building Population Summary

The 2003 total campus employee population at Bethesda is 17,511. The largest population center is the Clinical Center Complex, which houses over 7,000 employees or 40% of the entire campus employee population. The second largest staff concentration (31%) is in the Research complex with approximately 5,500 employees housed in various research buildings in close proximity to the Clinical Center Complex (CCC) and 4,200 research employees in the CCC itself. The Administrative/Special Function category, which include the general office Building 31 complex houses approximately 1,800 employees or (28%) of the entire campus population.

4.3.8 Building Conditions

The building conditions analysis is based on physical factors such as structural soundness, condition of finishes, operation of mechanical systems, etc. All campus buildings have been rated from excellent to poor as an indication of the immediacy of need for their renovation or replacement. A summary of building conditions is graphically presented in Figure 4.3.8.

Buildings assigned an “excellent” rating are those that were either recently constructed or renovated, and represent approximately 48% of the built space on campus. A significant number of buildings, accounting for more than 18% of campus space, are in “good” condition. Approximately 9% of the campus has been assigned a “fair” rating, with buildings in this category expected to have only 5 to 10 years of useful life. The remaining 26% of campus space is rated in “poor” condition, with an expectation of 0 to 5 years of useful life. A significant portion of the Clinical Center Complex (Building 10) and the entire Animal Facility (Buildings 14/28) are rated in “poor” condition and will require early renovation or replacement.

Buildings in “fair” or “poor” condition are primarily located in the central and south-central portion of the campus, leaving these areas more readily available for renovation or redevelopment.

Table 4.3.6 Existing Areas Summary *(areas do not include structured parking)*

Building Number	Building Gross Area	Primary Use
1	95,948	Central Administration
2	46,860	Administration
3	48,860	Administration (currently vacant)
4	91,292	Research
5	91,292	Research
6, 6A & 6B	145,043	Research
7	48,860	Research
8	99,296	Research
9	32,500	Research
10	2,261,545	Clinical Center Complex
10 / NMR's	11,135	Clinical Center
11	232,400	Central Power Plant
12	52,140	Support Services
12A & 12B	104,196	Offices
13	212,690	Support Services
14A - H	245,252	Animal Facilty
15B	8,065	Office
15C-I	52,345	Residences
15K	11,670	Research
16	17,480	Offices (Stone House)
16A	2,880	Offices
17	7,651	Substation
18	6,550	Research
21 & 21N	36,216	Research / Radiation Safety
22 & 22A	15,810	Grounds Maintenance
25	4,445	Waste Management
28 & 28 A	26,501	Animal Facilty
29	89,949	FDA Research
29A	106,694	FDA Research
19B	102,700	FDA Research
30	93,940	Research
31A - C	582,037	Administrative Offices
32	9,768	Research
34 & 34A	72,547	Refridgeration Plant
36	236,285	Research
37	248,469	Research
38	230,347	National Library of Medicine
38A	222,120	Lister Hill National Center
40	84,600	Vaccine Research Center
41	138,268	Research
41A	3,526	Research
45	372,535	Offices / Conference Center (Natcher Building)
46	11,526	Substation
49	270,311	Research
50	290,000	Louis Stokes Research Building
51	22,000	Fire Station
53	3,968	Electrical Power Vault
60	67,500	Mary Woodard Lasker Center (Convent Building)
61 & 61A	3,296	Office / Storage
62	37,565	Children's Inn
63	10,030	Substation
64	21,000	East Child Care
T2, T14, Y23, T39	15,031	Storage / Service
T26	2,900	Storage / Service
T46	3,000	Child Care Center

4.3.9 Building Functional Suitability

Functional suitability is based on the ability of a particular structure to continue to be used effectively for the activity assigned to it. In some cases, buildings which are judged to be in fairly good structural condition may no longer meet the functional requirements of the uses they house, or may not have a high reuse potential for other uses. Buildings deemed to be obsolete couldn't practically be reused because of inadequate mechanical systems, inflexible structural systems, building configuration, or cost factors.

Most buildings on campus are considered to be functional for the uses they currently house. Marginal buildings mostly include older research buildings whose structural systems and configurations cannot readily be updated to accommodate current research layout and mechanical systems requirements. The larger structures deemed to be obsolete are Building 14/28 (the Animal Facility), and service buildings 12/22. A summary of building functional suitability is graphically presented in Figure 4.3.9.

4.3.10 Campus Entries

The quality and character of entries onto the Bethesda campus create an important arrival image for employees as well as visitors. Campus entries also act as key orientation points for the organization of the entire campus. Most campus entries are not well defined by signage, landscaping, or other special features, except gates and guardhouses. There are five major vehicular points into the site, and two secondary entrance roadways. In addition to these multi-use campus entry points, there are several specific bicycle/pedestrian entry locations that should be accommodated in future planning. Following are descriptions of the qualities of the predominant entries, both for vehicular and bike/pedestrian traffic, as shown in Figure 4.3.10.

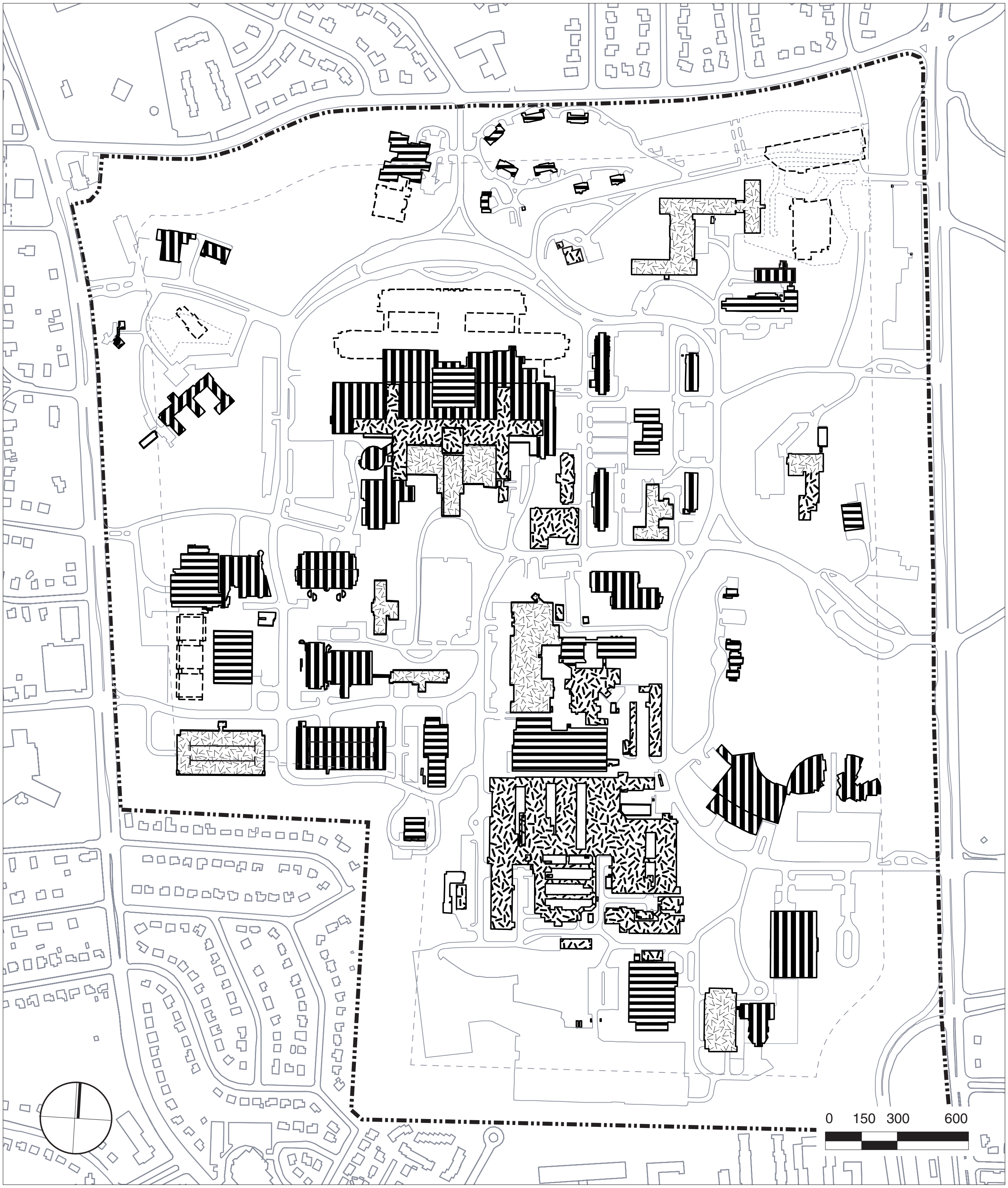

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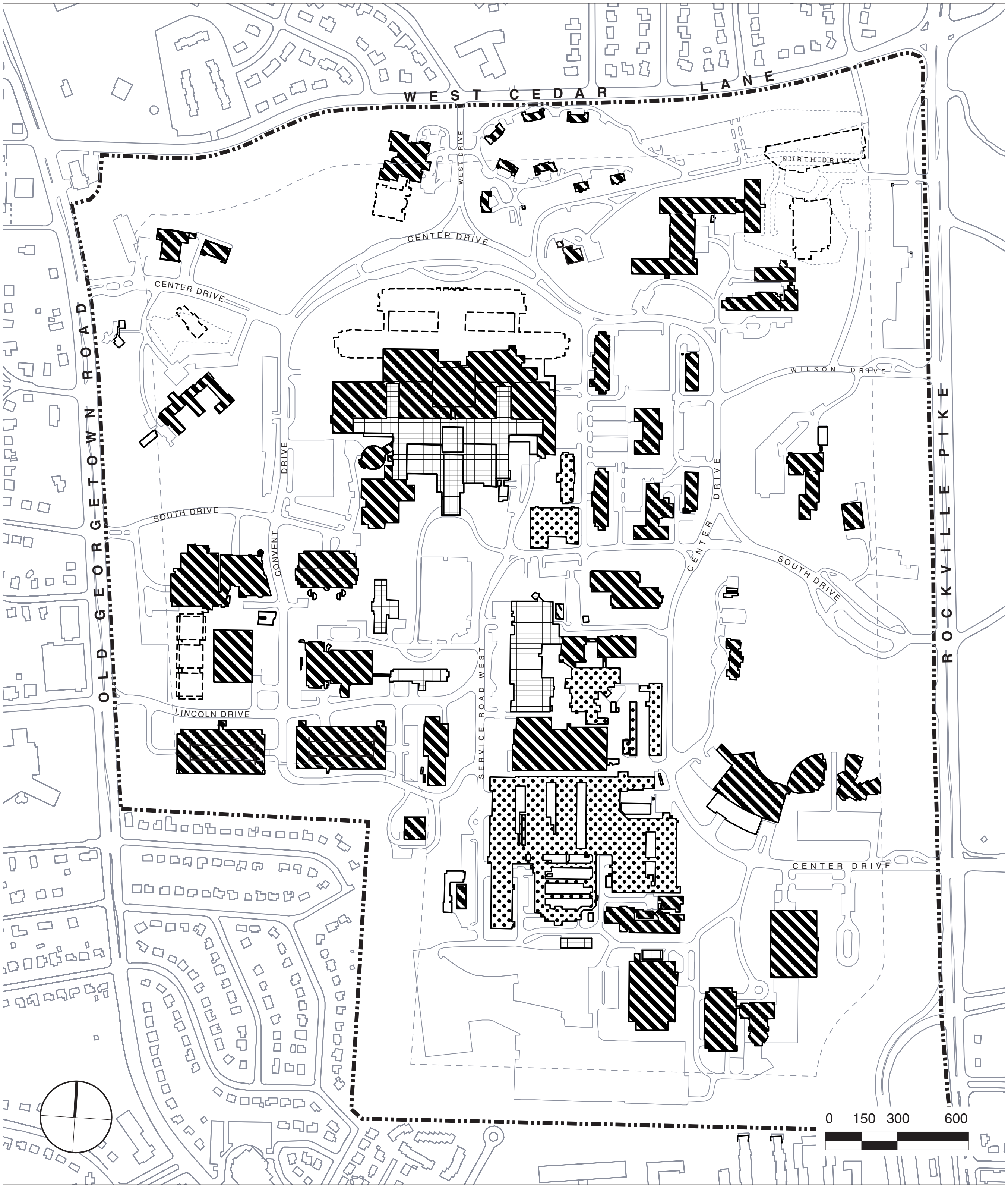
Figure 4.3.8

Existing Building Conditions



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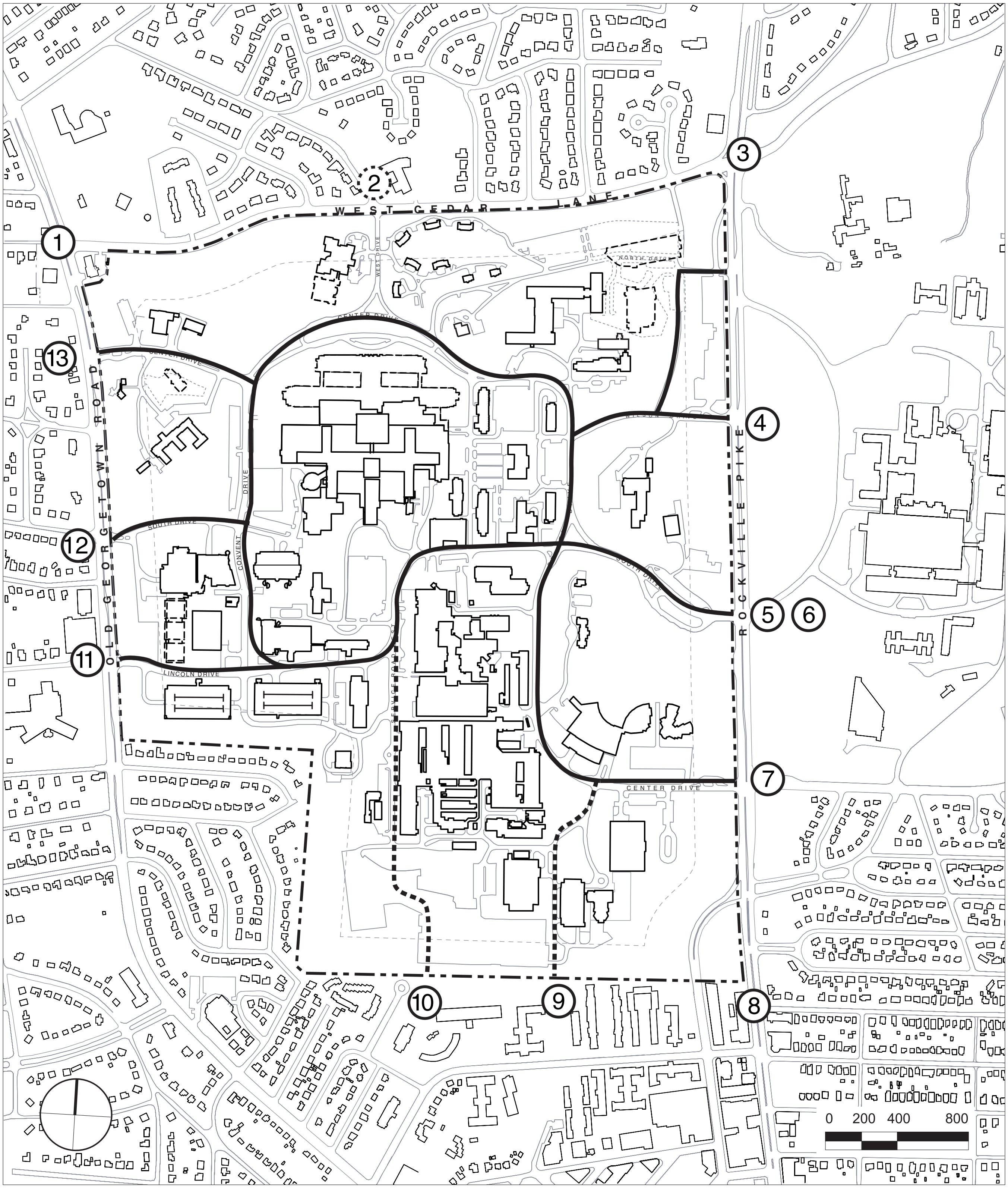
FUNCTIONAL
MARGINAL
OBSOLETE

Figure 4.3.9

Existing Building Functional Suitability



NOTE: SEE SECTION 4.3.10 FOR NUMBER LEGEND

Figure 4.3.10

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Major Campus Entries

Vehicular Access Roadways

2. West Drive at West Cedar Lane

This entrance is currently closed to vehicular traffic and used for emergency evacuation only due to post-9/11 security improvements. This entrance will be converted into an entrance that would allow exclusive access for Clinical Center patients and patient visitors.

4. Wilson Drive at Rockville Pike

There is a positive entry experience through woods with views of the naturalistic setting of the NIH Stream. Entry experience terminates positively with a direct view into the formal quad at the central administration Building 1. Wilson Drive is currently used as an employee-only entrance and is open between 5:00 – 9:00 PM each weekday. Wilson Drive is closed during the weekends from Friday at 9:00 PM to Monday at 5:00 AM.

5. South Drive at Rockville Pike

This entry is highly landscaped and projects a positive gateway image at the bus terminal/ Metro station entry. Due to special landscaping and visibility from Rockville Pike, this entry has the visual effect of being the main entry onto campus. However, the arrival sequence ends ambiguously at the memorial anchor/traffic island. South Drive is used by employees and visitors to enter onto the campus and is open 24 hours a day, 7 days a week.

7. Center Drive (Jones Bridge Road) at Rockville Pike

This primary campus entry has no special character or designation, other than signage. The entry drive passes by front entries and service areas for Building 45 (Natcher) and Building 38 (National Library of Medicine). The arrival sequence is negatively terminated by views into the Building 14/28 complex (Animal Facility). There will be bicycle access from the future east portion of the Capital Crescent Trail. Crossing of Rockville Pike is difficult due to high traffic volumes. Center Drive at Rockville Pike is an employee-only entrance onto campus and is closed between the hours of 7:00 PM and 6:00 AM. Center Drive at Rockville Pike is closed during the weekends from Friday at 7:00 PM to Monday at 6:00 AM.

11. Lincoln Drive at Old Georgetown Road

The lawn area in front of lab Building 36 creates a positive, "corporate campus" image. East of Convent Drive, the character of the entry drive becomes service oriented, and the entry sequence terminates with a negative view of the loading docks of Support/Services Building 13. Lincoln Drive is an employee-only entrance onto campus and is open between 6:00 AM – 7:00 PM, with exiting traffic only between 10:00 AM and 7:00 PM. Lincoln Drive is closed during the weekends from Friday at 7:00 PM to Monday at 6:00 AM.

12. South Drive (Greentree Road) at Old Georgetown Road

This road is wooded with steeply sloping sides. It terminates with views toward central green space (positive) and service area of lab Building 49 (negative). Direct bicycle/ pedestrian access is provided from neighborhoods to the west of NIH to South Drive. South Drive is an employee-only entrance onto campus and is closed between the hours of 9:00 PM and 5:00 AM. South Drive is closed during the weekends from Friday at 9:00 PM to Monday at 5:00 AM.

13. Center Drive at Old Georgetown Road

This is one of the most formalized entries to the campus with signage and a landscaped median. There is a positive entry view across the lawn toward Building 60, terminating with the view of Building 10/future CRC addition. Center Drive at Old Georgetown Road may be used by employees, visitors , and commercial vehicles to enter onto the campus and is open Monday to Friday from 5:00AM to 9:00PM, with entering traffic only between 5:00 AM to 2:00 PM.

Bicycle and Pedestrian Access Points

Employees by foot can enter all vehicular entry points in addition to all pedestrian and bicycle entrances. As of July 2004 only the two visitor entrances will remain accessible for public bicycle and pedestrian access.

1. Old Georgetown Road at Cedar Lane

Attractive wooded setting. Pedestrian path angles toward center of campus. Bicycle access from the Tenleytown Trolley Trail.

3. Rockville Pike at Cedar Lane

Attractive wooded stream setting. Bicycle access from Rock Creek Park.

6. South Drive - Metro Station

Highly landscaped transit plaza provides connections from the Medical Center Metrorail Station/Metrobus terminal to the central campus area.

8. Woodmont Avenue at south campus boundary

Access to retail areas of the Bethesda Central Business District. Path crosses a gracious lawn in front of the National Library of Medicine.

9. South Boundary at the Spring House building

This access point is reportedly the major bicycle/pedestrian connection between the campus and the Bethesda CBD. The fence opening and pathway to campus both are inadequate.

10. North Brook Lane at the south campus boundary

Access to the park-like lawn area at the southwest corner of the campus.

4.4 Circulation

4.4.1 Vehicular Circulation

Figure 4.4.1 shows current vehicular traffic patterns at the NIH Bethesda campus. Vehicular access is currently served by 7 entrances; 3 on the west, none on the north, and 4 on the east sides of the campus. There is no vehicular access from the south side of the campus and the driveway (Garden Lane) on the north side of campus only provides access to Lots 31B and 31C. Of the total vehicle trips entering the campus during the AM peak hour in January 2002, 53% occur on Rockville Pike, 38% on Old Georgetown Road, and 9% on West Cedar Lane. In January 2004, due to alterations in driveway operations these percentages had changed to 56% on Rockville Pike, 44% on Old Georgetown Road, and 0% on West Cedar Lane. Peak hour traffic flows for NIH occur from 7:45 to 8:45 a.m., and from 5:00 to 6:00 p.m.

There are seven vehicular entrances to the campus: Center Drive, South Drive and Lincoln Drive on the west side, with Center Drive, South Drive, North Drive, and Wilson Drive on the east side, and Garden Lane on the north side. Garden Lane currently services only the remaining surface parking lot near Building 31 and will be closed to vehicular access with the completion of Building 33 and MLP 10. The primary internal vehicular path is Center Drive, running from the northwest corner to the southeast corner of the site. The secondary vehicular paths are Lincoln Drive on the west and South Drive on the east, with a connection through the center of the campus; Wilson Drive on the east; and Convent Drive on the west. This internal circulation system creates an unbalanced loop-road within the campus which is inconvenient to use for internal campus circulation and can be confusing to people who are not familiar with the physical campus layout. As a result, campus traffic likely uses Rockville Pike, Old Georgetown Road, and West Cedar Lane as an informal “loop” road to circulate to the side of the campus where a destination is located, before entering onto campus.

There are numerous tertiary and service roads creating a web throughout the campus, allowing vehicular access to most areas of the site. Most roadways are curvilinear, lending to the informal character of the site. However, since roadways and building patterns are not closely related, roadways do not create a coherent system of building sites.

Traffic control on campus is currently implemented by a series of warning signs, stop signs, and police direction at major intersections during peak periods only. There are no signalized intersections on campus. However, a traffic signal is planned at the intersection of Center Drive and South Drive to help facilitate significant pedestrian crossing activity at this intersection.

4.4.2 Parking Resources/Distribution

The NIH campus has numerous surface parking lots, five multi-level parking structures and limited on-street parking to serve the needs of approximately 18,000 employees, 3,500 visitors, and 280 visits a day from the more than 7,500 off-campus employees. Due to displacement and relocation of parking to accommodate construction, exact parking counts vary continuously. Parking surveys were conducted in May 2002 and have been updated to reflect existing construction projects that have taken place or are currently taking place. The following parking space breakdown reflects the existing 2003 parking supply:

2003		
On-street	*87 spaces*	*(1 %)*
Surface Lot	*4,801 spaces*	*(51 %)*
Multi-Level	*4,468 spaces*	*(48%)*
Total	***9,356 spaces***	

Approximately half of the NIH campus parking supply is comprised of surface lots. Several of these lots are partially or entirely located in the perimeter buffer zone of the campus.

The supply of parking is designated for use by different categories of parkers. The most recent parking allocation data is shown below:

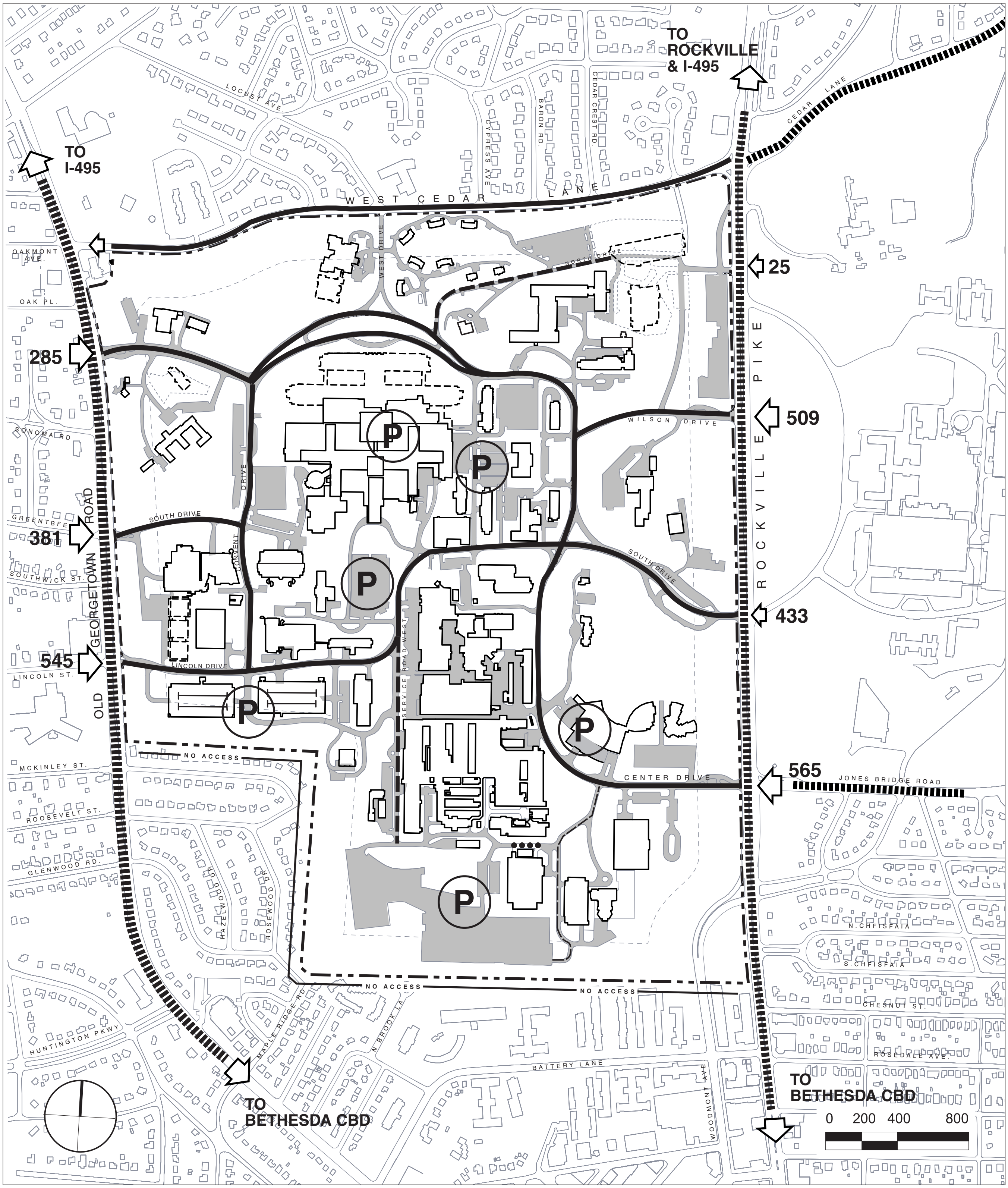
2003

Employee	8,149 spaces	87%
Motorcycle	43 spaces	0.50%
Residential	45 spaces	0.50%
Motor Pool	170 spaces	2%
Visitor	711 spaces	7%
Other	100 spaces	1%
Loading	138 spaces	2%
Total	**9,356 spaces**	**100%**

Community concern about parking generally focuses on whether there is consistently an adequate parking supply of employee parking located on the NIH Bethesda campus, especially with almost continual on-campus construction. The concern is that if there is not an adequate amount of on-campus employee parking, then employees could try to park in neighborhoods located adjacent to the NIH campus. Some neighborhoods adjacent to the campus are protected from long-term parking encroachment with a residential parking restriction program enforced by Montgomery County.

NIH employees park on-campus with a valid parking permit. The current ratio of employee-designated spaces per employee is significantly lower than at the time of the writing of the last NIH Master Plan in 1995. Based on the existing parking supply identified above, the ratio of employee-designated, spaces per employee, is currently 0.465, compared to a ratio of 0.54 in 1995. Thus, NIH has succeeded in its goal to maintain the employee-to-parking ratio at the same 1995 level or lower, In addition, the parking ratio is currently lower than the 0.50 ratio established by the National Capital Planning Commission, and it is anticipated that the NIH campus will continue to strive to maintain the employee-parking ratio to a level at below the 0.50 parking ration in the future through the implementation of a vigorous Transportation Management Program.

Parking areas are distributed throughout the site, with the largest parking areas located at the perimeter of the campus. The major concentrations of parking are: at the Clinical Center Complex; the northeast corner of the site near general office Building 31 (surface parking to be removed with the completion of MLP 10); the southwest corner of the site at parking structures MLP 6 and MLP 8; and the south side of the site at surface Lot 41, parking structure MLP 7A and the William H. Natcher Building 45. Figure 4.4.2 shows the relationship of parking distribution to major employee population centers on campus. In general, parking is distributed proportionately to population around the campus, with a higher proportion of parking per employee distribution in the northern and southern part of campus. In addition, 623 parking spaces are currently provided at five off-site satellite locations. Parking numbers and exact locations on campus are fluid due to the constant displacement of parking by numerous ongoing construction projects.



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MAJOR ARTERIAL
PRIMARY CIRCULATION
SECONDARY CIRCULATION
TERTIARY CIRCULATION
BLOCKED CIRCULATION

232 SITE ACCESS/A.M. PEAK
(P) PARKING RECEPTORS

Figure 4.4.1

Existing Vehicular Circulation

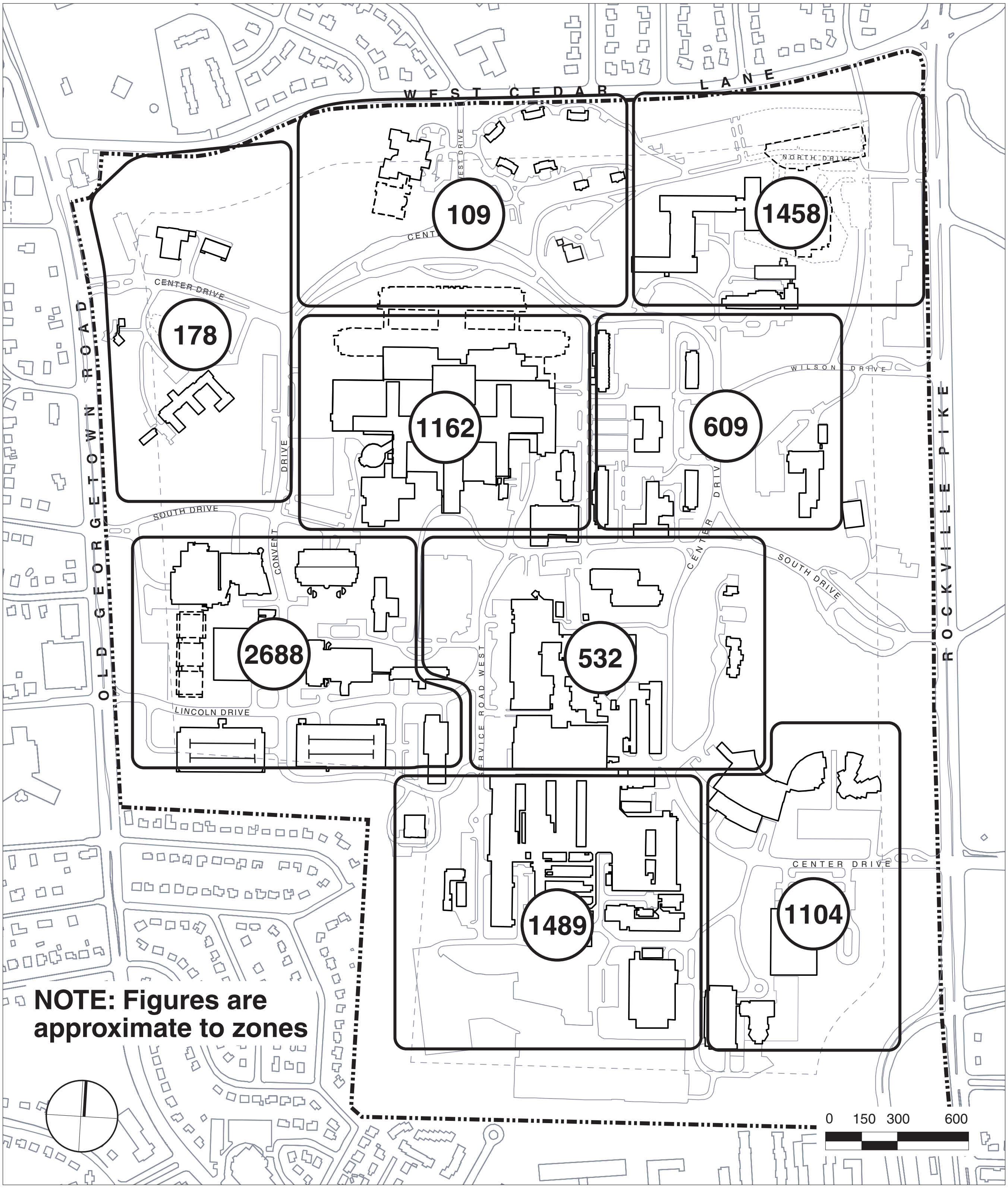

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Figure 4.4.2

Existing Parking Distribution

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4.4.3 Access for Persons with Disabilities

Existing buildings on the NIH campus are required to meet the criteria of the Uniform Federal Accessibility Standards (UFAS). As a federal entity, NIH does not fall under the jurisdiction of the Americans with Disabilities Act (ADA). However, the National Institutes of Health has adopted the Americans with Disabilities Act Accessibility Guidelines (ADAAG) as its standard for accessibility planning for new construction. NIH completed a building accessibility survey in 1991 and approved a Management Plan in 1992, which establishes priorities along with a 5-year capital plan for building improvements.

4.4.4 Transit Systems

The NIH Bethesda Campus is served by a variety of public and private transit services. Direct Metrorail service to the campus is provided via the Red Line at the Medical Center station located at Rockville Pike and South Drive. Both Metrobus and Montgomery County Ride-On buses operate along the perimeter of the campus and connect with Metrorail at the Metro station entry. There are also numerous on-campus shuttle routes, which circulate through the campus or connect to satellite office and parking locations. Campus shuttles that travel on the "NIH Campus Route" run on approximately 10-minute headways, while shuttles that are used on the other NIH routes have different headways, which vary by route. See Figure 4.4.4 for a diagram of existing transit systems.

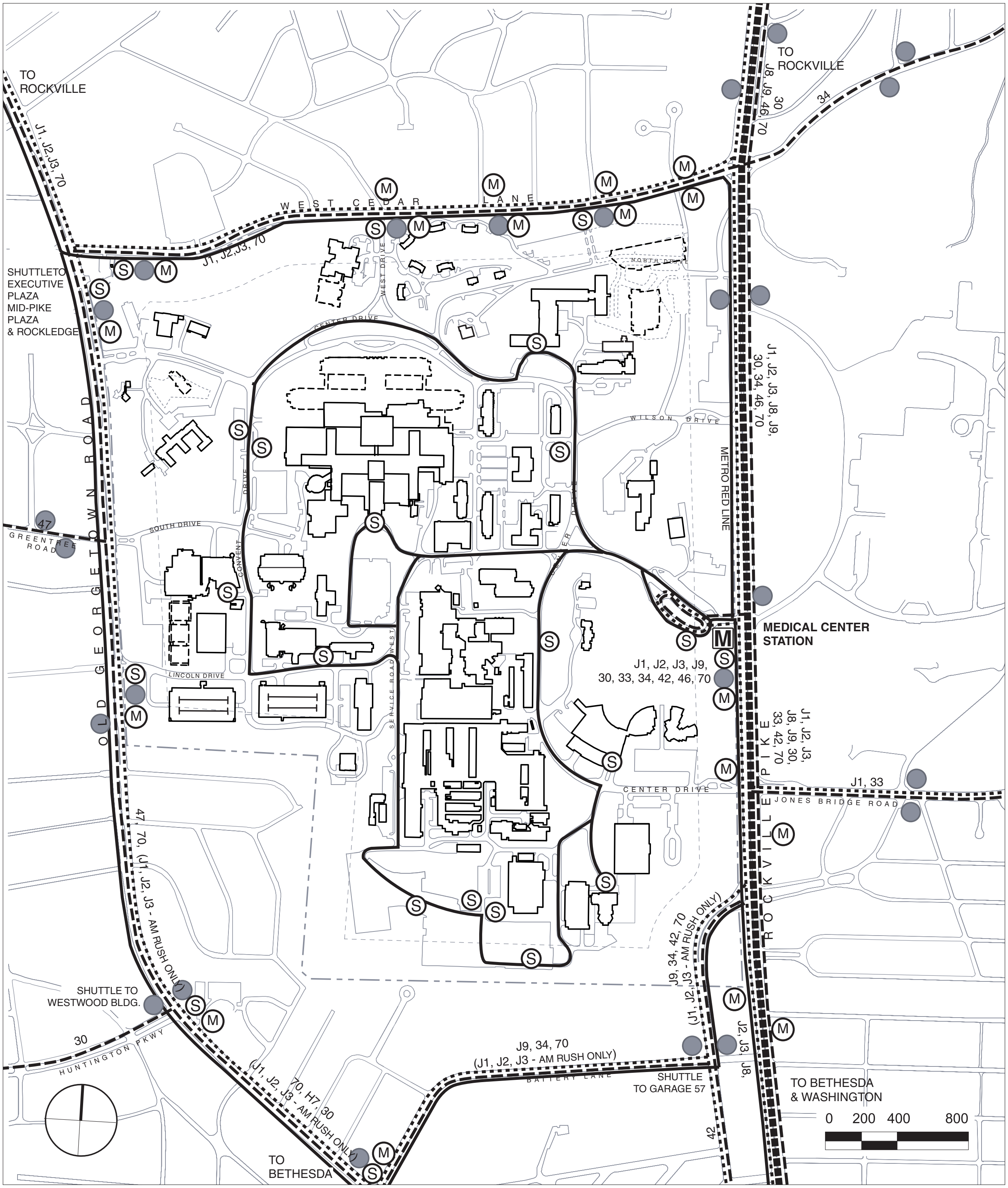
The large proportion of NIH employees using public transit is primarily due to the fact that NIH has actively worked with Montgomery County and WMATA officials to add several Ride-On and Metro bus routes to provide better access to campus, since the last master plan. There are currently seven Metrobus routes and seven Ride-On bus routes with stops at the NIH Campus. In addition, there are several express bus lines, which run during the morning and evening rush periods which provide service from areas that do not have as direct Metrobus or Metrorail links to the NIH campus. With the Metro station entrance on the east side of campus at Rockville Pike, however, the major transit node on the NIH campus is still somewhat remote from many major facilities at NIH. Also, the northern half of the site is better served by public transit than the southern half because of additional bus routes and a more continuous street system.

4.4.5 Pedestrian/Bicycle Systems

Pedestrian paths parallel most roadways on campus and make connections between buildings. See Figure 4.4.5. Almost all pathways have been upgraded to be a minimum of five feet wide and are paved with concrete, macadam, or in some cases special pavers.

Major pedestrian movements occur between pedestrian generators such as transit nodes, parking areas, and significant buildings. On the NIH Bethesda Campus, major pedestrian movements occur: from the Metro station north to administrative Buildings 1 and 31, west to the campus core and the Clinical Center (Building 10), and south to Building 38A; from general office Building 31 to the central administration Building 1 and the Clinical Center Building 10; from the campus core south to Building 38A along Center Drive, and to parking Lot 41; from the Clinical Center Building 10 to parking Lot 10K; from the campus core and Clinical Center Building 10 along Center Drive and Wilson Drive to parking Lot 31(area currently under construction with research Building 33 and MLP 10); and from parking structures MLP 6 and MLP 8 to research Buildings 36, 37, 49, and the Clinical Center.

From north to south, the campus is approximately a 15- to 20-minute walk (nearly two-thirds of a mile), and most major facilities are within a 5- to 10-minute walk (one-quarter to one-half mile) of the Metro station. Primary campus pedestrian and bicycle access points currently include Old Georgetown Road at Cedar Lane; Rockville Pike at Cedar Lane; Jones Bridge Road at Rockville Pike; along the south campus boundary at



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- METRO RAIL
- NIH SHUTTLES
- RIDE ON BUS ROUTE (30, 33, 34, 35, 42, 46, 70)
- METROBUS ROUTE (J1, J2, J3, J8, J9)
- RIDE ON STOP
- METROBUS STOP
- NIH SHUTTLE STOP

Figure 4.4.4

Existing Transit Systems

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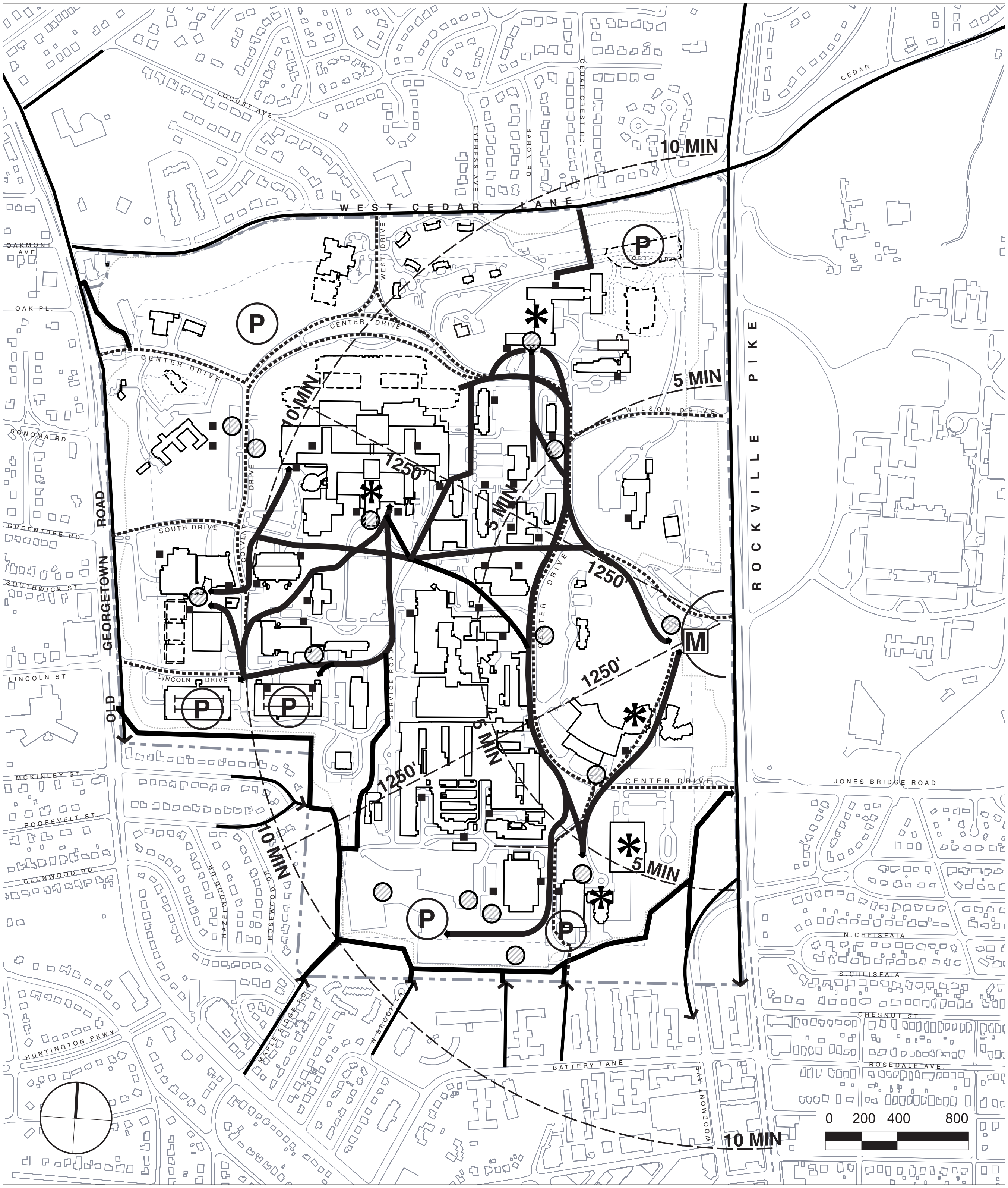

M METRO

P VEHICULAR PARKING

NIH PEDESTRIAN PATHS

PUBLIC PEDESTRIAN PATHS

CAMPUS BIKE ROUTES

FENCELINE

SHUTTLE/BUS STOPS

* PEDESTRIAN GENERATORS

■ BICYCLE PARKING

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Figure 4.4.5

Existing Pedestrian & Bike Paths

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Woodmont Avenue, the Spring House building, N. Brook Lane, Maple Ridge Road, and Roosevelt Street; and Greentree Road at Old Georgetown Road (pedestrian and bicycle access will change for visitors in July 2004). There are few clear paths traversing the entire campus north-to-south or east-to-west, with the exception of the east-west path along the south fence. Inadequate lighting and signage also hinder nighttime pedestrian movement, although plans are currently underway to improve lighting in several key areas.

Bicycle circulation occurs on existing roadways and sidewalks on the campus. There is an NIH Bikeway System Master Plan; however, there is no signage on campus indicating areas as specifically designated or prohibited for bicycle use. There are three sections of roadway on campus, which have striped, 3-foot wide bike lanes, but they do not form a continuous path. Bicycle parking is dispersed throughout the campus.

There is an existing County bike path along the east side of the campus, which parallels Rockville Pike. Additionally, the M-NCPPC *Master Plan of Bikeways* proposes continuous bicycle paths on the NIH site along West Cedar Lane, Old Georgetown Road, and across the southern end of the campus, with connections to surrounding areas at key locations. All of the above mentioned paths are designated in the bike plan as Class I, 8-feet wide, paved bikeways.

4.4.6 Roadway Sections

Most roadways on campus are 22 to 35 feet wide with one travel lane in each direction. Notable exceptions are: Center Drive which varies from a 60-foot wide boulevard at its northwest entry to the site, to a 40-foot wide - 4 lane cartway at its southeast entry, and; the eastern segment of South Drive which has a 40-foot wide, 4-lane section flanked by well landscaped bus staging and parking areas.

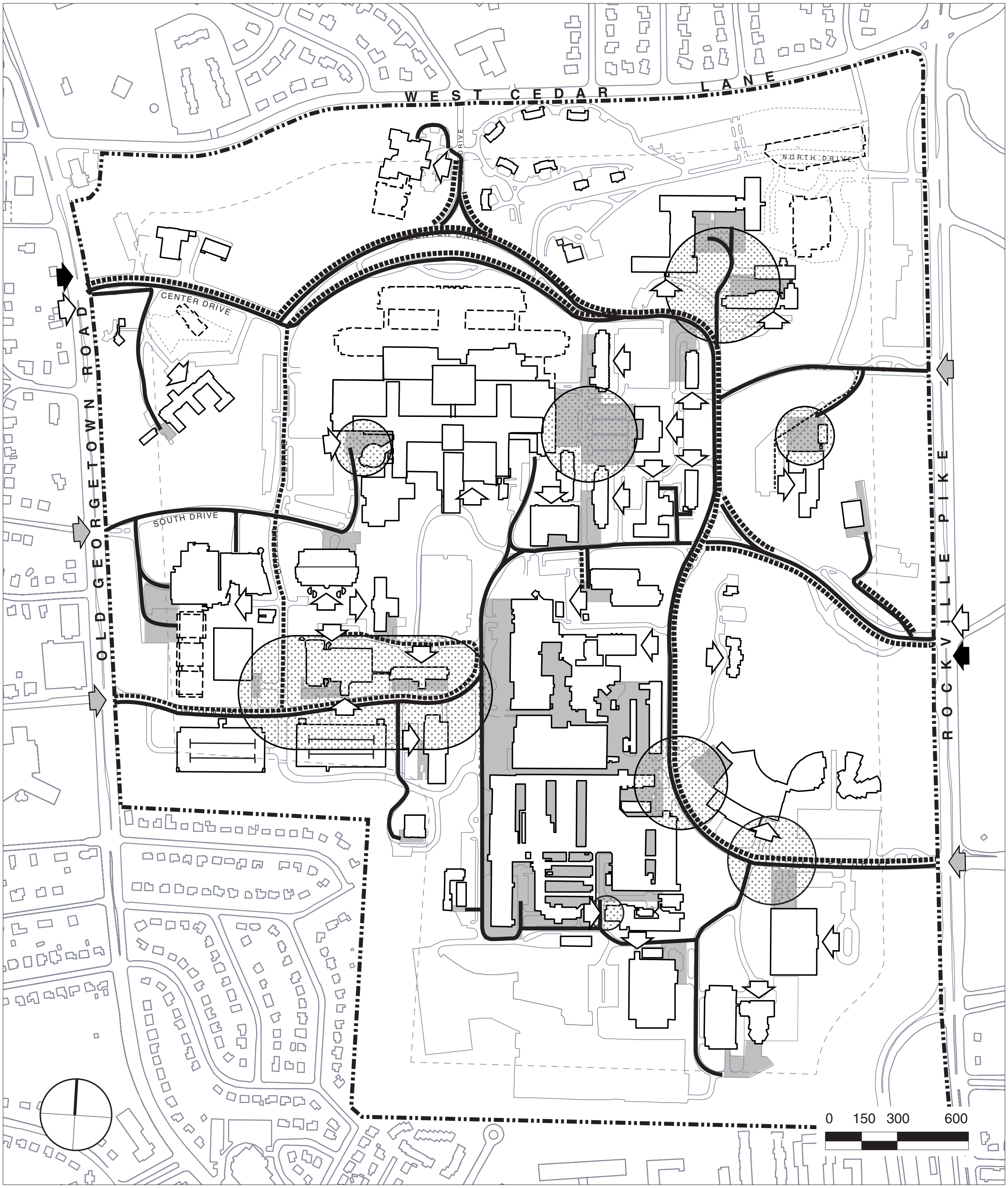
Toward the center of the campus roadways are generally bounded by sidewalks and formalized planting, whereas, at the periphery, roadways run through more natural landscape. Major buildings are generally set back from roadways 150-200 feet with 250 feet at the perimeter of campus, and, where buildings are closer than ±60 feet to roadways, there is a loss of the “campus” impression of the site as a sense of spaciousness and foreground landscape is precluded (e.g. Lincoln Drive at Buildings 29A & B, and Center Drive at Building 22).

4.4.7 Public Entries and Service Areas

The majority of primary public entries or “front doors” to buildings on campus face directly onto or can be accessed from Center Drive. This pattern is clear for prominent campus buildings such as Buildings 38 and 38A (the National Library of Medicine and the Lister Hill National Center), Building 45 (the William H. Natcher Building), central administration Building 1, the Building 31 office complex, Building 50, and Building 10 (the Clinical Center Complex). Buildings on the west side of campus have public access from Convent Drive or off of Service Road West, including Building 35, the Neuroscience Research Center (NRC) which will open off Lincoln Drive. Many of the major building entries have unclear relationships to adjacent streets or other buildings.

Service areas are interspersed among buildings throughout the campus. The largest concentration of service areas occurs in the south-central area of the campus near Buildings 13 and 14, the north-central area of campus between the Clinical Center Complex and Building 1, and the southwest area of campus along Service Roads West and South, and the central portion of South Drive.

Since there is little separation between service and public routes on the NIH campus, there are inevitable traffic and visual conflicts. Along Center Drive, which is the primary public



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PUBLIC ACCESS
SERVICE ZONE
PUBLIC ENTRY
EMPLOYEE ONLY ENTRY
SERVICE ENTRY
SERVICE ACCESS
CONFLICT AREAS

Figure 4.4.7

Existing Public Entries & Service Areas

drive on campus, visitors and employees co-mingle with service vehicles and have views directly into service areas. Likewise on Lincoln Drive, those accessing parking at the multi-level parking structures, or continuing to the campus core, must pass numerous service areas. Access to research Buildings 29A, 29B, and 30 passes by the truck docks of support services Building 13. West of Building 1 there are conflicts where public entries to buildings (Building 7) and service areas are mixed together. See Figure 4.4.7.

4.5 Site Amenities

4.5.1 Natural Amenities

Much of the NIH campus was part of an estate setting prior to development and the southern third of the site was a golf course at one time. In the process of development, much of the natural rolling topography of the site has been retained. This topography contributes to the variety of excellent views and vistas of the campus and its structures.

There are about 28 acres of medium-density woodlands on campus, primarily located in the northwest corner of the site, and along the course of the NIH Stream. These natural woodlands, in conjunction with the large extent of open space and landscaping, help contribute to and establish the “campus” character of NIH. Stream areas on site offer a naturalistic and quiet respite from the development of surrounding areas.

4.5.2 Architectural Character

The NIH campus is comprised of over 75 buildings of different ages, architectural styles, and conditions. There are, however, certain groupings of buildings that give distinct character to specific areas of the campus. See Figure 4.5.2.

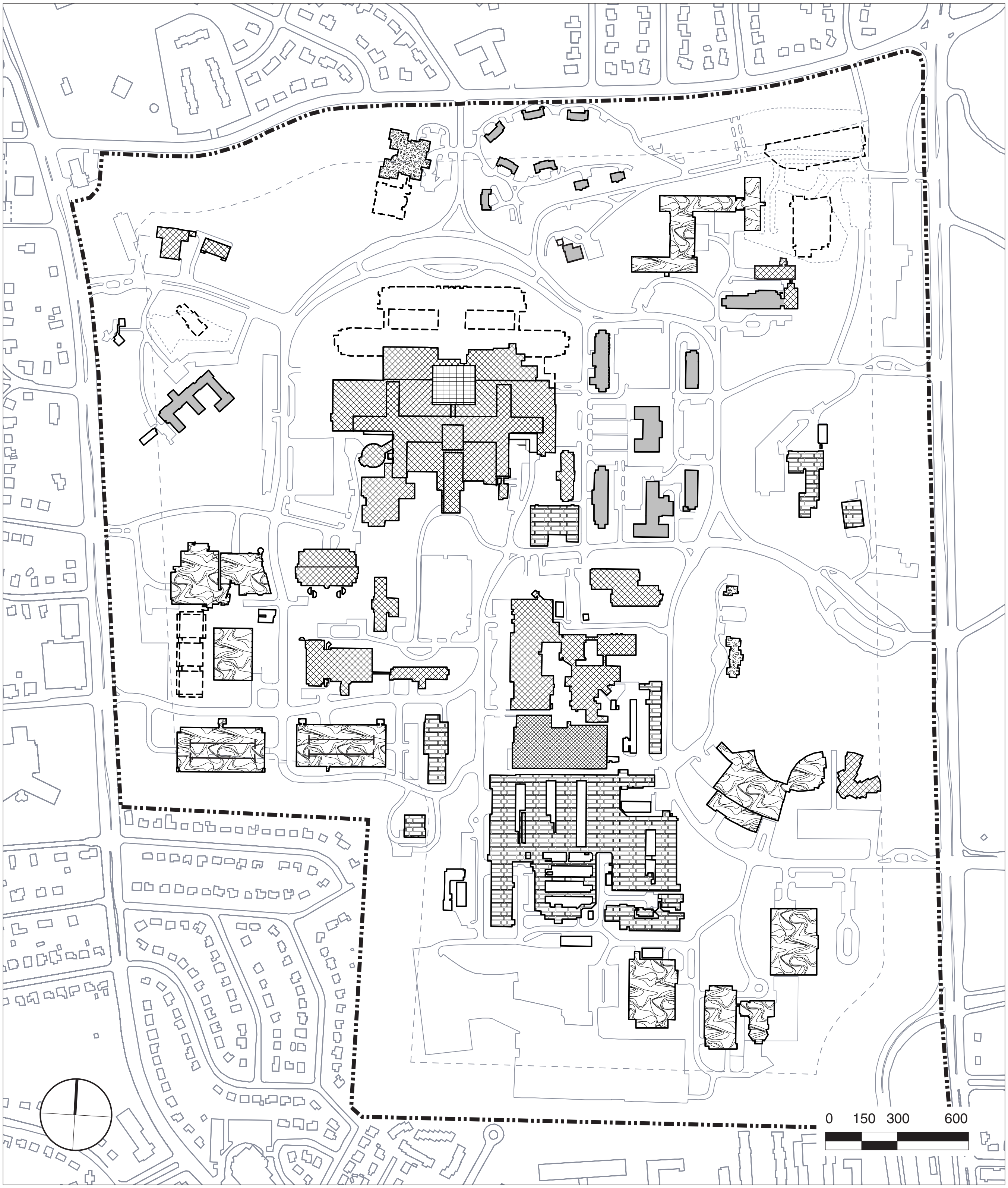
Brick-Traditional
These buildings are of neo-Georgian or other traditional style, usually of red brick with white trim. This character defines the original campus core (Buildings 1-6), the residential units in the northern part of the campus, and Building 60. Building 15K and its adjacent estate are also traditional brick structures designed in a revival style.

Brick - Modern
The central area of the campus is dominated by red brick buildings with white cast-stone trim, which relate to the original campus core, but are designed in a modernist vocabulary. This category includes older buildings such as Building 10, and newer structures such as research Building 49, and Building 50 and or renovated structures such as the Building 11 (Power Plant).

Brick - Utilitarian
This category the Building 14/28 complex (Animal Facility). These structures are generally of red brick and are utilitarian in their design.

Stone - Residential
The Building 16 (Stone House) and Building 62 (Children’s Inn) are the only examples of this character on campus. Materials are primarily wood and rusticated fieldstone, with a residential scale.

Stone/Concrete - Modern
Buildings at the periphery of the campus tend to be light in color and of modern design (Buildings 31A-C, 35 through 37, 38, 38A, 40, and 45). Materials include stone veneers, cast stone, structural concrete, and precast concrete, often in conjunction with large expanses of glass.



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BRICK - TRADITIONAL
BRICK - MODERN
BRICK - UTILITARIAN
STONE - RESIDENTIAL
STONE/CONCRETE - MODERN
GLASS - MODERN

Figure 4.5.2

Existing Architectural Character

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Glass - Modern

The ACRF (Ambulatory Care Research Facility - Building 10B) and the Building 10A-wing addition are the examples of this all glass curtainwall architectural character.

Specific buildings which are distinctive or architecturally significant include: the original campus quad - Buildings 1, 2, and 3; Building 60; Building 16; the original section of Building 10; Building 15K; and Buildings 38 and 38A (National Library of Medicine/Lister Hill complex).

4.5.3 Signage

The current campus exterior signage system was developed in 1976 as a hierarchical system with several categories of sign types as follows: A—major entry; B—limited access entry; C—general vehicular directional; D—specific directional; E—building identification; F—regulatory; G—directory. Signs are color-coded to correspond to specific areas of the campus.

In general, signs on the Bethesda campus are poorly located and in bad condition. Many of the original campus signs are faded, deteriorating, or out-of-date as a result of recent construction and other physical changes on campus. Moreover, campus signage tends to be oriented to vehicular traffic rather than to pedestrian movement. Traffic control signs are typical street and highway signs that follow the guidelines contained in the Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways. In addition, there are a limited number of current campus directories on-site.

The absence of a comprehensive signage system that promotes the desired image of the Bethesda campus is a concern. Signs at major entrances to the campus fail to convey a sense of arrival. Furthermore, because of the array of architectural styles on campus, which range from historic Georgian Revival buildings to modern office structures, a coordinated signage system is a challenge.

To address these issues NIH is considering a comprehensive wayfinding and signage study that will make it easier for those who live on, work within, or visit the Bethesda campus to access and move around the site. The NIH Streetscape Study will identify those signs that add to visual clutter, and therefore should be removed, and provide new signage guidelines that will result in enhanced design standards and recommended locations for future campus signs. The signage program will ensure that signage is easily maintainable and will remain consistent as the various phases of the master plan are implemented.

4.5.4 Site Furnishings

Site furnishings include items such as lighting, seating, waste receptacles, paving, and other freestanding objects. In general, there is not a coordinated site furnishings plan for the Bethesda campus.

Lighting types vary throughout campus. Standard "cobra" type street lamps generally light roadways, while pathway and building fixture types vary across campus with each architectural project.

Seating areas on campus range from built-in stone ledges to wooden and metal benches. Heavy, public park type steel picnic benches are scattered throughout the campus, sometimes without an obvious rationale.

Waste receptacles vary throughout campus, with an emphasis on the utilitarian. Freestanding bus stops are of standard metal fame and glass construction. There are no outdoor information kiosks or other organizational elements. Flagpoles at key locations on campus tend to act as significant markers. Artwork and monuments on campus are limited to the memorial anchor at the intersection of South Drive and Center Drive, a small memorial behind the Children's Inn (Building 62), the sculpture in front of the Lister Hill National Center (Building 38A), and the artwork in the "Pool of Bethesda" within the ACRF.

Most walkways on campus are concrete and most roadways are paved with asphalt. There are few areas of special paving on campus.

4.5.5 Recreation Areas

Recreation areas on campus are both indoor and outdoor. Indoor recreation includes the fitness center in Building 31, an exercise facility in Building 10, and an aerobics/dance facility in temporary Building T-39 on the south side of campus. See Figure 4.5.6 for recreation area locations.

Outdoor recreation areas can be classified as active, passive, or ceremonial. Active recreation areas include playgrounds, tennis courts, exercise areas, and places where people play informal games such as Frisbee or ball. Passive recreation areas are places where people go to sit and relax, read, or eat lunch. Passive areas are generally more secluded, and tend to have natural landscape or garden qualities. Ceremonial areas tend to have a more formal character, with the quad in front of Building 1 serving this function on special occasions.

4.5.6 Employee/User Services

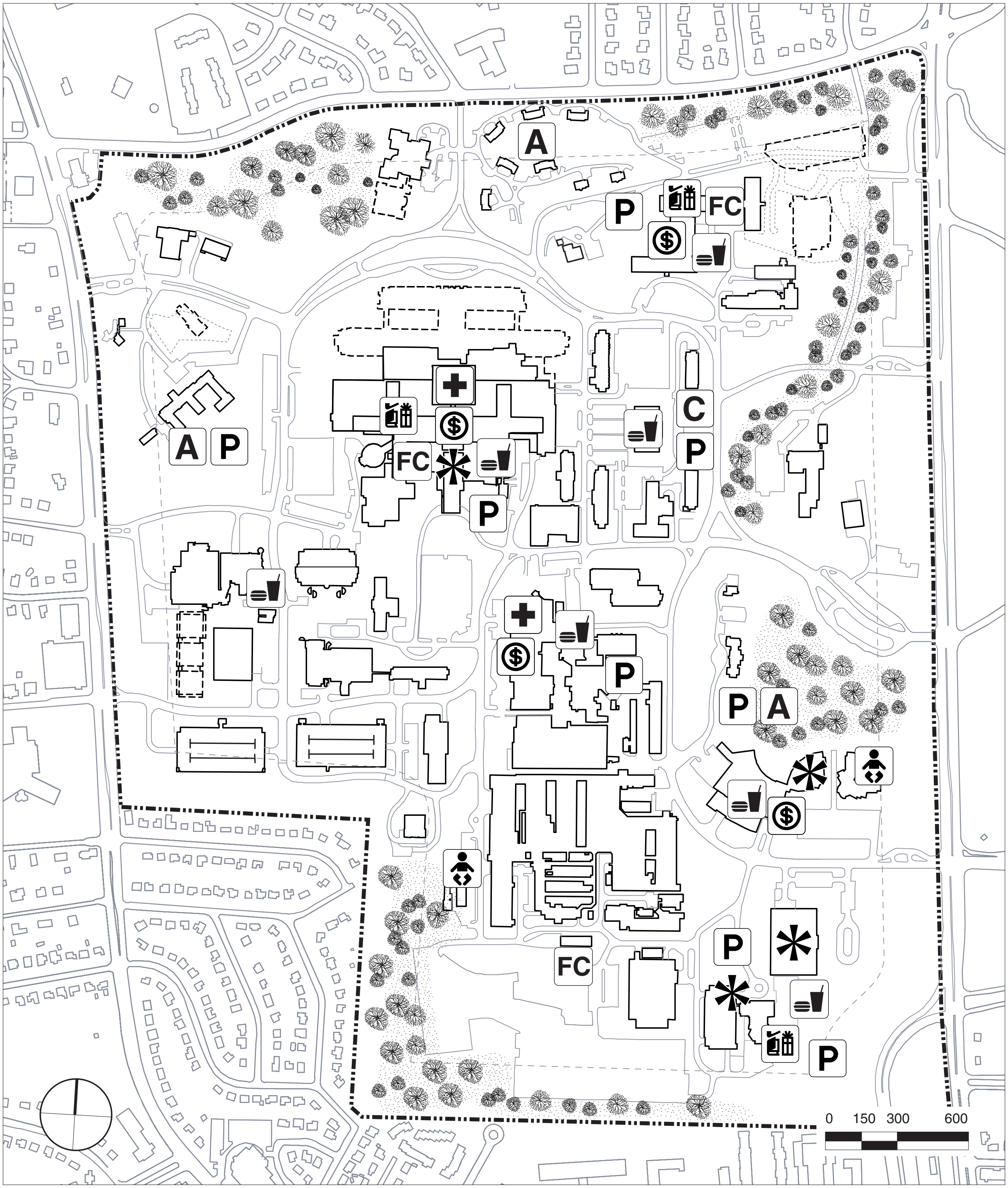
Employee and campus visitor services are dispersed throughout the site and include:
- Financial Services in Buildings 10, 13, 32 and 45.
- Health clinics in Buildings 10 and 13.
- Convenience retail in Buildings 10, 31, and 38A.
- Concession stands, dining centers and coffee bars in Buildings 1, 10, 12B, 31, 38A, 40 and 45.
- Fitness centers in Buildings 10, 31, and T-39.

Other services include personal services associated with the hospital function of the Clinical Center. There is also an automated postal facility located in Building 10. See Figure 4.5.6 for locations of campus services and amenities.

Many employee services are provided by businesses in the Central Business District (CBD) of Bethesda. Although walking distances between campus and the CBD are lengthy, bicycle access is reasonable and public transportation is available to transport employees to the area.

Although some services are available on campus, a desire has been expressed in campus interviews for a greater variety and higher quality of services, especially for those who are patients at the Clinical Research Center or users of other facilities. Employee/user services are not given a high priority on campus, and are often located in areas that are difficult to find. NIH is conducting a study of employee amenities and developing guidelines for future facilities. There is no central services/activity center on campus analogous to a university center, and NIH is currently conducting a study of amenities for employees both on the campus and in locally leased properties to identify potential areas of improvements and developing guidelines for future facilities.

Refer to Chapter 3 for more information on Bethesda campus and community context.



CREDIT UNION / ATM
CLINIC
A RECREATION (ACTIVE)
P RECREATION (PASSIVE)
C RECREATION (CEREMONIAL)
FC FITNESS CENTER
CONVENIENCE RETAIL
CHILD CARE
OPEN SPACE AMENITY
DINING CENTER / COFFEE BAR
SPECIAL FUNCTION

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Bethesda Campus

Figure 4.5.6

Existing Campus Amenities

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4.6 Historical and Archeological Features

4.6.1 Historic Properties

NIH acknowledges its responsibilities under Section 110 of the National Historic Preservation Act to identify and evaluate buildings that are over 50 years of age. NIH has been working and will continue to work in conjunction with the Maryland Historical Trust (MHT–the Maryland State Historic Preservation Office) to determine which resources on the NIH campus are eligible for listing in the National Register of Historic Places as either individual resources or as contributing elements to a larger historic district.

In 1997, NIH sponsored a cultural resource study of all buildings located on the campus that are over 50 years of age or that exhibited the likelihood of possessing exceptional historic and/or architectural significance regardless of age.

To date, NIH and MHT have reached a consensus determination that the following buildings are eligible for listing in the National Register of Historic Places:

Buildings 1, 2, 3, 4, 5, and 6–The Administrative Complex, or Historic Core
Collectively, Buildings 1, 2, 3, 4, 5, and 6 have been determined eligible for listing in the National Register of Historic Places

Buildings 1, 2, and 3
Completed in 1938, Buildings 1, 2, and 3 are the earliest buildings to be Congressionally authorized and constructed at NIH's Bethesda campus. (Buildings predating NIH's establishment on the site include Building 15K, "Tree Tops"; and Buildings 16 and 16A, the George Freeland Peter Estate; and Building 60, the Convent of the Visitation/Mary Woodard Lasker Center.) Collectively with Buildings 4, 5, and 6, these three buildings form the visual and symbolic core of the NIH site, and are typical examples of the academic Georgian Colonial Revival style used for many contemporary institutional buildings. In addition to their architectural merits, these buildings helped to establish NIH as one of the world's foremost biomedical research centers and are directly associated with major accomplishments in the field. Louis A. Simon designed the buildings, with J. Winthrop Wolcott, Jr., serving as the consulting architect. The George A. Fuller Company of Bethesda was responsible for construction.

Buildings 4 and 5–Research Buildings
Buildings 4 and 5 were constructed in 1941 as identical buildings. Constructed in the same Georgian Revival style previously used for Buildings 1, 2, and 3, Buildings 4 and 5 continue to represent the trend toward using this academic style. Building 4 was initially used as laboratory and research space, and in 1948 became the primary location for the Institute of Experimental Biology and Medicine. Other institutes housed in Building 4 have included the National Institute of Dental Research, the National Institute of Arthritis and Metabolic Diseases, which later became the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases. Building 5 initially housed researchers in infectious diseases and was home to the Microbiological Institute later renamed the National Institute of Allergy and Infectious Diseases. Because of the nature of this work, Building 5 was constructed with a sophisticated exhaust system that prevented the spread of infectious diseases from room to room within the building. The Charles H. Tompkins Company constructed Buildings 4 and 5.

Building 6
Constructed in 1939, just one year after Buildings 1, 2, and 3, Building 6 displays similar Georgian Revival characteristics as the earliest NIH buildings. Built to house the National Cancer Institute, Building 6 was believed to be one of few structures designed solely for research in a specialized field. Two additions have been made to Building 6: 6A was added

to the east portion of the building in 1976, and 6B was added to the north side of the building in 1988.

Building 7–Memorial Laboratory

Completed in 1946, Building 7 was originally known as Memorial Laboratory to honor scientists who had died while researching dangerous diseases. Building 7 represents a break in the traditional use of the Georgian Revival style of architecture at NIH, although it retains elements of the style, such as massing and materials. However, the distinguishing characteristics of Building 7 are its architectural planning and engineering details relating to its use as a state-of-the-art laboratory with the mission of providing a safe working environment for scientists engaged in highly dangerous research. Among its sophisticated features are an advanced air-flow system that insures the decontamination of exhaust to the outside of the building, the installation of rooms of various levels of germ decontamination, and triple-sealed windows with exterior shades to avoid the collection of dust on the interior of the building. All of these features were in use to insure the proper handling of potentially infectious diseases.

Buildings 15B1-15G2 and 15H and 15I–The Officers' Quarters

Collectively, the Officers' Quarters have been determined eligible for listing in the National Register of Historic Places. The Quarters are a collection of eight red-brick Georgian Revival duplexes and detached houses constructed in 1940 to serve as housing for junior officers so that they would be on the NIH site at all times. The quarters are an excellent example of the Radburn principle of planning, with residences sited around a common green in a wooded area with gently sloping topography and a series of paths linking the buildings. Louis Simon served as the architect for the buildings, and the Charles H. Tompkins Company was awarded the construction contract.

Building 15K–The Wilson House (Tree Tops)

Building 15K, Tree Tops, is the last remaining building and principal residence of the Wilson Estate. Predating NIH's occupation of the site, the Wilson Estate was constructed in 1926 to be the principal residence of Luke and Helen Woodward Wilson. Tree Tops is attributed to architect Edward Clarence Dean, and is a skillful blend of Tudor Revival and Craftsman elements. (Various other buildings originally present on the site were removed in 1997 as part of an 850,000-square-foot addition to the Clinical Center.)

The Wilson's, both members of prominent merchandising families, were responsible for the major donations of land in Bethesda to NIH. These donations of land were responsible for locating NIH on the site and changing the character of Bethesda from an area with large estates to a densely built area with a prominent medical community.

Building 16 and 16A–The George Freeland Peter Estate and Caretaker's Residence (The Stone House; currently used as the Fogarty International Center)

The Peter House (Building 16), an excellent example of the Colonial Revival style, was constructed in 1930. Designed by architect Walter G. Peter, brother of the original owner, the building exemplifies many of the qualities found in the large early twentieth-century estates that were constructed along Rockville Pike during that era. George Peter sold the estate to the federal government in 1949. The Caretaker's Residence (Building 16A), designed in the style of the main house, is also present on the site. The Montgomery County Master Plan for Historic Preservation includes the property in its list of county landmarks.

Building 38–The National Library of Medicine

The National Library of Medicine, which houses one of the world's largest collections of medical literature, has been determined individually eligible for listing in the National Register of Historic Places. Although the Library was constructed in 1962 and has not yet reached 50 years of age, a period of time that is generally necessary for a building to be evaluated in the greater historic context of its time, the Library displays several areas of exceptional significance. Concerns relating to the threat of nuclear war influenced the choice of a location outside of downtown Washington for the National Library of Medicine, as well as design features thought to protect the building from an atomic bomb blast. Three of its five stories are below grade and its distinctive hyperbolic paraboloid roof shape was thought to dissipate the effects of a bomb blast. Additionally, many progressive features of library design were incorporated into the interior planning of the building in an attempt to manage the extensive holding of the Library. The New York firm of Robert B. O'Connor and Walter H. Kilham were the architects for the building, with Dr. Keyes Metcalf serving as the library consultant for the project. The structural engineering form of Severud, Elstad and Krueger, one of the preeminent authorities on bomb-blast-proof construction, served as engineers for the structural design of the Library.

Building 60–The Convent of the Visitation (currently the Mary Woodard Lasker Center for Health, Research, and Education)

Constructed in 1922-23 as a self-sufficient, cloistered convent for the Roman Catholic Order of the Sisters of the Visitation, Building 60 remained in use for its original purpose until 1982. Designed by A.B. Mullet and Company, with Marsh and Peter as associated architects, the building reflects Georgian Revival characteristics popular during its era of construction. Romanesque elements, strongly associated with ecclesiastical architecture, were used to articulate the chapel wing.

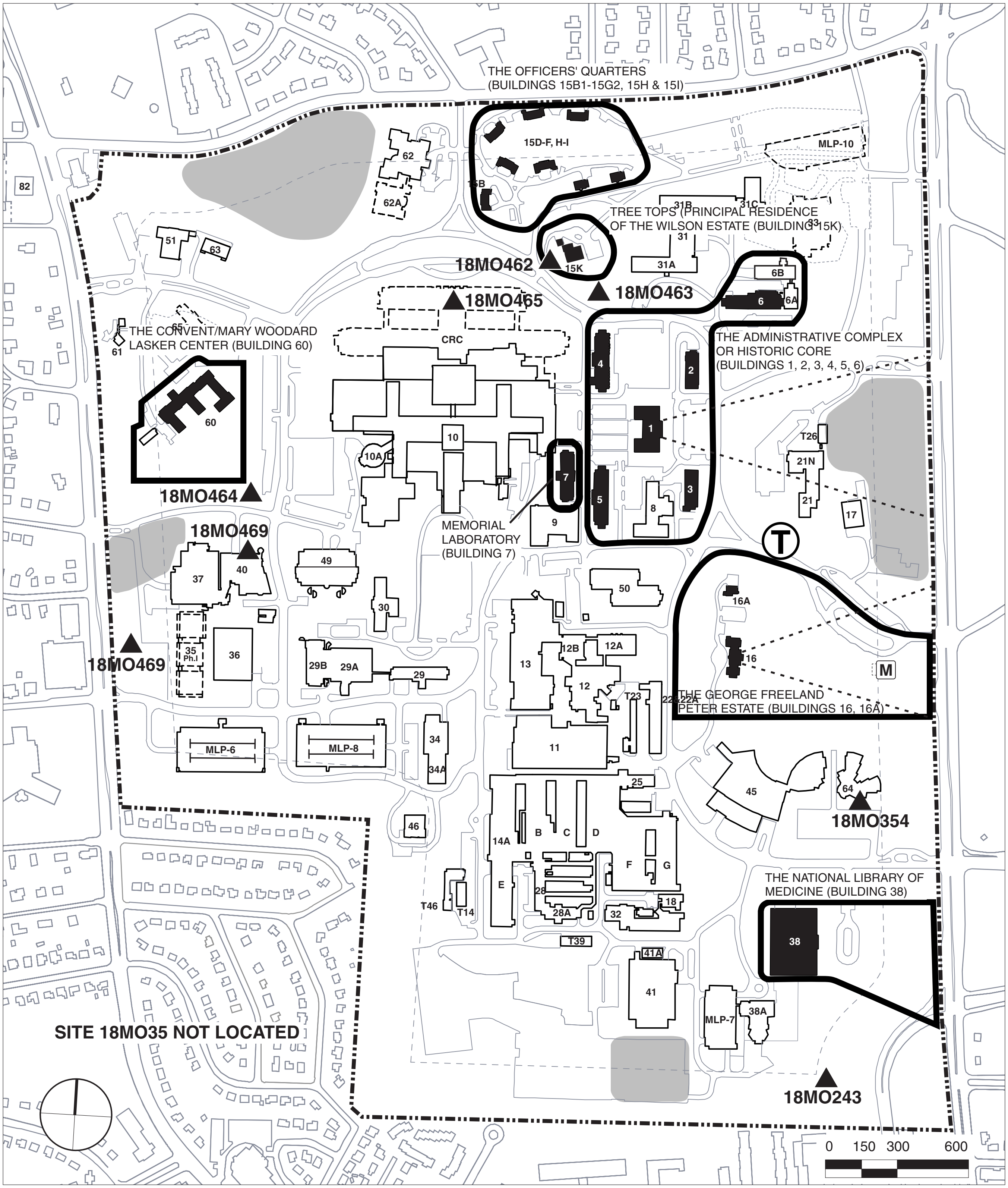
During the 1980s, the building was renovated for use as the Mary Woodard Lasker Center for Health, Research, and Education. At that time, a residential addition was constructed and linked to the original portion of the building by a modern glass entrance area.

4.6.2 Archeological Sites

The NIH campus is located in Maryland Archeological Research Unit 12 of the Piedmont Province. No Phase I cultural survey of the entire NIH campus has been completed. An inventory of known prehistoric and historic sites and identification of areas of potential sites was completed in 1985 (NIH Cultural Asset Inventory, D. R. Bush, 1985). The inventory included a review of Maryland Historic Trust records and files, research literature, and prior investigations in the immediate area, and a visual inspection of the campus

Nearly the entire campus surface has been disturbed by NIH and prior occupants. Prior site use includes crop farming, residential estates, a convent, and a golf course. Much of the central portion of the campus is located on the filled-in valley of the NIH Stream with the stream running as much as 30 to 35 feet below the surface. Archeological field investigations, which at least include Phase I surveys, have been conducted at eight sites on the Bethesda campus. None of the sites are eligible for listing on the National Register of Historic Places.

Four areas of the campus have been designated as "archeologically sensitive" areas, in that they have not been investigated or assessed. The largest of these occur in undisturbed areas at the periphery of the campus. If development is proposed for these areas, appropriate survey measures will need to be taken. The eight recorded archeological sites and four archeological sensitive areas are illustrated and identified on figure 4.6



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HISTORIC PROPERTY
RECORDED ARCHEOLOGICAL SITE
HISTORIC PROPERTY PROTECTION BOUNDARY
ARCHEOLOGICALLY SENSITIVE AREA
TAYLOR COLLECTION SUITE
SIGNIFICANT VIEWS AND VISTAS

Note: All categories as defined by NIH

Figure 4.6

Existing Historical & Archeological Areas

4.7 Environmental Features

4.7.1 Climate

The NIH campus is located in west-central Maryland at 39°00' N latitude and 77°22' W longitude, within the temperate continental climate of the United States.

Summers are long, warm and humid due to the dominance of maritime tropical air. Temperatures are almost sub-tropical in character, showing little change from day to day. Winters are relatively cold, however. Frequent air-mass changes occur because of the influence of either maritime tropical or continental polar air.

Temperature
The mean annual temperature is 57° F. Monthly mean temperatures vary little throughout the summer and winter seasons, but they are quite variable through the transition seasons of fall and spring. The January normal high is 43° F and the normal low is 27° F. The June normal high is 88° F and the normal low is 70° F. The number of normal heating degree-days for the Washington, D.C. area, as reported by the National Weather Service, is 3,988; the number of cooling degree-days is 1,432.

Humidity
The highest average relative humidity occurs in the early morning hours. The higher temperatures in the afternoon increase the amount of moisture the atmosphere can hold and thereby lower the relative humidity. Thus, the relative humidity decreases from a maximum in the early morning to a minimum around mid-day.

Precipitation
The maximum seasonal precipitation occurs in the summer, coinciding with the seasonal location of the jet stream. In winter, the location of the jet stream results in large-scale cyclonic storms that originate in the Texas area and Gulf of Mexico and move northeastward toward the Mid-Atlantic States. The storms' position in relation to the Appalachian range is the controlling factor on the quantity of snow the area receives. The 30-year mean annual precipitation is 39.0 inches for Ronald Reagan Washington National Airport. Snowfall averages 17.3 inches annually.

Sunshine/Winds
Total sunshine ranges from 40 to 50% of possible sunshine in January and from 60 to 70% from June through September.

Predominant breezes are from the southwest in the summer followed by north-northwesterly winds in the winter.

4.7.2 Noise

The NIH campus is subject to noise generated by sources within or internal, and outside or external to the campus. Most internal campus noise originates from stationary sources associated with cooling facilities in Buildings 11 and 34, individual building exhaust fans, and emergency diesel generators, which have sporadic or seasonal noise outputs. In addition, internal campus noise is generated from employee and visitor traffic and from construction activities and construction related traffic. External noise sources are primarily traffic on surrounding roads and from bus traffic associated with the Metro station. Aircraft overflights were judged to be only a minor noise source.

A noise survey of the entire campus was conducted in early 1995. The purpose of this survey was to establish noise generation design criteria for all local areas on the campus. The results indicate that nighttime noise levels are typically in the order of 50 to 55 dBA.

Daytime levels are in the range of 55 to 65 dBA, except within 200 feet of Rockville Pike and Old Georgetown Road, where noise levels generally range from 69 to 71 dBA between 7 AM and 9 PM daily. Maryland and Montgomery County have established 55 dBA as a goal for residential areas. The impact of traffic on NIH is quite evident with 60 dBA levels reaching about 300 to 400 feet into the campus from Old Georgetown Road and Rockville Pike. For further information on impacts associated with on-campus noise sources, see the NIH Master Plan Environmental Impact Statement Supplement.

4.7.3 Air Quality

Regional, local, and on-campus sources influence air quality at the NIH campus. The Washington metropolitan area is in non-conformity with the National Ambient Air Quality Standards (NAAQS) in that the criteria for ozone are exceeded. To meet the requirements of the 1990 Clean Air Act Amendments, the region must reduce ozone forming pollutant concentrations by 2005.

Within the immediate vicinity of the campus, there are two primary sources of emissions: the power plant in Building 11, and vehicular traffic.

Previously, combustion of fuel oil in the boilers in the central heating plant was a source of sulfur oxides, nitrogen dioxides, and suspended particulate matter. In 1994, NIH initiated a program to convert its fuel supply for its boilers from fuel oil to natural gas, with a consequent significant reduction in stack emission concentrations. NIH has also increased the boiler stack heights to improve emission dispersion.

Traffic around the campus is the primary contributor to local carbon monoxide (CO) concentrations. Micro-scale concentrations are generally proportional to traffic volumes and the highest concentrations are found along Rockville Pike.

All criteria pollutant concentrations in the vicinity of the campus meet the NAAQS.

4.7.4 Waste Disposal

Waste generated at NIH is classified according to federal and state regulations, which define procedures for storage, transport, and disposal. Classifications of waste generated at NIH include solid or general waste, medical/pathological waste, radioactive waste, chemical waste, and multi-hazard/mixed waste.

NIH rigidly controls waste generated by biomedical research. The Division of Environmental Protection (DEP) is responsible for all aspects regarding the safe use of materials and the management of waste, including the training of personnel in these areas. NIH manages waste from generation to ultimate disposal. Non-radioactive general, medical/pathological, chemical, and mixed waste is managed by the Waste and Resource Recovery Branch. The NIH DEP manages radioactive materials and waste. Specially trained and qualified private contractors carry out chemical, radioactive, and multi-hazard/mixed waste management operations on a “turnkey” basis.

Emphasis is placed on minimization of waste generation at NIH. Advisory services in the DEP are available to researchers in developing experiments and waste minimization protocols. Waste is strictly segregated in hospital, clinical, and research spaces to avoid creating unnecessary amounts of multi-hazard/mixed waste. A wide assortment of appropriate waste containers, many defined and specified by federal and state regulations, are provided to researchers. The researcher labels the container for date, source, constituents, and potential hazard. Accumulated waste is temporarily stored in cabinets or secure areas in research spaces away from the general public and easy employee access.

For chemical, radioactive, and multi-hazard/mixed waste, contractor personnel inspect and remove the wastes, and transport them to the waste marshalling facility located in Building 21. At Building 21 these wastes are segregated by different regulatory categories. If necessary, waste is treated to render them non-hazardous, reduce hazard, reduce volume, or convert multi-hazard/mixed waste to a single classification. Waste may be bulked for subsequent shipment and disposal by consolidation of multiple small containers of compatible waste materials generated in research spaces to fewer containers. This controlled waste is shipped weekly to off-site waste management facilities. When waste is disposed of, NIH keeps a permanent disposal record.

Solid or General Waste

General waste includes waste that is not contaminated with chemical, infectious, or radioactive materials and is not suitable for recycling. Examples of general waste include office waste, disposable products, animal bedding which is not contaminated, dining center waste, campus maintenance waste, and building renovation waste.

General waste is collected and placed in dumpsters located throughout the campus. A private contractor transports general waste to the Montgomery County Transfer Station away from the campus. NIH generated 9,600 metric tons of general waste in 2003. Records indicate that about 55 percent of this total was classified as office/institutional waste.

Medical/Pathological Waste (MPW)

Medical/pathological waste (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. To ensure compliance with all State and Federal regulations, NIH has merged the applicable definitions into the single category of MPW. Examples of MPW include microbiological cultures, clinical specimens, tissue cultures, waste from surgical suites, contaminated animal bedding, “sharps”, and contaminated disposable clothing or absorbent materials.

MPW is packaged at the point of generation into opaque bags placed in cardboard containers. MPW boxes are labeled for source and content and then stored under refrigeration in designated pickup locations inside buildings around the campus. It is then marshaled at Building 25 and transported from the site by contractor for approved treatment and disposal.

NIH has reduced MPW generation by 45 percent since 1990 even though the number of researchers on the campus has increased significantly in the interim.

Radioactive Waste

Radioactive waste is any waste that contains or is contaminated with radioactive materials, such as contaminated paper, glass and plastic containers, liquids and fluids, experimental or cleanup materials, and contaminated medical pathological wastes including patient care wastes. Nearly all radioactive material used at NIH involves very low levels of radioactivity. Most of these materials have a half-life of less than 100 days.

NIH is licensed by the U.S. Nuclear Regulatory Commission (NRC) to use, store, and dispose of radioactive materials. The NRC inspects all NIH facilities for compliance with applicable regulations on a regular basis. All NIH personnel involved in handling, transporting, and/or use of radioactive materials are trained in accordance with NRC requirements. Training emphasizes minimization of low-level radioactive waste.

Radioactive wastes are marshaled for disposal or treatment in Building 21. Some radioactive wastes, which have a short half-life, may be stored until they are no longer classifiable as radioactive, and only then disposed of as non-radioactive waste. Over the last five years, annual radioactive waste generation has ranged from 78 to 154 metric tons.

Building 21 also contains laboratories designed for the use of radioactive materials with quantities of radioactivity higher than typically used in a standard laboratory. NIH also operates three cyclotrons in the Magnusen Clinical Center, which produce isotopes that have half-lives measured in terms of minutes or hours, and thus effectively do not produce long-term radioactive waste.

Chemical Waste

Chemical wastes are discarded non-radioactive chemicals, including hazardous and non-hazardous chemicals, as defined by Federal regulations. Chemical wastes that are not regulated under Federal or State regulations as hazardous, but which have toxic or hazardous waste characteristics are considered to be hazardous waste by NIH.

Chemical wastes are collected, sorted, and packaged for shipment and disposal from Building 21. NIH generated 193 metric tons of chemical waste in 2003.

Multi-hazard/Mixed Waste

Multi-hazard waste is an NIH definition for waste that meets the definition and properties of more than one of the restricted wastes, which are MPW, radioactive waste, and chemical waste. Mixed waste is combined chemical and radioactive waste, and is therefore a subset of multi-hazard waste. Volumes of multi-hazard and mixed wastes generated are included within the chemical and radioactive waste totals. When possible, multi-hazard and mixed wastes are converted to a single classification before treatment or disposal.

Animal Waste

Animal waste is classified as solid waste, MPW, or sanitary waste as determined by waste characteristics. It consists of animal bedding with animal droppings, and wash-down from daily cleaning of animal holding areas and cages. Bedding material and animal droppings from diseased animals are managed as MPW or processed by heating to sufficient temperatures in a steam autoclave and disposed of as general solid waste. Bedding from healthy animals is disposed of as general solid waste. Wash-down from areas housing healthy animals is routed to the sanitary sewer. Animal waste is generated primarily in the animal services Building 14/28 complex, and also at other laboratory buildings around the campus.

Recyclable Materials

Recycling consists of recovering materials before they enter the waste stream and diverting them for reuse as raw materials for the manufacture of new products. Examples of recycled materials include white office paper, mixed paper, scrap metal, wood pallets, and yard waste consisting of lawn/leaf materials. For many years NIH has participated in GSA surplus property programs to recycle paper, scrap metal, and used furniture and equipment. Since 1999, an even more concentrated effort to incorporate recycling within waste management services contracts has been instrumental in increasing recycling and recovering activities. As a result, recycling of general waste has increased from 2080 tons in 1999 to 2,657 tons in 2003. This does not include additional recycling of yard and construction waste materials. NIH has a recycling center at the William H. Natcher Building 45; however, there is no central recycling center covering the remainder of the buildings on campus. Materials are picked up from individual buildings by outside contractors, and many locations lack sufficient dock/storage areas.

Construction/Demolition Materials

Construction/demolition materials include any waste generated through the construction/demolition process that is directly attributable to a valid construction contract, controlled by specifications. Construction debris is removed from the site as part of the general conditions of the specification and is part of the construction cost. NIH buildings to be demolished or renovated undergo extensive inspection and testing of building infrastructure for the presence of hazardous materials such as asbestos and lead. These hazardous materials are removed and disposed of according to applicable federal and state regulations prior to general demolition. Non-hazardous building materials are evaluated for recycling potential.

4.8 Existing Utilities

The NIH Bethesda Campus Master Plan is developed separately from, but in coordination with the campus Master Utilities Plan (MUP) Year 1 and Year 2, and the Master Utility Plan 2000 Update (UMUP). For more specific information on campus utilities, see the Utility System Analysis and Planning, MUP Task 3.0 Report and the UMUP. The Major Utility Corridors diagram, Figure 4.8, shows the general locations of the existing major utility distribution tunnels and trunk lines on campus.

Although utilities are concentrated under campus roadways, buried utility lines crisscross the entire campus. NIH is in the process of consolidating many utilities in utility corridors as recommended in the MUP. There are two existing utility tunnels on site, one running north-south from the Power Plant (Building 11) to the Clinical Center Complex (Building 10) and the Animal Facility (Building 14), the other running east-west between the Convent and Center Drives along the axis of South Drive. Future third and fourth sections are proposed for completing the loop around Building 10 (Clinical Center) and around the Building14/28 complex (Animal Facility). Proposed utility trenches carrying steam and chilled water lines would be extended in the northeast sector of the campus toward Building 33 on the north, and around Building 14 on the south. The purpose of these proposed tunnel and trench expansions is to provide utility service redundancy to all parts of the campus in case of disruptions in service.

Construction of future campus development must take into consideration these existing tunnels and utility lines, as well as proposed corridors, tunnels, and utility improvements.

4.8.1 Water

The Washington Suburban Sanitary Commission (WSSC) supplies water to NIH through water mains under Rockville Pike, West Cedar Lane, and Old Georgetown Road. Service pressure, 495 feet, is established at the Alta Vista standpipe and storage tank located across West Cedar Lane near the northwest corner of the campus.

Supply to the campus is split among seven metered entry points to spread fire flow demand and provide service redundancy. There are three WSSC service lines on West Cedar Lane, two on Rockville Pike, and one each on Old Georgetown Road and Roosevelt Street. The average daily campus water demand in 2003 was 2.141 million gallons. The largest single demand source on the campus is the cooling towers in the chilled water plant in Building 11. The towers are submetered. They use water evaporation to release heat collected by the system from campus buildings. The towers can account for more than 70% of the total campus demand when outdoor temperatures exceed 95ºF. For this reason, average campus daily water use ranges from approximately 1.5 million gallons per day during the winter months to more than 2.4 million gallons per day during July.

4.8.2 Gas

The Washington Gas Co. supplies natural gas to NIH from gas mains on Old Georgetown Road and West Cedar Lane. Total natural gas consumption on the NIH campus for 2003 was 1.748 billion cubic feet. Natural gas is the primary fuel used by the campus central plant boilers in Building 11. This use accounts for more than 98%, of campus demand with the remainder consumed in laboratories or cafeterias. The NNMC and residential areas to the east of the campus are fed by Washington Gas lines that are routed across the campus in easements near the southern periphery.

4.8.3 Chilled Water

The chilled water distribution system at NIH is used for air conditioning most of the buildings on the site. Chilled water is generated in two refrigeration plants in Buildings 11 & 34. These two plants serve a single underground chilled-water distribution system consisting of major East, West, and Central Campus Headers. It is a closed loop system. Pipe is located in utility tunnels, utility trenches, or is directly buried.

The estimated current campus peak chilled water demand is 51,100 tons. The total and firm chilled water plant capacities are 68,000 and 63,000 tons.. However, due to equipment age and conditions, the reliable chilled water plant capacity is 63,000 tons. The total capacity will be increased to 72,000 tons with the addition of chillers 26 and 27, and retirement of Chillers 10 and 14 by the end of 2004. Additional chiller units will be installed, as needed in future chilled water plant expansion projects, and distribution lines will continue to be upgraded.

The UMUP notes that numerous sections of the distribution systems have hydraulic deficiencies and cannot adequately meet projected building cooling loads. Major replacements, improvements, and expansions are needed throughout the campus distribution system to meet near future operational needs.

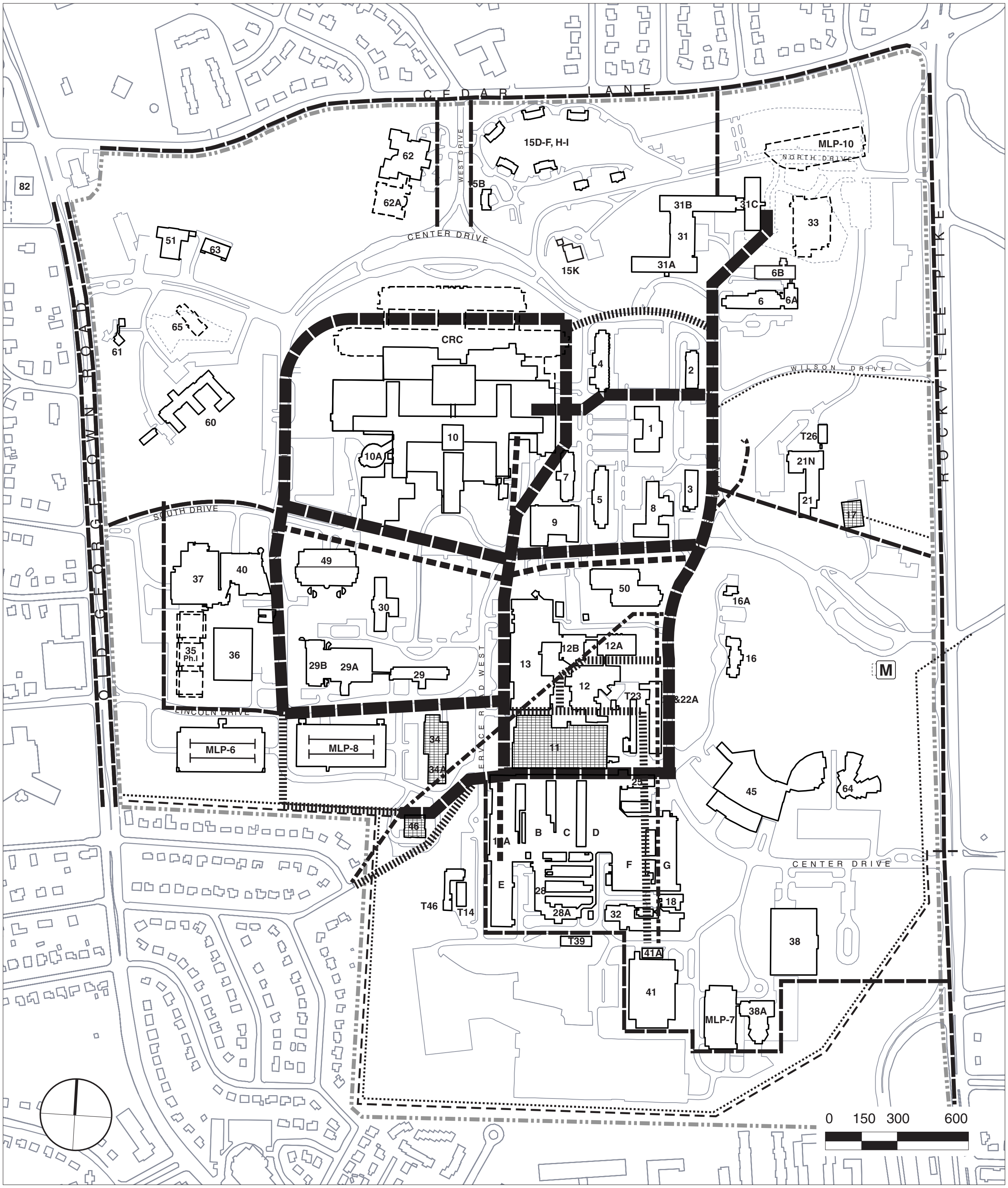
4.8.4 Steam

With a few exceptions, the central heating plant in Building 11 heats buildings on the NIH campus. Steam is produced in five boilers in the plant and distributed at 165 psi by lines that are located within tunnels or are directly buried. Pressures are reduced at each building for internal distribution and use. The generating plant in Building 11 also provides steam for “process” uses such as building humidity control, sterilization of equipment, cleaning of animal care areas, and at the laboratory bench.

The existing boiler plant can produce a total of 800,000 pounds per hour of steam for use on the NIH campus. The PEPCO co-generating unit, which is scheduled to come on line by 2004, will be capable of generating an additional 180,000 lb/hr when its heat recovery boiler is used. The peak recorded steam demand in 2003 was 532,000 lb/hr. The average winter demand (Jan-Feb-Dec) was 340,000 lb/hr.

4.8.5 Sanitary Sewer

The flow of the sanitary sewer system at NIH is in a general southwest to northeast direction across the campus. A sanitary sewer line crosses the site diagonally from southwest to northeast, and is connected to WSSC sewer mains as it enters and exits the site. Most of the campus sanitary system drain to this line which connects to Washington Suburban Sanitary Commission (WSSC) sanitary sewer mains near the intersection of Rockville Pike and West Cedar Lane. Buildings 38 and 38A in the southeast corner of the discharge sanitary sewer waste into the WSSC system at Rockville Pike and Glenbrook Parkway. Building 60 (the Convent Building) has a separate small WSSC sanitary line dating to pre-NIH occupancy which discharges to a WSSC system that drains westward from Old Georgetown Road. Except for Building 60, all the sewage generated on the NIH campus is discharged to the WSSC sewer network within the Rock Creek Basin and flows to the Blue Plains Waste Water Treatment Plant.



EXISTING MAJOR CORRIDORS
EXISTING UTILITY TUNNEL
WATER
GAS
ELECTRICAL
SANITARY
STORM DRAIN
POWER PLANT/UTILITY BLDG.

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Figure 4.8

Existing Major Utility Corridors

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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4.8.6 Stormwater Systems

The NIH campus encompasses four drainage areas: the NIH Stream, the North Branch, Stony Creek, and a small area on the west side of the campus (See Figure 4.2.2.). Each area has a separate campus storm drain system. All, but the last, drain to Rock Creek.

All of the campus storm drains are owned and maintained by NIH. The main storm drain on the campus, which ranges from 84 to 96 inches in diameter, carries the NIH Stream across the campus between the southwest corner its outfall to daylight near Building 21. Two other systems join it in the vicinity of Building 50. One of these systems drains the area within the NIH Stream basin to the south of Building 11, the other drains the area within the basin that is north of Lincoln Drive. The area to the east of Building 10 is served by several individual short stormdrains that flow directly into the NIH Stream. Drainage in the northern and southernmost sections is handled either by either surface flow or short pipe systems carrying roof top runoff. In general, the existing drainpipe systems have adequate capacity and are in good condition.

Criteria for stormwater runoff quality and quantity control has been established in the Draft NIH Bethesda Institutional Stormwater Management Plan (ISMP) now under review. The plan proposes campuswide management. Quantity control will be achieved through a North SWM Facility on the North Branch; quality control through the South Pond, which will also serve as a Montgomery County quantity control facility.

4.8.7 Electric Power

Power to three campus substations is provided by the Potomac Electric Power Co. through underground ducts. Electric power is distributed to campus buildings from these three main substations via an NIH owned and operated network. One substation is on the east side of the site at Building 17, the second is on the west side at Building 46, and the third is the recently built substation, Building 63, located at the northwest corner of the campus.

Typical daily electrical usage ranges from about 1.0 to 1.3 million kilowatthours (KWHR). Total PEPCO billed electricity consumption for the year 2003 at the NIH campus was 409,000,000 KWHR. The maximum-recorded daily demand of 74,486 Kilowatts occurred in June 2003.

Operation of the NIH/PEPCO Cogeneration facility is scheduled to begin in 2004. The steam turbine electric power generation nominal capacity is about 23 megawatts (MW), and the unit will provide about 19.6 MW at 85 percent efficiency. The kilowatthours of power produced will be included in PEPCO billings. Billed kilowatt peak use, however, will decline by the amount supplied by the COGEN facility.

4.8.8 Compressed Air

The compressed air system at the NIH campus is an underground system that is generated in Building 11 at 125 psi and is distributed to other specific buildings at approximately 110 psi. Most campus buildings have their own exclusive air systems. Compressed air is used primarily as laboratory air and, occasionally, as backup for the control air in the HVAC system.

4.8.9 Oxygen/Compressed Gases

The oxygen system is not an interconnected system. It consists of a large tank adjacent to the north elevation of support services Building 13 to supply the Clinical Center (Building 10). Small portable tanks in place within the individual buildings supply any other oxygen used on the site.

4.8.10 Signal System

The signal system at NIH accommodates the telephone, fire alarm, security and door supervision, and local signal services. Concrete-encased fiber, asbestos-cement, and plastic 4-inch duct liners connect the underground manhole and handhole system.

4.8.11 Fuel Storage

There are two large underground fuel oil storage tanks east of Building 34, which supply fuel for the boilers in Building 11. Each tank holds 500,000 gallons. Currently, all five boilers use natural gas as the primary fuel. However, fuel oil storage will be required as an emergency supply. The Master Plan will replace the existing tanks with new ones on the south side of Building 11 in the service area. The new tanks would have the same or similar combined capacity as the existing ones.

4.9 Opportunities and Constraints

The following Opportunities and Constraints diagrams are a synthesis and summary of the program and analysis information presented in Chapters 2, 3, and 4. The Opportunities diagram (Figure 4.9.1) shows the physical site features which the Master Plan can take advantage of and identifies potential buildable sites to meet the program requirements. The Issues and Constraints diagram (Figure 4.9.2) shows a composite of issues to be addressed by the Master Plan as determined from program requirements, as well as potential constraints to development due to existing natural or built features of the site. In general, the Bethesda Campus has a high number of constraints to be considered due to the extensive level of existing development on the site.

The following numbered items correspond to areas noted on the accompanying figures:

4.9.1 Opportunities (Figure 4.9.1)

1. ***Natural Features/Topography***
   - The site has many positive natural features (streams, woodlands, topographical variation, etc.), which can be retained and incorporated in the Master Plan.
   - New development can be shielded by topography in appropriate locations.

2. ***NIH Stream***
   - Upgrading of the NIH Stream is currently underway and will be a site amenity enhancing the campus character.
   - Appropriate new development may be located along the stream provided a buffer (100 feet / 30m) between the development and stream is maintained.

3. ***Campus Organization***
   - The Master Plan can create a campus structure, which connects and unifies the various components of the site.
   - A system of hierarchy can be established among campus buildings and spaces.

4. ***Redefine Campus Core***
   - Many existing buildings within the campus core need to be renovated or replaced (Building 10 -Clinical Center Complex, Building 12/13 Support and Computer Services complex, Building 14/28 Animal Facility complex). New construction can redefine the character and increase the density of the center of campus.

5. ***Site Landscape (not located on diagram)***
    - Site landscaping may be improved in coordination with redefinition of the cam pus core and reduction of surface parking.

6. ***Circulation***
    - Clarifying and enhancing vehicular and pedestrian circulation systems can improve orientation on campus.
    - Visitor and service traffic conflicts may be minimized by separation where possible.

7. ***Campus Entries***
    - Key campus entry points are currently being reconfigured and improved with landscaping to create a better sense of arrival and orientation.
    - A "front door" address to the campus in general and to individual buildings can be created.

8. ***Historic Core***
    - The Historic Core, one of ten sectors defined by the Master Plan, represents the original building group on the NIH Bethesda campus and contains a number of individually eligible historic buildings. The setting of these buildings may be enhanced through use change, parking removal, and landscaping.

9. ***Power Plant***
    - The continued expansion of the Power Plant (Building 11) in support of NIH activities may be designed to compliment adjacent development

10. ***Periphery Development Sites***
    - In addition to redevelopment of sites within the campus core, there are limited sites around the periphery of the campus, which can be more intensely developed. These sites are currently occupied mostly by surface parking or buildings, which may potentially be replaced. Such a redevelopment is already taking place at the northeast corner of the site with the construction of research Building 33 and MLP10.

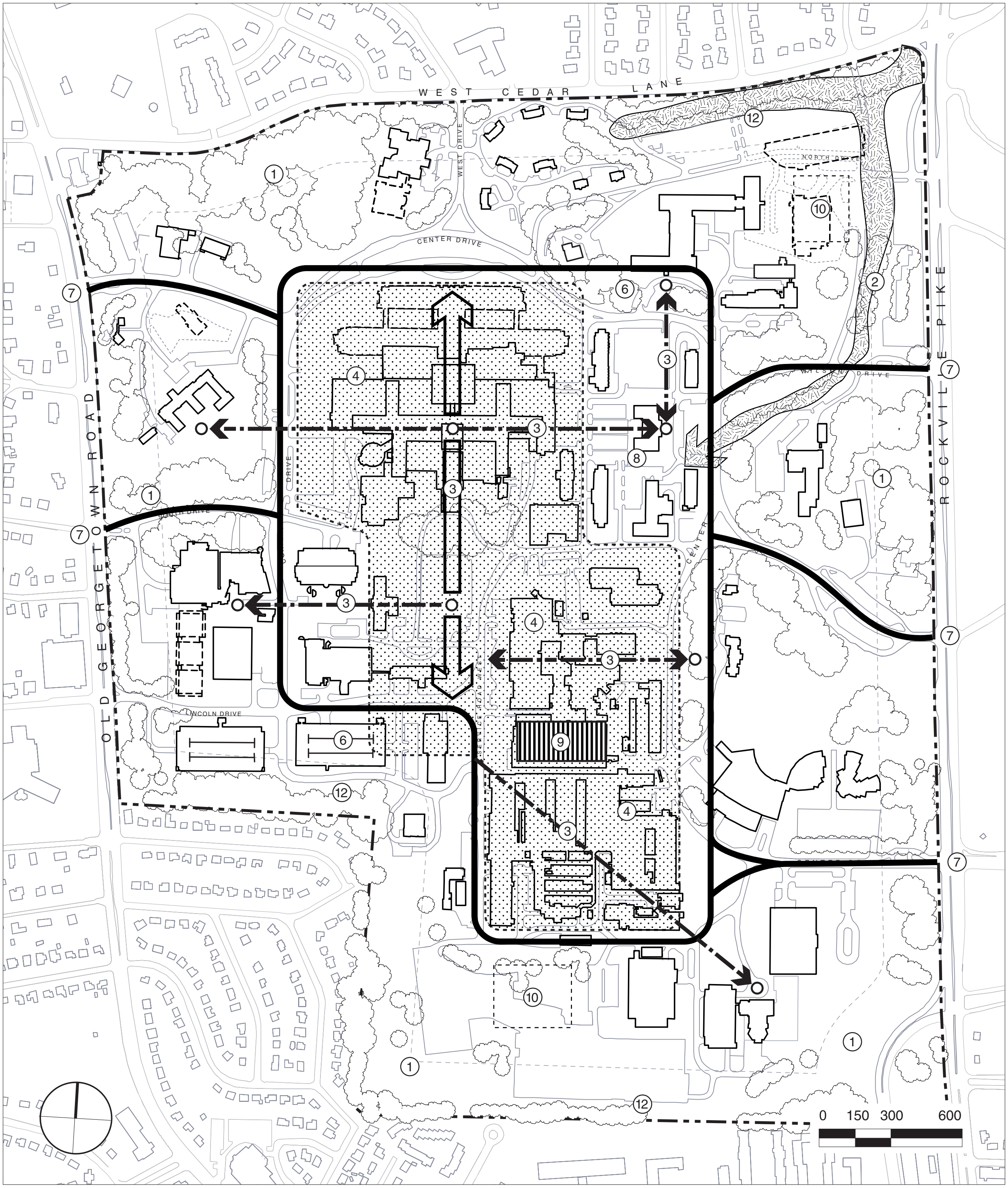
11. ***Utilities Distribution (not located on diagram)***
    - Coordination of major utility corridors with proposed new development and roadways can create a more efficient distribution system and avoid future disruptions to campus functions.

12. ***Enhance Perimeter Buffers***
    - Relationship of campus development to surrounding residential areas and major thoroughfares can be improved through the expansion or enhanced landscaping of the perimeter site buffers.

4.9.2 Issues and Constraints (Figure 4.9.2)

1. ***Neighborhood Compatibility***
    - The campus is bounded on the north, west, and south by residential neighborhoods, requiring sensitivity in building location, heights, and uses near these areas.

2. ***Natural Features/Topography***
    - Steep slopes occur around the periphery of the campus, particularly on the north and east sides, and should be avoided for new development.
    - There are several significant areas of mature specimen trees and woodlands around the periphery of the campus, that should be retained as natural areas.



NIH Master Plan 2003 Update

Bethesda Campus

1 NATURAL FEATURES/TOPOGRAPHY
2 NIH STREAM
3 CAMPUS ORGANIZATION
4 CAMPUS CORE
6 CIRCULATION
7 CAMPUS ENTRIES
8 HISTORIC CORE
9 POWER PLANT
10 DEVELOPMENT SITES
12 ENHANCE BUFFERS

Figure 4.9.1

Opportunities

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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3. *Buffer Zones*

- Buffer zones of varying dimensions exist around the perimeter of the site within which buildings and parking are restricted.

5. *Streams and Floodplains*

- There are two streams with associated floodplains on campus, the NIH Stream with its North Branch in the northeast sector and Stony Creek in the southwest corner. New development should be placed outside of these floodplains.
- To meet Maryland State storm water management criteria, storm water drainage and retention should be addressed by an Institutional Stormwater Management Plan.

6. *Existing Campus Anchors*

- There are five major groups of buildings which will remain on campus through the period of the Master Plan: the general office Building 31 complex on the northeast, the Historic Core near the center, the Clinical Center - Building 10 Complex, the West Quad research group near Buildings 36 and 37, and the Lister Hill/National Library of Medicine/Natcher group to the south. Most of these buildings are in good to excellent physical condition and should be integrated into the campus Master Plan.

7. *Important Views and Axes*

- There are strong visual axes created by the relationship of central administration Building 1 to the tower of the National Naval Medical Center, and the symmetrical nature of the existing Clinical Center (Building 10). Additionally, there are important views into the campus, primarily at the corners of the site. These views and axes should be considered in the development of the Master Plan.

8. *Clinical Center Complex*

- The existing Building 10 complex will undergo a phased renovation program to create a modern clinical research facility.

9. *Support Services Complex*

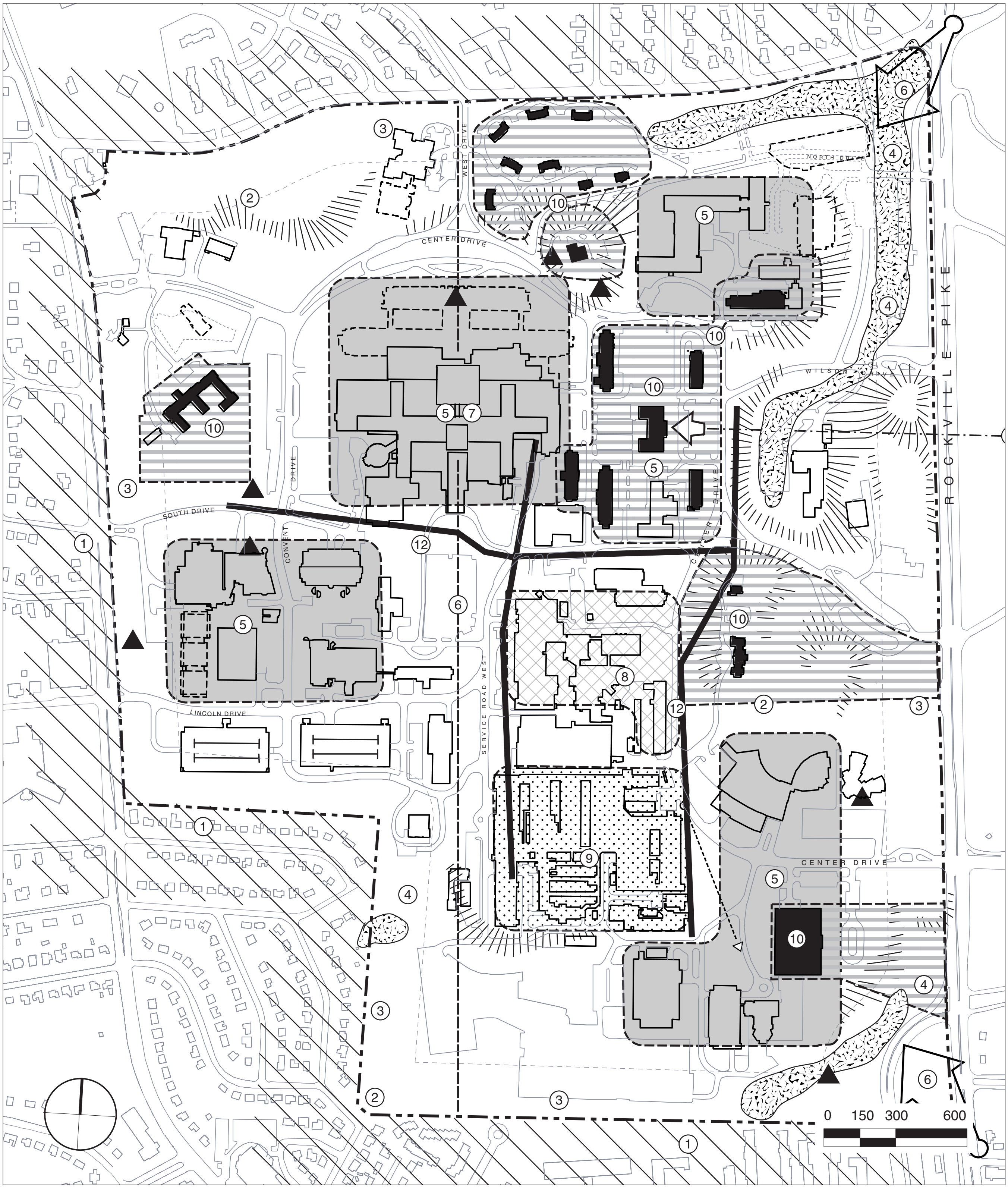
- The Building 12/13 complex (support services) is a low-density use which occupies a central site within the campus. Alternative development potential for this site should be explored.

10. *Animal Services*

- The Animal Facility (Building 14/28 complex) is a large footprint, one-story structure that occupies a strategic location for future development.
- The complex is in poor physical condition and will exceed its useful lifespan during the Master Plan period. Replacement phasing and an appropriate relocation site should be addressed by the Master Plan.

11. *Historic Resources*

- Several buildings on the NIH campus are currently identified by MHT and NIH as historic resources, including Buildings 1, 2, 3, 4, 5, and 6 (The Administrative Complex, or Historic Core) the Peter Estate (Buildings 16 and 16A), the Convent (Building 60), and Building 15K(Wilson House or Tree Tops) (see Section 4.6.1 for complete list of buildings determined eligible for listing in the National Register of Historic Places). These buildings should be retained and their settings respected by new development.



NIH Master Plan 2003 Update

Bethesda Campus

1. NEIGHBORHOOD COMPATIBILITY
2. NATURAL FEATURES/TOPOGRAPHY
3. BUFFER ZONES
4. STREAMS AND FLOODPLAINS
5. CAMPUS ANCHORS
6. IMPORTANT VIEWS AND VISTAS
7. CLINICAL CENTER COMPLEX
8. SUPPORT SERVICES
9. ANIMAL SERVICES
10. HISTORIC RESOURCES
11. RECORDED ARCHEOLOGICAL SITES
12. UTILITIES

Figure 4.9.2

Issues & Constraints

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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12. Archeological Areas

- Four areas of the campus have been designated as "archeologically sensitive" areas, in that they have not been investigated or assessed. The largest of these occur in undisturbed areas at the periphery of the campus. If development is proposed for these areas, appropriate survey measures will need to be taken.

14. Utilities

- There are many existing utility distribution lines on campus, and new lines are planned to accommodate future growth. The location of new buildings should be coordinated with these utility tunnels.
- Utility tunnels and improvements will require specific phasing strategies to avoid disruptions to campus activities.
- While projects are underway, utility services must be maintained to all parts of campus.

15. Proposed Projects (not located on diagram)

There currently are several projects under development that have been integrated into the Master Plan, which include:

- Building 10 - Clinical Research Center (CRC) expansion
- Building 35 Replacement - Neuroscience Research Center (NRC) Phase

16. Traffic and Parking (not located on diagram)

- Traffic congestion in the Bethesda/NIH area is a serious issue, requiring a careful analysis of traffic impacts associated with employment growth at the NIH campus.
- A high percentage of the campus site area is currently dedicated to vehicular circulation and surface parking, impairing the quality of the campus and limiting development sites.
- The amount and location of parking should be studied to assure an appropriate ratio and distribution for the site, and in relation to measures, that reduce reliance on single occupancy vehicle trips.

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
Totals	**7,360,734**	**8,634,881**	**9,888,500**	**10,127,436**	**10,715,636**

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.
- Vistor-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)

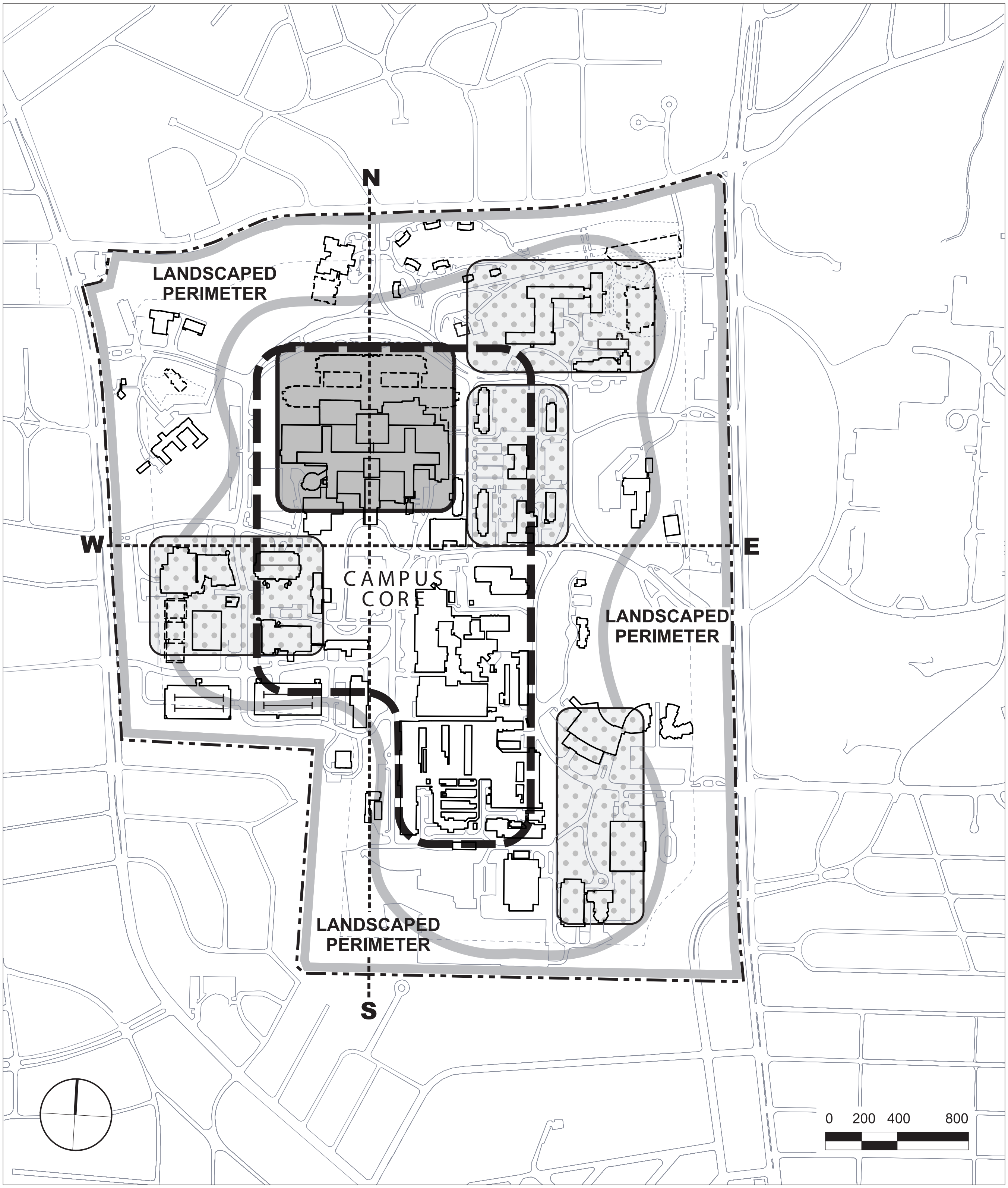
- The existing core of Building 10 will be retained and should remain the highest building mass within the new Clinical Center Complex composition.
- Due to the large bulk of the Clinical Center Complex and the Clinical Research Center expansion, appropriately scaled open spaces should be created around 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

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Bethesda Campus

Figure 5.1.4-a

Planning Principle

Campus Structure

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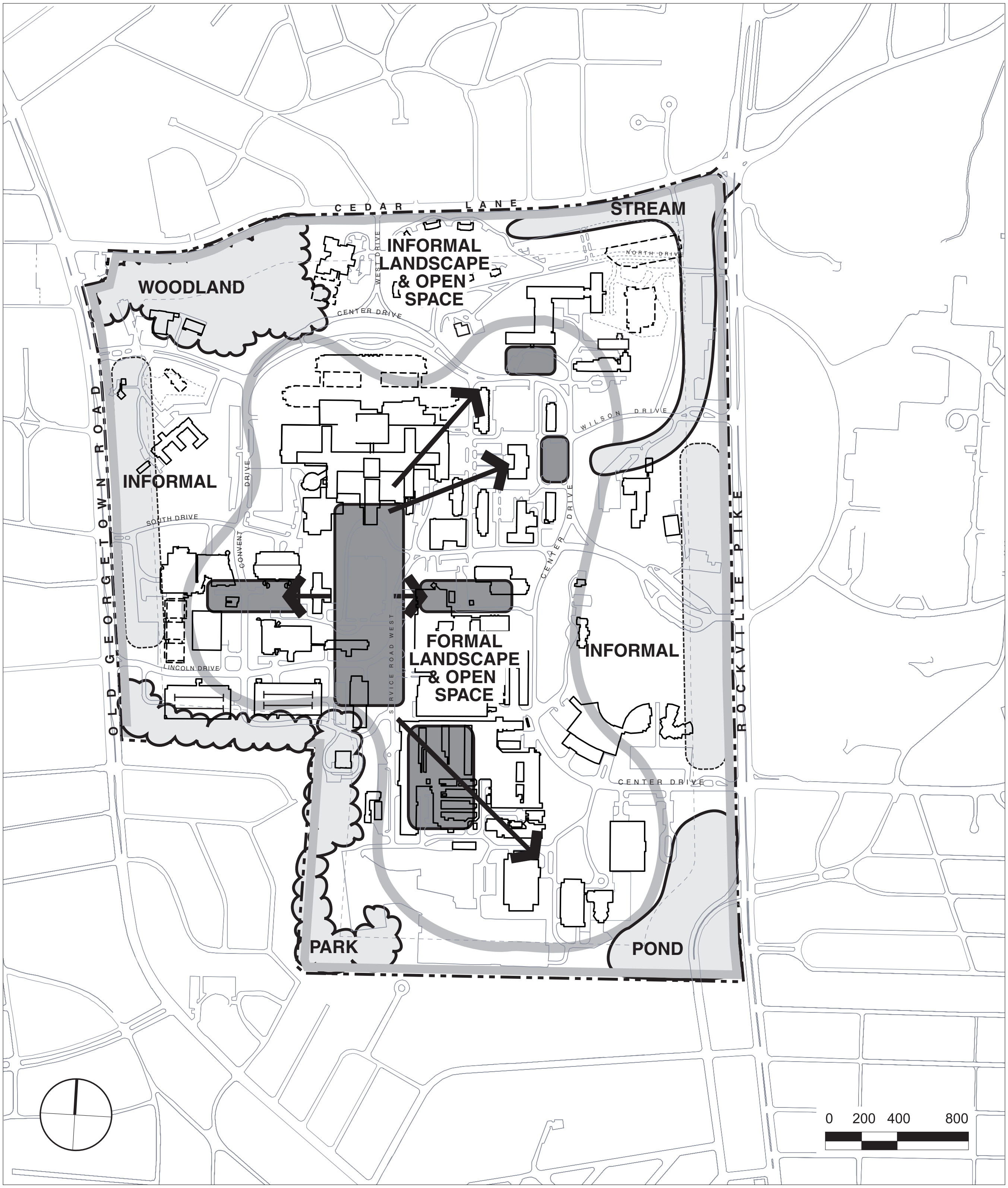

Figure 5.1.4-b

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Planning Principle

Landscape & Open Space

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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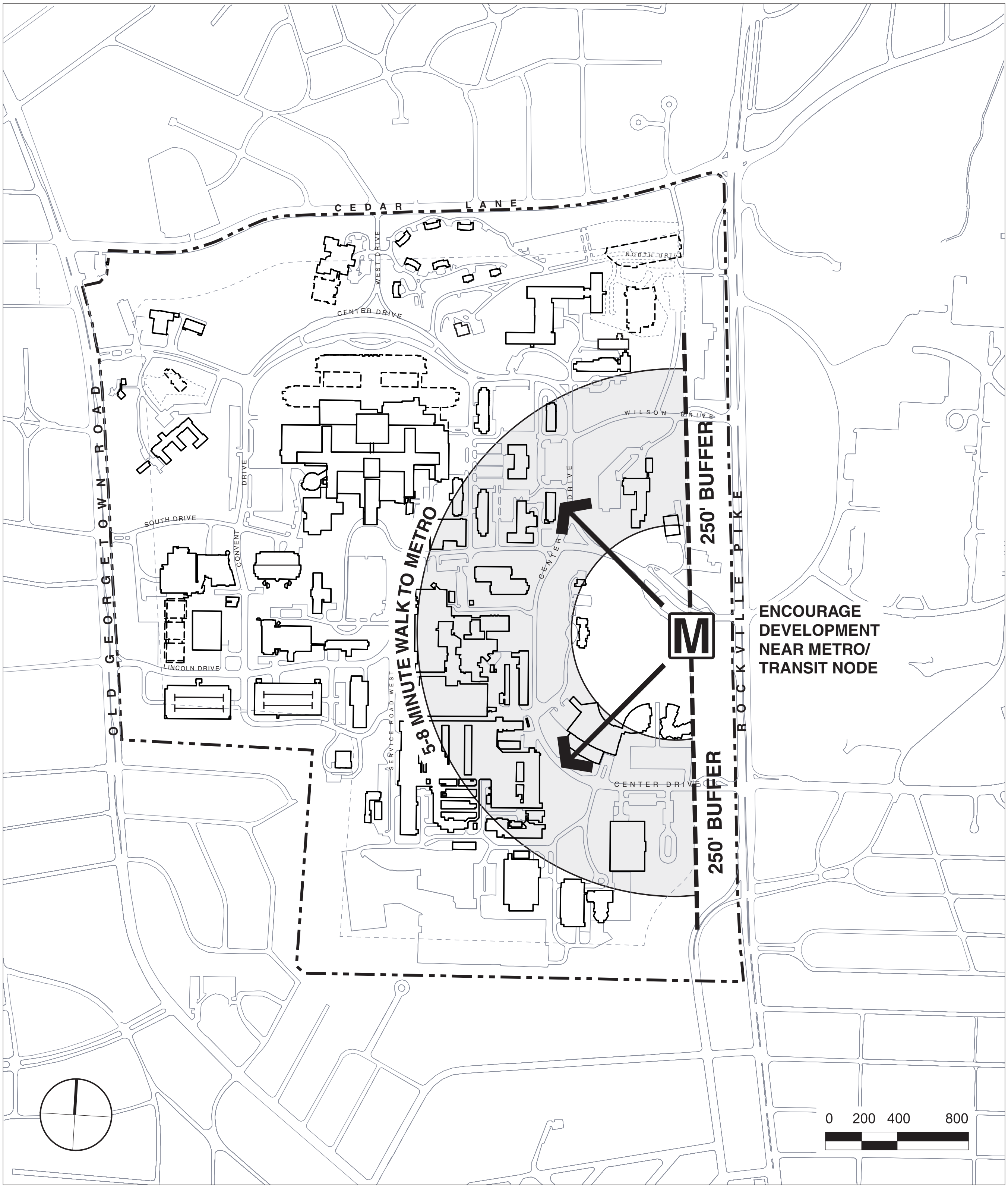

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Figure 5.1.4-c

Planning Principle

Development Proximity to Metro

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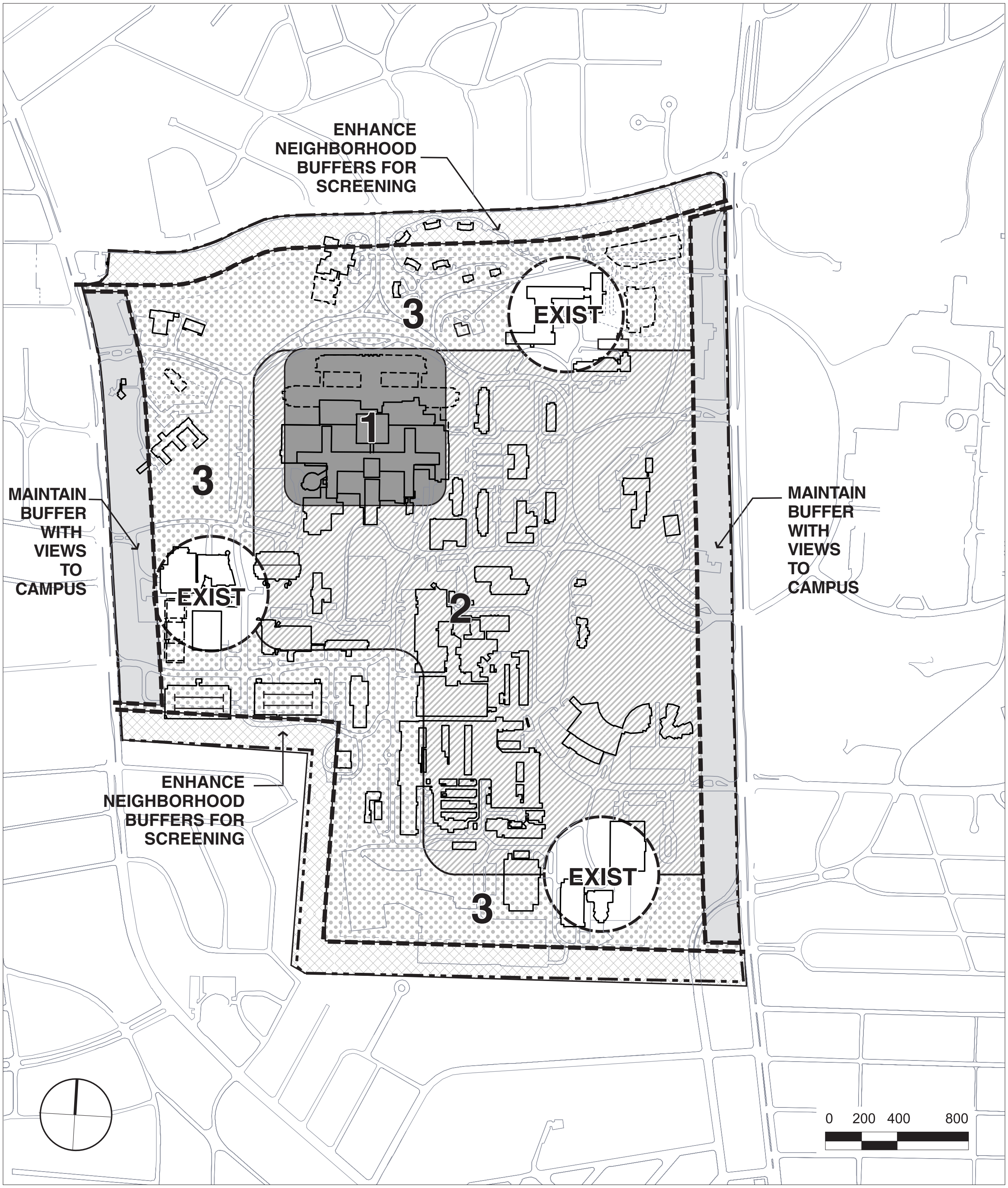

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1 HIGHEST DENSITY
2 MEDIUM DENSITY
3 LOWEST DENSITY
SCREEN BUFFER
OPEN SPACE BUFFER

Figure 5.1.4-d

Planning Principle

Development Density Zones & Community Buffers

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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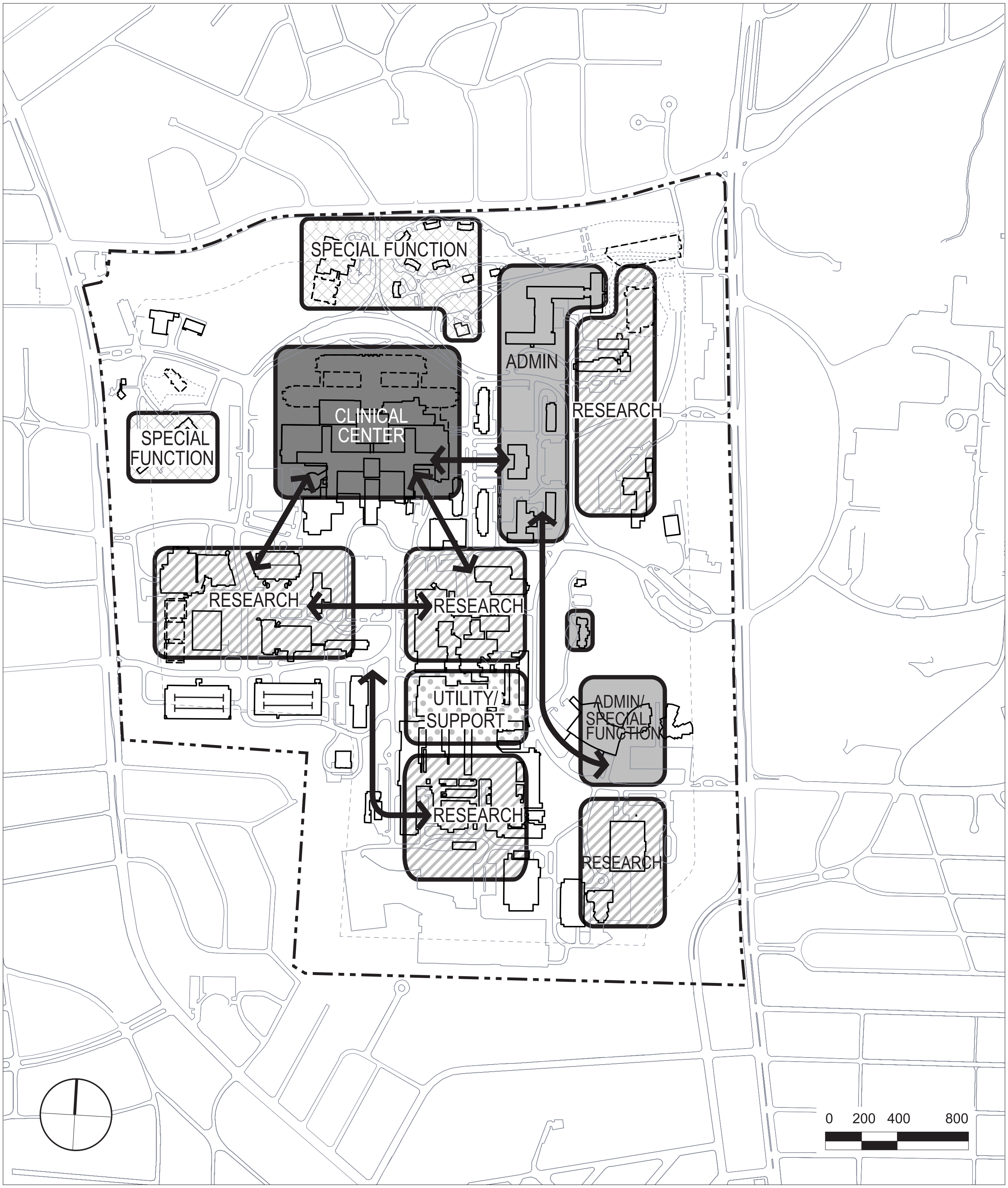

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Figure 5.1.4-e

Planning Principle

Functional Relationships

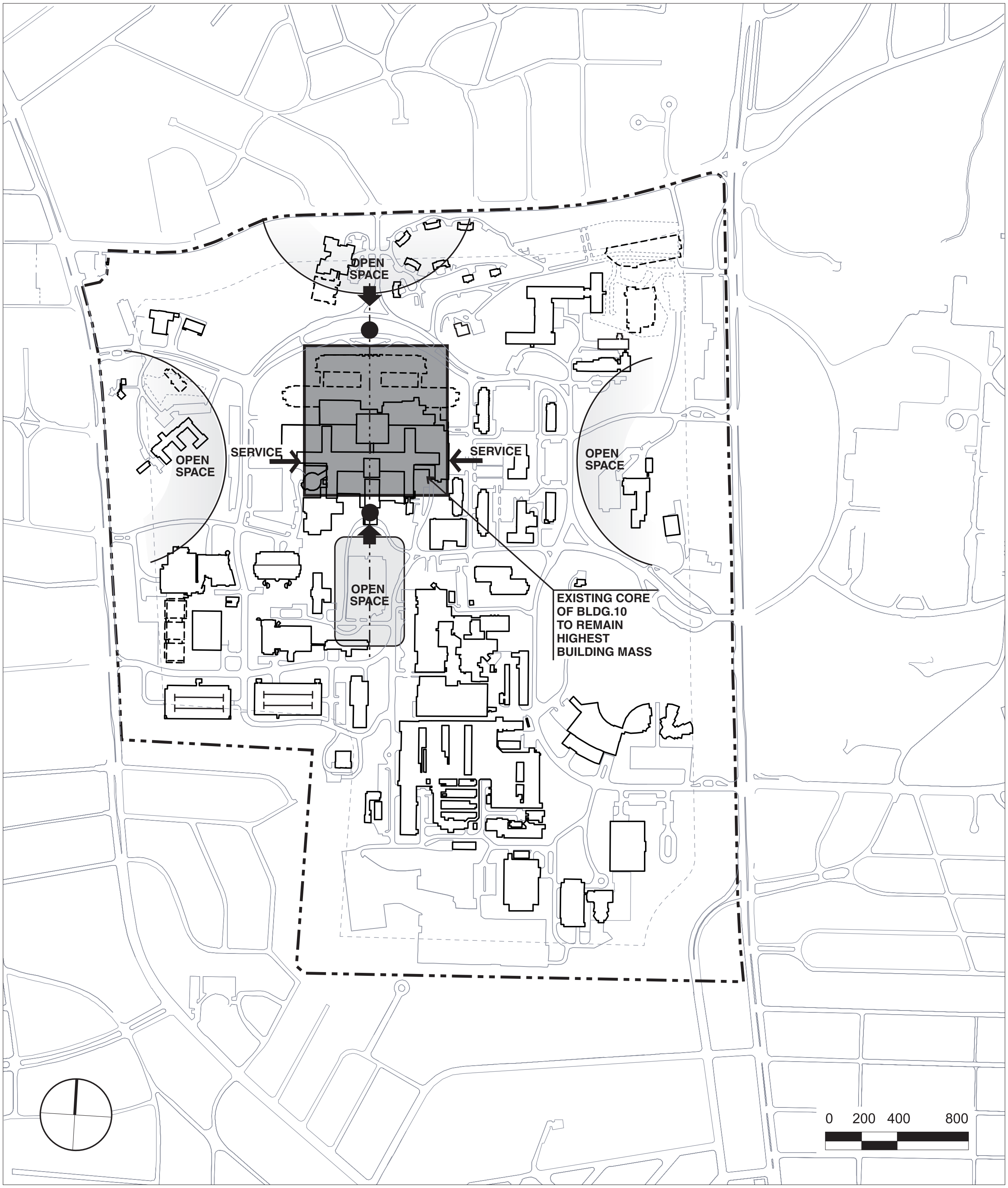

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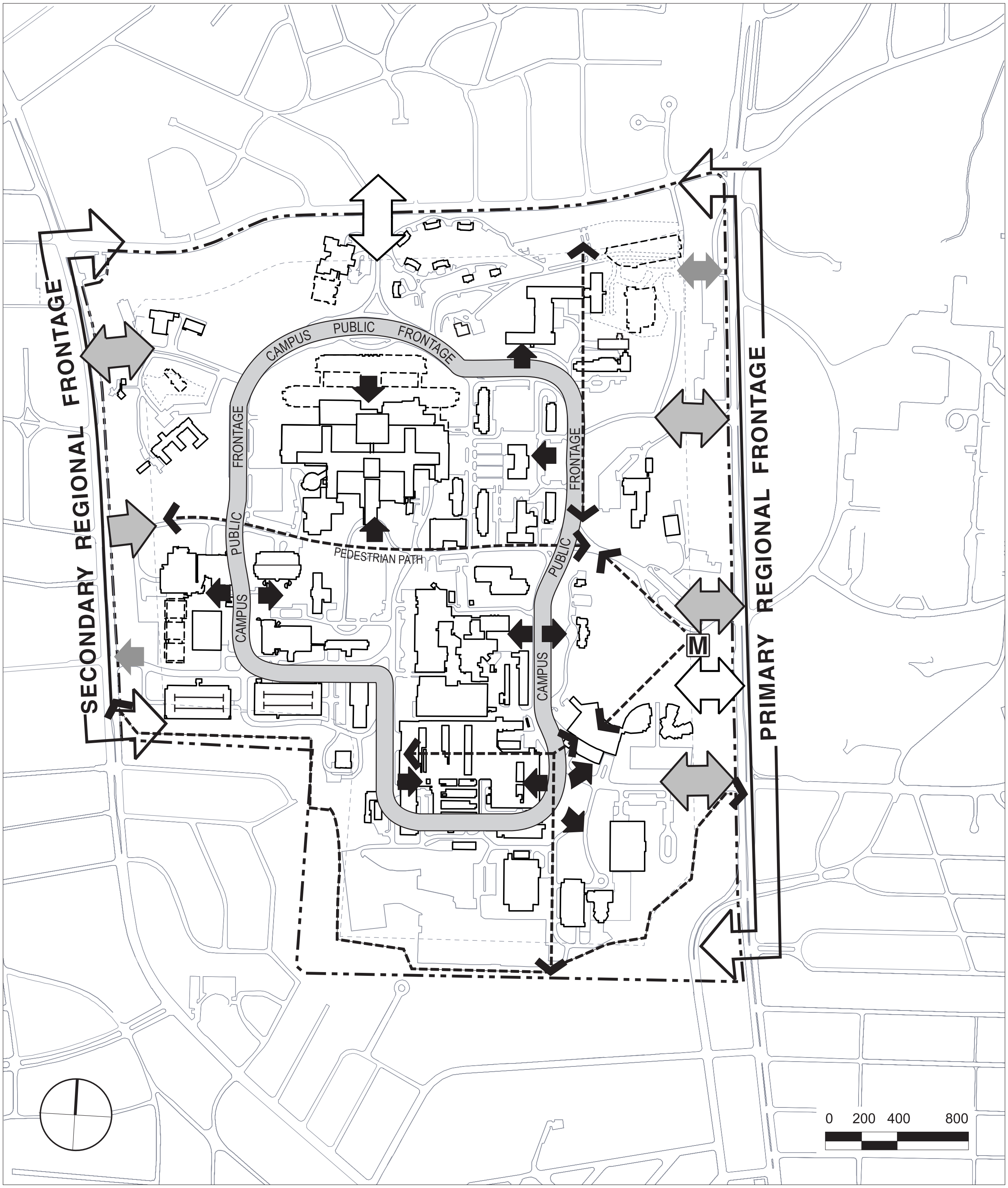
Figure 5.1.4-f

Planning Principle

Clinical Center Development



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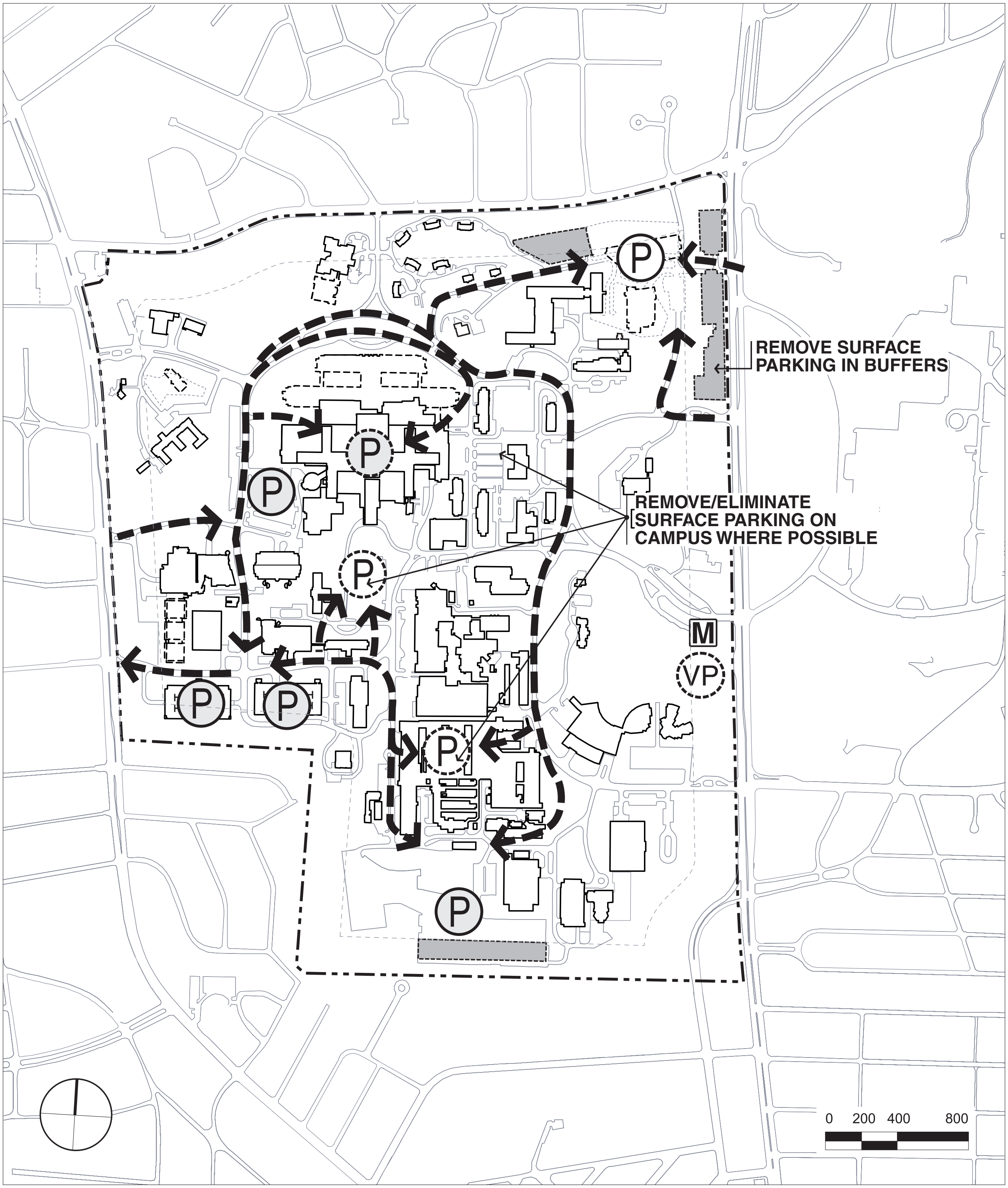
- MAJOR VEHICULAR ACCESS (EMPLOYEE ONLY)
- VEHICULAR , PEDESTRIAN & BICYCLE VISITOR ACCESS
- SECONDARY VEHICULAR ACCESS (EMPLOYEE ONLY)
- CAMPUS PUBLIC ADDRESS ORIENTATION
- PEDESTRIAN/BICYCLE CONNECTION

Figure 5.1.4-g

Public Access & Orientation



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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

BUFFER PARKING TO BE REMOVED

Figure 5.1.4-h

Planning Principle

Parking

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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
Total	**10,715,636**	

EXISTING	SECURITY FENCE
PROPOSED	BUFFER LINE
GREEN/OPEN SPACE / RECREATION	
CENTRAL MALL/PRIMARY OPEN SPACE	
M METRO STATION	

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Figure 5.2.1-a

Illustrative Master Plan

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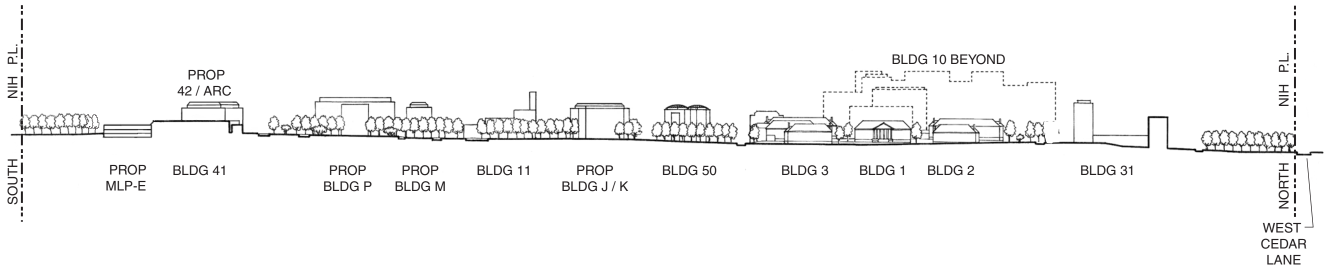
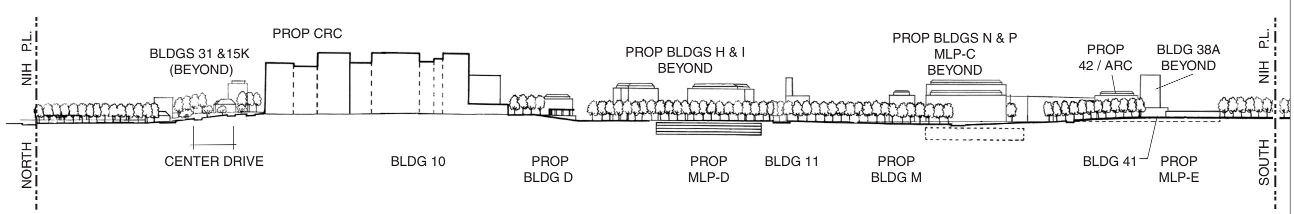
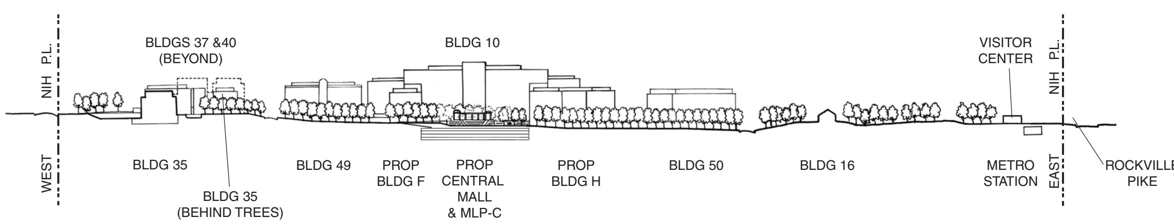


1 North - South Section Through Center Drive



2 North - South Section Through Central Mall



3 East - West Section through West Quad, Central Mall, and East Quad

P.L. = PROPERTY LINE
PROP = PROPOSED

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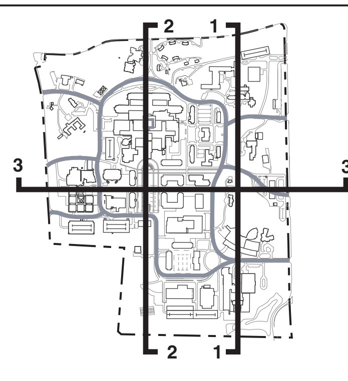

Figure 5.2.1-b

Site Sections

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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.

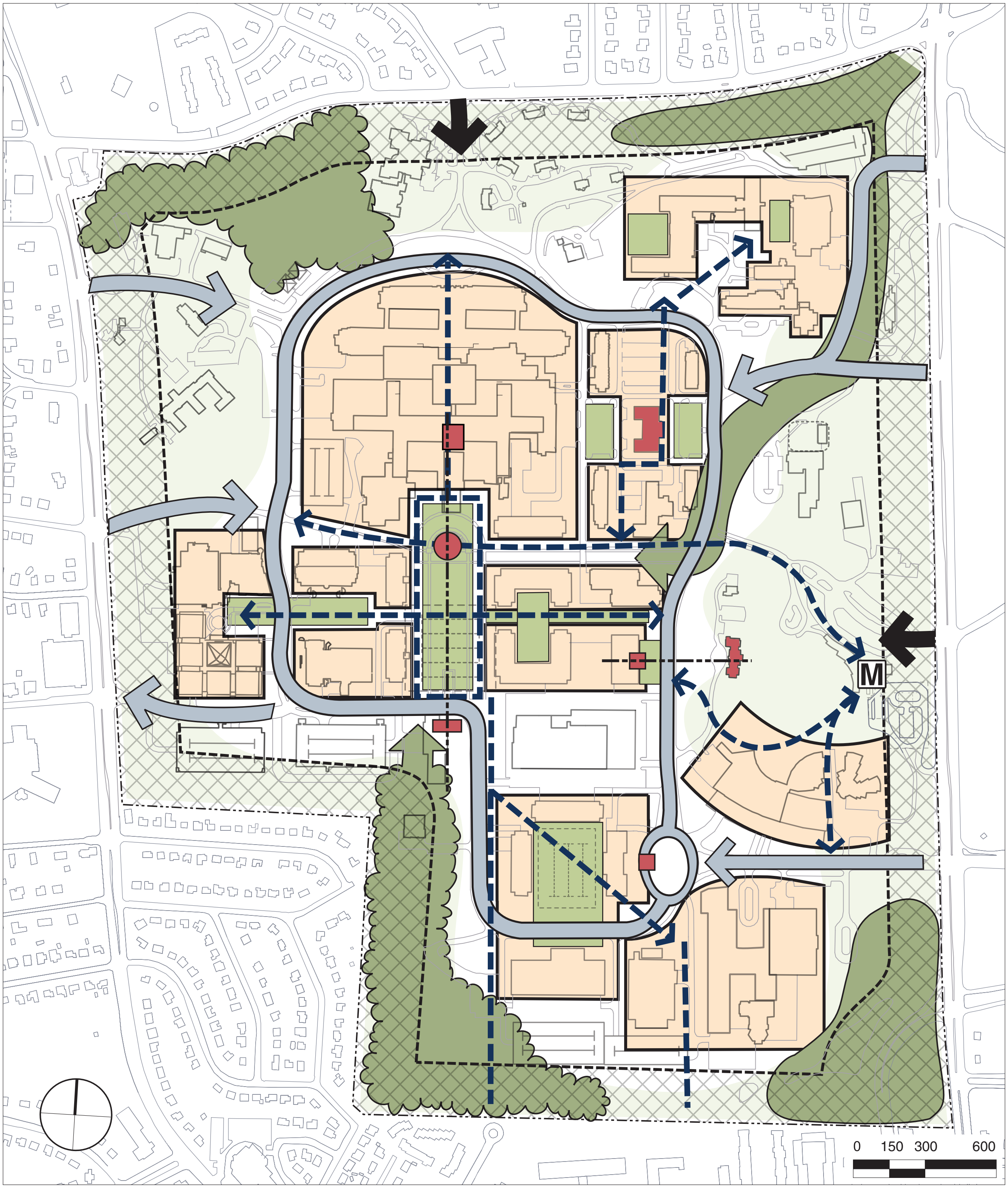
As special features of the perimeter open space system, the four significant corners of the site will retain their existing characters. These are the “woodland” setting of the northwest corner, the “stream” character of the northeast corner, the “lawn and pond” image of the southeast corner, and the “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		FORMAL OPEN SPACE
	MAJOR VEHICULAR ENTRY		INFORMAL LANDSCAPE
	VISITOR ENTRY		SPECIAL CORNERS
	LOOP ROAD	M	METRO STATION
	QUAD/BLDG GROUP		INTERNAL PED/BIKE PATHS
	FOCAL POINT		

Figure 5.2.2

Concept Diagram

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Oudens & Knoop, Architects, P.C.

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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 Conplex 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

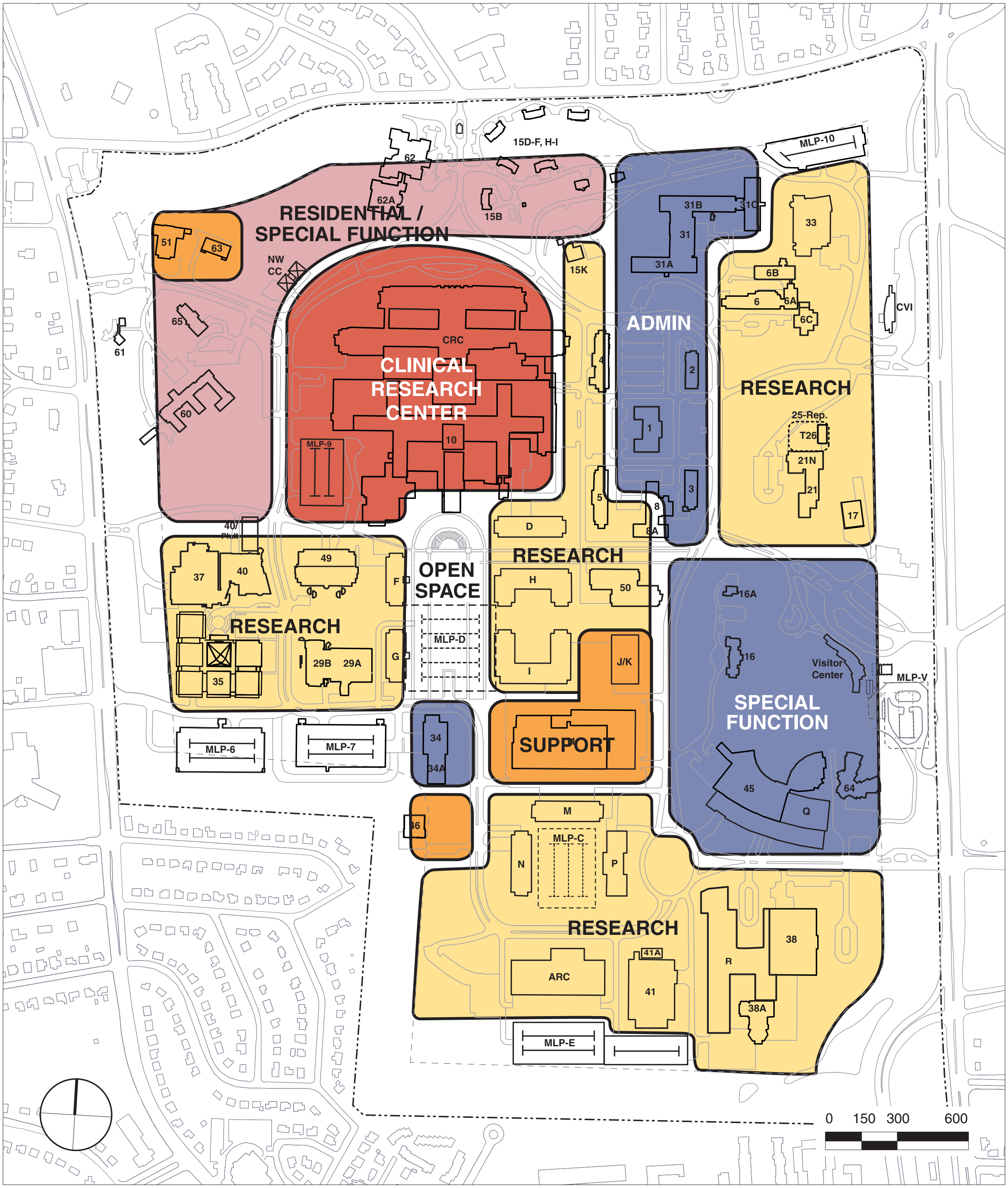
Figure 5.2.3-a and Table 5.2.3-c show the amount of new development which is planned for each major building site or area identified in the Master Plan. For each site, a target area is indicated. The cumulative target areas meet the overall campus development program shown in Section 5.1.3. Development 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)



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

Figure 5.2.3-a

Land Use

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Oudens & Knoop, Architects, P.C.

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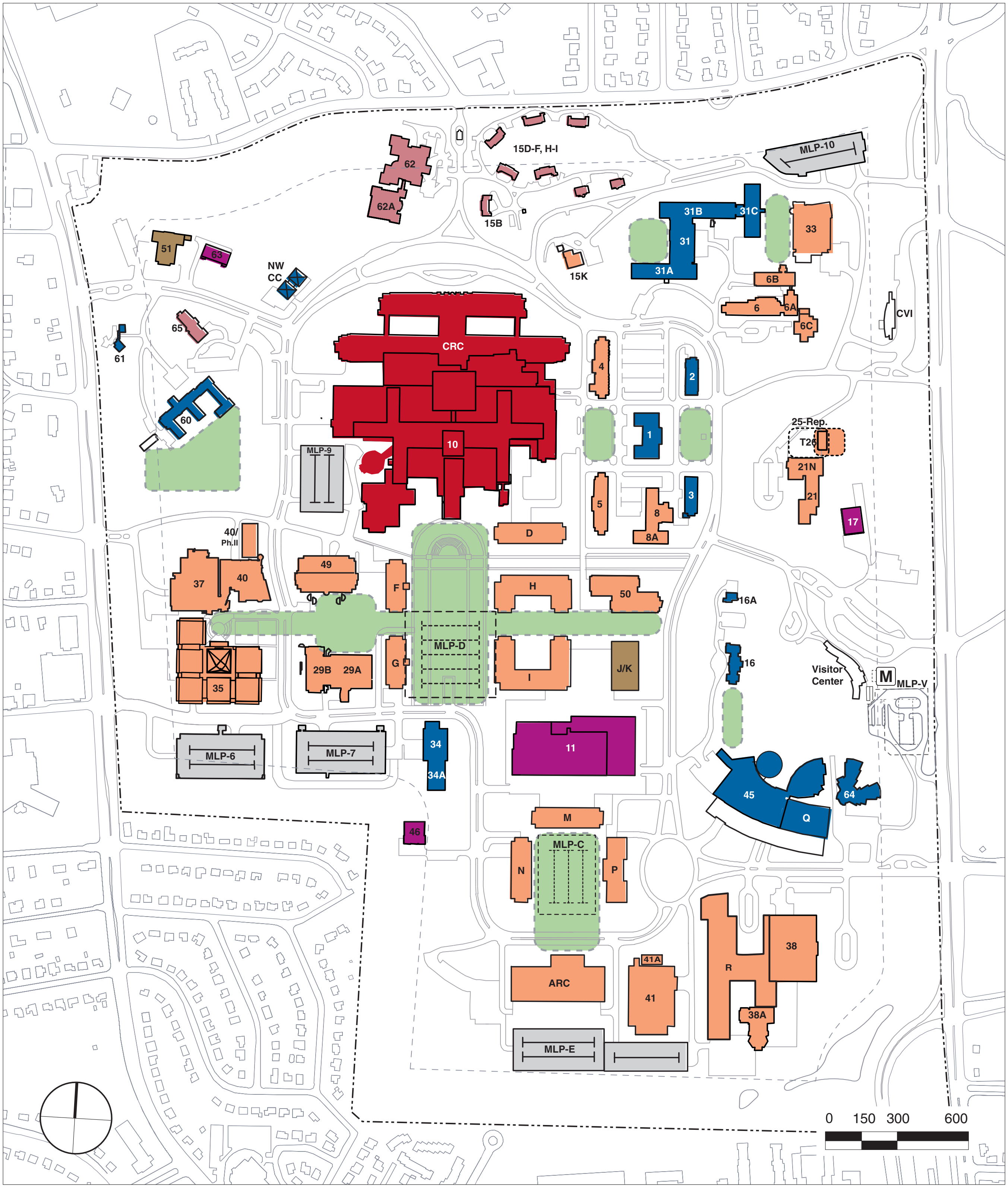

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Bethesda Campus

CLINICAL RESEARCH CENTER

RESEARCH

ADMIN/SPECIAL FUNCTION

SERVICE/SUPPORT

UTILITIES

RESIDENTIAL/SPECIAL FUNCTION

MULTI-LEVEL PARKING

DEFINED OPEN SPACE

Figure 5.2.3-b

Building Use

NIH / ORF / DFP

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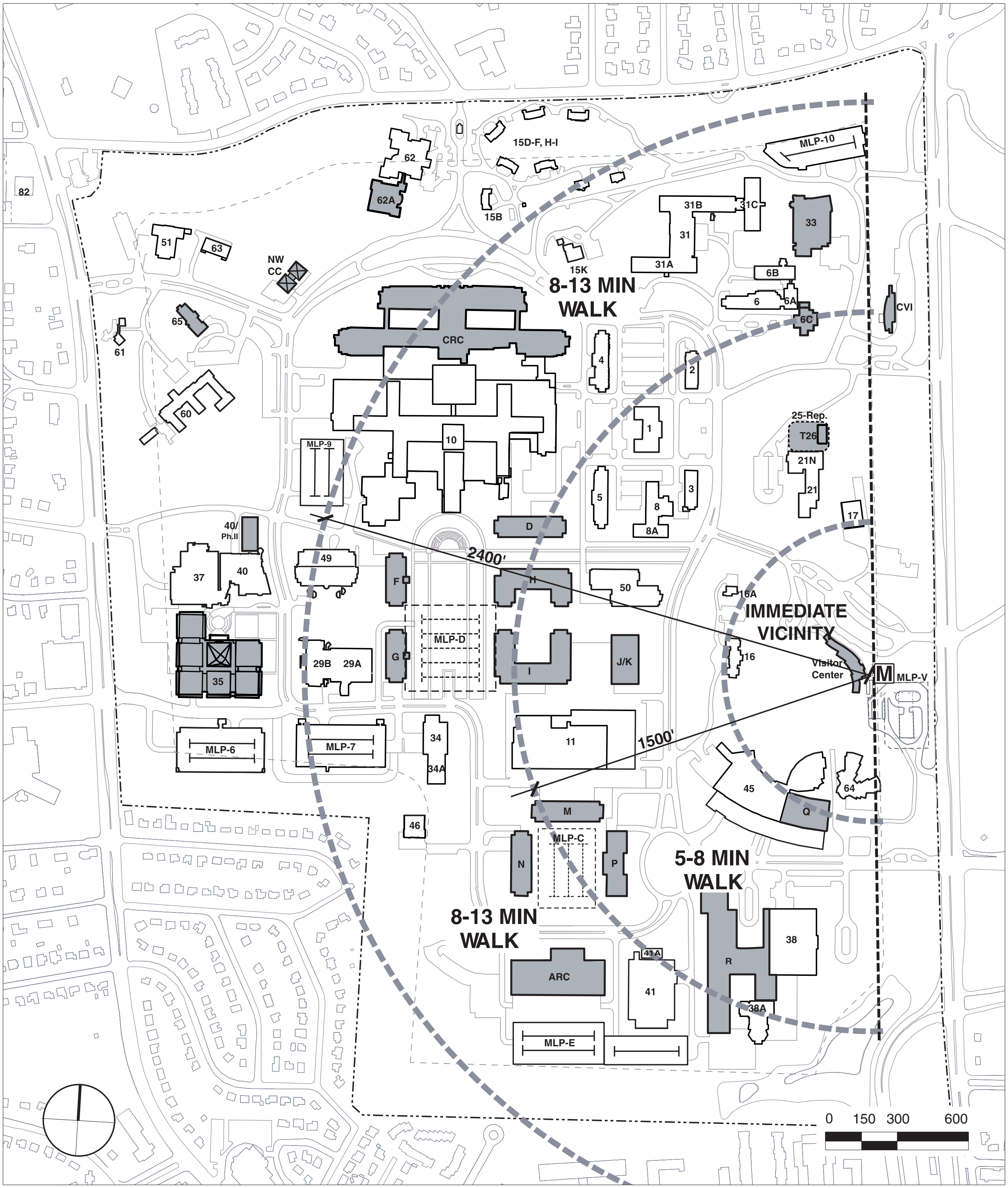

PROPOSED DEVELOPMENT SITES

Figure 5.2.3-c

Development Sites

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Bethesda Campus

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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

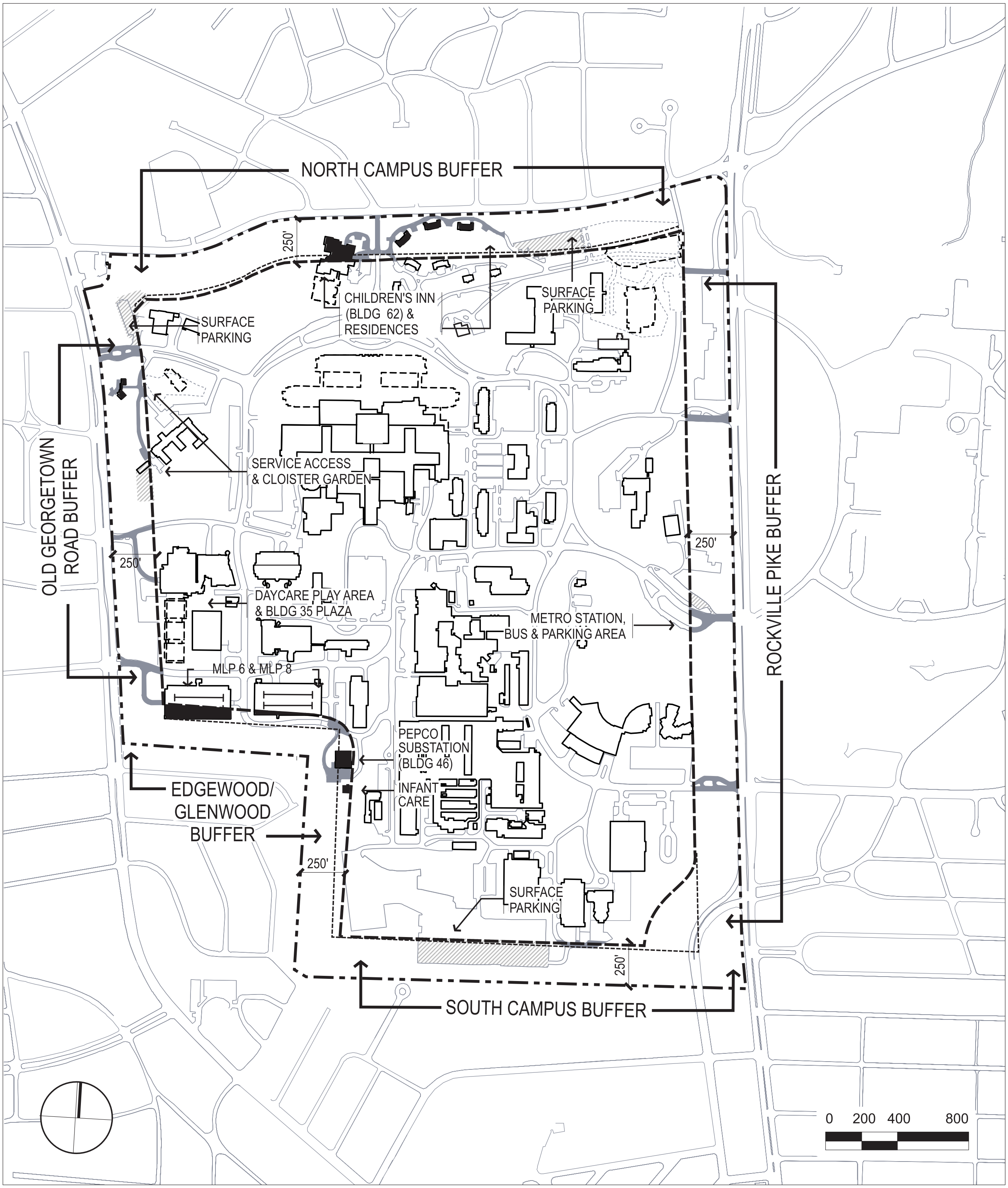
- Landscape and lawns to remain allowing views to campus
- Light recreational activity to be allowed (*)
- Bikeways and walkways to be allowed along length of buffer outside campus perimeter fence (*)
- Stream and stormwater management areas to be allowed
- Metro easement and transit node activities 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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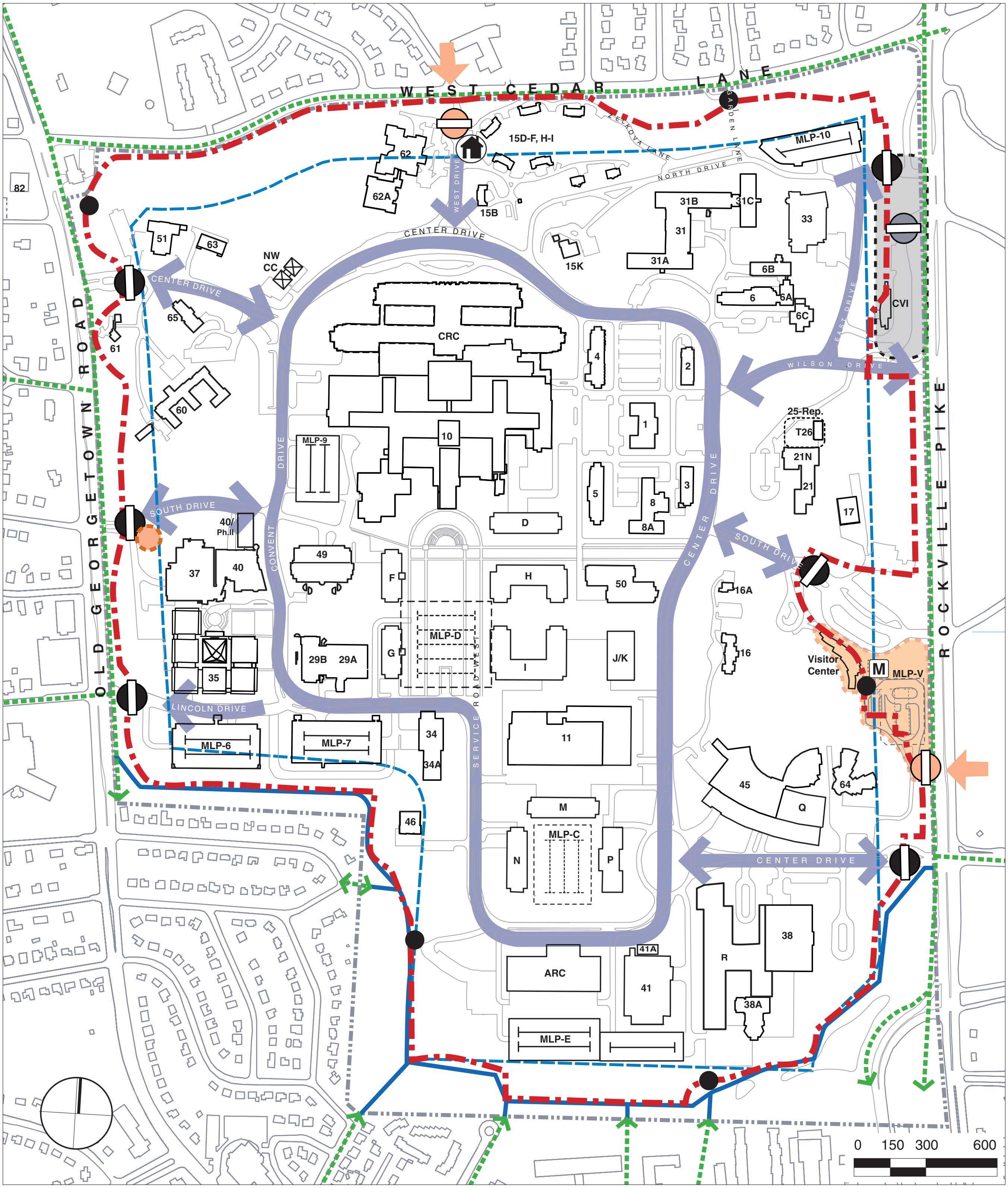
Bethesda Campus

- 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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Bethesda Campus

- 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

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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.

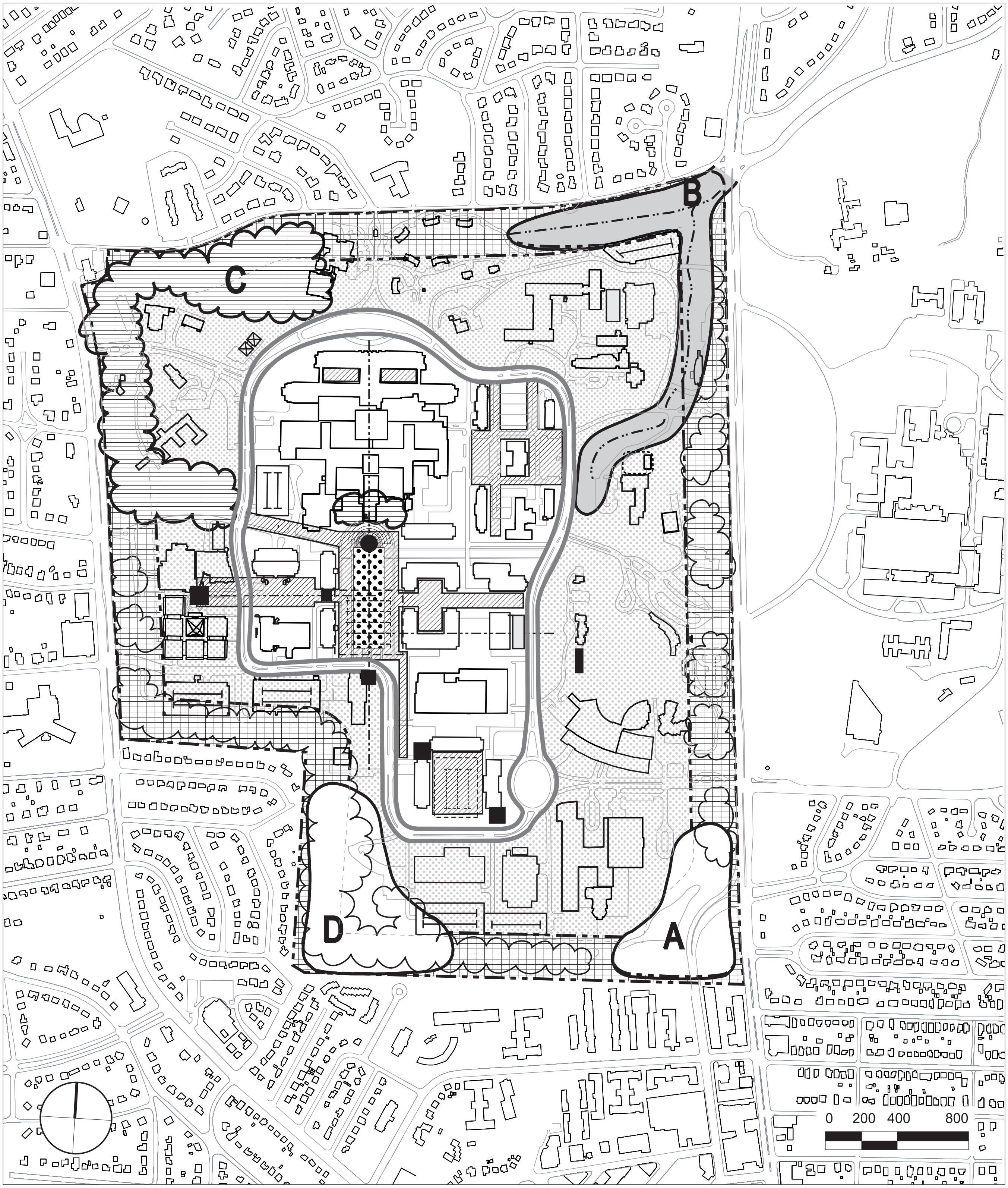
Hierarchy of Open Space

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
A DISTINTIVE CORNERS	
STREAM VALLEY WOODS	

Figure 5.2.5

Landscape Concepts

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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.

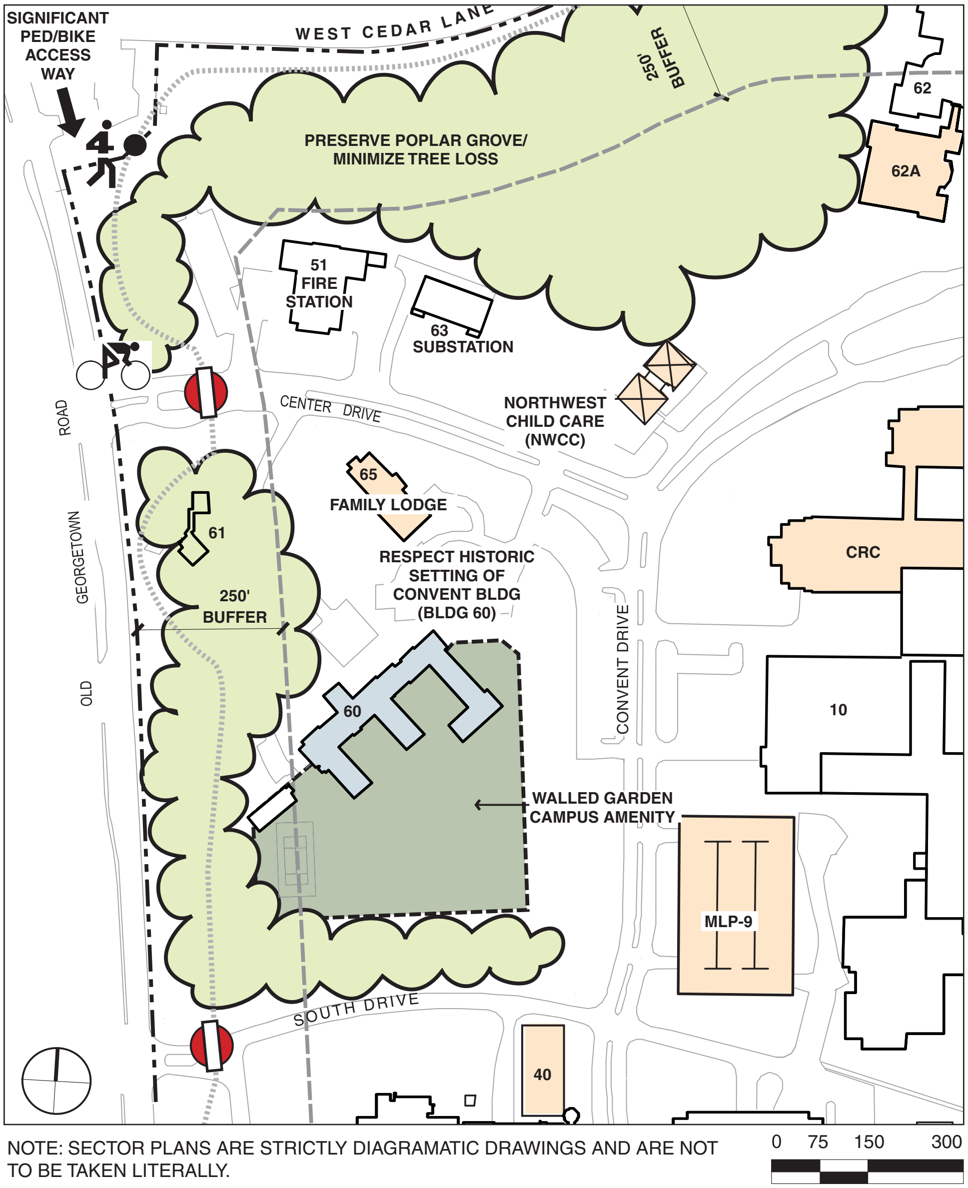
Plant material selection criteria will also provide educational or symbolic meaning to the landscape. One such concept for the NIH campus is the use of plants to dramatize and acknowledge their medicinal values. Water has also played a significant role in the healing and caring of mankind. The name Bethesda 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

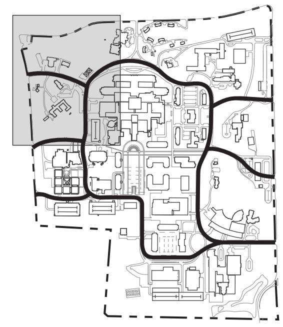
To illustrate detailed elements of the Master Plan, the campus has been divided into ten sectors. Although each sector is primarily defined by a building group or an open space, there may be some overlap and interface between the sectors.

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

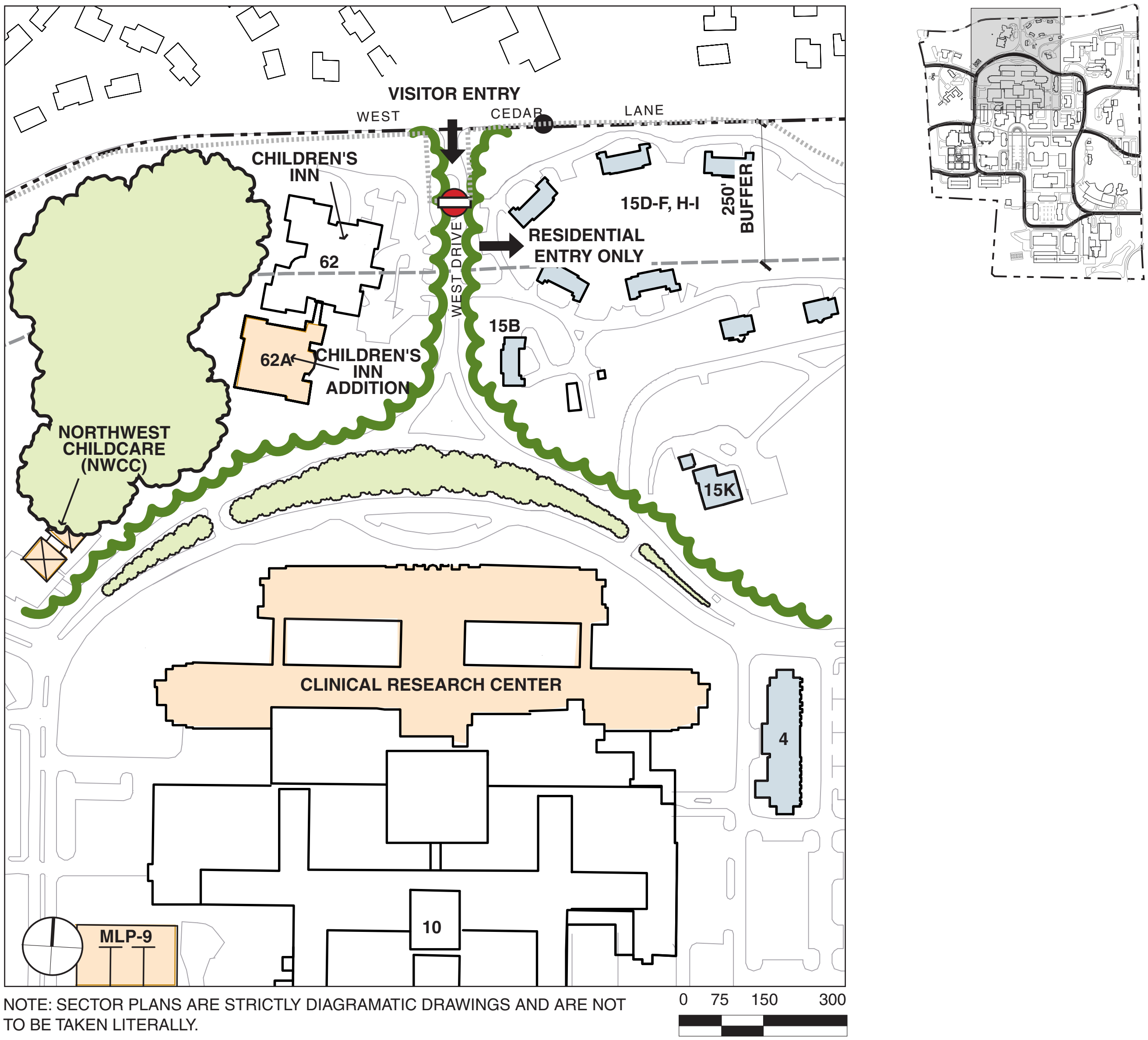
as possible. Structures in this sector should be located to respect the buffers and minimize tree loss.

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 structuresThe 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.

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Bethesda Campus

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

Figure 5.2.6-b

Residential Sector

Building 31 / Stream Sector

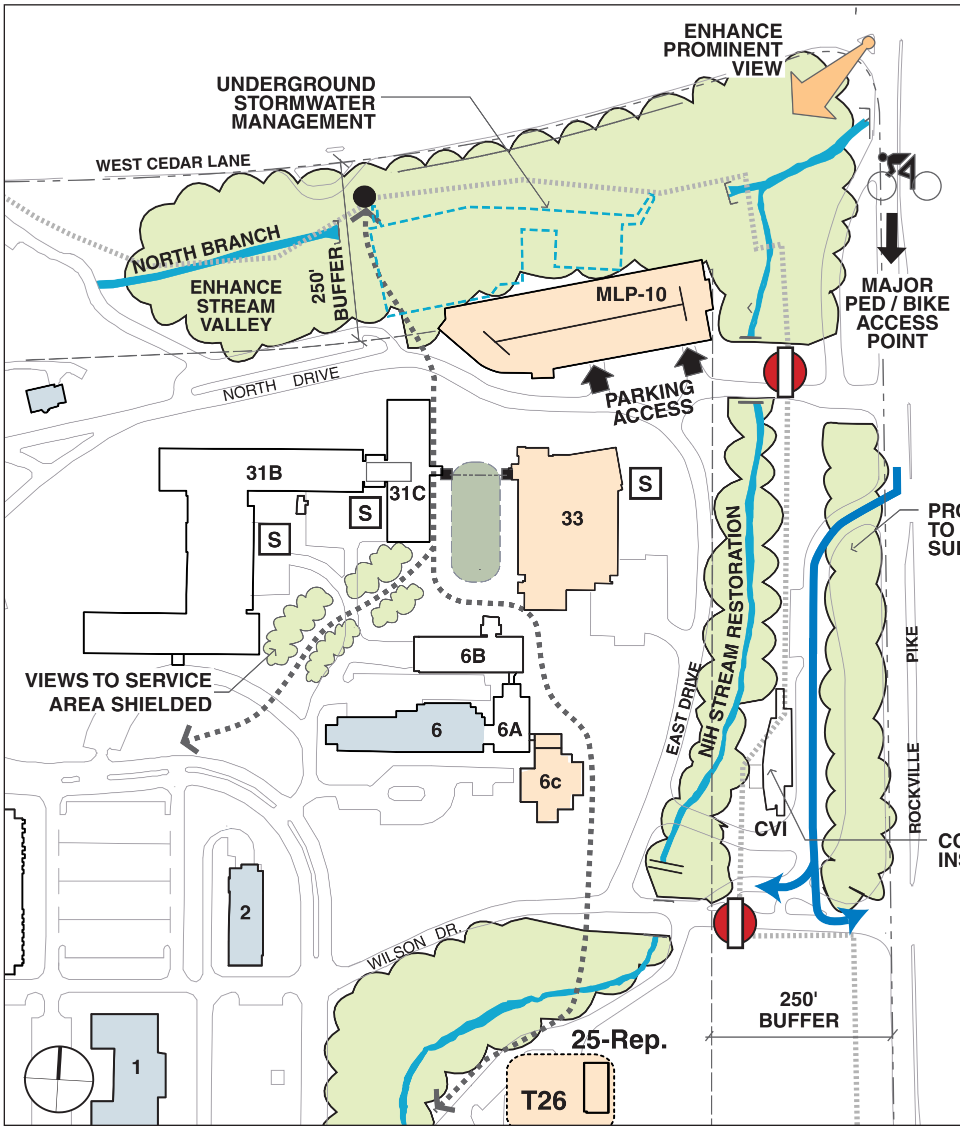
The sector includes the general office Building 31 complex, the Building 6 research complex, and the open area at the northeast corner of the site. A new research Building 33 and Multi-Level Parking 10 (MLP-10), with space for approximately 1,262 cars are now under construction. The new research building 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.

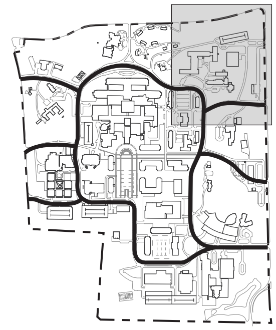
To connect the parking structure and new development to the rest of the campus, pedestrian paths are proposed to the north and south of the Building 6 complex, with views into service areas shielded where possible. A new road (extension of North Drive) north of Building 31 connecting Building33 and MLP 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





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

0 75 150 300

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

Figure 5.2.6-c

Building 31/ Stream Sector

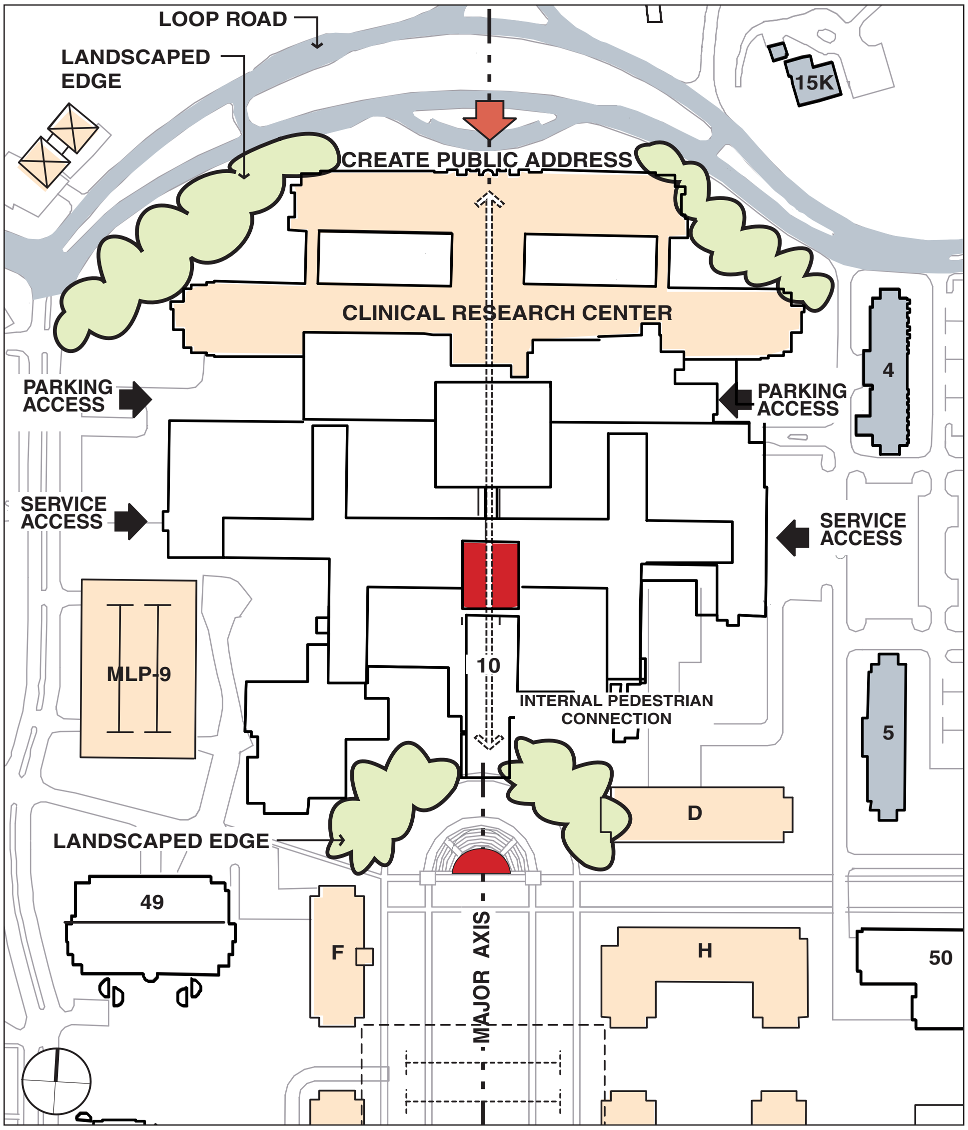
Clinical Center Sector

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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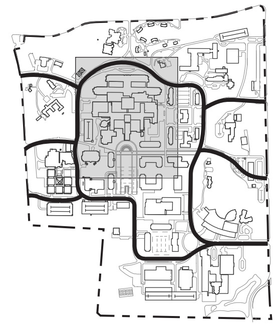

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	PROPOSED
	FOCAL POINT
	HISTORIC PROPERTY

Figure 5.2.6-e

Clinical Center Sector

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Oudens & Knoop, Architects, P.C.

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Historic Core Sector

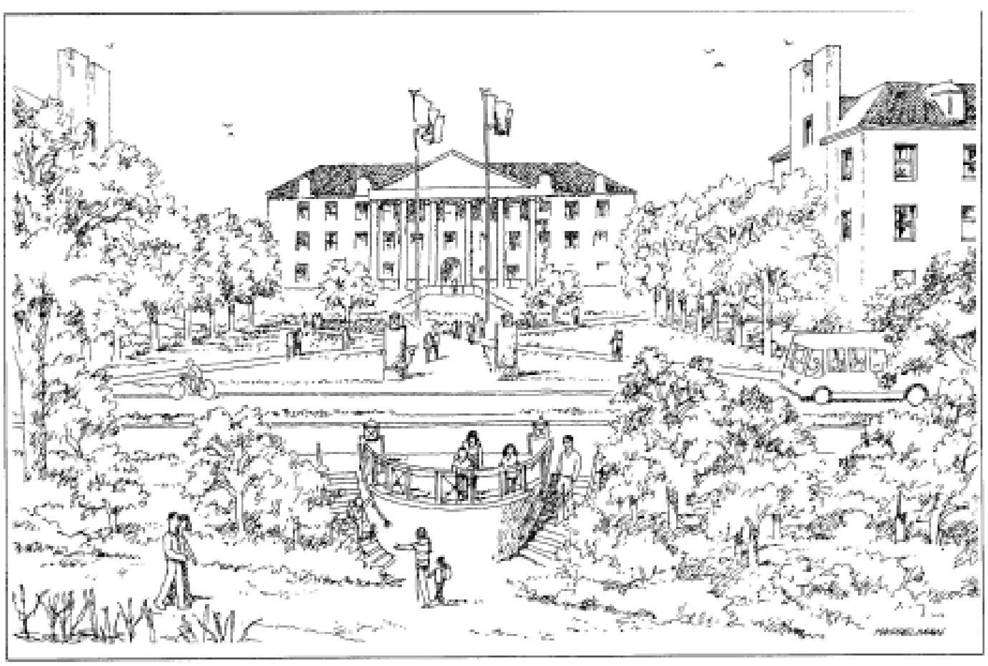
The Historic Core Sector is defined as the area of the early campus structures (Buildings 1 through 5) and the existing radiation safety/waste handling Building 21 site to the east. The goals for this area are to enhance the historic setting of Buildings 1, 2, 3, 4 and 5, and to enhance the NIH Stream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

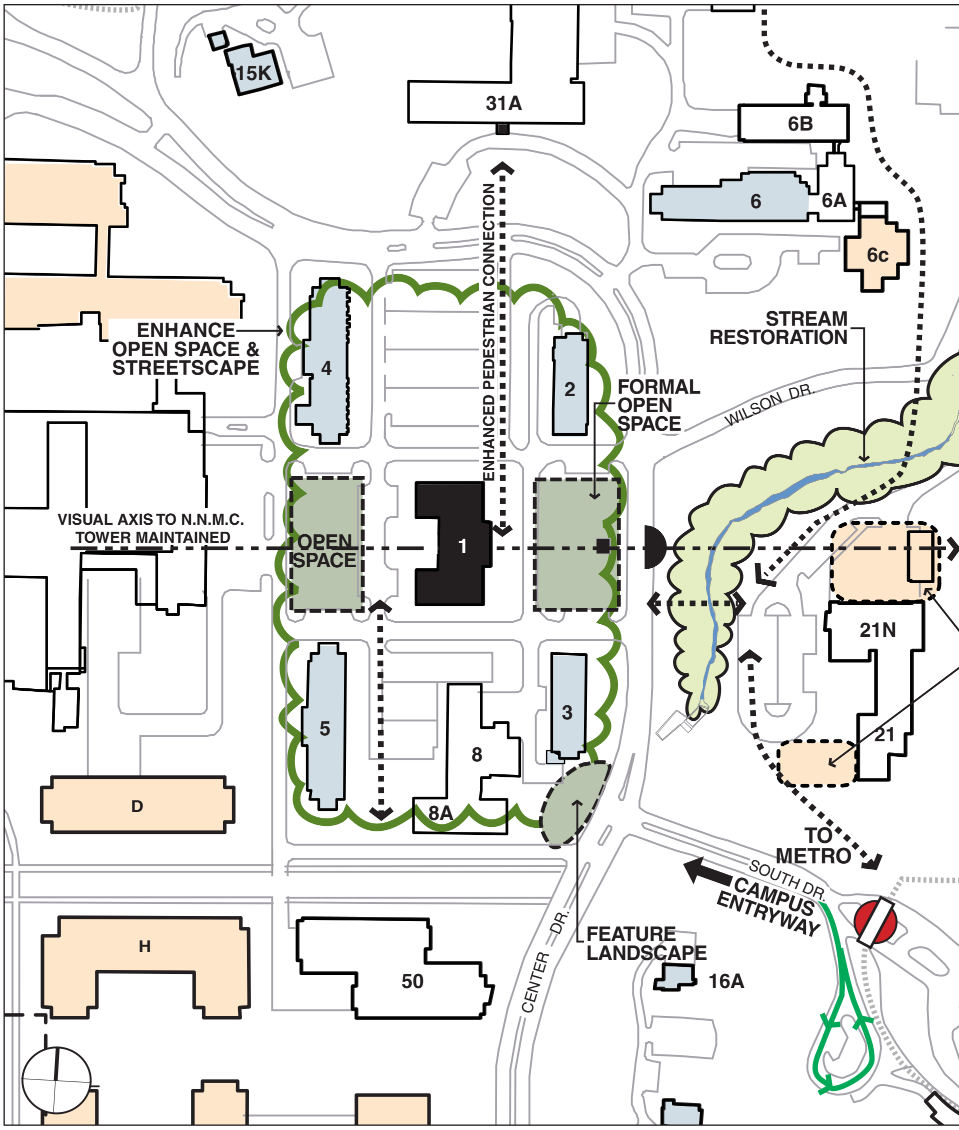
As part of the enhancement of the Historic Core, the Master Plan proposes that some of the surface parking in this area be removed when possible, including the removal of parking directly in front of Building 1. This will allow landscaped open spaces to surround and highlight Building 1, which is the 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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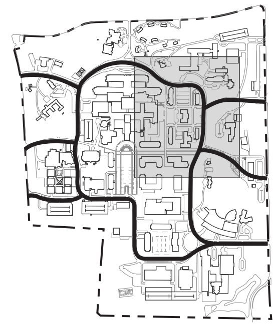

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Bethesda Campus

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

Figure 5.2.6-f

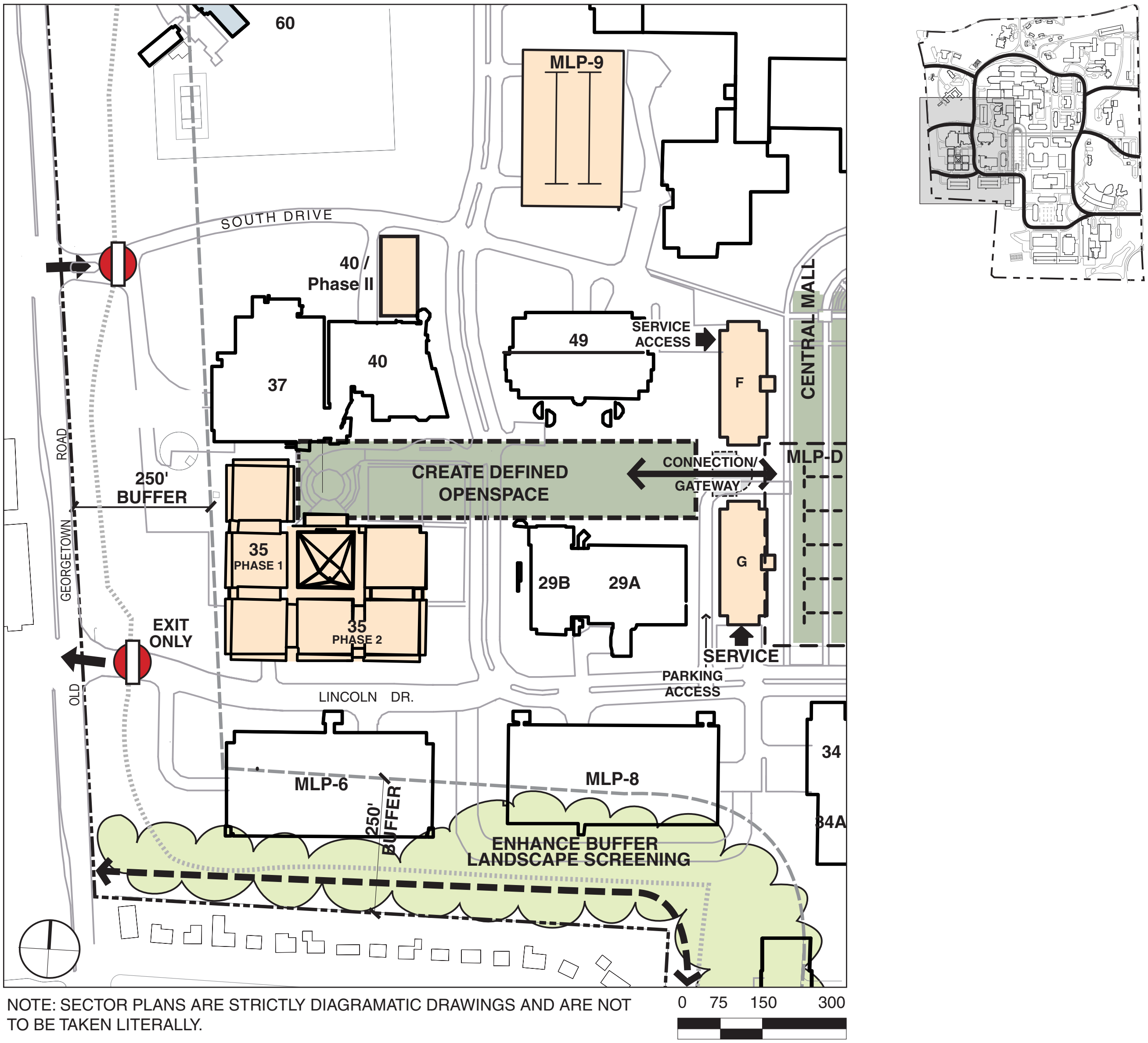
Historic Core Sector

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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NIH Master Plan 2003 Update

Bethesda Campus

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

Figure 5.2.6-h

West Quad Sector

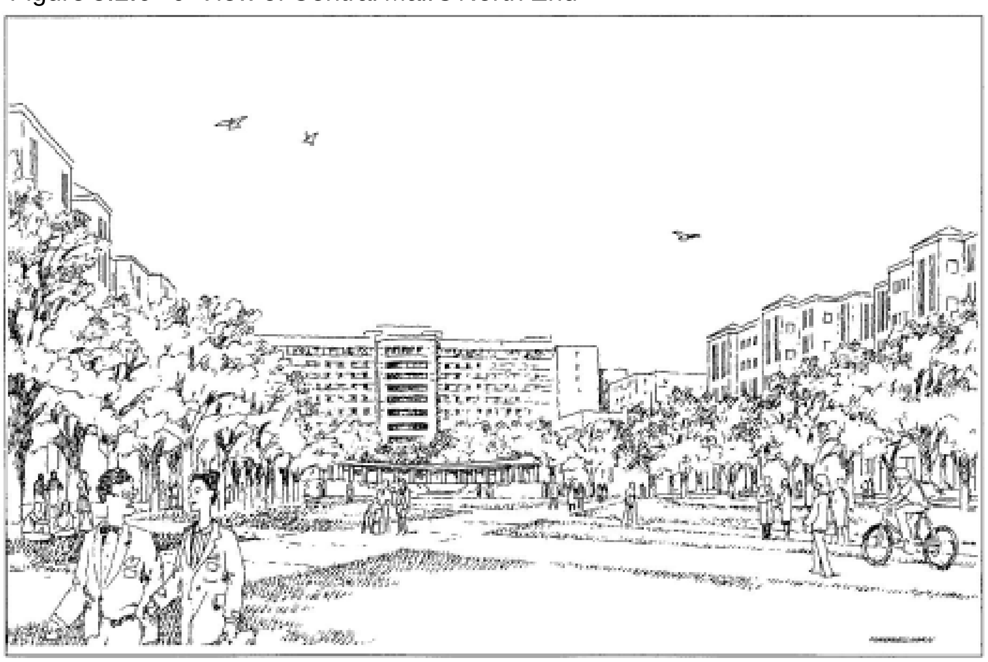
Central Mall Sector

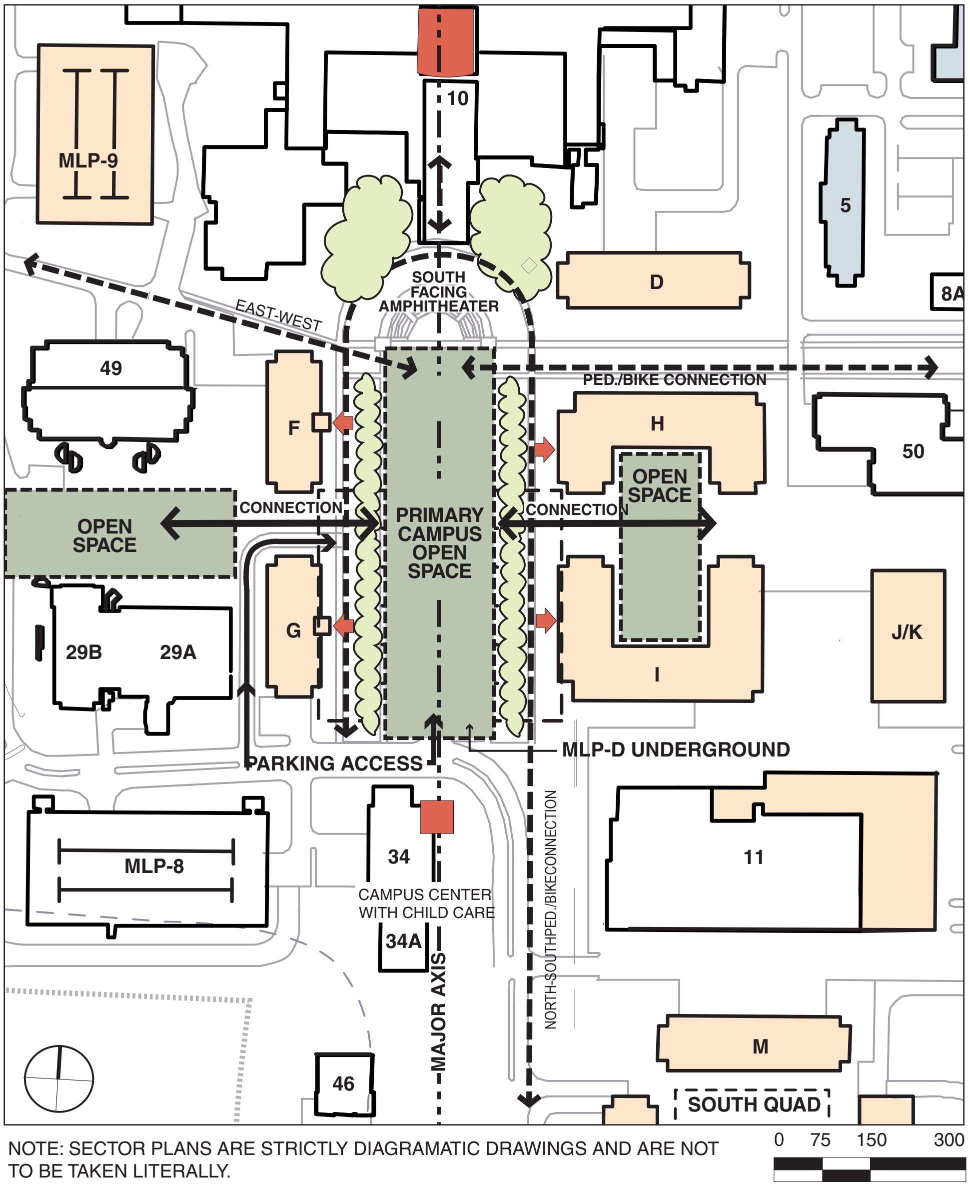
The Central Mall is intended as the primary outdoor “room” and symbolic heart of the campus. It will be the primary space on campus for interaction and collegiality (a goal of the Master Plan) because of its central location and proximity to the Clinical Center Complex. The Master Plan envisions the 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.

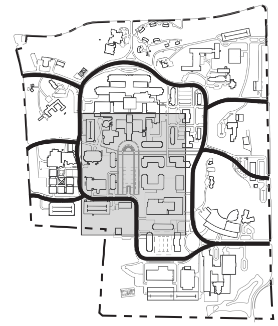
Functionally, the central Mall helps organize pedestrian movement through the center of campus, creating clearly defined north-south and east-west paths across campus. Spatially, the Central Mall provides an open area, which allows the connection of the other campus spaces, such as the West Quad, to 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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NIH Master Plan 2003 Update

Bethesda Campus

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

Figure 5.2.6-i

Central Mall Sector

East Quad Sector

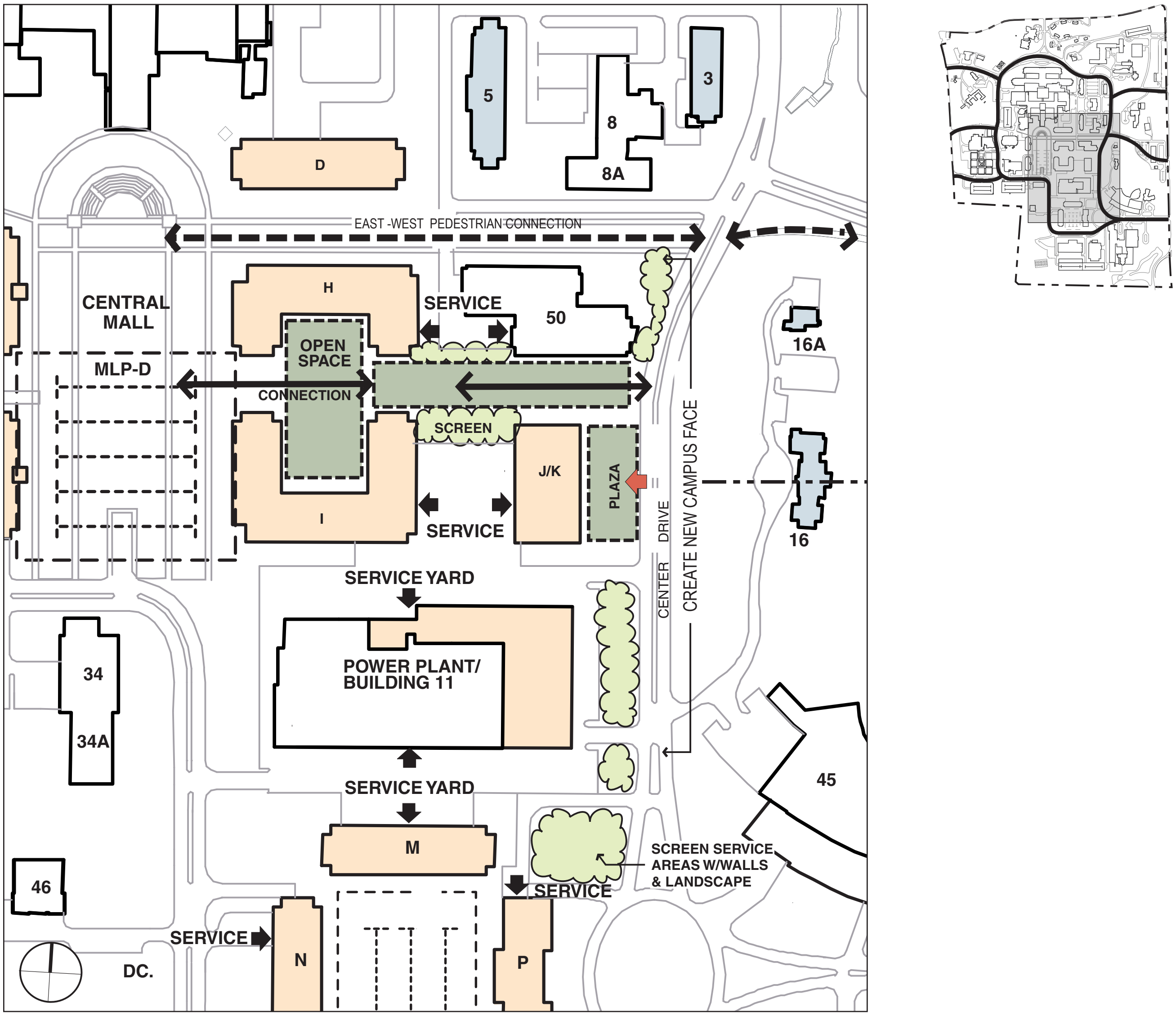
To make more efficient use of a central site near the Clinical Center Complex in close proximity to the Metro station, the Master Plan proposes the redevelopment of the existing support and computer services Building 12/13 site for more intense and higher scaled laboratory uses. Buildings H and I, which 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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0 75 150 300

NIH Master Plan 2003 Update
Bethesda Campus

PROPOSED

HISTORIC PROPERTY

Figure 5.2.6-k

East Quad Sector

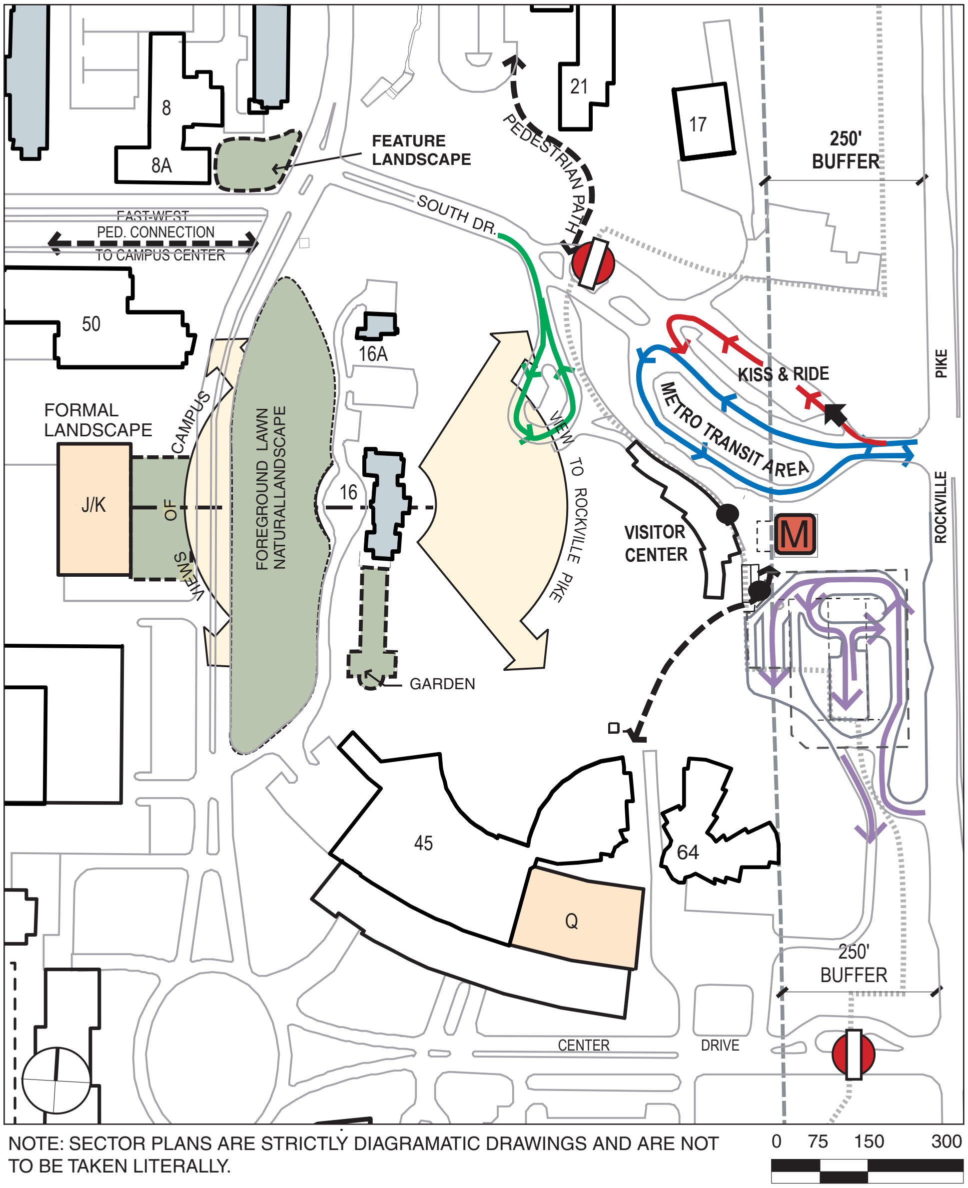
Stone House/Metro Sector

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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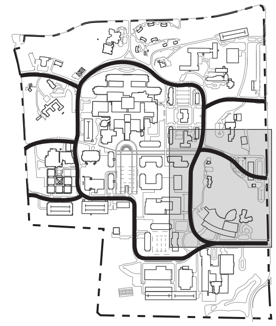

PROPOSED
FENCELINE
VISITOR PEDESTRIAN PATH
KISS & RIDE ROUTE
METRO BUS / RIDEON ROUTE
NIH SHUTTLE ROUTE
VISITOR ROUTE
VISITOR PARKING
CONTROLLED ACCESS GATE
PEDESTRIAN CONTROLLED ACCESS
VISITOR ACCESS
HISTORIC PROPERTY

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Figure 5.2.6-m

Stone House/ Metro Sector

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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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.

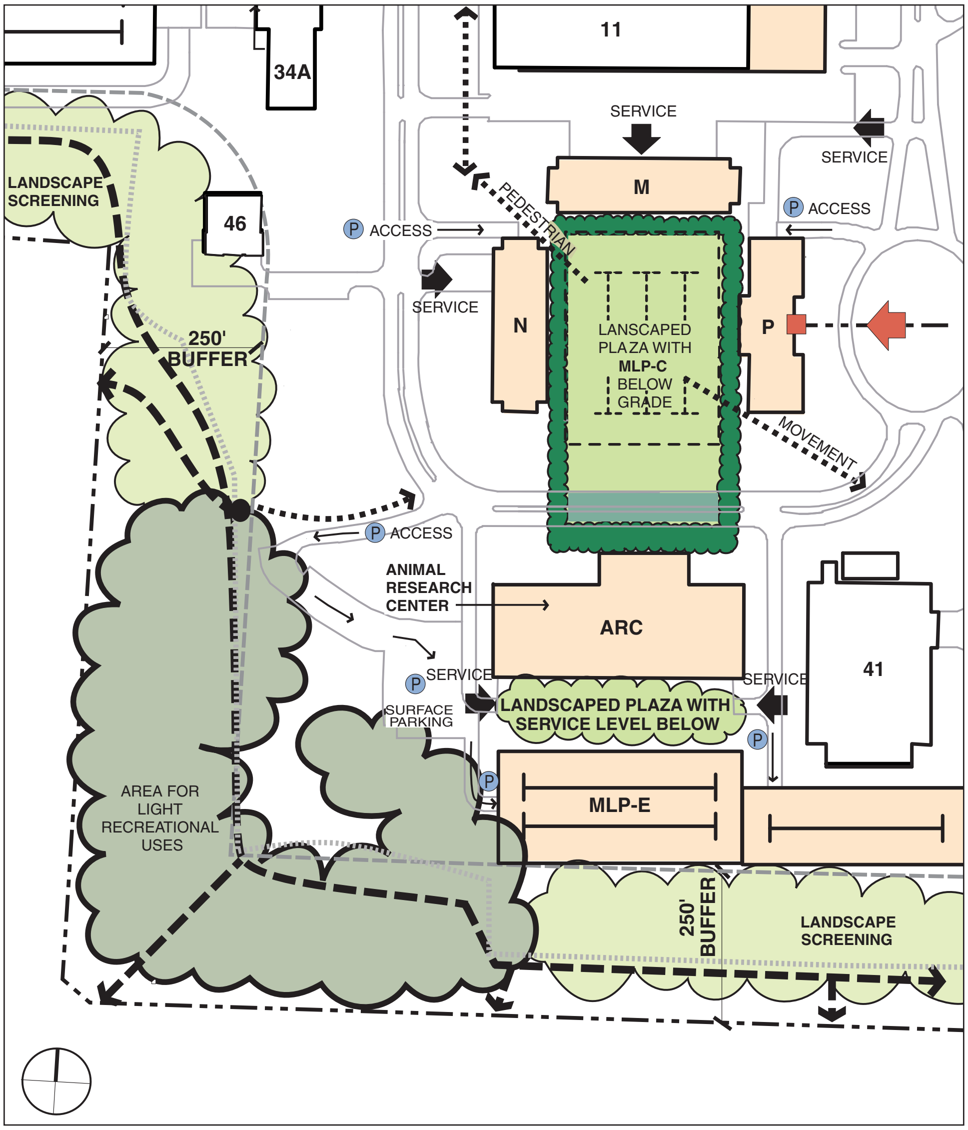
Development proposed for this sector includes the replacement of the animal facility at the south end of the South Quad contiguous to research Building 41 in a new Animal Research Center (42/ARC) mid-rise structure. This location reduces the apparent height of the proposed structure by taking advantage 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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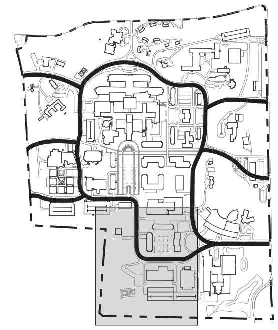

PROPOSED

FENCELINE

PEDESTRIAN CONTROLLED ACCESS

PEDESTRIAN PATH

PARKING

NIH Master Plan 2003 Update
Bethesda Campus

Figure 5.2.6-n

South Quad Sector

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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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.

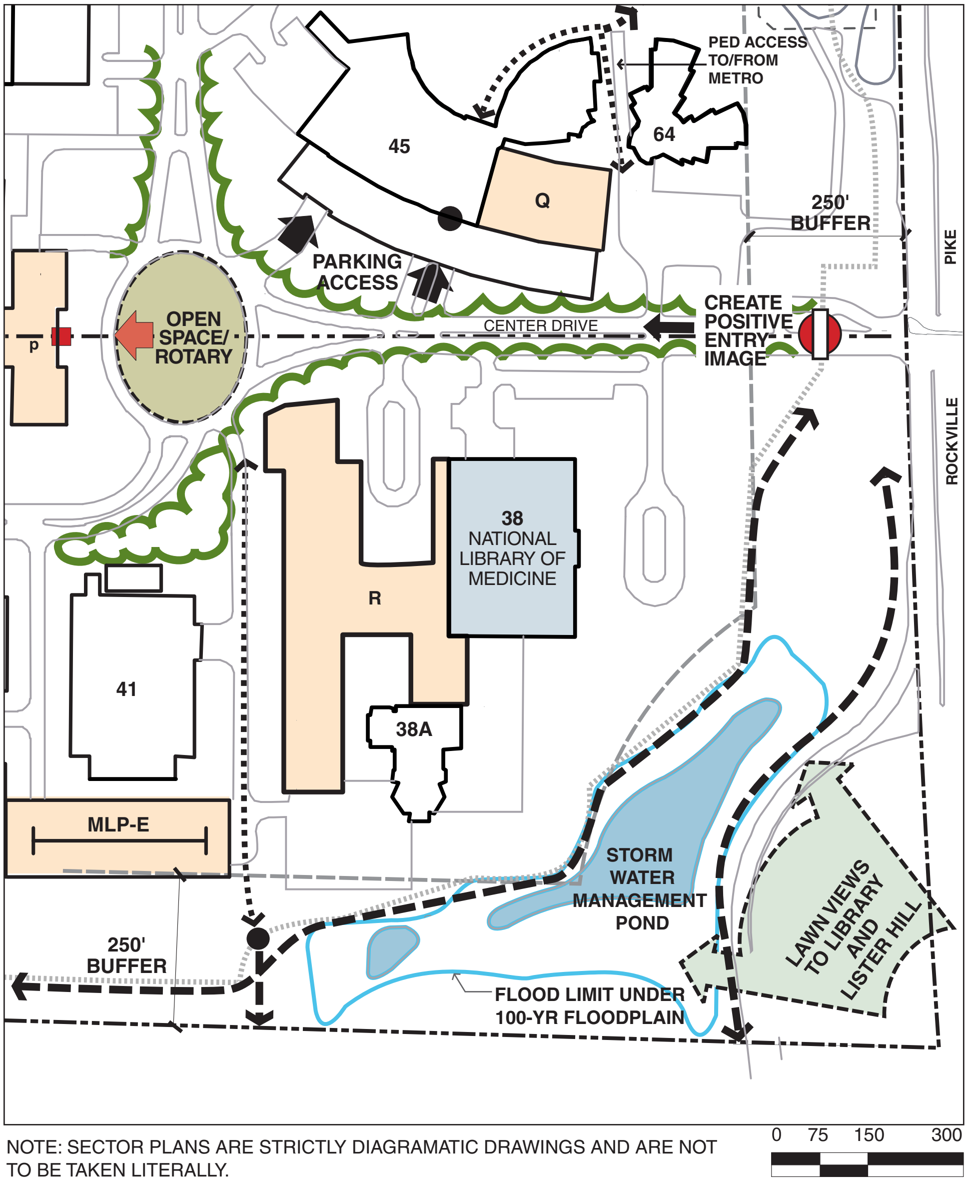
New research Building P is proposed as the axial termination of the Center Drive entry and forms the east edge of the South Quad open space. The architectural design and functional use of this building should be of significance commensurate with its prime location. The Addition to the National Library 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.

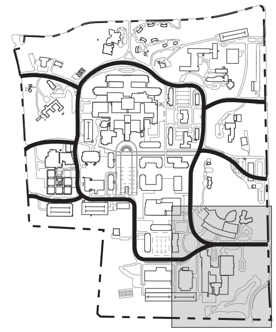
The Center Drive entry at Rockville Pike currently has the highest volume of entering and exiting traffic of any entry on campus. In the future, traffic projections indicate that the use of this intersection will increase with additional employees using this entry to travel north into the campus and 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 signalizing 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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Bethesda Campus

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

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.

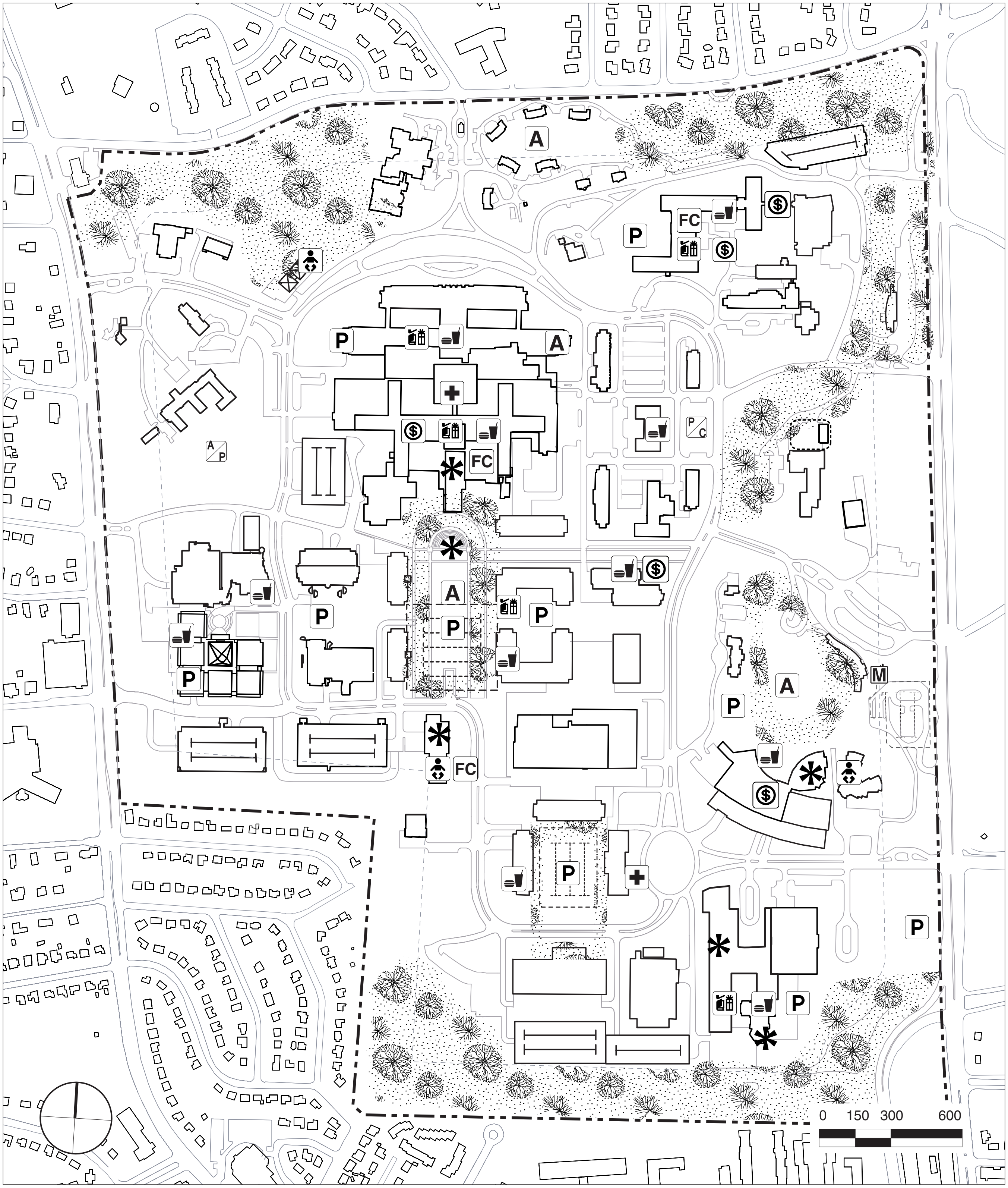
At the south end of the Central Mall, the Master Plan shows a new Campus Center in renovated Building 34/34A, which would be analogous to a university center on a college campus. The Campus Center would house such uses as fitness and recreation space, transit information, employee meeting rooms, dining 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 facilitate 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.



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

NIH Master Plan 2003 Update
Bethesda Campus

Figure 5.2.7

Campus Amenities

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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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

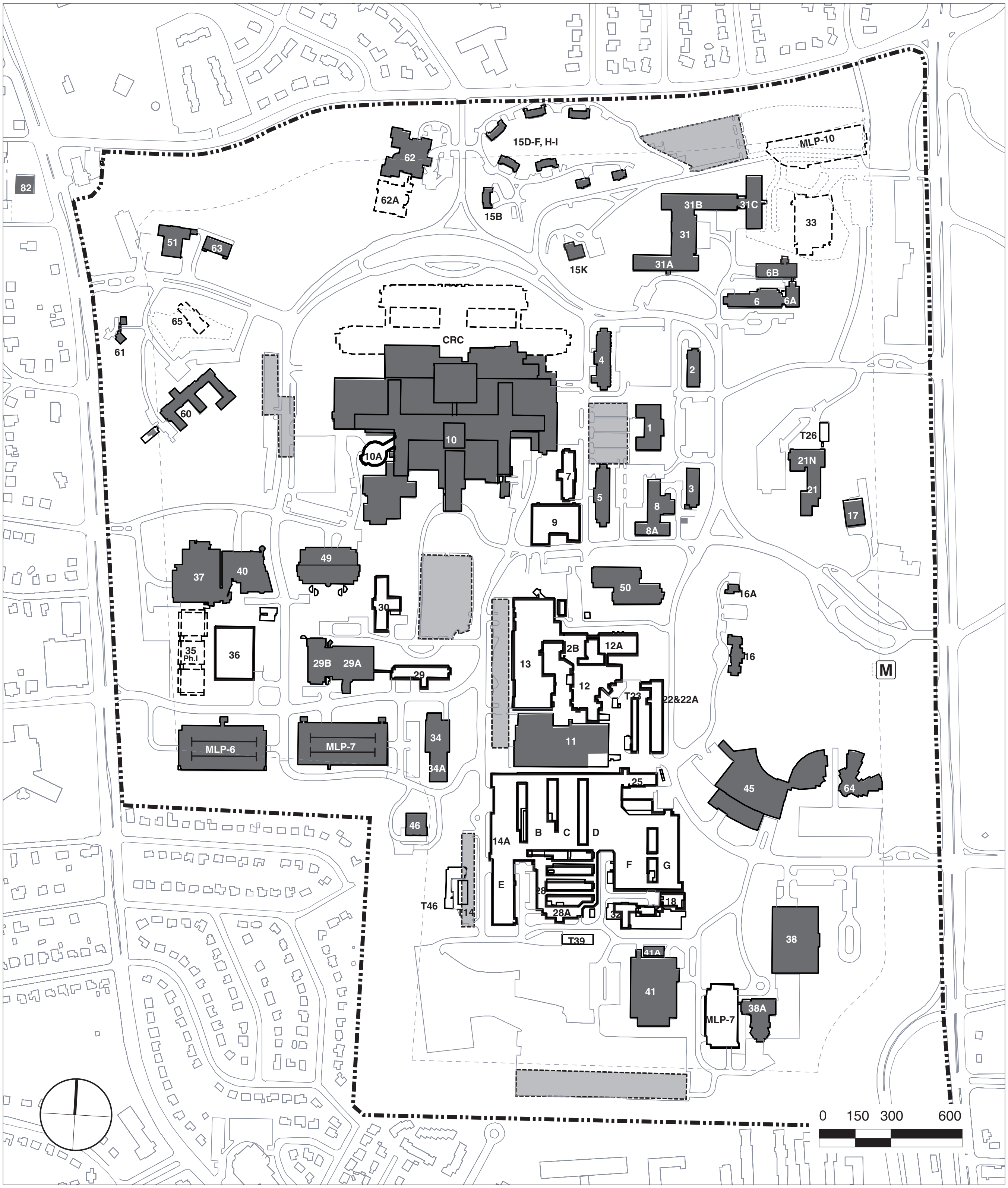
Emergency Vehicle Access

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 Master Plan 2003 Update

Bethesda Campus

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

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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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.

Divisionof 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

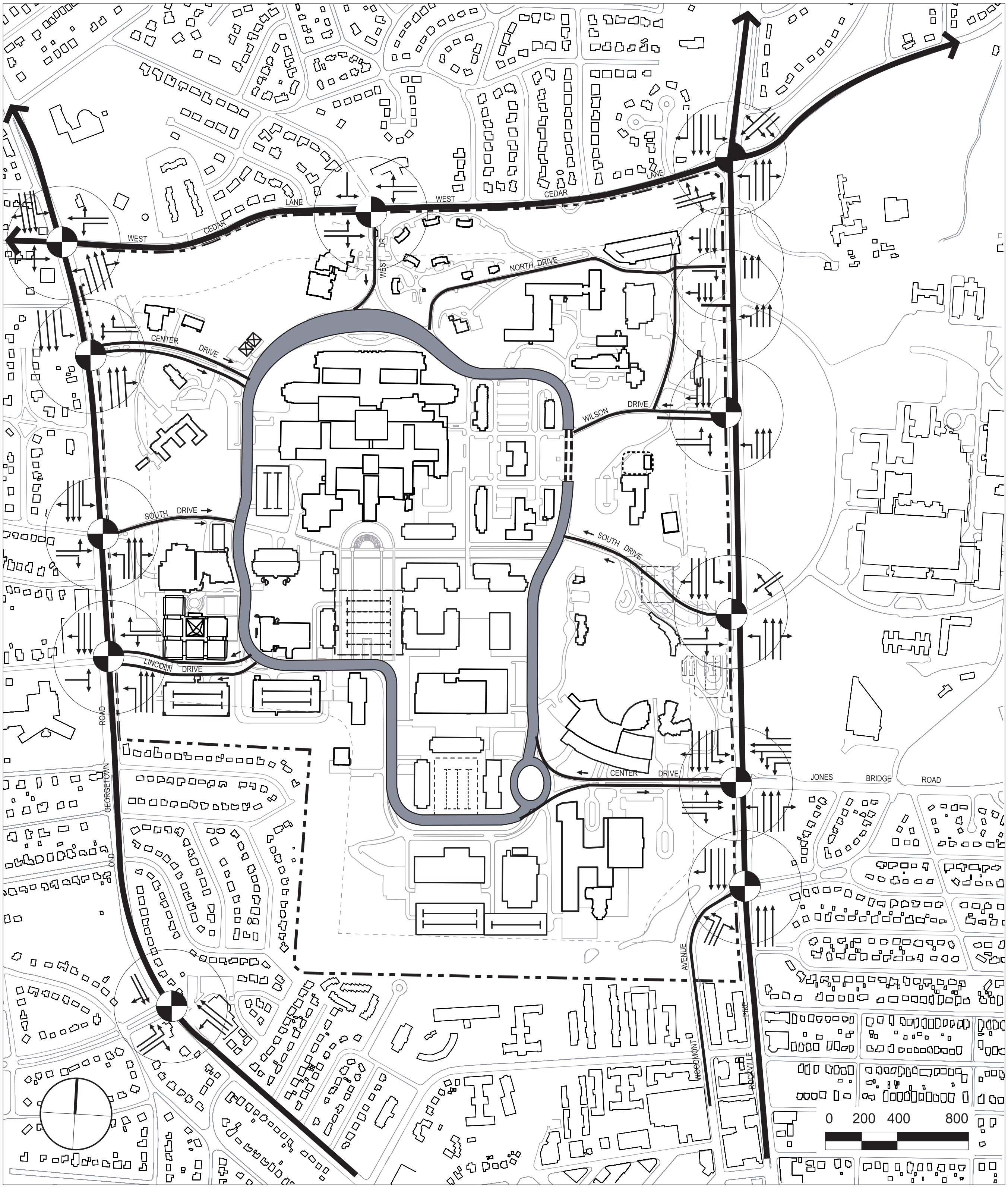
Vehicular access to the Bethesda campus will continue to occur at all of the entrances on Rockville Pike. The South Drive entrance will be used as an NIH employee; the North Drive entrance will be used as an NIH employee; and the Center and Wilson Drive entrances will be used as NIH employee-only entrances. 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.



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

Figure 5.3.4

Roadway Improvements

NIH / ORF / DFP

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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.

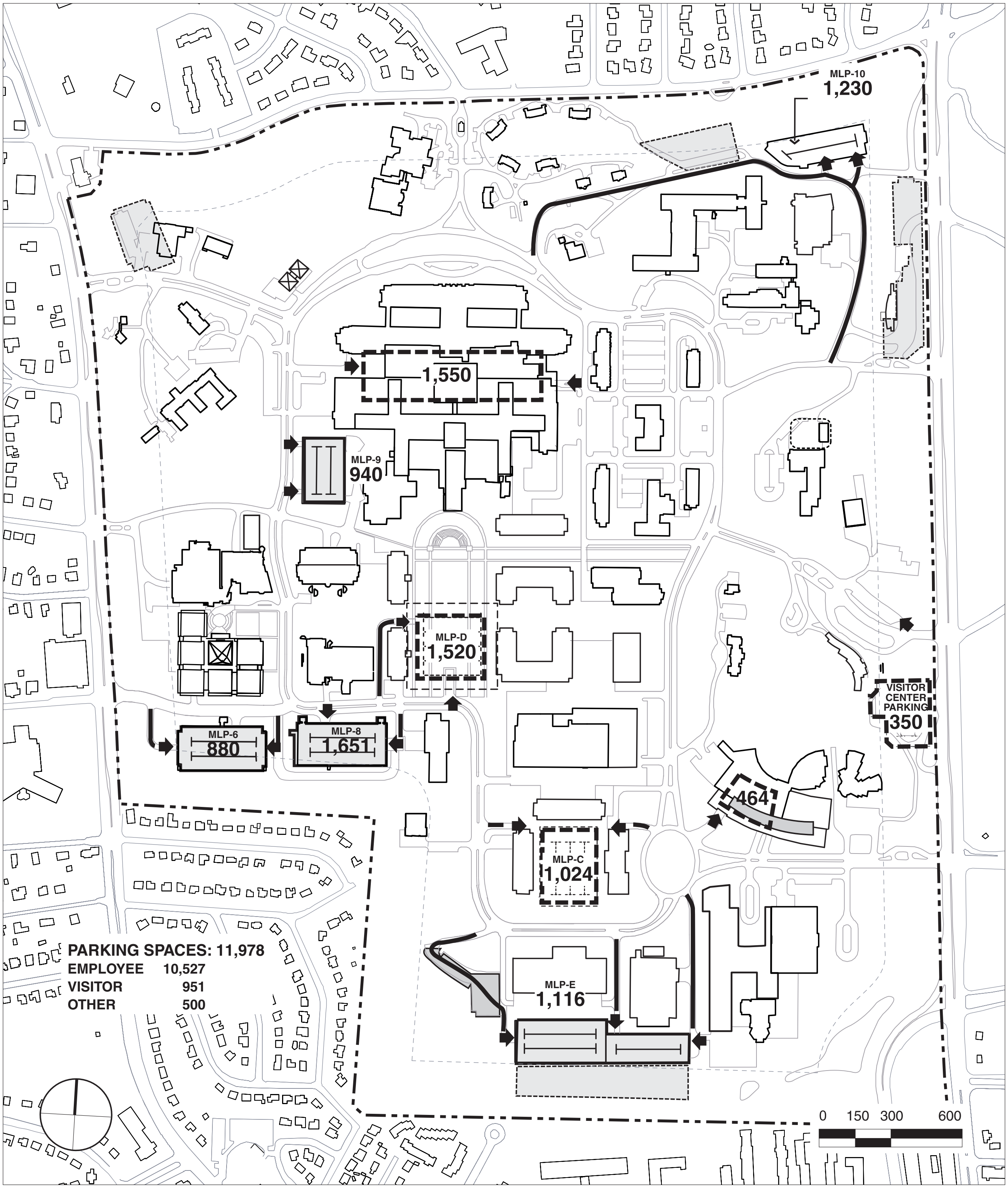
5.3.5 Parking

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.



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PARKING ACCESS

ABOVE GRADE MLP

BELOW GRADE MLP

MAJOR SURFACE PARKING

CURB PARKING ALLOWED

PARKING ZONE

EXISTING SURFACE PARKING TO BE REMOVED

Figure 5.3.5

Proposed Parking Distribution

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.

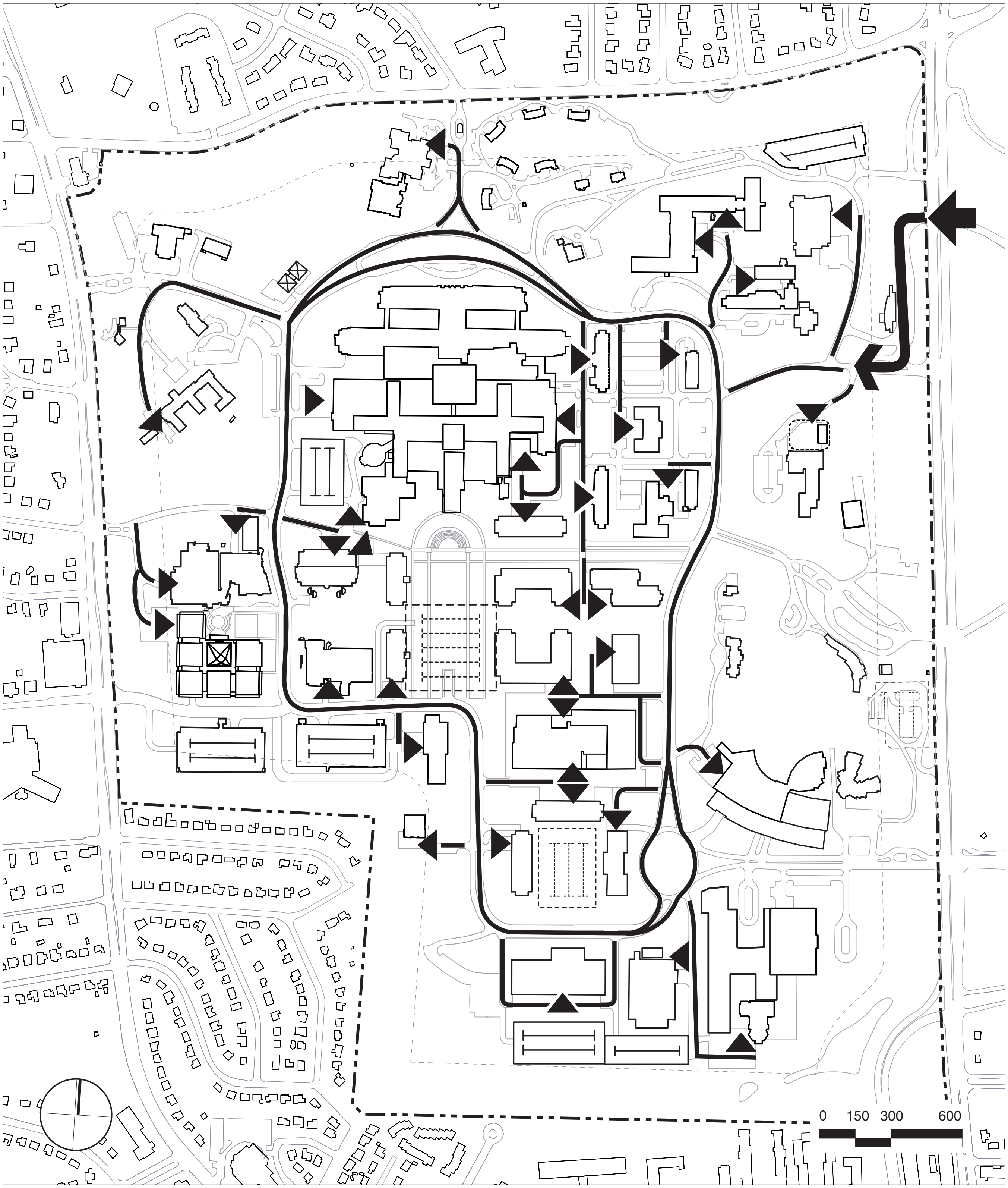
The Master Plan consolidates and simplifies service access on the Bethesda Campus to avoid conflicts with passenger vehicles and minimize the negative visual impacts of multiple service areas. Most existing buildings will continue to have individual service areas. However, most of these will be better 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



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SERVICE AREA
SERVICE ACCESS ROUTE
CAMPUS SERVICE ENTRANCE
VEHICLE INSPECTION ROUTE

Figure 5.3.6

Service Access

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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.

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NIH SHUTTLE LOOP

SHUTTLE STOP

M METRO STATION/TRANSIT NODE

METROBUS & RIDE-ON BUS ROUTES

FENCELINE

Figure 5.3.7

Public Transit

NIH / ORF / DFP

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Pedestrian Paths

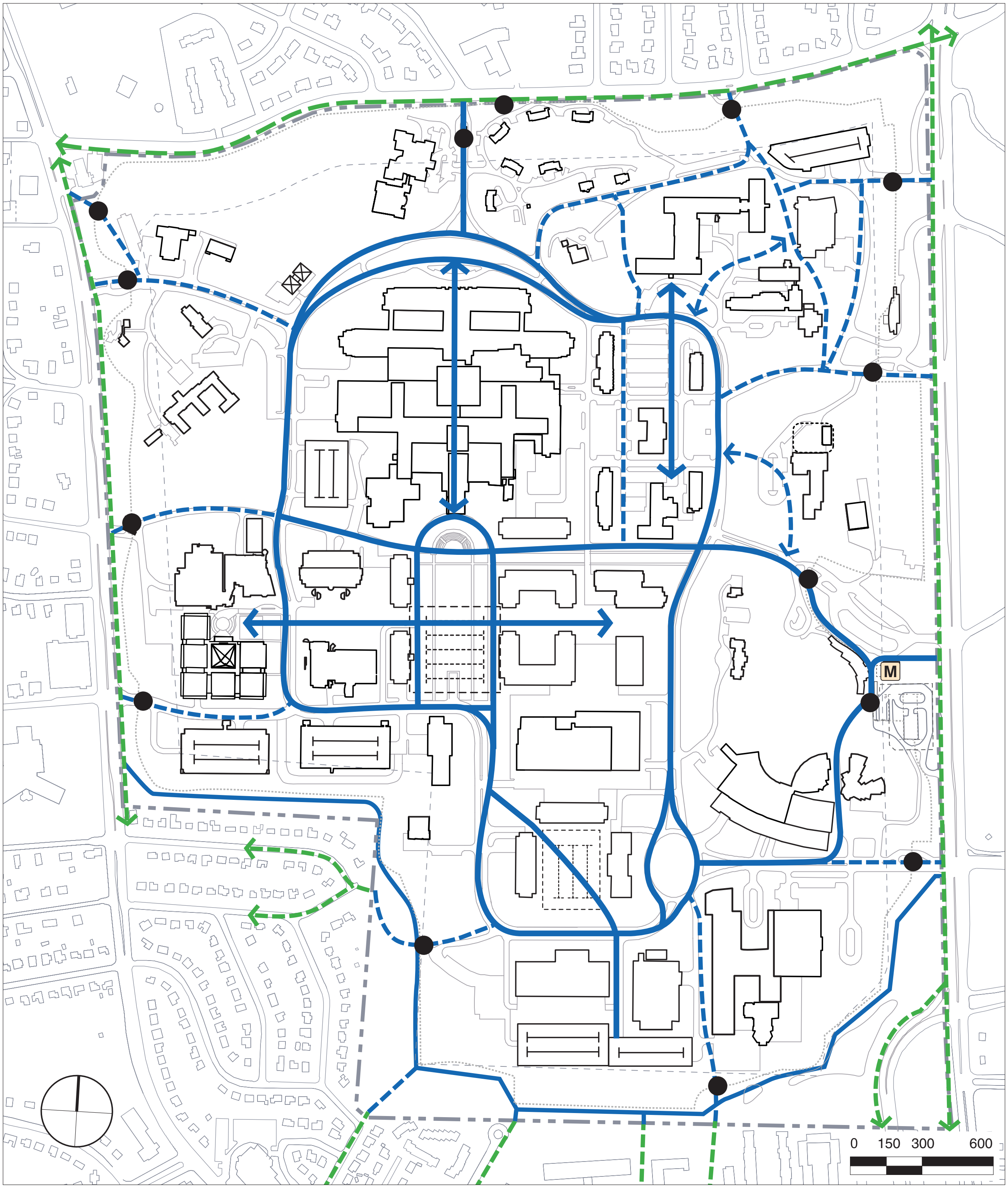
Pedestrian access to the campus will be limited, with the completion of the security fence around the campus perimeter. Pedestrian/bicyclist visitors will only be allowed to enter onto the campus through the NIH Gateway Center for Visitors which is to be located at the Rockville Pike/South Drive entrance 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



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

Figure 5.3.8-a

Pedestrian Circulation

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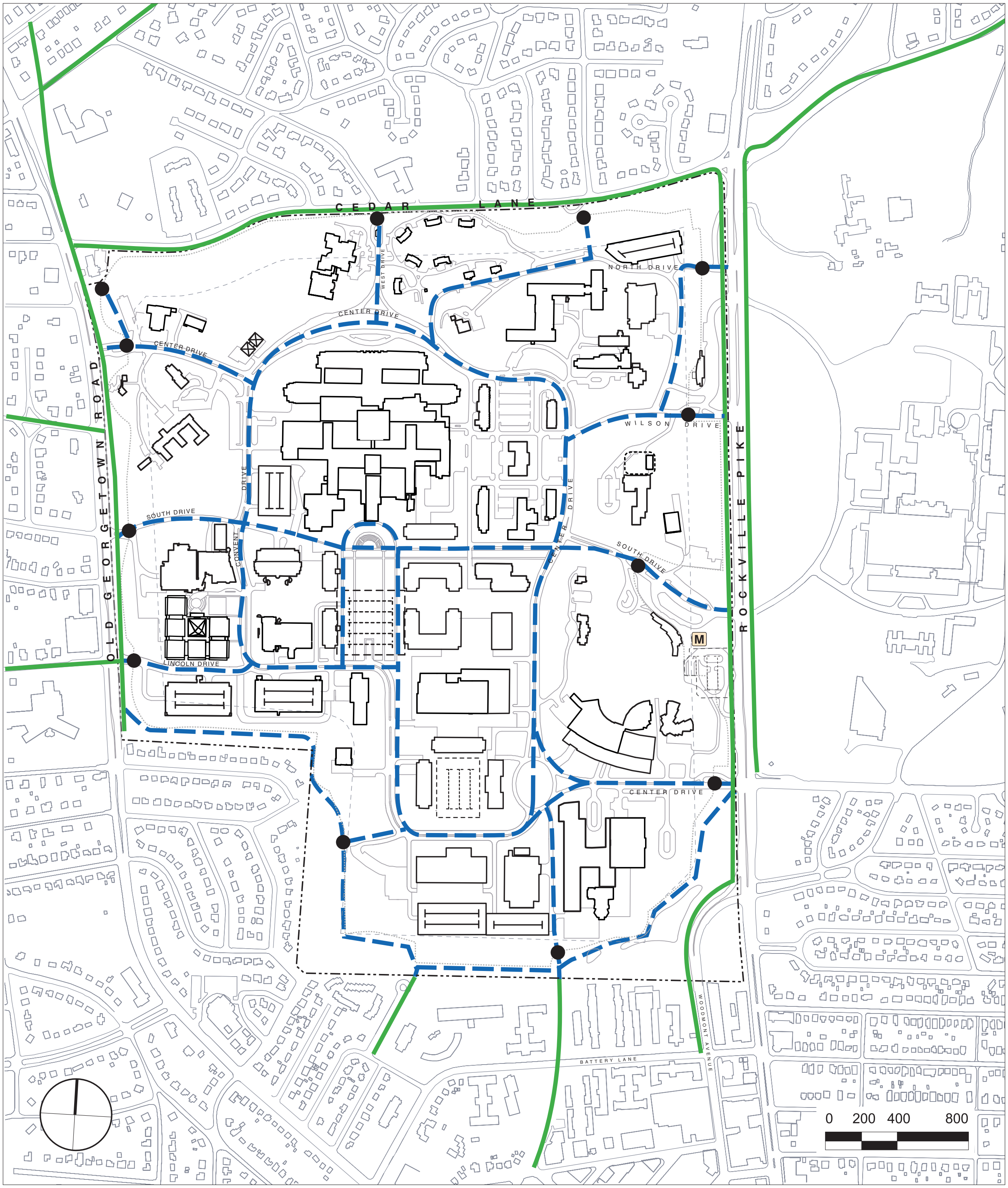
from the alignment shown in the county's 1978 approved bicycle plan, NIH is prepared to consider realigning the path should the county decide to develop its county trail system through the NIH campus.

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.



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

Figure 5.3.8-b

Bicycle Circulation

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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

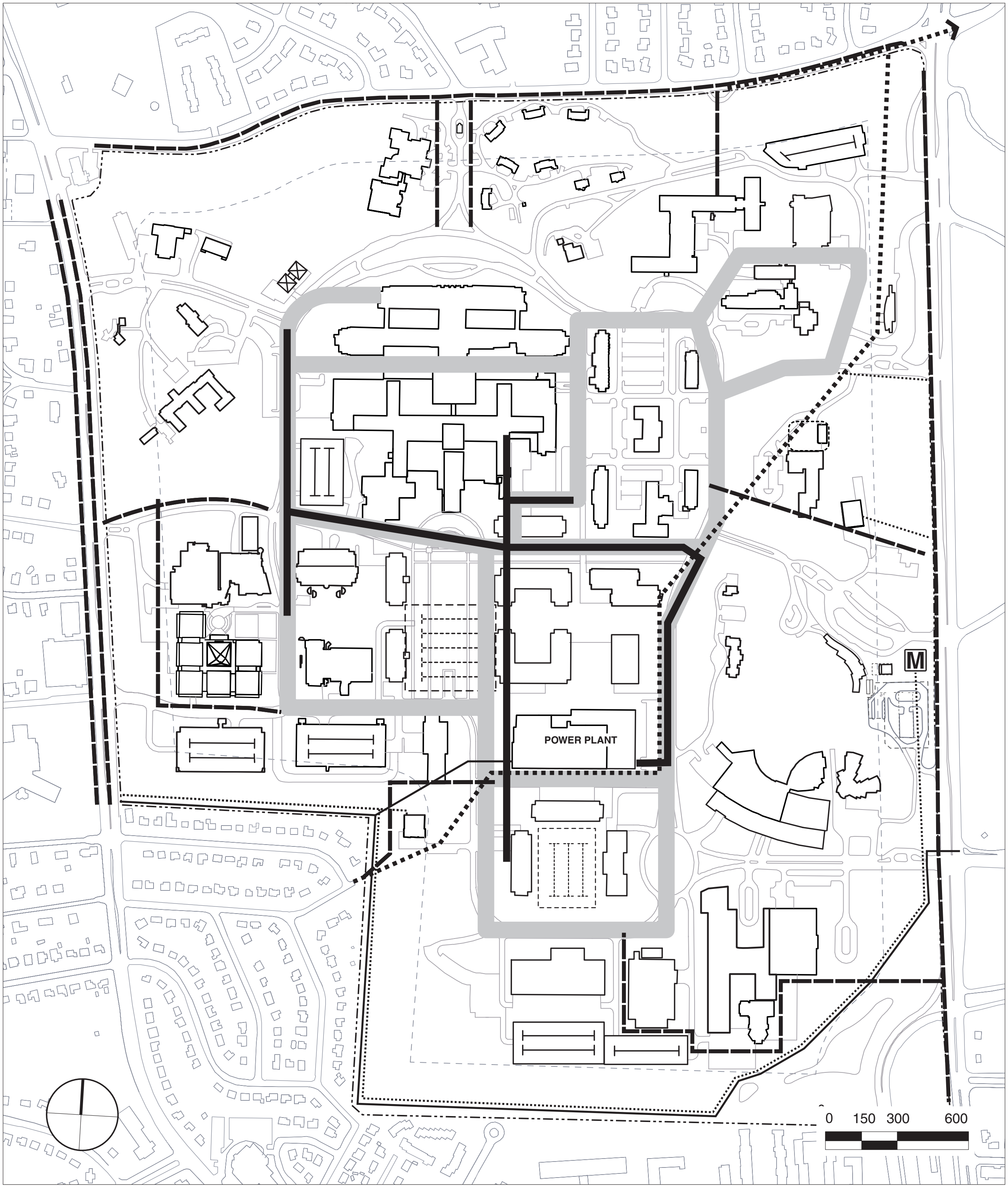
5.4.1 Utility Distribution System

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



UTILITY TUNNEL
MAJOR UTILITY CORRIDOR
SANITARY SEWER
GAS
ELECTRICAL
WATER

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Figure 5.4.1

Major Utility Corridors

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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

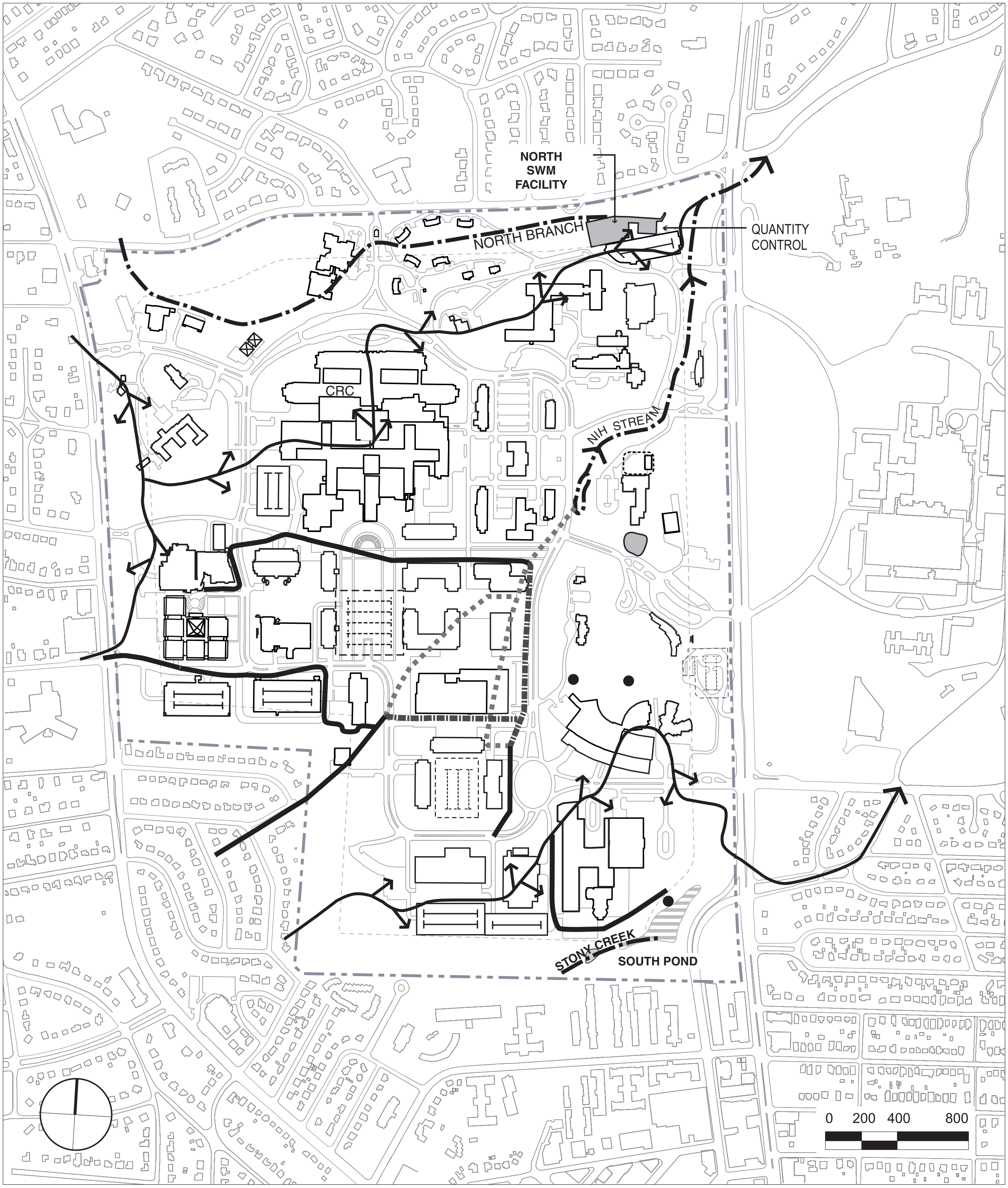
Future stormwater management will be conducted through an <u>NIH Bethesda Institutional Stormwater Management Plan (ISMP)</u>, which is an element of the Master Plan. Components of the ISMP include both management procedures and physical facilities. Management will be completed on a campus-wide or "regional" 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, <u>for the purposes of computing required SWM quality control volumes only</u>, 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 <u>quantity</u> control. The



NIH Master Plan 2003 Update
Bethesda Campus

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

Figure 5.4.4

Stormwater System

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

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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 and 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 a 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 resarch 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 abut 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_2), particulates, volatile organic compounds (VOC), and nitrogen dioxide (NO_2).

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 of 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, treament, 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

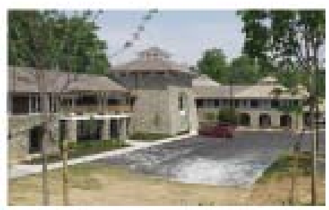
Animal waste is classified as solid waste, MPW, or sanitary waste as determined by waste management procedures. It is disposed of according to its assigned category. It is assumed that there will be little or no growth in animal waste generated at NIH Bethesda; however, the system of separation and disposal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

Chapter Six
Development Guidelines



6.1 Introduction

Development guidelines are included in this Master Plan 2003 Update to quantify or further define the general concepts and planning intentions set forth in Chapter 5. Although there is flexibility within the Master Plan, certain key relationships, patterns, and standards should be adhered to or considered when developing site or building projects to ensure that the desired functional characteristics and campus character are achieved. The Development Guidelines define these key elements and provide recommendations for their implementation.

Subjects addressed in this chapter include issues of building size and scale, definition of open spaces, site character and quality, as well as access and circulation. Phased implementation is recommended in this chapter as a logical sequence of construction and demolition, providing a means to efficient and effective use of the site. Phasing will be subject to actual program needs and available funding.

These Guidelines supplement the NIH Design Policy and Guidelines, which include NIH Physical Security Design Guidelines.

6.2 Building and Siting Guidelines

6.2.1 Setbacks and Build-to-Lines

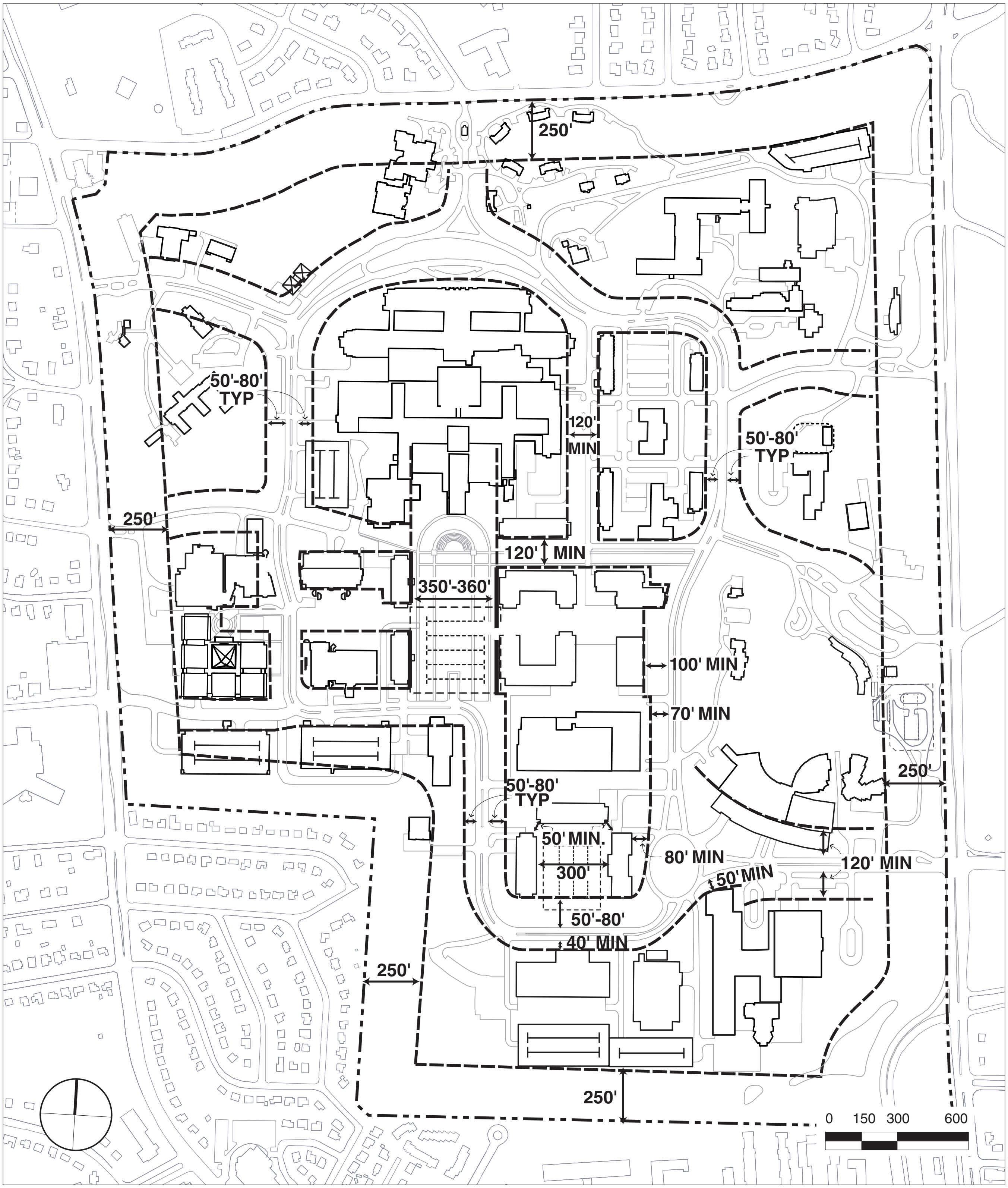
Major Building Setbacks

On a campus-wide basis, the Master Plan proposes general patterns of setbacks for buildings from major roadways to control density, ameliorate the scale of buildings, and ensure the development of a “campus” character to the site. Along internal roadways, buildings should generally not be any closer than 50 to 80 feet from roadway curb lines. Where exceptionally large buildings occur, or at prominent campus addresses such as the Center Drive/Rockville Pike entrance and the area in front of the Clinical Center Complex, building setbacks should be in the 80 to 150 feet range. In order to maintain a clear relationship between building entries and roadways, it is recommended that no new structures be set back more than 180 feet from their principal roadway. See Figure 6.2.1.

At the perimeter of the site, the buffer zone setbacks should be acknowledged by excluding new buildings and surface parking within this area. The buffer should be maintained at 250 feet throughout the entire campus perimeter. See Section 5.2.4 for more detailed discussion of buffer zone characteristics.

Within the campus there are two proposed major open spaces, which have critical minimum dimensions. The first space is the Central Mall, which has a minimum width dimension of 350 to 380 feet. This width corresponds to the distance between the C and G wings of the existing Clinical Center. The second major space to be defined is the South Quad, which has a minimum width dimension of 300 feet by 300 feet to ensure an appropriate proportion to the space.

In general, enclosed open spaces are perceived to be comfortable in scale if the proportion of the width of the open space to the height of surrounding structure is between 2.5:1 and 3.5:1. Spaces, which have a proportion greater than 2:1 create an “urban” feel, and require significant, shadow considerations. To fall within these proportional guidelines, the buildings, which will form the “walls” of the Central Mall, should be a minimum of 100 feet and a maximum of 160 feet high. Building faces along the east and west sides of the Central Mall should align to create uniformity to the enclosure, edge treatment, and width of the space.



SETBACK LINE

BUILD-TO LINE

NIH
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2003 Update
Bethesda Campus

Figure 6.2.1

Major Building Setbacks

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To avoid the perception of the Central Mall as being too narrow and long, the desired proportion of the width to length of the mall is recommended at between 1:2 and 1:3. With a recommended width of between 350 and 380 feet and a total length of approximately 1200 feet, the proposed width to length proportion is about 1:3. From the south end of the mall to the amphitheater and trees on the north, the proportion is approximately 1:2. The length of the Central Mall is also based on the need to connect the north and south portions of the site, a distance of approximately 2,600 feet from the loop road on the north to the loop road on the south.

The scale and integrity of buildings within the Historic Core (Buildings 1 through 5) should be protected. A minimum setback of 120 feet to the nearest buildings on the west and south sides is recommended.

6.2.2 Building Heights

General Campus Height Plan

Proposed building heights follow the Master Plan building height concept of placing the highest buildings near the center of campus and transitioning to low buildings at the perimeter. Transitions in building heights are also made near the structures of the Historic Core. Figure. 6.2.2-a indicates the recommended maximum heights of new construction on campus. This height limit includes all occupiable floors (excluding interstitial floors and mechanical penthouses), and should be measured from the average grade at the perimeter of the structure. Figure 6.2.2-a is intended as a general campus-wide guideline. Within this overall building height framework there are particular areas, which require special consideration upon implementation of nearby construction. These areas are listed later in this section under Critical Areas.

An important concept in the development of height limitations at the perimeter of the site is the imposition of an allowable height envelope corresponding to a 1:5 height to distance ratio, extending approximately 750 feet into the NIH campus on the north, west and south sides. This ratio limits the height of any proposed new structure to one foot for every five feet of distance measured perpendicularly from the property line of parcels adjacent to the NIH campus, except along Rockville Pike where building height concerns are lessened. There are four primary reasons for using the 1:5 height ratio:

- In relation to the discussion of spatial definition in Section 6.2.1, generally accepted urban design guidelines indicate that areas, which have a height to distance ratio greater than 1:4, do not feel enclosed. Therefore, a 1:5 ratio will provide an even greater sense of openness at the perimeter of the site.
- A person's primary cone of vision is about 30 degrees above the horizon. Objects which fall within this visual zone block the observer's view of the sky, thus giving a greater or lesser sense of enclosure depending on the amount of the sky-plane which is blocked. The 1:5 height ratio corresponds to approximately 11.5 degrees, so that an object within this height envelope would obstruct less than half of the viewer's sky-plane.
- A 1:5 ratio is typical of surrounding residential neighborhoods. In surrounding areas, houses tend to be 2 stories tall ("20 feet) and about 100 feet apart at rear yards.
- Almost all of the current buildings on the NIH campus fall within the 1:5 height to distance ratio.

The recommended building heights were determined from three-dimensional massing studies of the relationships between proposed and existing structures on campus, and to fall within the 1:5 height envelope at the perimeter of the campus. Heights have been arranged to create a coherent pattern among all campus buildings and to give a sense of hierarchy or prominence to the most important ones. In general, the tallest buildings are located on the Central Mall. The building heights shown also accommodate building construction sufficient for the attainment of the proposed Master Plan development program as described in Section 5.1.3.

Critical Areas

The Master Plan minimizes the effects of new construction on neighboring areas off campus. Within the campus, special attention has been given to creating appropriately scaled open spaces and relationships between new and existing buildings. Areas of significant attention to scale issues include: development adjacent to the Convent Building 60; development near the Historic Core quad; the Central Mall; the potential development parcels near the Metro station; and the areas adjacent to the south perimeter of the campus which directly abut residential neighborhoods. Figures 6.2.2-c, and 6.2.2-d illustrate in section form the Master Plan intentions for building envelopes in these sensitive areas. Sectional drawings indicate the desired target heights of buildings as used to calculate the target square footage areas listed in Table 5.2.3-a.

6.2.3 Ground Level Activity and Use

In all areas of the campus it is desired that buildings present an accessible appearance at ground level. Building entries should be designed to address streets or major spaces. Blank walls without fenestration should be avoided.

In particular, ground level activities and uses are encouraged around the Central Mall. This area should become the central meeting place of the campus. Numerous building entries and ground level activities, which open out into the mall, will aid in creating this sense of vitality and centrality.

Pedestrian movement can also add to the vitality of public spaces on campus. Spaces should be designed to accommodate and encourage pedestrians comfortably. Walkways within the major open spaces should be of high quality materials, shaded, and equipped with seating and furnishings where appropriate. Buildings around the major open spaces may also include arcades to encourage pedestrian movement in inclement weather.

6.2.4 Density and Bulk

Maintaining a “campus” character and image for the site is an important aspect of the Master Plan. To ensure that an appropriate proportion of open space and landscape is maintained, it is important to control the density of buildings on campus. Generally, development should be denser at the core of the campus than at the periphery. However, filling in of open spaces shown in the Master Plan by additional construction is discouraged as this may diminish the character and quality of the open spaces, as well as impede views and light available to other buildings.

Building bulk in future development should also be limited. The Master Plan concept creates quads or groups of buildings made up of individual building modules, which can be implemented incrementally over time. Where possible, building modules should be limited to footprints of 40,000 gsf or less, with no dimension greater than 300 feet in any direction. Long buildings creating the appearance of a wall should be avoided, especially near the perimeter of the site.

6.2.5 Rooftop Elements

Rooftop elements such as parapets, penthouses, exhaust stacks and antennas should be carefully designed to ensure architectural compatibility and to minimize their

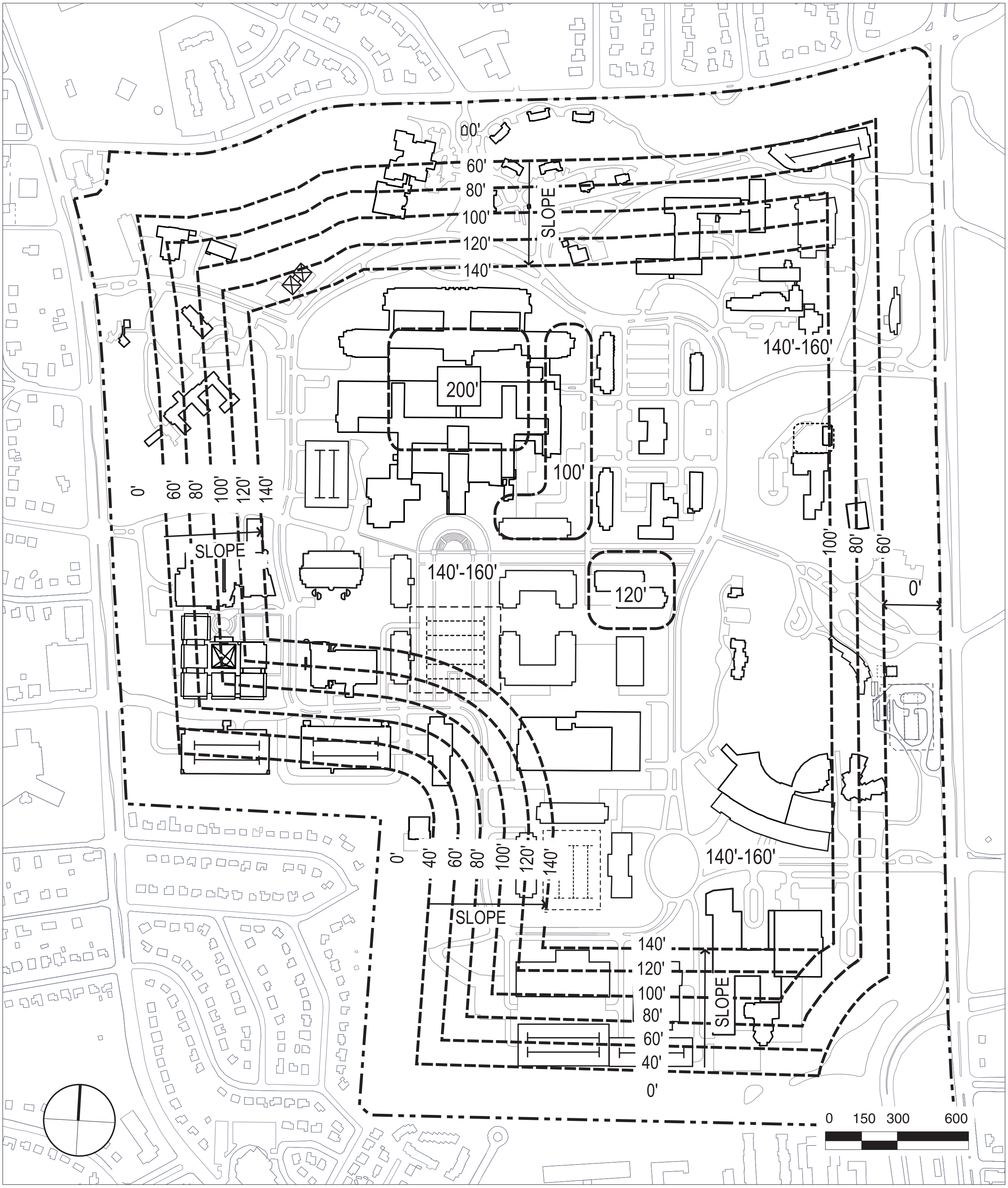

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Figure 6.2.2-a

Recommended Maximum Building Heights

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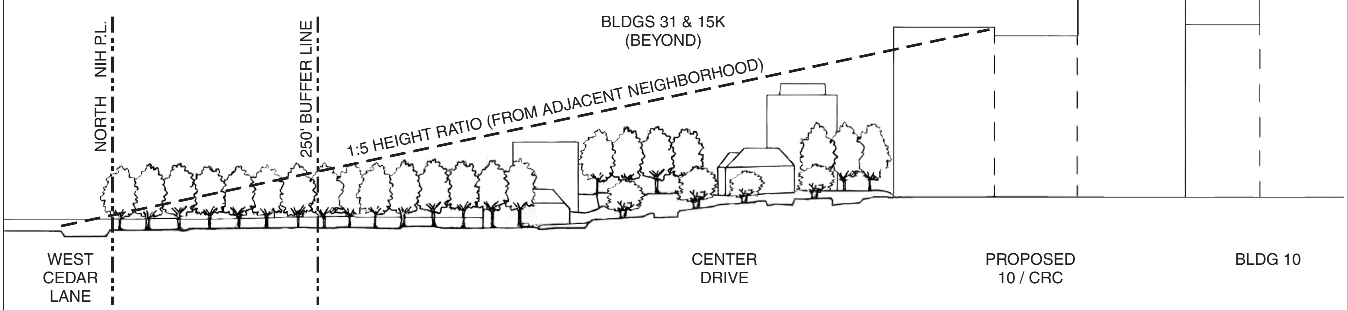
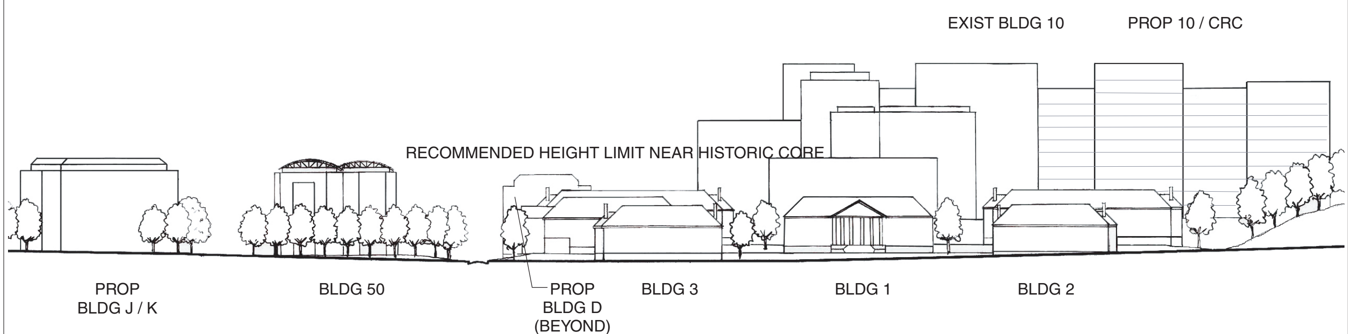
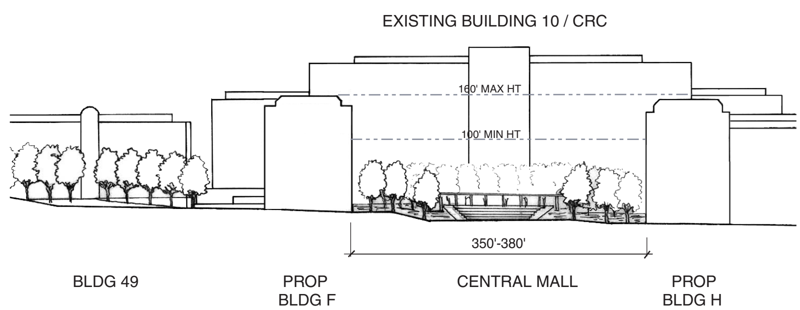


1 Recommended Building Envelopes for North Campus Area - View Toward East



2 Recommended Building Envelopes near Historic Core - View Toward West



3 Recommended Building Envelopes at Central Mall - View Toward North

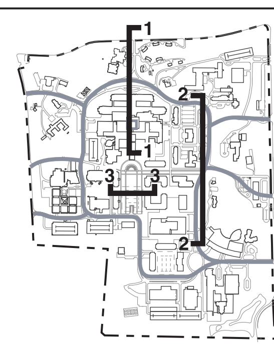
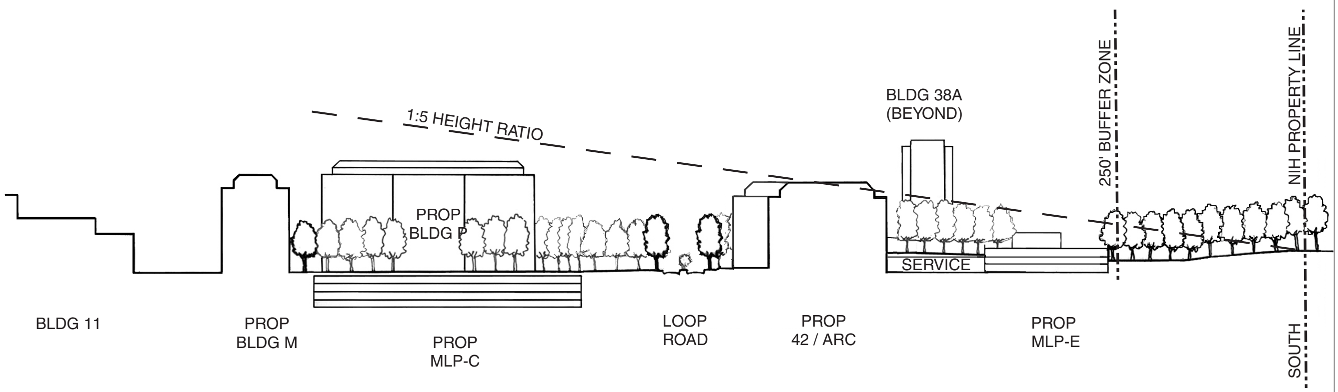
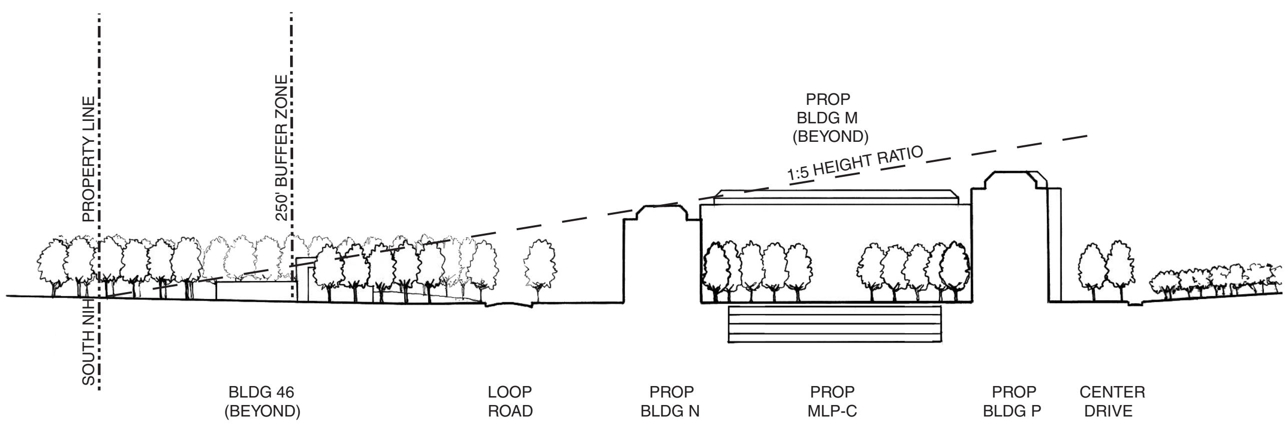


Figure 6.2.2-b

Building Envelopes Critical Areas



1 Recommended Building Envelopes for South Quad from South Property Line - View Toward East



2 Recommended Building Envelopes for South Quad from Southwest Property Line - View Toward North

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Figure 6.2.2-c

Building Envelopes Critical Areas

visual impact on the skyline. Mechanical and elevator penthouses should create visually attractive roofscapes and rooflines for the NIH campus. These elements should be integrated into the architectural expression of the building, and can be articulated as an attic story or hidden within the roof form of the structure. All rooftop equipment should be screened from view using materials consistent with the major building facades.

Installation of rooftop antennas, including satellite and microwave dishes, should be carefully considered for location and visual impact. Antennas should be installed at the lowest possible elevation above the roofline, and screened to the extent practicable from public view. Antennas should be set back as far as possible from all edges of the roof (20 feet at a minimum). Rooftop antennas, which cannot be screened, should be placed in association with penthouse structures so as to avoid the appearance of a freestanding object on the roof. Antenna and mounting materials should be unobtrusive and of a color that blends with surrounding buildings. Antennas should be protected against corrosion, securely mounted, and adequately grounded to protect against lightning strike.

6.3 Historical and Archeological Guidelines

6.3.1 Historical Guidelines

As discussed in Section 4.6.1, to date NIH and the Maryland Historical Trust (MHT) have agreed that the following sites meet the criteria for listing in the National Register of Historic Places:

• The Historic Core	
Building 1	Administration Building
Building 2	Office/Administration
Building 3	Office/Administration
Building 4	Research
Building 5	Research
Building 6	Research
• Building 7	Research
• Buildings 15B1-15G2, 15H, and #15I	The Officers' Quarters
• Building 15K	Wilson House (Tree Tops)
• Building 16/16A	George Freeland Peter Estate (Stone House and Caretaker's Residence)
• Building 38	National Library of Medicine
• Building 60	Convent Building

Buildings that have been evaluated and do not meet the criteria for listing in the National Register of Historic Places include:

• Building 8	Research
• Building 9	Research
• Building 10	Clinical Center
• Building 61	Caretaker's Cottage (Convent)

It is possible that other resources not yet evaluated may also meet the criteria for listing in the National Register of Historic Places, or that other buildings, upon reaching 50 years of age, will be eligible for listing. (Under Section 110 of the National Historic Preservation Act, federal agencies are required to identify and evaluate historic resources and to ensure that the resources are managed and maintained in a manner that is sensitive to their historic, archaeological, architectural, and cultural values.) NIH is committed to working with the Maryland Historical Trust (the State Historic

Preservation Office) to evaluate the potential historic significance of buildings that are approaching 50 years of age. Until these evaluations are complete, NIH acknowledges that cultural resource investigations will be necessary for individual undertakings to be submitted under Section 106 review. (Under Section 106 of the National Historic Preservation Act, government agencies are required to take into account the effects of planned undertakings on historic resources prior to approving funding for the undertaking.) NIH will continue consultation with the Maryland Historical Trust on these and other issues.

Although a Programmatic Agreement and Historic Resources Management Plan are goals to be considered for the future, it is not possible at this time to fund or implement these documents.

In this regard, the Secretary of the Interior's Standards for Rehabilitation provide basic principles to guide work undertaken on historic buildings. The Standards are as follows:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of distinctive features, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that can cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

6.3.2 Archeological Guidelines

Implementation of the NIH Master Plan will necessitate new construction and site improvement, hence ground disturbance. It must be assumed that any archeological resources present at the specific site would be adversely affected by these construction activities. Figure 4.6 shows the few remaining sites with archeological potential based on the undisturbed nature of the areas. These are identified as archeologically sensitive areas. Future construction in these areas will require Phase I cultural surveys prior to design and construction to satisfy Section 106 of the National Historic Preservation Act criteria for determining archeological significance and potential eligibility for the National Register. If Phase I surveys indicate that the areas contain materials of potential significance, then a Phase II survey will be completed. The scope of the Phase I survey is dictated by public law, which assures that appropriate levels of survey evaluation and mitigation are pursued. The National Historic Preservation Act of 1966, as amended in 1980, directs the Secretary of the Interior to promulgate guidelines for Federal agency responsibilities under Section 110 of the same Act. The *Maryland Historical Trust Archeological Standards and Guidelines* will be followed to complete these requirements.

In the master planning process, efforts were made to avoid or minimize intrusion into archeologically sensitive areas. However, if a sensitive area will potentially be impacted, the site will be evaluated and recommendations for appropriate sampling, recovery of artifacts, or protection in place will be prepared as necessary. It is possible, but not probable, that an alternative building site would have to be chosen or construction delayed if the archeological site were determined to be of great importance. In general, artifact recovery is preferable to avoidance since the historic and archeological value of most sites lies in the information obtainable from the artifacts.

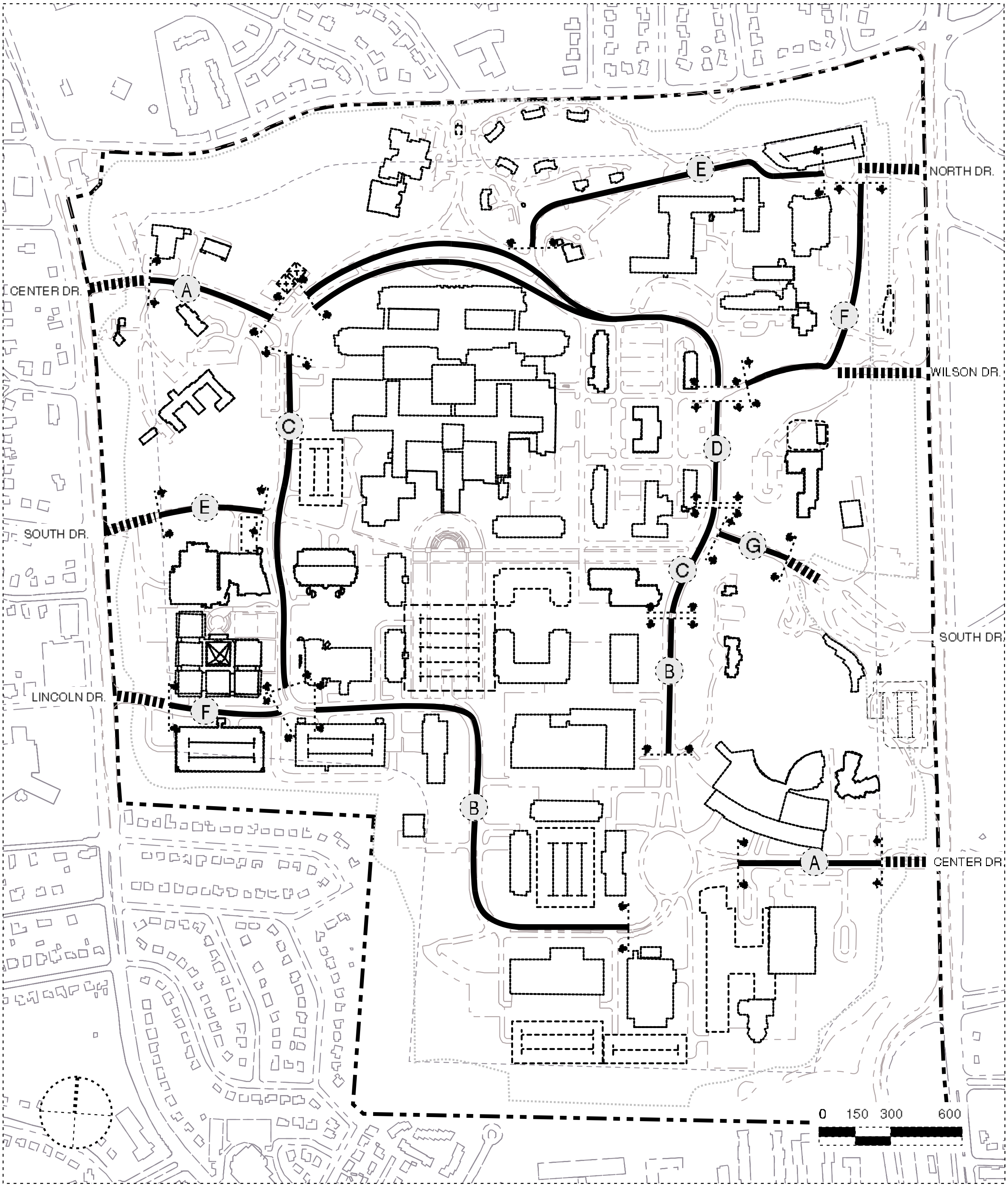
The survey, evaluation and mitigation work (if required) should be completed during the planning of individual building projects and prior to the start of any construction. This releases the site for construction and avoids delays and additional costs once construction is underway.

6.4 Circulation Guidelines

6.4.1 Vehicular

Although no new overall campus peak hour trips will be generated by future NIH growth beyond the trip generation goal defined for the Transportation Management Plan in the 1992 "Memorandum of Understanding", traffic volumes will increase at some intersections due to the increase of employment and the increase and redistribution of parking within the campus.

The locations of roadway types on campus are presented in Figure 6.4.1-a. In general, lanes are recommended to be eleven feet wide at primary site entries, with the exception of the Lincoln Drive exit where the recommended lane widths are to be ten feet. The loop road is recommended to consist of three different cross section widths; Section B, Section D, and Section E (see below). Lane widths are recommended to be ten feet wide in most other areas. The number of lanes along the loop road was determined based on the peak hour link volumes, the desire to provide for bicycle circulation throughout campus, and the presence of intersecting driveways. Entrance roadways should be median divided, except in sections of the northern part of campus where the existing, undivided roadway provides a woodland appearance. Medians should be a minimum of eight feet wide to allow for adequate planting area. Where curb lane parking is provided, the parking lane should be thirteen or fourteen feet wide for off-peak parking and bicycle traffic. Where provided, bike lanes should be a minimum of five feet wide, clearly designated, and striped to separate them from the main roadway. Following is an explanation of the proposed cross-sections, which are illustrated in Figure 6.4.1-b.



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- (A) 4 LANES, MEDIAN, BIKE LANES - WIDTH 62'
- (B) 4 LANES, MEDIAN, BIKE LANES/OFF-PEAK PARKING - WIDTH 56'
- (C) 2 LANES, BIKE LANES/OFF-PEAK PARKING - WIDTH 48'
- (D) 2 LANES, OFF-PEAK PARKING LANES - WIDTH 40'
- (E) 2 LANES - WIDTH 22'
- (F) 2 LANES, BIKE LANES - WIDTH 30'
- (G) 2 LANES, MEDAIN, BIKE LANES - WIDTH 40'
- VEHICULAR GATE

Figure 6.4.1-a

Roadway Types

- **Section A** is designated for major site entries. The roadway provides four moving lanes with marked bike lanes in both directions. The minimum eleven-foot wide lanes are recommended because of the high volumes of traffic anticipated in this area. No curb parking is allowed in this section.

- **Section B** is the north and south loop road section. This roadway type has one ten foot wide travel lane and one fourteen-foot travel lane in each direction. The ten-foot wide travel lane would be for vehicles only and the fourteen-foot wide lane would serve as an on-street, off-peak parking/bicycle travel lane and a mixed vehicular/ bicycle travel lane during the peak periods. Two travel lanes, separated by a landscaped median, are recommended in each direction during the peak periods since traffic volumes are anticipated to require four moving lanes.

- **Section C** is the west and east loop road section. This roadway type has one ten-foot wide travel lane and one fourteen-foot travel lane in each direction. The ten-foot wide travel lane would be for vehicles only and the fourteen-foot wide lane would serve as an on- street, off-peak parking/bicycle travel lane and a mixed vehicular/ bicycle travel lane during the peak periods. Two travel lanes are recommended in each direction during the peak periods since traffic volumes are anticipated to require four moving lanes. No median is included as part of this cross-section due to the physical constraints of providing for it.

- **Section D** is the loop road in front of Building 1. Due to the constraints of the historic buildings to the west and steep slopes to the east, this roadway section was kept as narrow as possible. The roadway provides two ten-foot wide travel lanes in each direction. Two travel lanes are recommended in each direction since traffic volumes are anticipated to require four moving lanes during the peak periods.

- **Section E** is used for roadways with relatively low traffic volumes or which pass through woodland areas, in an effort to avoid the removal of existing trees. This roadway type has one, eleven-foot travel lane in each direction.

- **Section F** consists of a thirty-foot cross-section with one ten-foot travel lane in each direction with one five-foot bicycle lane in each direction.

- **Section G** is for the East South Drive entry to campus. This roadway type has one eleven-foot wide travel lane and one five-foot exclusive bicycle lane in each direction. There is no on- street parking in this roadway section type.

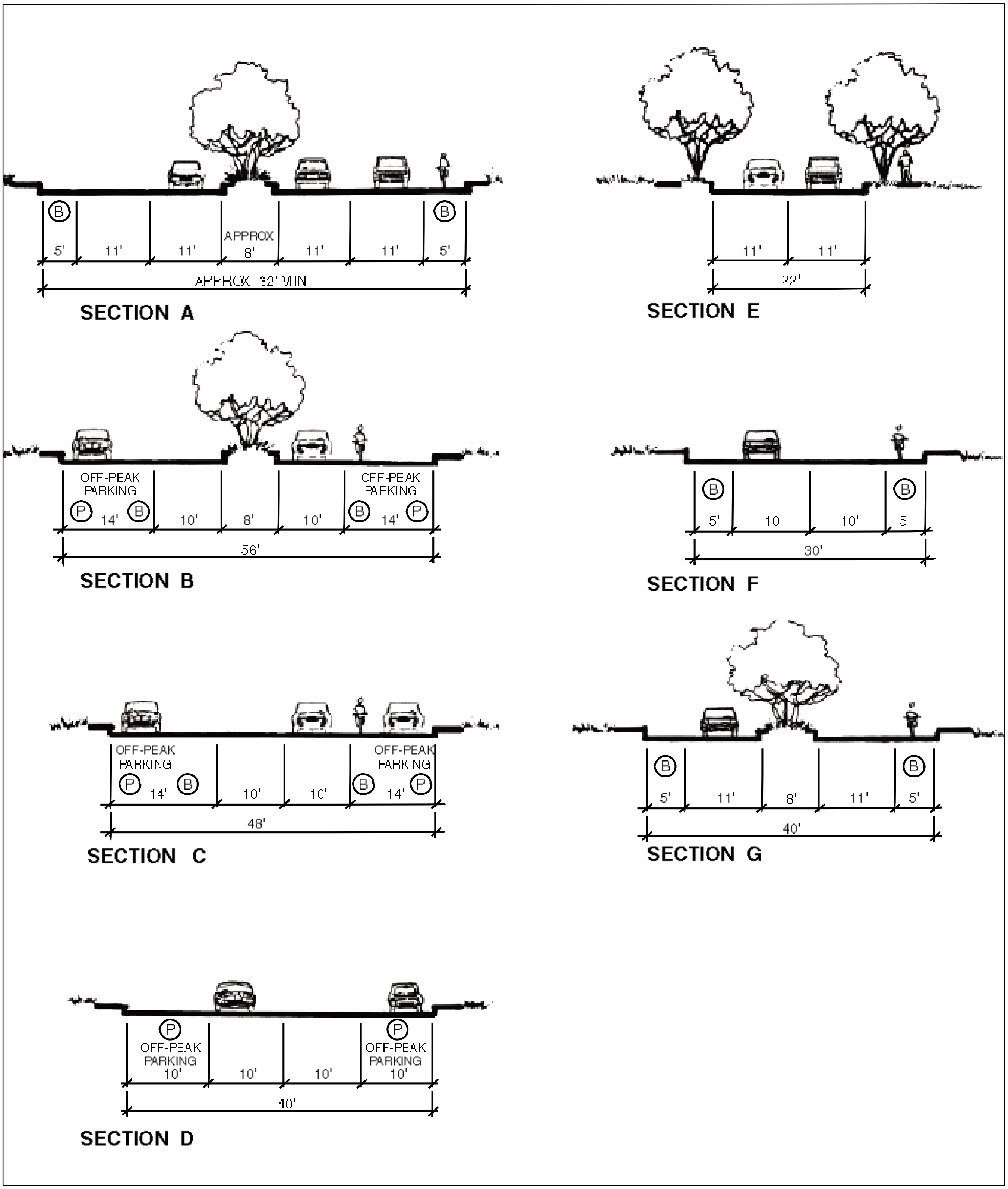


Figure 6.4.1-b

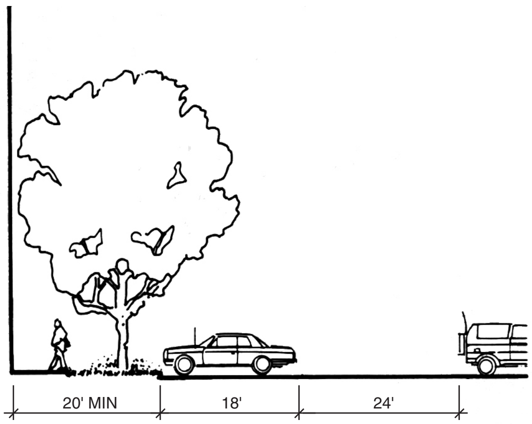
Typical Roadway Sections

6.4.2 Parking

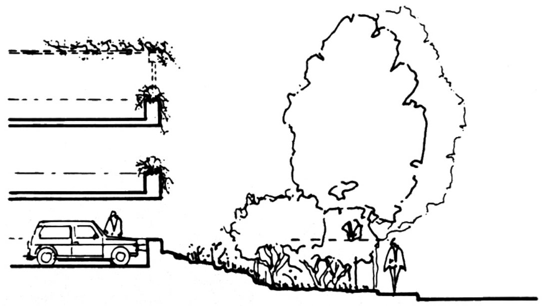
Where possible, surface-parking areas should be reduced within the campus, and surface parking should be removed from the buffer zones at the perimeter of the campus. Surface parking should be screened at its perimeter with planting, berms or low walls. Parking lots should have interior planting islands to break up large expanses of paved area.

Parking decks should be integrated into the topography where possible, and should be screened by landscape or have planting areas integral with their perimeters, such as planter boxes or trellises. For examples of parking screening techniques, see Figure 6.4.2.

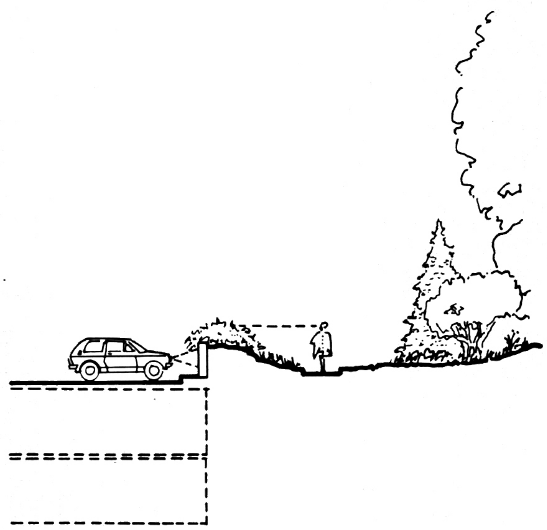
Curbside parking should be designated for limited time and off-peak hour use, with appropriate signage and enforcement. Limiting curbside parking to off-peak hours and limited time periods will maintain a reserve of parking spaces intended for off-campus employees coming to the site for part-day activities. This arrangement will also allow increased traffic flow at peak hours by providing extra travel lanes. Accessible parking for persons with disabilities should be placed as near and convenient to buildings as possible.



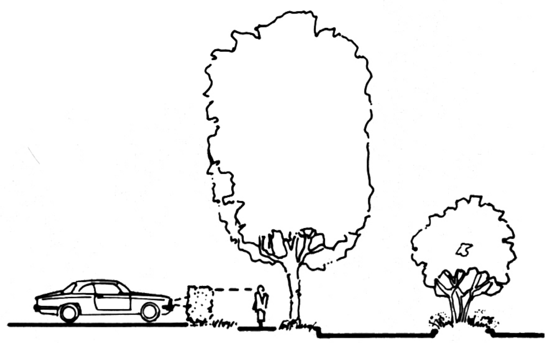
1 TYP SURFACE PARKING NEAR BLDG



2 TYP PARKING DECK SCREENING



3 TYP SURFACE PARKING SCREENING



4 TYP SURFACE PARKING SCREENING

Figure 6.4.2

Typical Parking Guides

6.4.3 Service

All future commercial delivery truck traffic will access the NIH campus using the CVI truck entrance, where there will be an on-site inspection facility. The truck entrance will be located south of the North Drive employee-only entrance, and will only provide access to the inspection facility. Commercial vehicles, which pass inspection, will be allowed to continue onto campus, to their final destination after concurrence with the destination building dock master to avoid congestion at the destination point.

Since service/delivery areas are necessities for virtually all buildings on campus, the placement and design of these areas must be considered carefully. Generally, the following guidelines should be administered for the design of service/delivery areas, as illustrated in Figure 6.4.3.

All major loading areas should be provided at the ends or rear of buildings. Some short-term delivery service should be provided in short term visitor parking near the front of the buildings. Long term vendor and contractor parking should be provided in long term parking facilities. In no case should major loading be permitted on- street or in parking facilities.

The number of access driveways on the internal loop road has been limited by providing shared service/delivery areas for groups of buildings. This consolidation of the service/delivery areas will minimize conflicts in the internal road system. In site areas where grades and slopes of the topography permit, service/delivery areas should occur at a lower level. In all locations service/delivery areas should be screened by walls and/or landscaping.

The design of the access driveways from the internal loop road system should be provided with adequate sight distances and proper turn-around areas for trucks within the access drive layout. In general, access driveways for service/delivery vehicles and employee or visitor passenger vehicles should be separated. Although these criteria may not be feasible in all cases, it is a good policy to reduce the possibility of the access driveway being temporarily blocked by a service/delivery vehicle.

6.4.4 Pedestrians and Bicycles

Pedestrian Pathways

The existing system of extensive pedestrian paths on the NIH campus should be enhanced to increase the capacity of certain highly trafficked areas, make better connections from the campus core to surrounding neighborhoods, and form a more continuous pathway system. Employee pedestrian access to the NIH campus will be provided for employees at all vehicular and pedestrian/bicycle employee-only gates in the perimeter fence. Pedestrian access to the NIH campus will be provided for NIH visitors through the South Drive Gateway Center entrance located on Rockville Pike and at the Cedar Lane entrance.

Pedestrian crossings of campus roadways should generally occur at intersection points along the loop road and at the entrance driveways from the county and state road system. It is anticipated that the internal, unsignalized intersections will operate as three-way stop intersections. This intersection type will facilitate the crossing of small groups of pedestrians. All pedestrian crossings should be clearly signed and lighted, with crossing areas designated by striping, special paving, raised road surface, or other appropriate marking devices. Medians should be designed to provide pedestrian refuge areas. In addition, the implementation of mid-block pedestrian crossings at certain locations may be provided. Vehicular traffic through these mid-block pedestrian crossing sections is not required to stop if the pedestrian area is clear; but is required

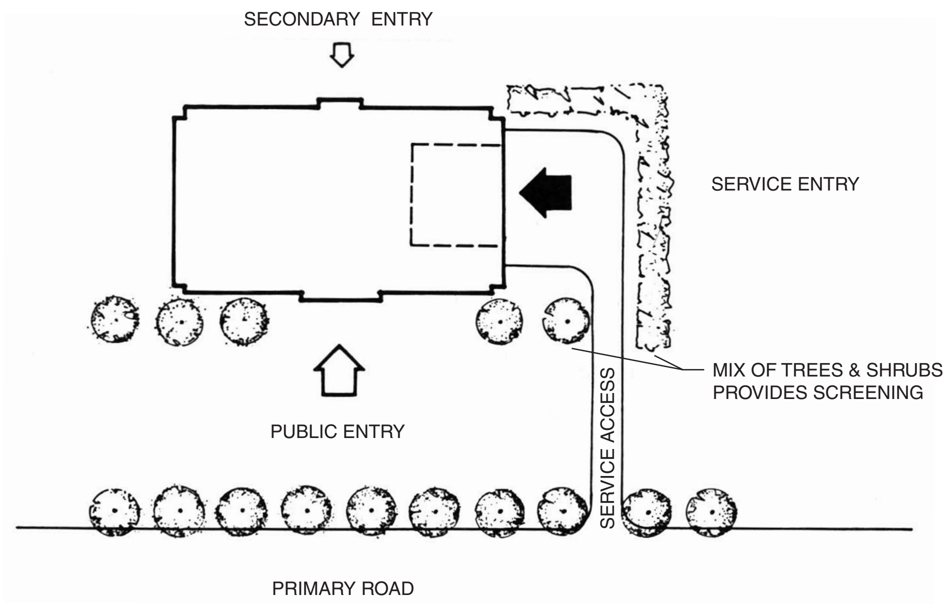


Figure 6.4.3

Typical Service Area Guides

to yield to pedestrians in the cross walk. The mid-block pedestrian crossing area should be clearly signed, striped, and lighted, and may also include a median for pedestrian refuge.

In order to minimize the chance of vehicular-pedestrian conflicts, the NIH should adopt some crosswalk location guidelines to standardize the location of future crosswalks on campus. The following elements should potentially be used as part of a new crosswalk location policy, to regulate when and where future crosswalk installation is appropriate on the NIH campus:

- Crosswalks should be provided at all roadway intersections;
- Crosswalks should not be used indiscriminately;
- Crosswalks should allow for restriction of parking in the immediate appropriate vicinity for adequate visibility;
- Crosswalks should be sited based on an engineering study if located other than at an intersection;
- A non-intersection crosswalk location should only be considered when all of the following circumstances are present: 1) The distance to the nearest intersection exceeds 300 feet, 2) There is a proven demand for a crossing at the subject location with pedestrian crossing volume that exceeds 100 pedestrians during any one hour, or 150 pedestrians during any two consecutive hours within a 24-hour period, 3) There is adequate sight-distance and other critical safety conditions are satisfied, and 4) The location of the crosswalk does not conflict with any aspect of the campus plan.

NOTE: If all of these conditions are not satisfied and there are any significant signs of pedestrian activity near the subject crossing location prior to the installation of a crosswalk, then the subject location may warrant the placement of a pedestrian barrier to ensure that pedestrians do not cross at the non-intersection location, but rather walk to the nearest marked crossing location.

Bikeways

On-site bikeway facilities are an important element in the promotion of alternative transportation modes for employees of the NIH Bethesda campus. In addition, it is important for the NIH Bethesda campus to link with the Montgomery County Bikeway System for the broader countywide promotion of alternative transportation modes. Bicycle access will be provided for employees at all vehicular entrances and pedestrian/bicycle employee-only gates in the perimeter fence. Bicycle access to the NIH campus will be provided for NIH visitors through the South Drive Gateway Center entrance located on Rockville Pike and at the Cedar Lane entrance.

Bicyclists should be encouraged by signage and policy to walk their bikes in congested areas. In addition to the specially NIH-designated bikeway facilities, bicyclists can often ride in the outer travel lane along roadways with speeds of 30 miles per hour or less. All internal roadways on the Bethesda campus will be signed for speeds of 20 to 25 miles per hour, and therefore it is expected that bicyclists will utilize the loop road system to circulate around the campus, with the exception of the loop road segment between South Drive and Wilson Drive (in front of Building 1) on the east-side of campus. However, it is important that the roadway be regularly maintained and cleared of debris, and that drainage grates be designed flush to the surface with narrow grid openings (so that bicyclists do not get trapped as with conventional parallel, widely spaced grates).

6.4.5 Mass Transit

Metrorail and local bus service is provided to the NIH Bethesda campus at the Medical Center Metro Station on the Red Line. This station and related transit node is located near the intersection of South Drive and Rockville Pike.

Because of the size of the Bethesda campus and the campus edge location of the Metrorail station, it is necessary to provide a means for employees using Metrorail to get to and from the various employment centers around campus. The NIH currently operates internal campus shuttle bus routes.

Shuttle riders transfer between the two systems at the NIH Gateway Center, in order to travel between interior campus locations and off-campus NIH facilities. This bus service is provided as a part of the Transportation Management Program.

All shuttle bus stops should provide adequate covered waiting area at the stop or at nearby buildings. The on-campus shuttle bus stops are located along the loop road in close proximity to most major destinations or building clusters. However, there may be a few shuttle bus stops located directly in front of building entrances, as determined later by the operators of this system.

The Master Plan calls for a continuous, four-lane loop road throughout the interior of the campus. This loop road will allow for more efficient operation of the shuttle bus service provided on campus. The Employee Transportation Services Office (ETSO) currently acts as a liaison with WMATA and Montgomery County Ride-On. This liaison allows for the coordination of the NIH shuttle bus, WMATA, and Ride-On bus services.

6.4.6 Access for Persons With Disabilities

For implementation of access standards, see the Uniform Federal Accessibility Standards (UFAS).

6.5 Site Performance Guidelines

6.5.1 Building Character/Materials

Figure 6.5.1 indicates the Building Character and materials recommended for each zone of the site. In general, the Master Plan recommends that all new construction in the central core be of Brick - Modern design, and that buildings at the perimeter of the site be of Concrete / Stone - Modern design, reinforcing the pattern that currently exists. The predominant material for central core buildings should be red brick, responding to the materials of the Historic Core and numerous other central campus buildings. Structures at the perimeter should be predominantly white or light in color. Outside of the Historic Core and away from historic properties, it is preferred that a contemporary architectural vocabulary be used to express the technology and aesthetic of the time of construction. Within or directly adjacent to the “exception zones” as delineated in Figure 6.5.1, projects should be designed to be compatible with the existing historic or special character of the buildings within the zone.

6.5.2 Landscape Design and Planting Criteria

Figure 6.5.2-a, shows the proposed Landscape Concepts and Planting Patterns for the NIH Bethesda Campus. Further guidance is given in the NIH Bethesda Urban Forest Stand Delineation and Conservation Plan.

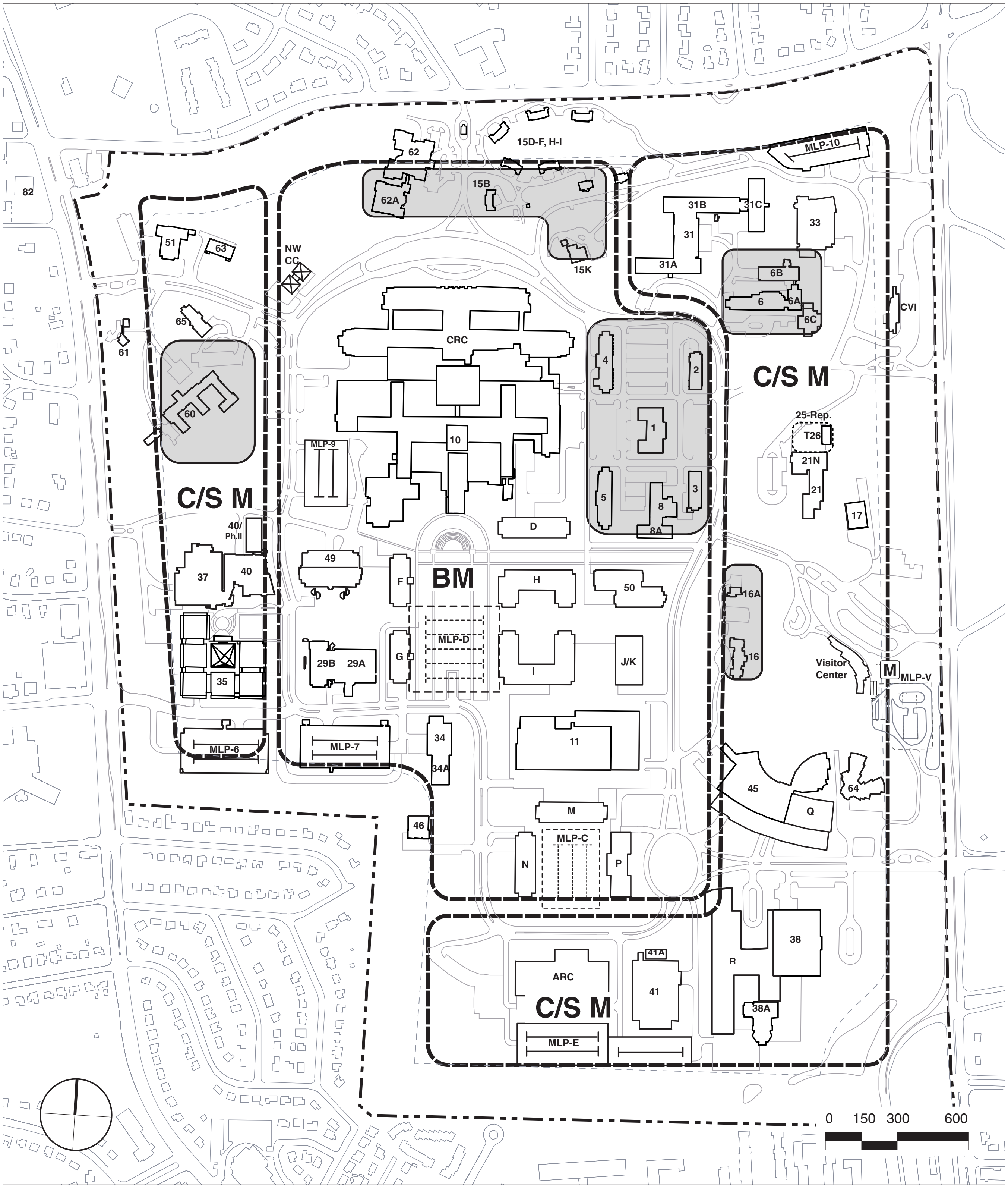
Planting Patterns and Scale
The size of trees, shrubs, and plant beds should be considered with respect to their scale relationship to the NIH campus buildings, roads, and spaces. In general, plantings should be simple and conceived in broad masses that are appropriately scaled to the campus. In addition, there should be a hierarchy of plantings, ranging from large tree and shrub massings along roads and entries, down to small garden scale plantings and floral display beds in courtyards and pedestrian gathering areas.

Plants can also serve to punctuate and reduce the scale of stairs, walls, terraces, and building facades, through the use of hanging, twining, or climbing plants, which can help the buildings and spaces become part of the landscape. Plants should be used to soften the edges of buildings, paths, and outdoor areas with flowers.

Plants selected for use on the NIH campus should be an indigenous or native species, possess appropriately long-lived characteristics, and have visual traits that offer refined intrinsic beauty to reflect the enduring quality of the institution. The overall design of the campus planting should be simple and seek to evoke a mood of tranquility to complement the existing natural and surrounding plantings. It is also recommended that the use of annuals and perennials be encouraged to create an uplifting campus environment for NIH visitors and employees.

Care should be exercised in the use of exotic or highly ornamental plants, and as a general rule should not be used in the more natural perimeter landscape. They should only be used in the central core areas, in association with pools, in enclosed courtyards, and internal landscape spaces between buildings and parking areas. Simple refined patterns will yield a campus that is unique, dignified, and practical to maintain.

The natural forms of plants should be retained through restrained but proper pruning techniques. This is most important when considering shrubs. Shrubs should be planted in arrangements that allow for their natural shape to be retained through periodic renewal pruning. Adequate space must be allowed for plants to grow, particularly near paths and buildings, in order to avoid heavy shearing of these plants which often makes them unnatural and unattractive.



EXCEPTION ZONE

C/S M CONCRETE/STONE MODERN

BM BRICK MODERN

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Figure 6.5.1

Building Character Zones

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periodic renewal pruning. Adequate space must be allowed for plants to grow, particularly near paths and buildings, in order to avoid heavy shearing of these plants which often makes them unnatural and unattractive.
Tree pruning should start early in the life of campus trees to ensure that a proper form is established and the canopy is promoted and trained to a sufficient height to provide clear visibility beneath trees for autos and pedestrians, and to allow adequate light to lawn areas below.

Selection and placement of plant materials should be made in accordance with lighting and security cameras to avoid obscuring views and creating hard to see places. Trees and shrubs must be kept away from the perimeter fence to prevent their use for climbing over the fence.

Buffers and Perimeter Screening

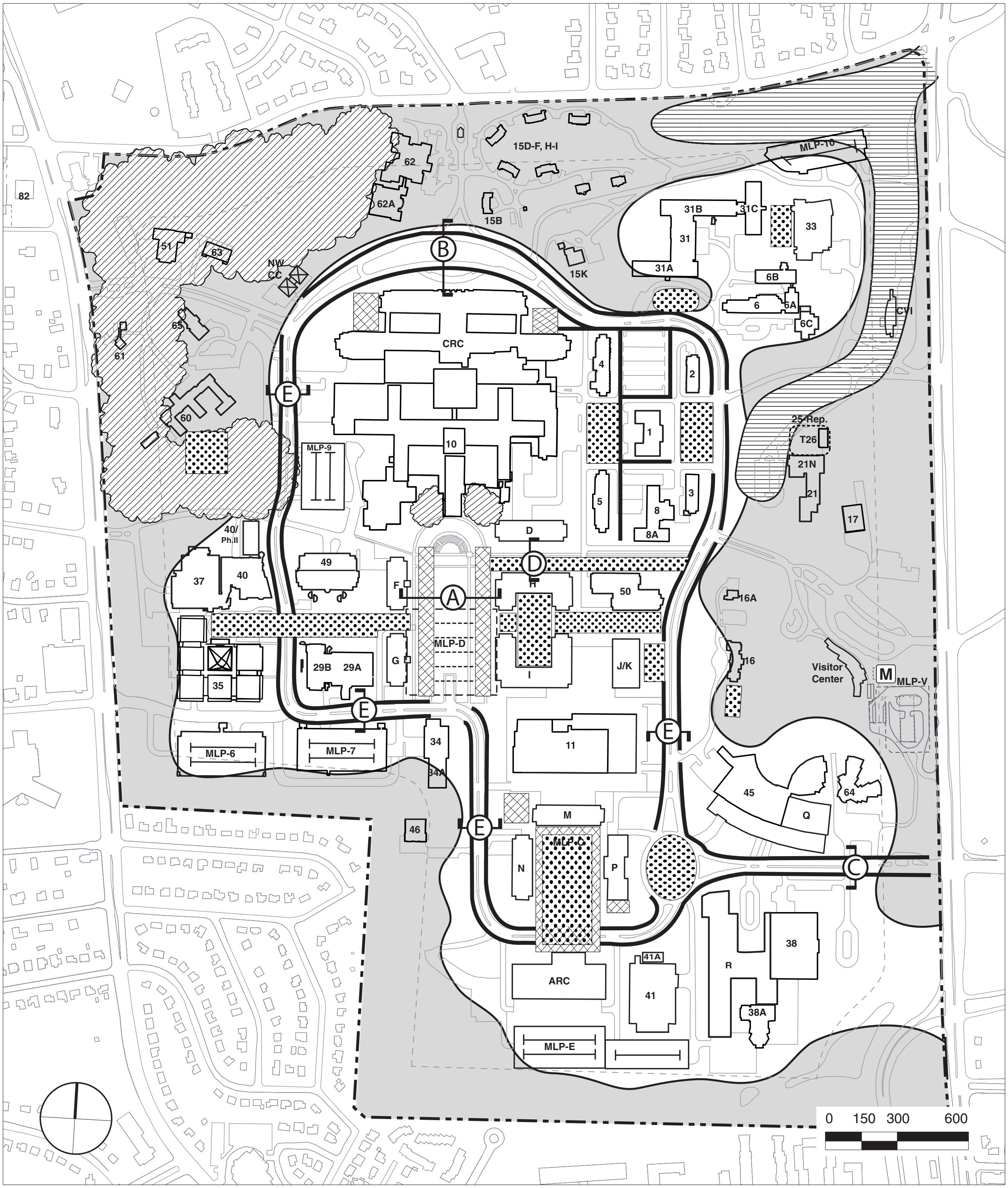
There are three primary long-term objectives for enhancing the perimeter landscape and buffer areas of the NIH campus. The first is preservation. The existing stands of large native trees and areas of natural vegetation that currently provide screening and buffering to the surrounding residential areas are to be maintained. The second is managed renaturalizaton. As surface parking areas are removed from the campus perimeter, these areas will need to be replanted with native and indigenous varieties of plant material to extend and augment the buffer plantings. In addition, open lawn and mowed turf grass areas not designated for recreational purposes should also be planted or reforested in order to reduce grounds maintenance areas. These areas need to have a natural yet controlled or maintained appearance, with curvilinear lawn edges, shrubs, and understory tree massings. The third will be general environmental improvements as a result of the first two objectives. Preservation and reforestation will provide the direct environmental benefits of cooling, enhanced storm water management, erosion control and water quality, increased species diversity, and reduced water and energy consumption for grounds maintenance.

With these objectives in mind, aesthetic design consideration should be focused on maintaining some open views into the site to visually prominent buildings and landscape features from Rockville Pike and Old Georgetown Road. These areas may benefit from the use of high canopy trees and understory plantings to filter and direct these views. Reforested areas should not be designed as strict restorations of the existing woodland communities that naturally occur in the region, but rather as general compositions and structures that simulate the plant communities of the Piedmont Region, implemented to complement the existing landscape patterns and provide spatial definition to the NIH campus. In addition, any reforestation, screening, and buffering in the perimeter areas will require careful study and fine tuning to ensure that design consideration to the campus safety and security is maintained.

Plant Material Palettes

An underlying concept in the development of the Landscape Plan for the NIH campus is the recognition of the medicinal values of plants and water. This medicinal theme can contribute to a deeper understanding of the landscape, its relationship to mankind and the environment, and its relationship to the mission of NIH.

Potential uses and combinations of plants may take on many forms in the landscape development of NIH. For example, plants may be used primarily in cultural associations such as hot/sunny, cool/moist, or dry/shade garden conditions to name a few. Other material uses can be based on purely aesthetic considerations such as color or textural combinations, accent or screening applications, and to control scale and spatial hierarchy within the central core of the NIH Bethesda campus.



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- BOSQUE PLANTING
- STREET TREE PLANTING
- STREAM VALLEY/RIPARIAN
- UNDERSTORY/FOREST EXTENSION
- BUFFER/PERIMETER
- QUAD/COURTYARD/GARDEN

Figure 6.5.2-a

Campus Planting Patterns

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Finally, trees and plants can be displayed in numerous programmatic arrangements, such as grouping together plants with similar traditionally held medicinal values, or to display medicinal plants with exceptional seasonal qualities, for winter, spring, summer, and fall garden themes. These plant groupings may be signed in an interpretive manner so that their uses can be better understood and appreciated. As mentioned previously, care should be exercised in the use and location of these materials.

Special Landscape Areas and Features

The sections shown in Figure 6.5.2-b indicate in greater detail the landscape character and recommendations proposed for key areas of the site.

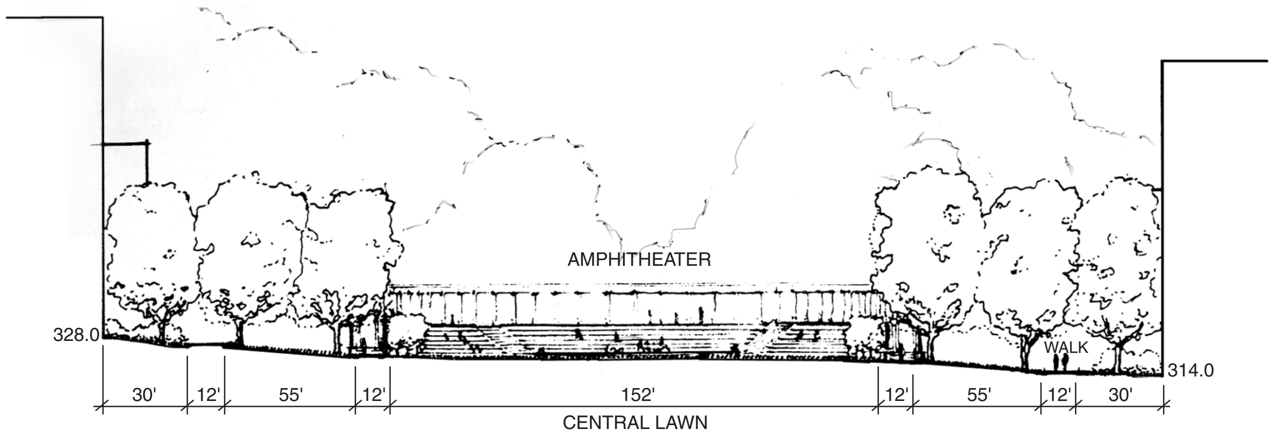
- **Section A** indicates the proposed landscape treatment of the Central Mall. A triple row of trees is proposed to frame this central open space, with a pedestrian concourse between the trees. Changes in grade are proposed to be accommodated within the bosque areas at the edge of the mall. The mall itself is envisioned as a grassy, open area. The mall is proposed to be terminated on the north end by an amphitheater with informal tree plantings as a backdrop.

- **Section B** shows the area to the north of the Clinical Research Center. Bosques are densely planted on the south side of the loop road, flanked by walkways. The median is planted with groundcover and ornamental trees. The existing tree cover is maintained on the north side of the loop road, within a natural landscape character.

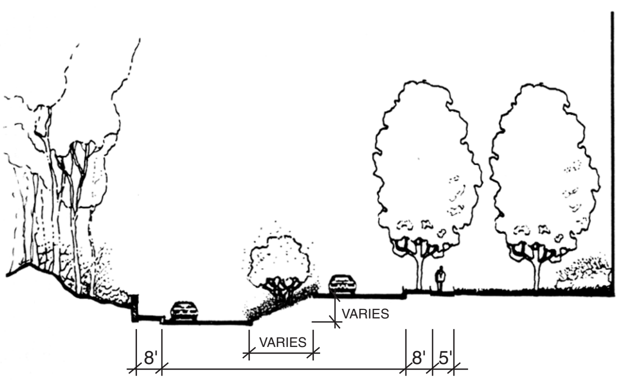
- **Section C** shows the proposed treatment of the main campus entry on Center Drive at Rockville Pike, near Building 45 (the Natcher Building). This area is shown to be formally landscaped with double rows of trees on either side of the road and a landscaped median in the center.

- **Section D** shows the proposed major east-west pedestrian walkway between Center Drive and the Central Mall. In this area, linear planting beds, and potentially and water features, symbolically connect the NIH Stream with the center of the campus. The section also shows the accommodation of a vehicular roadway (if needed) adjacent to Building 8A.

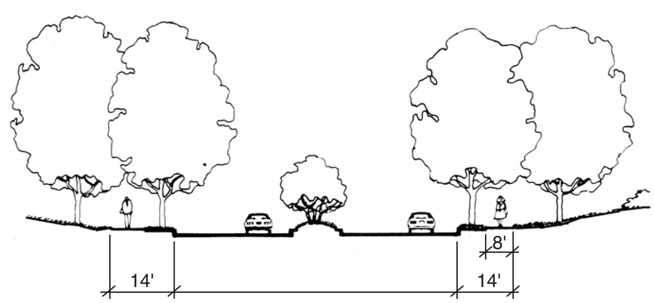
- **Section E** is the typical loop road section, with street trees planted on each side and ornamental trees planted in the median. Where possible, it is recommended that pedestrian walkways be separated from the roadway by a minimum 6-foot planting strip.



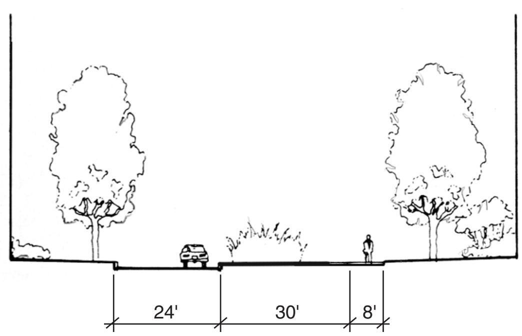
(A) SECTION @ CENTRAL MALL



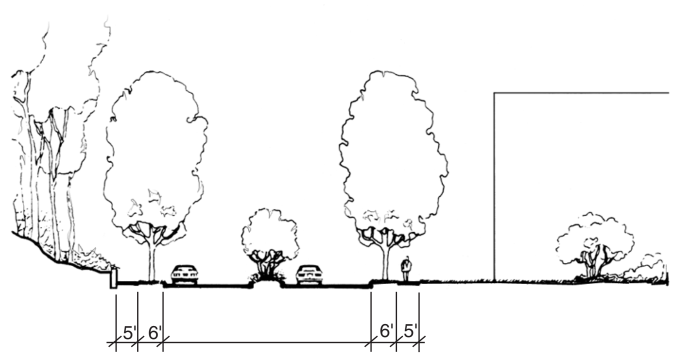
(B) SECTION @ NORTH SIDE OF CLINICAL RESEARCH CENTER



(C) SECTION @ MAIN CAMPUS ENTRY ON CENTER DRIVE & ROCKVILLE PIKE



(D) SECTION @ EAST-WEST PEDESTRIAN WALKWAY



(E) TYPICAL LOOP ROAD SECTION

Figure 6.5.2-b

Landscape Special Areas

6.5.3 Streetscape/Pathscape

The NIH is currently considering a comprehensive streetscape, signage and lighting master plan. The plan will include recommendations for the enhancement of existing streetscape design and pathscape according to street type, location, and physical condition of existing streetscape and paths.

Street Tree Recommendations

The primary planting objective for main campus entry roads and the loop road system around the central core area should be to define the campus streets as continuous spatial corridors and to create a uniform appearance. The use of a uniform tree type and spacing will help control the variation of landscape, building conditions and setbacks along the campus streets. As a general rule, the Master Plan recommends the use of large deciduous trees along streets in order to form a continuous canopy that will provide foliage at a height from fifteen to sixty feet above the ground, while allowing open views below the branches.

The sycamore (London Planetree), which grows in numerous locations throughout the NIH campus and is commemorated as the Tree of Hippocrates near the National Library of Medicine, is proposed as the keystone tree planting for the central campus bosques. Due to its symbolic importance and ability to survive in an urban setting, this species is proposed to be used as linear tree bosques within the Campus Core, both to frame the Central Mall and help form and articulate important building entries and gathering spaces. It is also recommended that sycamores be used as a bosque planting between the loop road section north of the Clinical Research Center. These dense tree bosques would also serve to reduce the scale of the buildings and provide more intimate spaces for patient and staff use.

Suggested street tree planting of the primary entry from Rockville Pike consists of a double row of Red Maples. Planting along the interior loop road is proposed as a single row of street trees, consisting of combinations of Willow, Laurel and Sawtooth Oaks to reduce monoculture concerns yet maintain a consistent size and similar tree form. Other entries to the campus should have informal tree plantings which relate to the indigenous types present, such as Tulip Poplars, White and Red Oaks, Ash, and Black Gums. These trees may also be planted with understory groupings of ornamental trees, evergreens and shrub plantings. In general, street trees should be selected which have deeper root systems in order to reduce potential future damage to walks and roadways. Additional tree species for consideration include Silver and Weeping Silver Lindens, Crownright Pin Oaks, and Halka Honeylocusts, which have a more uniform upright structure.

Detailed Streetscape Layout Recommendations

The typical streetscape proposed by the Master Plan is shown in Figure 6.5.3. Where possible, roadways should be bounded by planting strips of a minimum dimension of six feet to accommodate street tree planting. Within the planting strip there should be occasional paved areas for access to the curb lane of the street, and in highly traversed areas, continuous paving with tree grates may be required. Also accommodated within the planting strip are streetlight posts, information kiosks, and roadway regulatory and directional signage.

Beyond the planting strip is the pedestrian walkway, which is recommended to have a width of 5 feet minimum or 6 feet where space permits. In locations where room permits, walkway widths of six feet would allow the walks to accommodate service vehicles, if needed. Paths and walkways will generally be constructed of concrete or asphalt, however, special paving patterns and materials should be used to highlight key areas such as plazas and major building entrances. It is recommended that a

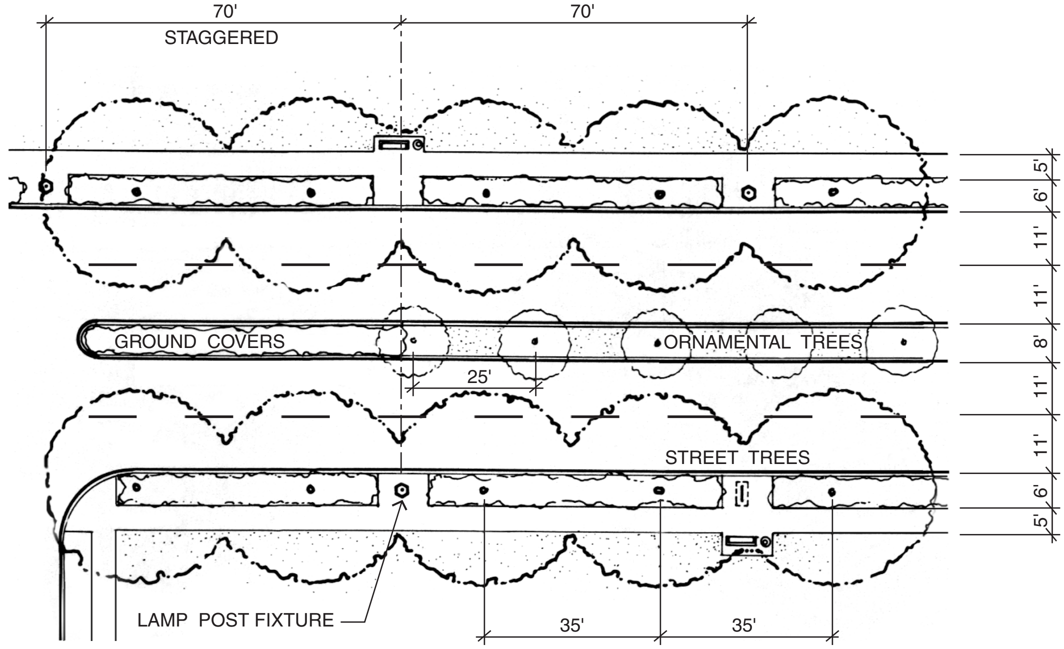


Figure 6.5.3

Streetscape Typical Plan

standard quality paving material be used throughout the campus to ease maintenance and enhance campus coherence. Also within this zone should be seating areas associated with building entries, bus and shuttle stops, and pedestrian gathering places. These should be furnished with comfortable benches, trash receptacles, pedestrian lighting and landscaping.

Currently site furnishings on campus are not well coordinated either by style or location. The Master Plan recommends that seating, receptacles, bollards, and kiosks, which are functional, easily maintained, and aesthetically compatible, be adopted for use throughout the campus. The use of durable wood and natural materials for site furnishings is encouraged. These elements will not only provide pedestrian scale and comfort, but also visually unify the campus environment. Special emphasis should be given to increasing seating areas through the use of low seat walls, picnic tables, and chairs throughout the campus, in order to improve the quality and location of outdoor places for eating and relaxation within the extensive grounds of the NIH campus.

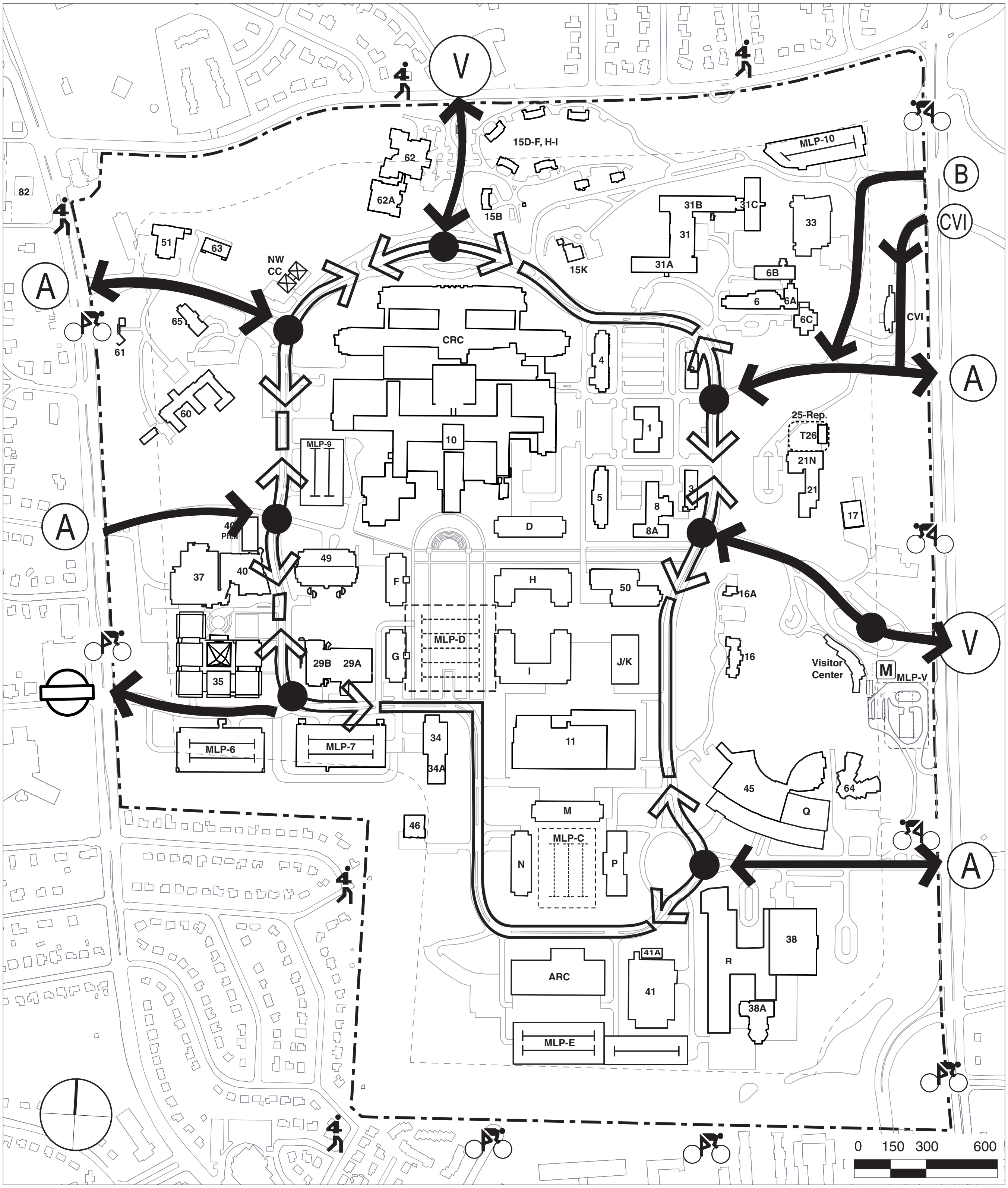
6.5.4 Exterior Signage

The NIH is currently considering a comprehensive streetscape, signage and lighting master plan. The plan will include recommendations for the upgrade or replacement of the existing signage system according to sign type, location, graphic quality, physical condition and maintenance, currentness of information, and adequacy of the amount of signage. The categories of signage which will be addressed include the following:

- **Orientation -** site maps near campus entries and area maps in the core of the campus.
- **Direction -** to major campus buildings and areas, both for vehicles and pedestrians. Notations of accessible routes for persons with disabilities.
- **Identification -** campus entry signage and exterior building and place signage.
- **Regulatory/Safety -** traffic and parking control, safety, and warning signage.
- **Information -** transit information, public announcements, etc.
- **Interpretive -** NIH tour signage, plant species signage, etc.

Figure 6.5.4 illustrates the key signage concepts proposed by the Master Plan. Visitor and staff entries should be clearly and coherently signed to both identify the NIH campus and create a positive first impression of the institution. At the juncture of each entry path (including pedestrian/bicycle paths) with the loop road there must be clear directional signage to major campus buildings. Where possible, a vehicular pull-off with a campus map should be provided at each major vehicular entry path. Along the loop road, signage should be consistent and become a clear orientation tool. A new Gateway Center for visitors containing information is indicated in the Master Plan at the Metro transit area. This location is clearly accessible to both public transit users and visitors arriving by automobile. Additional campus and transit information will be located at the Campus Center (Building L) and at the Clinical Research Center (CRC).

Signage character should be clearly legible and should be of a quality appropriate to a world renowned institution. There should be design compatibility among all campus sign types. Signage placement should also be carefully considered to avoid visual clutter. Specifically, regulatory and traffic signage should be reviewed to determine if more compatible signage designs can be implemented rather than the standard uniform roadway signs which are now used.



NOTE: See Figs. 5.3.8-a&b for pedestrian and bicycle circulation plans.

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Figure 6.5.4

Signage Concept Plan

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Oudens & Knoop, Architects, P.C.

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6.5.5 Exterior Lighting

The NIH is currently considering a comprehensive streetscape, signage and lighting master plan. The plan will include recommendations for the upgrade or replacement of exterior campus lighting according to light fixture type, location, light quality, fixture and lamp condition, and adequacy of the number of light fixtures. Categories of lighting, which should will be addressed, include the following.

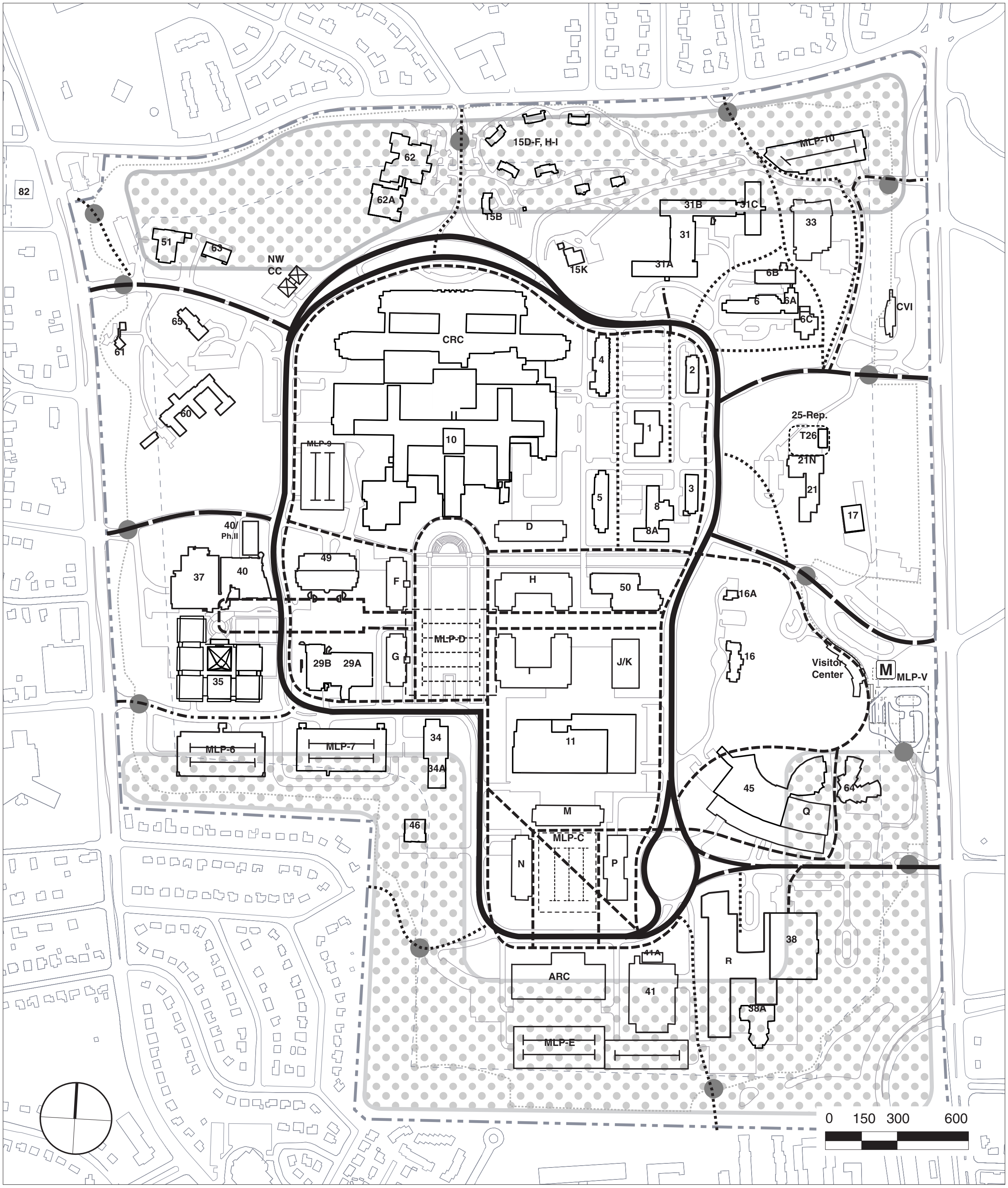
- **Street -** for vehicular safety and general campus illumination.
- **Intersection -** special lighting at roadway intersections.
- **Pedestrian -** for pedestrian safety and path marking.
- **Building -** to identify building entries and provide security.
- **Safety/Security -** for areas of the campus, that pose danger or require surveillance.
- **Signage -** at major entry locations and for key directional and orientation signage.
- **Special Features -** building or landscape highlighting, special outdoor spaces or monuments.

Figure 6.5.5 illustrates the major Master Plan lighting concept recommendations. The major campus entry roadways should be of a single lighting character to identify them as entryways. Loop road lighting should be of a second distinct character to provide coherence to the core of the campus. Within the campus core, lighting for major pedestrian pathways should create a consistent and unified framework which reflects the hierarchy of the principal paths. Branching out from this central framework, lower intensity pedestrian lighting should provide a network of lighted paths connecting all building groups on the campus. Of particular importance is the creation of well-lighted and secure pathways to the Metro station, for employees and visitors. In general, lighting should be less intense at the periphery than at the core.

Figure 6.5.5 also delineates a light control zone at the north and south ends of the campus. In these areas, special attention should be given to avoid spillover lighting into adjacent neighborhoods. Full-cutoff light fixtures, which allow no light to be emitted above a designated horizontal plane, should be used for roadways, walkways, parking structures, and buildings. Increased landscape screening should be provided in the buffer zone, and special architectural light screens should be considered where necessary.

There are currently many lighting fixture types on the NIH campus. The Master Plan recommends that all defined campus lighting systems (the loop road, major pedestrian framework, primary entries, etc.) each be of a single fixture type. Individual building projects may continue to differentiate fixture types for buildings and surrounding area lighting, within a complementary style to other campus lighting. In general, roadway light fixtures should be between 25 to 30 feet high, while major pedestrian path fixtures should be between 12 to 15 feet high. Secondary pedestrian path fixtures may be pole mounted luminaires or bollard type fixtures.

Fixture lamps should be selected for energy savings, light quality, and maintenance characteristics. Metal halide, high-pressure sodium, or compact fluorescent lamps are preferred, and mercury vapor lamps are discouraged. Additionally, it should be recognized that simply increasing lamp wattage is not always the correct solution to a perceived lighting problem. Other factors such as light direction, light quality, surface reflectance, and contrast with surrounding areas can affect perceptions of security and character.



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LOOP ROAD LIGHTING

PRIMARY ENTRY LIGHTING

SECONDARY ENTRY LIGHTING

MAJOR PEDESTRIAN PATH LIGHTING

SECONDARY PEDESTRIAN PATH LIGHTING

LIGHT CONTROL ZONE

FENCELINE

CONTROLLED ACCESS GATE

Figure 6.5.5

Lighting Concept Plan

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6.5.6 Utilities

Power Plant Expansion

According to the Master Utilities Plan and 2000 Update, the central Power Plant capacity must be expanded to meet future growth projections. Figure 6.5.6-a shows the Master Plan recommended guidelines for the Power Plant expansion. Future projected expansion includes Boiler 7, additional chillers/cooling towers, utility tunnels running to the ease and south of building 11, and possibly additional electric power facilities or substation. Steam generation facilities are located in the northern half of Building 11, chilled water in the southern section. Future Boiler 7 would be located on the north side of of Building 11 to the east of the COGEN facility. Additional space is available for other uses. Future expansion of the central refrigeration plant would be on the east side of Building 11. The MPW marshalling and storage functions in Building 25 , and the storage and maintenance functions in Building 22 and 22A, must be relocated before this eastward expansion can occur to allow adequate access to the Power Plant, the Master Plan proposes a service court on the north and south sides of the facility. The minimum recommended distance between the Power Plant and adjacent development is 110 feet to allow sufficient maneuvering room for large trucks and emergency equipment. Power Plant service areas should be screened on all sides by minimum eight foot high walls and landscaping. The south service yard is an important utility corridor that already has a high utility density, and this function will continue in the future. The Master Plan proposes this corridor as the potential route or alignment for major relocations of NIH stormwater and sanitary sewer trunk lines that are necessary for East Quad development.

The two existing 500,000 gallon distillate oil fuel tanks on the east side of Building 34 must be relocated prior to construction of the loop road in this area. The Master plan recommends replacing them with equivalent storage capacity on the south side of Building 11.

The Master Plan locates significant pedestrian paths at the west end of Building 11, requiring the relocation of loading functions to other sides of the facility. An expansion reserve area is planned for the east end of the complex, however, it should be set back substantially from Center Drive to avoid becoming an overwhelming mass on the entry side of the campus.

Utility Corridors

In all cases, new utility corridors should avoid existing buildings and development sites proposed by the Master Plan. As noted in Section 5.4.1, it is desired that utility corridors lie within roadways where possible. Excluding the proposed center median, the typical loop road condition allows for 40 feet of width for utility placement. Under more constrained conditions, the loop road section provides two ten to fourteen foot wide outside lanes below which utilities can be placed. This arrangement would allow at least one travel lane in each direction if repair access were needed. Additional utility lines could be placed outside of the roadway within a limited distance of the curb, leaving an easement to allow planting and walkways at the street edge. Figure 6.5.6-b shows the recommended allowable utility corridor areas ranked in their order of preference; first below the curb lane, second below the travel lane, and third outside of the roadway.

For utility systems design criteria, see the Master Utilities Plan, MUP 2000 Update, and Section 5.4 of the Master Plan 2003 update Environmental Impact statement.

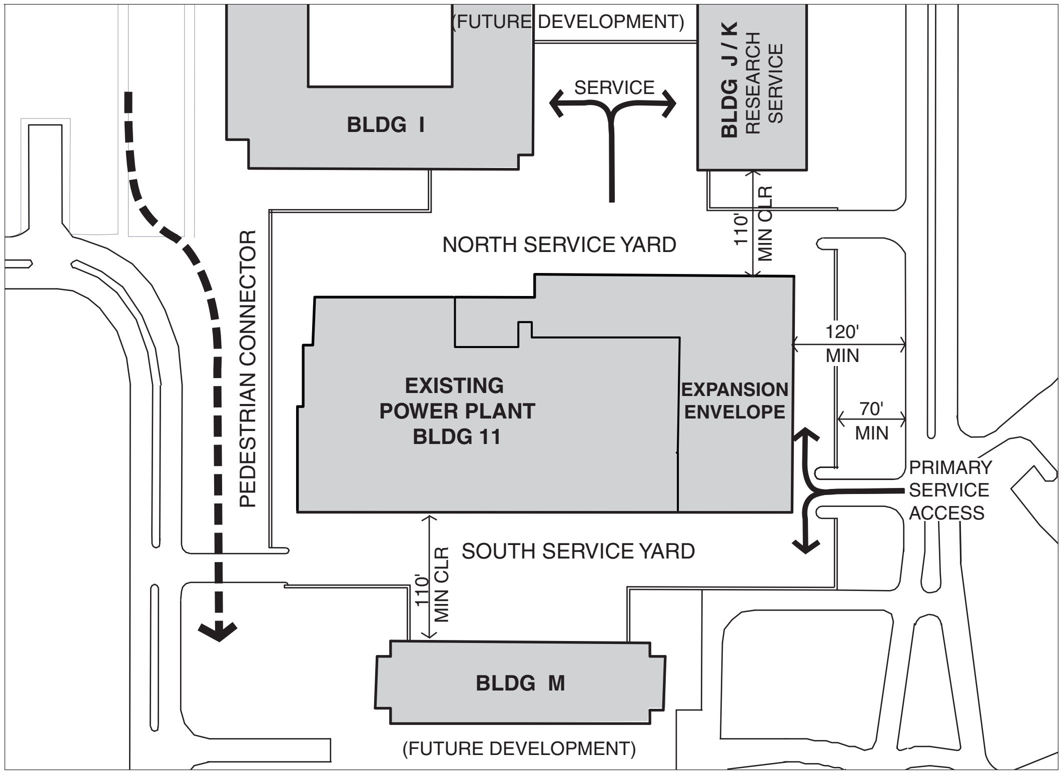

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Figure 6.5.6-a

Power Plant Expansion Guide

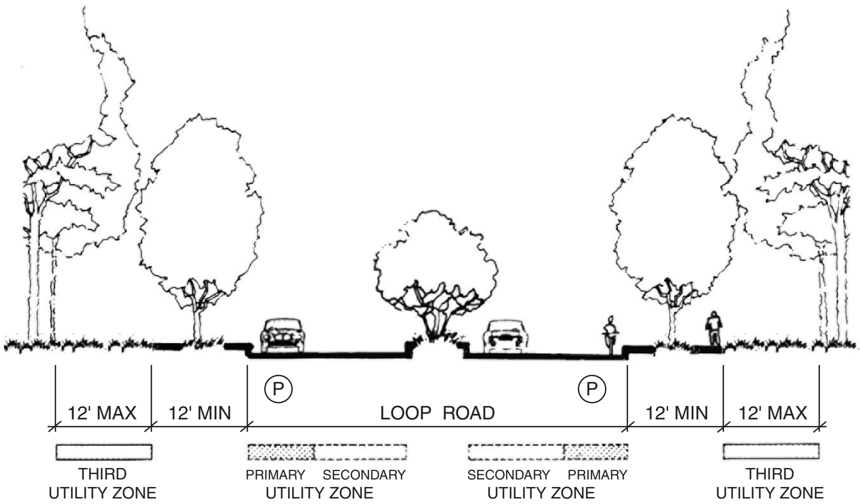

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Figure 6.5.6-b

Utility Corridor Section

6.6 Phasing

The following diagrams (Figures 6.6.1 through 6.6.4) and text describe the implementation of the Master Plan in five-year increments over the next twenty years. The purpose of the phasing analysis is to give guidance to the sequence of projects to be constructed on campus, to emphasize the priority of key developments, and to illustrate potential future development conflicts. Of particular importance is the development of a strategy to relocate or replace key functions to accommodate new construction in the central areas of the site closest to Metro access.

The phasing plan is based on a linear progression toward fulfilling the programmatic needs projected by the Master Plan. The actual growth and replacement rate on campus will depend on evolving national policy and budget decisions. The phasing illustrates issues and subsequent strategies affecting sequencing such as project priorities, replacement and demolition, and critical continuity of campus functions including services and infrastructure.

Establishing the framework and character of the campus is an important consideration. Priority should be given to implementation of projects, which define the key open spaces of the campus, such as the new lab building sites along the Central Mall. Emphasis should also be placed on projects which replace obsolete structures or which allow a more efficient use of land resources. The proposed Master Plan phasing can be summarized in five steps:

1. Construction of the Clinical Research Center (CRC);
2. Construction of Neuroscience Research Center (35/NRC) completing the West Quad research group;
3. Replacement of the Animal Facility and redevelopment of the Building 14/28 site for the South Quad research group;
4. Replacement of the Support and Computer Services facilities and redevelopment of the Building 12/13 site for the East Quad research group, and;
5. Completion of the Central Mall.

In each section, major activities are identified within a five-year period. At the end of each section a tabulation is given showing the total building area provided which corresponds with the building area target indicated in the Table of Bethesda Campus Growth set forth in Section 2.8.8. Square footage figures do not include structured parking areas.

First Phase Objectives and Relationships

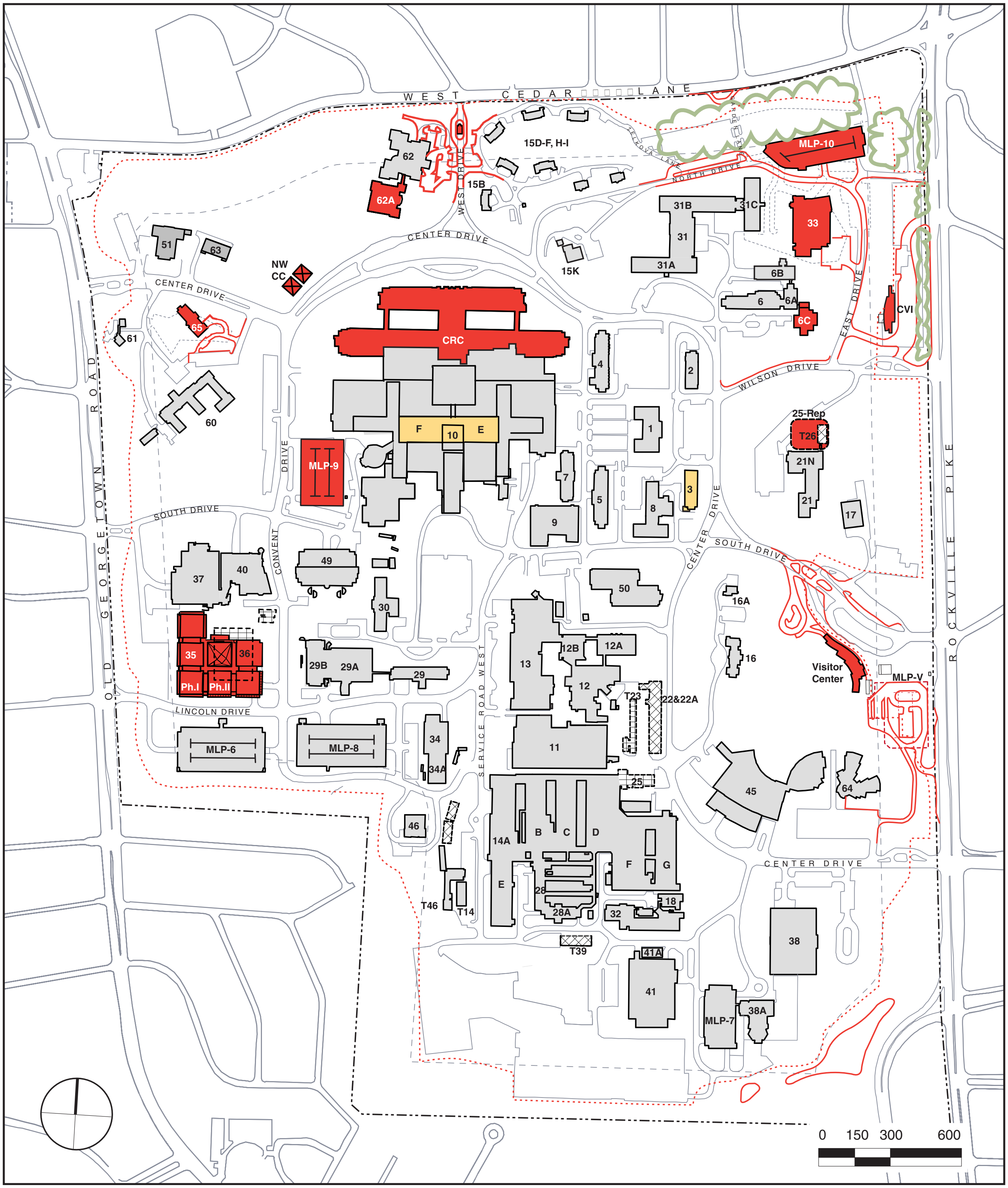
One of the greatest needs among NIH facilities is the timely upgrade of the Clinical Center Complex and completion of the Mark O. Hatfield Clinical Research Center (CRC), which is currently under construction. The Commercial Vehicle Inspection Facility (CVI) and the Gateway Center for visitors are also critical elements in the ongoing security improvements to the NIH facilities and campus environment as a whole.

To meet critical service needs due to the campus growth over the 20-year plan, projects proposed include expansions to the existing Power Plant (Building 11) throughout the implementation of the Master Plan. A new child care center at the northwest side of campus will be added to meet growing NIH child care needs.

Site character enhancements include the removal of buffer parking on the north and northeast sides of the campus, and enhancement of landscape screening to improve the buffer between NIH and adjacent neighborhoods along the south perimeter of the site. The new southeast pond will serve both to provide a parklike setting while providing storm water control.

Table 6.6.1 - First Phase

Existing Total GSF Area	**7,360,734**	**gsf**
Building 65 - Family Lodge	26,500	gsf
Building 62A - Childrens Expansion	34,000	gsf
Building 35 - Porter Neuroscience Research Center (NRC) - Phase I	265,000	gsf
Perimeter Fence + Gates		
Mark O. Hatfield Clinical Research Center (CRC)	1,050,000	gsf
MLP-10 - Multi-level parking at northeast corner of campus	0	gsf
replacing northeast buffer parking		
MLP - 9 - Multilevel Parking west of Clinical Center Complex	0	gsf
Remove remaining surface parking lots 31F and 31H	0	gsf
CVI - Commercial Vehicle Inspection Facility	3,719	gsf
Building 10 Stabilization - Patient Care Units, Floors 2-13, out-of-service	-297,756	gsf
Demolish Research Building 36	-236,285	gsf
Gateway Center (Visitor Center / Visitor Vehicle Inspection Station)	20,528	gsf
MLP-V - Gateway Center multi-level parking below grade	0	gsf
Research Builing 33	150,000	gsf
Building 6C - Addition to Building 6	16,500	gsf
Building 10 upgrades - no additional space	0	gsf
Building 35 - Porter Neuroscience Research Center (NRC) - Phase II	335,000	gsf
including West Quad landscape improvements		
Building 10 Central Core Project, Transition Program and Penthouse	49,227	gsf
Complete renovation of Building 3	0	gsf
Reassign Research Buildings 29A &29B	0	gsf
Renovate Building 10E&F Wings and North Corridor	-147,000	gsf
NWCC - Northwest Child Care Center	21,000	gsf
Demolish T-39 Fitness Center*	-5,160	gsf
25 Rep - Construct Replacement for Building 25 near Building 21	12,000	gsf
Demolish Building 22, 22A and 25	-20,255	gsf
Demolish Building T-23 and T-2	-5,871	gsf
Proposed Southeast stormwater management pond	0	gsf
Master Plan Development - Period sub-total	**1,274,147**	**gsf**
Cumulative subtotal end of First Phase	**8,634,881**	**gsf**



EXISTING BUILDING

NEW CONSTRUCTION

MAJOR RENOVATION

NEW MLP BELOW GRADE

DEMOLITION

LANDSCAPE IMPROVEMENTS

FENCELINE

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Figure 6.6.1

Phasing Plan First Phase

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Second Phase Objectives and Relationships

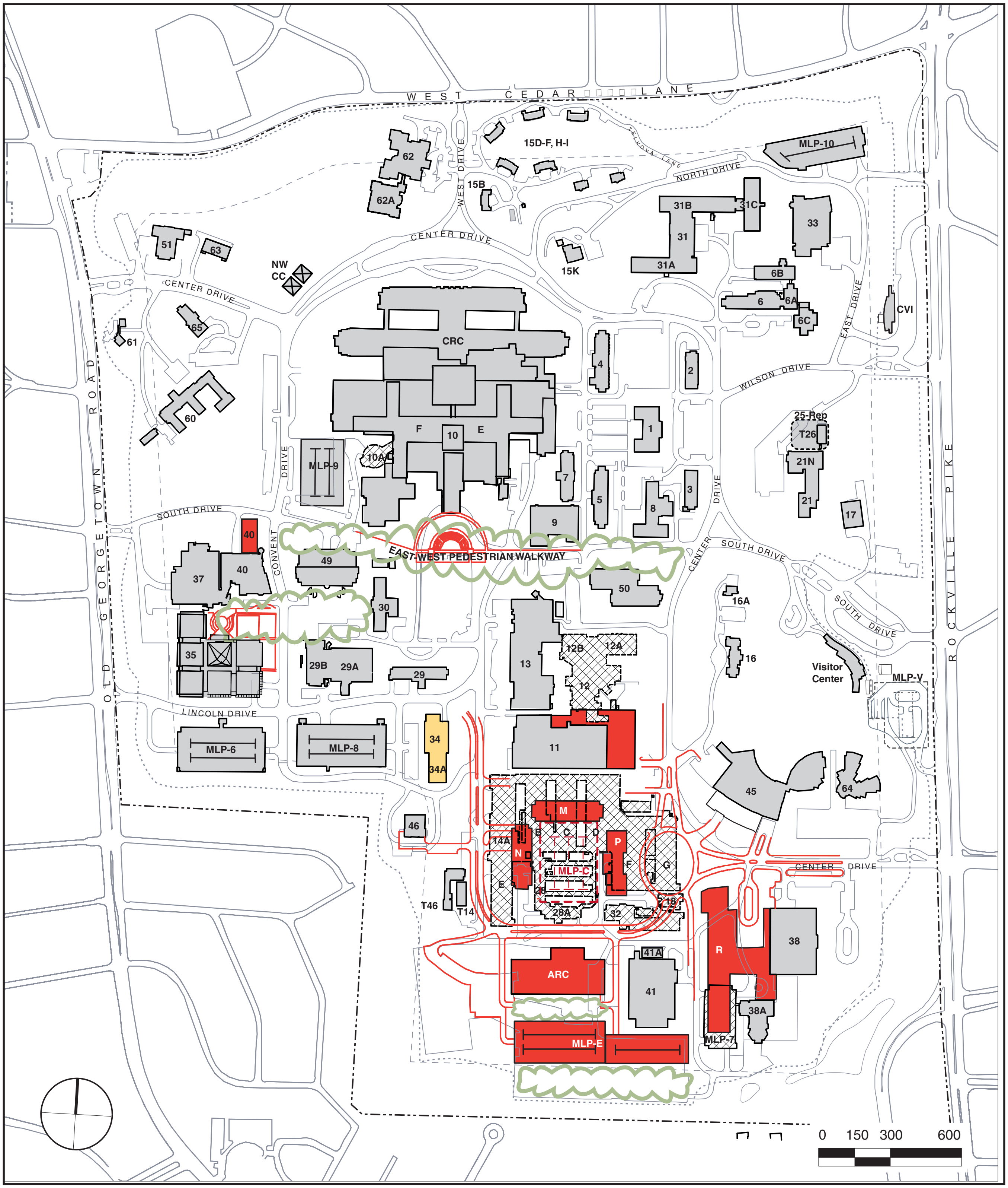
The major objective of this time period is the clearing of the Building 14/28 site for the future South Quad research development. To accommodate the demolition of the existing Animal Facility, which is considered obsolete, the ARC (Animal Research Center) must first be constructed. Construction of the south portion of the loop road should also be completed to improve internal access to this area of the site. The ARC would be the first research building in the South Quad to be constructed, and Research N would follow.

The Medical Pathological Waste (MPW) marshalling and management facilities located in Building 25 must be relocated to make room for any Phase III expansion of the central chilled water plant on the east side of Building 11. Building 25 operations would be moved to a new facility. For purposes of this Master Plan, the relocation of Building 25 is shown in the vicinity of Buildings 21 and T-26, allowing campus facilities for MPW, hazardous, and radioactive waste to be consolidated in one location. If required, the relocation could be done in conjunction with any upgrade or renovation of existing facilities in Buildings 21 and 21N at the site. Many regulatory requirements are involved in siting waste management facilities. Therefore, additional studies of potential relocation sites for Building 25 and details in the arrangement and orientation of facilities would be developed at the time of project implementation. The Master Plan only designates a generalized "site" or area for the Building 25 replacement (25-Rep) to indicate the recommended relocation of the MPW facilities to the Building 21 area. The generalized "site" could be extended to cover the entire Building 21 complex, if that building is involved in improvements at the time of the Building 25 relocation.

Site character enhancements for this phase include landscape/streetscape improvements near the Convent Building (Building 60) and in the Historic Core area. Upgrades are also proposed for the central east-west pedestrian walkway through the campus, along with construction of the amphitheater to help define the center of the campus as a gathering place. The second phase of multi-level parking E is at the south side of the ARC, to accommodate growing population needs. The remaining paved surface south of MLP-E is to be turned into landscape, screening the parking structure.

Table 6.6.2 - Second Phase

Cumulative sub-total end of First Phase	**8,634,881**	**gsf**
ARC - Animal Research Center	335,000	gsf
Demolish Buildings 14/28, 18, 32	-288,071	gsf
Southern Loop Road	0	gsf
Reseach Building M, South Quad	178,500	
Building 11 Phase III eastward Expansion (Boiler 7; Chillers 26-29)	35,000	gsf
Building 40 - Vaccine Research Center - Phase II	50,000	gsf
Research Building N, South Quad	137,700	gsf
MLP C - Multi-level parkingbelow grade at South Quad	0	gsf
Building 10, Reoccupy E & F Wings	444,756	gsf
Remove Portions of South Surface Parking Lot 41B/T1 and 41C	0	gsf
MLP E - Phase I	0	gsf
Demolish Building 10A	-56,000	gsf
Demolish MLP-7	0	gsf
Building R - Addition to the National Library of Medicine	389,370	gsf
Demolish 12, 12A, 12B making wat for East Quad	-156,236	gsf
MLP E - Phase II	0	gsf
Surface parking removal from South buffer and landscape improvements	0	gsf
Research Building P, South Quad	183,600	gsf
Remove Portions of South Surface Parking Lot 41B and 41C	0	
Reassign Building 34/34A (Campus Center)	0	gsf
Master Plan Development - Period sub-total	**1,253,619**	**gsf**
Cumulative subtotal end of Second Phase	**9,888,500**	**gsf**



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EXISTING BUILDING
NEW CONSTRUCTION
MAJOR RENOVATION
NEW MLP BELOW GRADE
DEMOLITION
LANDSCAPE IMPROVEMENTS
FENCELINE

Figure 6.6.2

Phasing Plan Second Phase

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Oudens & Knoop, Architects, P.C.

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Third Phase Objectives and Relationships

One major objective of this phase is the redevelopment of the central portion of campus for proximity both to the Clinical Center and Metro of more dense development. Research Building I and Research Service Building J/K are proposed to be built on the former building 12/13 site. Outdated buildings 29 and 30 are proposed to be replaced with modern research Buildings F and G.

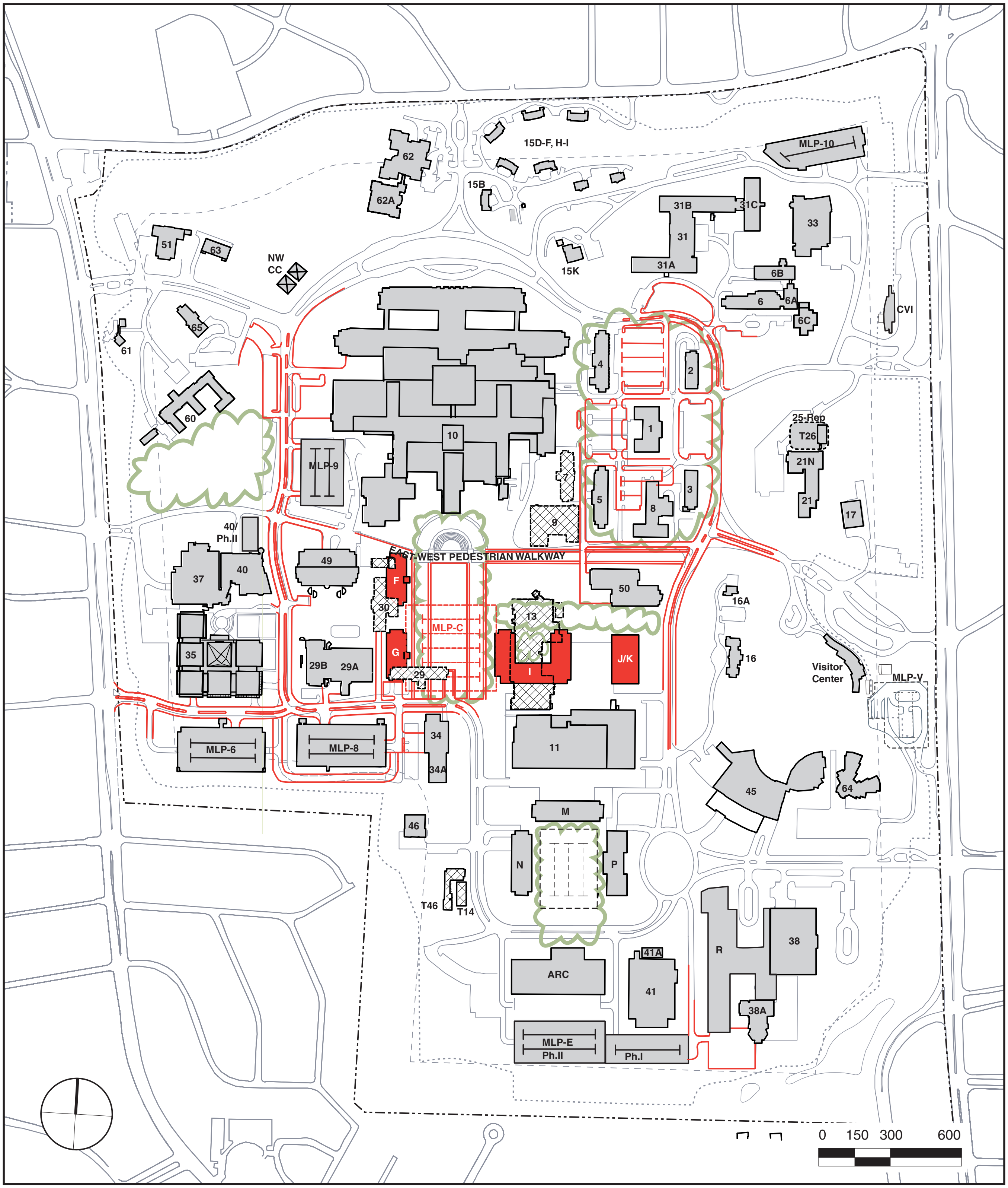
Another major objective is the completion of the Central Mall as the heart of the campus. With the enclosure edges provided by Buildings F, G, and I, the interior landscaping can be completed. The campus center proposed as part of an adaptive reuse of Building 34/34A will be the focal point at the south end of the Mall.

The South Quad research development will get finalized with the construction of labs M and P and by landscaping the plaza above MLP-C.

To accommodate projected campus population growth, construction of MLP-D below the Central Mall is proposed, along with upgrades to the east and west section of the loop road.

Table 6.6.3 - Third Phase

Cumulative sub-total end of Second Phase	**9,888,500**	**gsf**
Demolish Building 29	-89,949	gsf
MLP D, Central Mall Parking	0	gsf
Demolish Research Building 7 and 9	-81,360	gsf
Central Mall	0	
Building J/K - Research Services	212,175	gsf
Demolish Building 13	-212,690	gsf
Demolish T14	-4,000	gsf
Demolish T46 - Child Care Center	-3,000	gsf
Demolish Research Building 30	-93,940	gsf
Research Building I	249,900	gsf
Research Building G	112,200	gsf
Research Building F	149,600	gsf
Master Plan Development - Period sub-total	**238,936**	**gsf**
Cumulative subtotal end of Second Phase	**10,127,436**	**gsf**



EXISTING BUILDING

NEW CONSTRUCTION

MAJOR RENOVATION

NEW MLP BELOW GRADE

DEMOLITION

LANDSCAPE IMPROVEMENTS

FENCELINE

NIH Master Plan 2003 Update

Bethesda Campus

Figure 6.6.3

Phasing Plan Third Phase

HIH / ORF DFP

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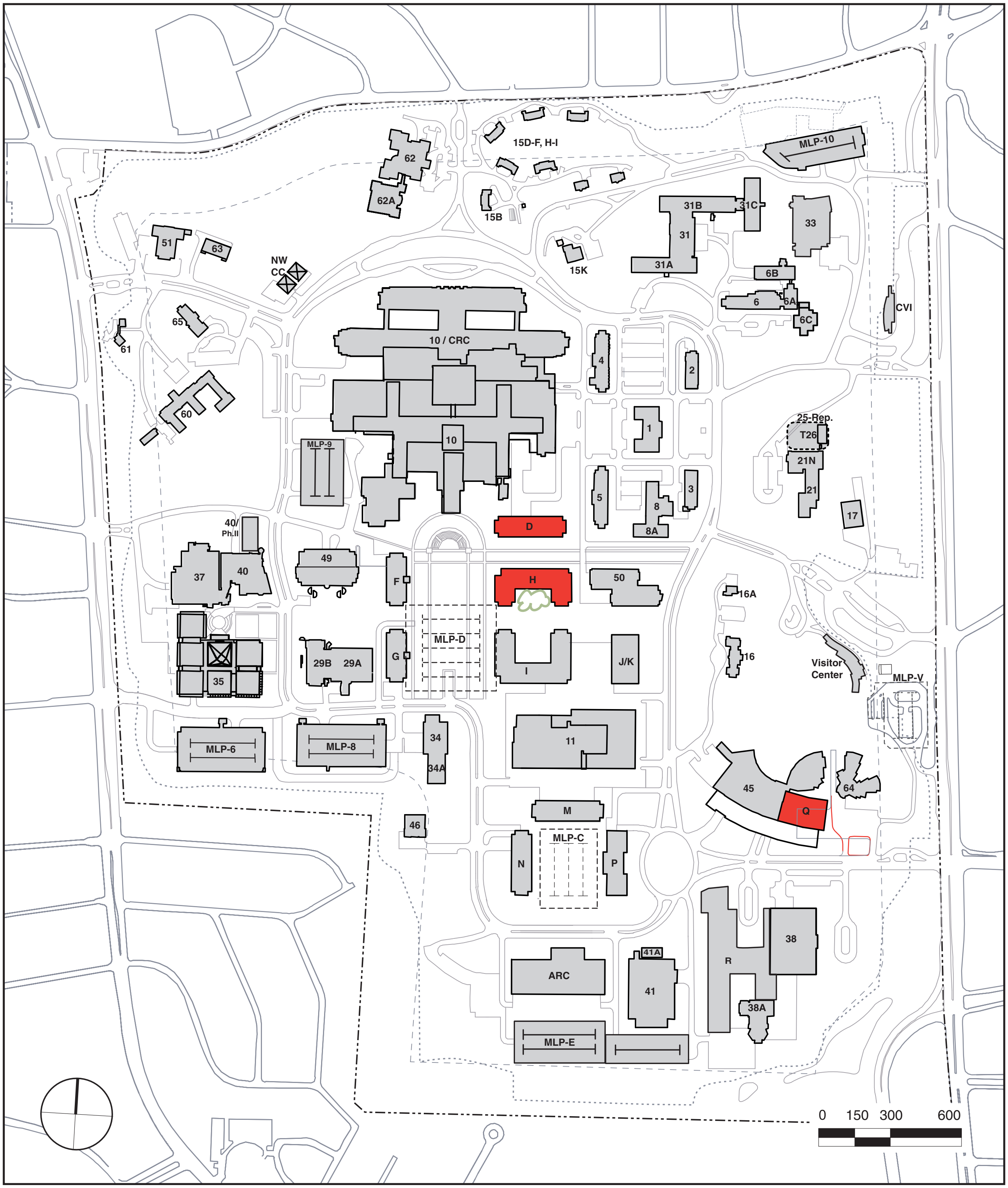
Final Phase Objectives and Relationships

The objective of this phase is the decompression of existing research buildings, to allow for an efficient and appropriate ratio of gross square feet per employee. Included in the final phase development, is proposed Building Q which will be an eastward extension of the Natcher Building containing administrative and office space.

Table 6.6.4 - Final Phase

Cumulative sub-total end of Third Phase	**10,127,436**	**gsf**
Remove Surface Parking Lot 45 (Natcher)	0	gsf
Office Building Q (Natcher Addition)	190,000	gsf
Research Building D	168,700	gsf
Research Building H (includes decompression of existing Research Buildings)	229,500	
Master Plan Development - Period sub-total	**238,936**	**gsf**
Cumulative subtotal end of Second Phase	**10,127,436**	**gsf**



	EXISTING BUILDING		DEMOLITION
	NEW CONSTRUCTION		LANDSCAPE IMPROVEMENTS
	MAJOR RENOVATION		FENCELINE
	NEW MLP BELOW GRADE		

NIH Master Plan 2003 Update

Bethesda Campus

Figure 6.6.4

Phasing Plan Final Phase

NIH / ORF / DFP

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6.7 Transportation Management

6.7.1 Background

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 or alternative work scheduling. 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.

Maintaining the transportation management plan as part of NIH administrative responsibilities is mandated in a Memorandum of Understanding (MOU) signed by the NIH, the Montgomery County Planning Board (MCPB), and the National Capital Planning Commission (NCPC) in May 1992. The MOU defined an agreement among these three agencies that:

1. the signatories will meet a minimum of two times per year to discuss NIH issues affecting NIH transportation;
2. the NIH commits to best faith efforts to meet its TMP and to seek funding for it; further, the NIH will monitor the success of the TMP with semi-annual traffic counts and annual evaluations;
3. the NIH will assess its parking needs and attempt to reduce its future parking demand to the extent practical;
4. NCPC and MCPB will evaluate future employment and parking in light of the NIH's success in implementing the TMP, and;
5. the NIH will implement other measures if current strategies prove unsuccessful.

The addendum to the MOU lists three goals for the TMP and a series of short-term and long-term strategies. These goals and strategies have provided guidance for the TMP activities, which the NIH has been carrying out, and for the Master Plan. The goals of the 1992 MOU TMP are as follows:

1. ***Improve the availability of parking spaces on campus for NIH personnel and visitors.*** (Note that one of the long-term strategies is to maintain the parking supply at the NIH at no greater than 0.5 parking spaces per NIH employee, consistent with the NCPC Comprehensive Plan for the National Capital, Federal Elements, Federal Parking Policies, 5.b and Diagram 4, plus additional parking spaces to serve the needs of visitors and patients. Additionally, NCPC has asked the NIH to reduce its employee parking supply below the 0.5 parking spaces per employee ratio.)
2. ***Mitigate the traffic impacts of future campus development on the roadways serving the NIH campus, such that the level of congestion is made no worse than if such development did not occur.*** (This means that NIH traffic should have no net impact on traffic conditions as compared with conditions, which would prevail if there were no growth. This has been interpreted into very specific criteria used in the impact analysis for the Master Plan.)
3. ***Maintain a "good neighbor" relationship with the surrounding community.*** (the NIH has established Community Liaison Council to air issues, including transportation and parking. From the standpoint of traffic and parking, the Master Plan and EIS mitigation measures define actions to reduce the NIH's traffic and parking impact on adjacent neighborhoods.)

For many years prior to the MOU, the NIH administration had engaged in efforts to manage its traffic and parking. This included provision of shuttle buses on campus to encourage employees and visitors to use Metrorail, Metrobus and Ride-On bus to access the campus. Shuttle buses have been provided so that trips between NIH facilities can be made without use of a personal automobile. Shuttle routes have also been provided between NIH locally leased properties and the Bethesda Campus, as well as between the main campus and satellite parking, to reduce demand for on-campus parking and/or vehicle trips to campus.

In addition to these efforts, the NIH has developed a telecommuting pilot program in which a number of employees work at home several days each week, and communicate with their offices using telephone, computer, and modem.

The following table offers a comparison of various factors relating to and influencing NIH-related traffic, both at the time of the 1995 Master Plan and at present:

	1995	2003
Number of Employees	16,500	17,511
Total Daily AM Peak Hour Trip Generation	5,242	4,190
Total Daily PM Peak Hour Trip Generation	5,138	3,159
Total Number of Parking Spaces	10,500	9,356
Number of Employee Transhare Participants	1,923	4,422

The above table shows several significant differences in the NIH's AM and PM daily trip generation and employee modal choice between 1995 and 2003. The above differences indicate that the TMP adopted as part of the 1995 Master Plan was successful in reducing peak hour traffic volumes and encouraging greater use of transit by employees. As a result, the current TMP seeks to build upon the NIH's success over the last five years in minimizing the NIH's traffic impacts, and continue to serve as a cornerstone for the NIH's transportation policy.

6.7.2 Ongoing TMP

In October 1991, the NIH created an Employee Transportation Services Office (ETSO), and staffed a position with the responsibility of coordinating Transportation Management Plan efforts.

In general, it is the responsibility of the ETSO to work with other administrative staff to monitor the effectiveness of existing NIH programs and adjust these programs to make them more effective. The ETSO also currently works as part of a NIH/Naval Medical Center/Suburban Hospital/Montgomery County DPW&T working group. It also works in conjunction with the local community and the North Bethesda Transportation Management District, to coordinate the NIH's transportation management program with the other member groups' TMP programs. The ETSO is a member of the Association of Commuter Transportation (ACT), which works with employers throughout various cities, and local and state agencies, to share alternative commuting ideas and strategies, and to promote these alternative transportation modes to organization member employees. On a daily basis, ETSO's Transportation Information Office provides NIH employees and visitors with public bus route and schedule information, including Metro, MARC, VRE, and MTA. In the future, the ETSO will continue to research new programs, and test and implement them if they prove to be effective.

The current efforts of the NIH ETSO include programs to encourage ride-sharing, use of public transportation, and use of private NIH park-and-ride facilities and services. The following list details each of the current NIH Transportation Management Plan's programs and features:

- NIH Transhare Program – This program was established in 1992 and originally provided employees a subsidy of $21.00 per month. As budgets permitted, the amount of subsidy and level of participation continued to rise. This program currently provides 4,422 employees a monthly subsidy of up to $100.00 for using public transportation. In exchange for program participation, NIH employees must surrender all parking permits and privileges for use of on and off-campus parking areas.
- NIH Carpool Program – This program allows employees to utilize strategically located "carpool" parking spaces that are located in close proximity to many potential on-campus destinations. The carpool spaces are reserved for employees with carpool permits until 9:30 A.M. Two or more people may participate in the program and each individual carpool member must surrender their individual "general" parking permit. There are currently 380 registered carpools (accounting for 760 NIH employees) on the NIH campus.
- NIH Vanpool Program – This program allows a group of employees to obtain an individually reserved space in the lot of their choice for a van. Vanpoolers (10 vanpools with 150 NIH employees) are eligible to participate in the NIH Transhare Program to subsidize their commuting cost(s).
- NIH Ridematching Program – Employees are provided with a list of other available people who are also looking to participate in the program from similar geographic areas. These lists are usually provided to employees within two business days of the request. The NIH ETSO is very active in promoting and facilitating this program through the maintenance of an accurate database listing of all of the participants. In conjunction with the Ridematching Program, the NIH also participates in the Washington Metropolitan Council of Governments "Commuter Connections" Program.
- MWCOG Guaranteed Ride Home Program – the NIH participates in this program, which is also sponsored by the Metropolitan Washington Council of Governments (MWCOG). The program ensures commuters who regularly carpool, vanpool, bike, walk, or take transit to work with a reliable ride home when they need to work overtime or in the event another unexpected reason to leave work arises. The ride, using a taxi or other transit, is free to the user.
- NIH Alternative Work Schedule Program – NIH offers an alternative work schedule program, which allows some NIH employees the opportunity to work one additional hour each day in order to receive one additional day off from work every two weeks.
- NIH Telecommuter Work Program – The NIH Telework Program enables eligible NIH employees to reduce or eliminate their commutes by working part-time or full-time from a remote location, including their home, a telework center, or some other approved site. "Telework", which is also known as "telecommuting", is a management tool that is designed to help organizations and individual's function more effectively and efficiently, as well as recruit and retain qualified employees. Long-term telework can be integrated into space planning and can also have a beneficial impact on the community and the environment by reducing site-generated traffic.
- NIH Shuttle System – the NIH has its own comprehensive shuttle system, which provides regular service to the whole campus and to all of its off-campus work locations. The shuttle system consists of seven routes, with one route serving just the campus as a "loop" route; the "loop" route runs with 10-minute headways while the other routes have headways which vary by route. The campus contains thirteen stops, which are all in close proximity to the buildings. Approximately 3,400 employees use this service during the workday. Several shuttle routes operate from 6:30 a.m. to well past midnight. After normal route times, the shuttle

operates as an escort service to transport employees to their vehicles. Three of the NIH Shuttle stops serve as transfer locations to other shuttle routes and the Montgomery County Ride-On and WMATA Metrobus systems. One of the transfer locations is located at the Medical Center Metrorail station located on campus, where a rider may transfer to the Metrorail, Metrobus, or Ride-On bus systems.

- NIH Express Bus Routes – the NIH has worked with MCDPW&T, NNMC, and Suburban Hospital to implement several express bus routes which link the Bethesda Campus directly to the Milestone Park & Ride Lot in Germantown, MD, the Lakeforest Park & Ride Lot in Gaithersburg, MD, Tyson's Corner in Virginia, and the New Carrollton Metro Station in Prince George's County, MD. These express buses operate during the morning and evening rush periods.
- Off-Campus NIH Satellite Parking – There are currently 575 spaces available to NIH employees at off-campus, satellite locations. The satellite spaces are located in lots strategically located at Metrorail stations or close to NIH employment centers. Employees can park for free at these locations and then either ride Metrorail or an NIH shuttle bus to the campus, depending upon the location.
- NIH Construction Contractor Parking – NIH requires construction contractors to park in off-campus locations. There are currently 150 off-site spaces provided for construction contractor parking, and NIH operates a dedicated construction employee shuttle during the morning and evening rush periods, between the off-site parking and NIH campus. These shuttles do not travel on residential streets.
- Managed NIH Parking Facilities – For those employees who must drive to work, a parking management company has been utilized to assist in parking employees and visitors to the NIH campus. This allows for increased efficiency in the utilization of several parking facilities on campus, and results in more overall campus parking capacity. The managed parking also discourages illegal or lengthy parking and enhances the security of the parking areas.
- NIH/NNMC/Suburban Hospital Working Group – This group meets quarterly and on an "as needed" basis to review transportation issues which affect the three institutions in a coordinated manner. This group was instrumental in the establishment of the numerous express bus services between the NIH local area and Virginia, Montgomery County, and Prince George's County.
- Paid NIH Visitor Parking – the NIH has implemented paid visitor parking on the Bethesda Campus to
discourage non-visitors from parking in visitor parking spaces on-campus.
- Information and Communication Systems – the NIH is developing enhanced transportation systems information for employees and visitors to provide greater opportunity for them to choose the best transportation and parking alternatives for their commute and trip to the campus. These systems include the following:
    - o Official NIH Website – the NIH provides updated parking, transit, and transportation demand management (TDM) information to employees and visitors to promote awareness of our robust TDM plan and parking/transportation system.
    - o Highway Advisory Radio (Emergency Broadcast System). The NIH installed and operates a Highway Advisory Radio (HAR) system on the campus. At the present time, this system is used to provide information regarding current facility and operational status and situations, and to inform them of upcoming changes in the parking and traffic facilities.
    - o Real-time Bus Arrival Forecasts. The NIH has contracted to install this system that will provide "real-time" shuttle arrival information to shuttle users at on-campus shuttle stops through the use of electronic signs.
    - o Personal Digital Assistant Access to the Website. The NIH has developed the capability for employees to access information on the Website using Blackberry PDA's.
- NIH Employee Education/Promotional Events – The NIH ETSO is proactive in

stressing the importance of using transit and participating in other alternative transportation programs to NIH employees. One way the TSO educates new NIH employees about commuting options is through the monthly employee orientation programs. The ETSO also holds NIH Commuter Transportation Fairs. At each of these events, many vendors are present and provide NIH employees with numerous commuting options (vanpool, carpool, transit, commuter buses, Guaranteed Ride Home Program, bicycling, etc.)

Monitoring the effectiveness of existing programs is a continuing activity on which the NIH ETSO office will report on a regular basis to the MCPB and the NCPC as part of its MOU commitment. The first results of these monitoring efforts were obtained in May 1993 when comprehensive traffic counts were conducted at all eleven NIH entrances. These traffic data were compared with 1992 surveys to determine the relative level of change in total campus trip generation during the morning and evening peak hour and for the three-hour peak periods in both the morning and evening.

The results of this monitoring work, which is continued every 6 months, are presented in the Traffic Monitoring Program Current Condition Surveys, the National Institutes of Health, Bethesda, Maryland, by Gorove/Slade Associates, Inc. Washington D.C. The principal finding of the most recent study is that the rate of vehicle trip generation and the absolute number of peak period vehicle trips generated at the NIH Bethesda Campus, has declined from 1992 to 2003 by approximately 33% during the AM peak hour and 45% during the PM peak hour. Thus, the MOU agreement and the effectiveness objectives of the TMP are being satisfied.

6.7.3 Future TMP Goals and Activity

Memorandum Of Understanding

Trip Generation

A primary goal of the NIH TMP is to mitigate traffic impacts such that the level of congestion is made no worse. This has been interpreted in this Master Plan 2003 Update to be a goal of reducing the rate of vehicular trip generation per employee such that growth in employment does not generate peak hour vehicular traffic which would exceed the ceiling for peak hour trip generation set by the MOU and established by the 1992 traffic counts conducted at NIH. This ceiling and the goals for the NIH TMP are calculated as follows:

The NIH has committed to not generate more peak hour trips than what prevailed at the time the Memorandum of Understanding was signed in May 1992. On this basis, a site generation limitation of 5,888 AM peak hour trips and 5,772 PM peak hour trips was established.

The October 2003 traffic-monitoring program revealed that NIH was currently generating 4,190 AM peak hour trips and 3,159 PM peak hour trips. Thus, NIH's current trip generation rates are significantly below the MOU rates by 1,698AM peak hour trips and 2,613 PM peak hour trips, through TMP measures that have been enacted since 1992.

If the main campus employee population grows as estimated (approximately an additional 4,500 (26%) employees to an approximate total of 22,000), trip generation would theoretically by 1,074 AM NIH peak hour trips and 810 PM NIH peak hour trips, using a straight-line extrapolation. Therefore, the total AM NIH peak hour trips of 5,264 and the total PM NIH peak hour trip of 3,969 will still be below the MOU-based limits of 5,888 AM peak hour trips and 5,772 PM peak hour trips.

6.7.4 Future TMP Activities

As part of the Master Plan process, a broad range of enhancements to the current TMP have been identified, which are considered to have a potential for effectiveness in meeting TMP objectives. These candidate programs have been screened in an open forum discussion among those NIH offices now responsible for transportation and parking. Furthermore, preliminary screening of candidate program enhancement has been made based on estimates of their potential cost and range of likely effectiveness. Coupled with these efforts, more effective techniques for monitoring TMP programs are being reviewed and will be implemented. In addition to maintaining and continually striving to improve all of the existing TMP programs, specific additional enhancements to the current TMP which are being considered are as follows:

1. Expand the use of managed parking.
   Rationale: Managed parking gives NIH the flexibility to provide adequate parking at times when demand exceeds self-park capacity, especially when construction projects cause NIH to close down part of the campus parking supply. The managed parking also discourages illegal parking and enhances the security of the parking areas.
2. Restructure routings of transit services and waiting areas on campus to establish a transportation center from which all services emanate, possibly located at the new Clinical Research Center or new NIH Gateway Center for Visitors. Consider providing a permanent taxi-stand at such a location that might be the base for Emergency Ride Home (ERH) services.
   Rationale: A central transportation terminal may be a more efficient means of delivering services and communicating service information to employees. Possibly relocate the Transportation Information Office there.
3. Work with county to discourage illegal parking in nearby residential neighborhoods, including NIH contractors and construction workers.
   Rationale: Unless county parking restrictions in the adjacent neighborhoods are regularly enforced, nearby neighborhoods will remain attractive to NIH visitors and contractors who wish to avoid parking fees.
4. Initiate further promotional and marketing activities for transit, such as services similar to those employed by Transportation Management Associations. For example, arrange discounts with Bethesda CBD merchants and restaurants (through the Chamber of Commerce or the Bethesda Urban Partnership) for Transhare participants and car/vanpoolers.
   Rationale: In addition to providing Metrochecks at The Recreation and Welfare (R & W) Store, additional marketing of services can be conducted, through The R & W Store in order to provide further inducements to encourage transit use by employees. Chamber members could benefit by using this as an opportunity to increase business. While not the deciding factor to utilize other modes, popular merchandise and other discounts will contribute to the attraction of the alternative modes.
5. Seek to ensure good transportation linkages between new campus construction, especially for office buildings, to the Metrorail station, NIH Gateway Center, and/or to a new transportation center.
   Rationale: A pleasant walking experience between office facilities and transit modes is a substantial inducement for transit use.
6. Employee Education. Continue to expand the ETSO's educational effort with top NIH management and campus personnel stressing the benefits of alternative transportation. This would include posting detailed information regarding bicycle routes located throughout the Washington Metropolitan area, on the NIH

website. Easily accessible bicycle route information would aid bicyclists in traveling to/from the Bethesda campus from off-site locations, and may encourage employees who are unfamiliar with the existing metropolitan area bicycle route system to bicycle to/from the Bethesda campus.

7. Increase the number of employee carpools
   Rationale: A much more intensive marketing of this transportation demand management measure to NIH employees would reduce the amount of NIH-related single occupant vehicles (SOVs).
8. Conduct Annual Employee Transportation Surveys
   Rationale: Annual transportation surveys given to NIH employees would allow the ETSO to better monitor employee transportation needs on a more continual basis and suggest changes to the NIH Transportation Demand Management (TDM) program to maintain the TDM program's relevance and effectiveness.
9. Review and Enhance Current Telework Program Policy
   Rationale: When revised and fully implemented, the revised program policy will lower existing barriers to telecommuting, and enable managers and employees to integrate telecommuting more effectively into their organizations and further reduce commute traffic.
10. Increase Transhare
    Rationale: A much more intensive marketing of this transportation demand management measure to NIH employees would reduce the amount of NIH-related single occupant vehicles SOVs.
11. Parking Reduction. The following recommendations have been made regarding the reduction of parking at NIH and may be repetitive to the previously mentioned enhancements to the current TMP:
    - Maintain parking at 0.50 spaces per worker plus 97 additional spaces for visitors and patients by the year 2020. This parking ratio would be achieved through the maintenance of existing TMP measures, an adequate on-campus parking inventory, and incentives resulting in a measurable success in parking demand reduction. It would be contingent on the continued funding for the TMP (such as NIH TRANSHARE subsidy program, satellite parking). Federal legislation which would require NIH to charge visitors and/or employees for parking while allowing NIH to retain the revenues to cover operating expenses and subsidize additional TMP measures could expedite the achievement of the reduction of a lower employee-parking ratio.
    - Continue to encourage NIH employees to utilize transit and ridesharing in an effort to minimize NIH's trip generation during peak periods.
    - Continue to implement pedestrian- and bicycle-friendly recommendations of the NIH Master Plan 2003 Update, including the construction of more pedestrian and bicycle paths throughout the campus, and ensuring more secure bicycle storage provision
    - Continue to expand Alternative Work Schedule (AWS) to a more evenly distributed 5-day program utilization
    - Continue to expand telecommuting programs
    - Increase NIH TRANSHARE, and continue to explore subsidies for other modes: carpools/vanpools, bicycle, walking. Explore subsidies for NIH visitors, contractors, patients, and volunteers, which are not available under current law.
12. Study potential for enhancements to NIH Transportation Information and Communications Systems.

The NIH will monitor the information needs of its employees and study additional communications systems that could provide additional opportunities to improve their commute trip-making alternatives. For example, it would be desirable to communicate with employees who are already in transit either in private automobiles or on public transportation. Technology is available to accomplish this using off-campus highway advisory radio or variable message signs, "reverse 911" cellphone communications, audible wireless voice messaging, and other telecommunications technologies. This could alert commuters to specific conditions on the campus that may adversely impact their commute. It is anticipated that in the event of a traffic event such as an accident, change in the "Threat Level by the Department of Homeland Security", or some other type of emergency, motorists could be channeled to alternate NIH entrances/exits for an orderly arrival or departure, which will minimize traffic problems on major roadways leading to and from the campus. Also, the NIH is examining technology that would provide employees with real time information regarding occupancy of the on-campus parking facilities.

In August 2004, NCPC published an update of the 1989 Comprehensive Plan for the National Capital Region. The updated Comprehensive Plan changed the parking space per employee ration goal applicable to the NIH Bethesda campus from one space per two employees (0.50) to one per three employees (0.33).

This change occurred a few weeks before the Draft NIH Bethesda Master Plan 2003 Update went to press for publication. The Draft Master Plan Update and Environmental Impact Statement (EIS) are closely integrated with one another. A change in one document generally requires a change in the other. Development of the Draft Master Plan Update and Draft EIS was predicated on the 0.50 space per employee parking ratio indicated in the 1989 Comprehensive Plan, with a long term goal of 0.45. Changes to the draft documents to account for an 0.33 parking ratio goal would require a major replanning and environmental analysis effort.

NIH believes the 0.33 employee parking ration goal is unrealistically low. To resolve the situation, and based on consultation with NCPC during the draft document review process, NIH will complete an analysis or revised TMP during the next year to establish a new, mutually agreeable, employee parking ratio goal for the Bethesda campus in accordance with the NCPC 2004 Comprehensive Plan.

Practical changes in the parking goal and traffic conditions can start with the completion of an approved revised TMP. However, the long range 0.45 and 0.50 parking ratio goals have been retained throughout the Master Plan 2003 Update and Final EIS to remedy the need for extensive document changes. It is NIH policy to update the campus Master Plan every five years. Changes accounting for the new parking ratio goal as determined by the TMP, will be incorporated in the next Master Plan Update.

6.7.6 Conclusions

This section has outlined the principal goals of the NIH Master Plan TMP and the recommended activities to attain these goals. The analysis indicates that the goals may be reached to differing degrees with shifts in the mode choice distribution by 2020. By achieving these shifts:

- The MOU impact goal will be met since the peak hour trip generation of NIH will not exceed 1992 levels.
- The NIH will manage its parking supply so as to not exceed a parking ratio of 0.50 spaces per employee. As a result, the parking supply for employees can equal 11,012 spaces in 2020 to comply with NCPC guidelines.

Appendix A

Applicable Federal Regulations

A.1 The following laws and regulations that impact the master planning process, as it applies to the Public Health Service facilities planning program, are listed in the PHS Facilities Manual.

A.1.1 National Environmental Policy Act of 1969, as amended (NEPA) (42 USC 4321 et seq.) This law prescribes the consideration that federal agencies must give the impact of their actions on the human environment.

A.1.2 The Clean Air Act of 1970 (42 USC 7401 et seq.). Authorizes EPA to establish national standards for air quality to protect the public health and welfare. It is a comprehensive and complex Federal statue for the prevention and control of air pollution from stationary and mobile sources.

A.1.3 Clean Water Act of 1977, as amended (33 USC 403 et seq., 33 USC 1344 et seq., 33 USC 1413 et seq.) Army Corps of Engineers. Prohibits release of discharges to navigable waters without a National Pollution Discharge Elimination System permit.

A.1.4 Clean Air Act Amendments of 1990 (Pub. L. 101-549, 42 USC 7401-7671q). The amendments accelerate the schedule for pollutant emission reductions from mobile and stationary sources, and set many new requirements for reduction of air toxins by 75%, including reduction of sulfur dioxide emissions, phase out of chloroflourocarbons, and use of cleaner fuels.

A.1.5 The Safe Drinking Water Act (42 USC 300f-300j-26). Authorizes EPA to determine if an action which will have an environmental effect on a sole or principal drinking water source would also constitute a significant hazard to a human population and, if so, to prohibit such an action.

A.1.6 National Historic Preservation Act of 1966 (16 USC 470-470x-6) and Implementation Procedures Contained in Federal Register Vo. 35, No. 23, February 3, 1970, Department of the Interior, National Park Service, National Register of Historic Places. Requires evaluation of the effect the proposed facility will have on historic properties listed or that may be eligible for listing in the National Register of Historic Places, and requires that the Advisory Council on Historic Preservation be notified and given reasonable opportunity to comment with regard to the undertaking.

A.1.7 Uniform Relocation Assistance and Land Acquisition Policies Act of 1970 (42 USC 4601-4655). This law sets forth the policy for fair and equitable treatment of persons displaced as a result of Federal and Federally assisted programs.

A.1.8 Housing and Urban Development Act. This law reflects national policies on urban growth.

A.1.9 Executive Order 11988, Floodplain Management. Prohibits construction or support of incompatible development in floodplains without determining flooding risks, identifying natural floodplain values and impacts, and mitigating impacts.

A.1.10 Executive Order 12372, Intergovernmental Review of Federal Programs, as amended. This Executive Order requires Federal agencies to under-take coordinated planning on an intergovernmental basis with local, regional and state agencies for coordination and review of proposed federal financial assistance and direct federal development.

A.1.11 Executive Order 12898, Environmental Justice. Requires federal agencies to identify and address disproportionately high and adverse effects of its activities on minority and low income populations.

Appendix B

Program Questionnaire and Interview

Oudens + Knoop Architects PC

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Chevy Chase, Maryland 20815-7003

Gerald F Oudens FAIA
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July 5, 2000

Dr.
National Institute of General Medical Studies
45 Center Drive, MSC 6200 (Room 2AN-12)
Bethesda, MD 20892-6200

Dear Dr. :

Pursuant to Dr. Kirchstein's letter dated June 6, 2000, we are contacting you to prepare for an interview in which we seek to determine NIGMS's needs as we plan for the research agenda of the future in the context of the 20 year NIH Master Plan 2000 Update. To assist your staff in preparing for the interview, we enclose memoranda of our interviews conducted with NIGMS in 1993 along with a copy of the questionnaire which provided the outline for the interviews. We also enclose personnel projections made by NIGMS staff in 1993 and a copy of the current NIGMS Mission Statement as it appears on the NIH web page.

For this Master Plan 2000 Update we would like you to review the memoranda of our 1993 meetings and advise of us significant changes that have occurred since these responses were recorded. We are particularly interested in the following:

a. Mission and Objectives
   Any anticipated or contemplated changes in mission and the impact of such change on personnel and other requirements.

b. Functional and Operational Relationships
   1) How each of the functions in NIGMS interact with each other, with other Institutes and Centers, including Building 10, the ACRF and the CRC at initial occupancy and long-term, and with other, non-NIH entities if any.
   2) If first class research space were available on campus or at convenient, close-in locations (such as the NNMC), what research activities would you consider locating outside of the Clinical Center Complex (CRC/Building 10/ACRF).
   3) Which functions and personnel, now on the main campus, can be located off-campus, and the conditions under which location off-campus would be workable.
   4) Which functions now located off-campus must be brought back and the reasons for this.

c. Personnel Needs
   In order to plan appropriately for NIH's facilities requirements, we would like to understand your IC's current staffing and future personnel projections for 2005, 2010 and 2020 from a program perspective. Please use the attached forms to provide data by personnel category at the division, program or branch level most appropriate to reflect your requirements. (A floppy disc with the forms in Excel is enclosed for your convenience.)

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Oudens + Knoop Architects PC

Dr.
July 5, 2000
Page 2

d. Clinical Research Center/Building 10/ACRF Resources
In addition to activities reported in the staffing projections, please note anticipated changes and/or growth in Clinical programs, as well as projected needs for inpatient, outpatient and diagnostic & treatment resources.

e. Animal Requirements
Describe your current and anticipated long range animal use and the types and numbers of animals required. Please note the functional, management and cost considerations that affect the location of your animal holding facilities.

f. Campus Quality
How do quality of life issues, i.e., the nature of the site; opportunities for socialization and collegiality; provisions for recreation, dining, fitness and other amenities; and conveniences of access and parking affect your ability to achieve your mission and what aspects are particularly important to you in this regard.

If you have not already been contacted, Ms. Paula Nazarian of this office will be calling soon to schedule an appointment for the interview. If you have any questions, please call me at 301-718-0080. If you would like additional information about the master plan and interview process, Ms. Stella Serras-Fiotes, Master Planner and Assistant Director for Facilities Planning, Office of Research Services, can be reached at 301-496-5037.

Sincerely,

Gerald F. Oudens

Gerald F. Oudens, FAIA
OUDENS + KNOOP ARCHITECTS, P.C.

cc:
Executive Officer
Stella Serras-Fiotes, ORS/OFP

GFO:pn
enclosures

Appendix B

Program Questionnaire and Interview

Please Respond in the space provided or attach additional pages as required. Please note "not applicable" where appropriate.

A. Mission and Objectives

1. Mission

A. Please review, in Attachment A, your current mission statement as reported in the 1991 NIH Almanac. Is this statement current and complete?

B. How do you envision the evolution of this mission in the future.

2. Organization and Programs

A. Please review the organizational listing presented in Attachment B and advise us whether it is current and correct with respect to activities and locations.

B. Please review, in Attachment C, the listing of programs, and activities within those programs, as precedented in the 1991 NIH Almanac and advise us whether this listing of programs and activities is current and complete.

C. How are intramural and extramural research programs or other services initiated? On what basis do you decide to pursue these on an extramural basis? On an intramural basis?

D. Please describe the relationship between you intramural and extramural research programs.

E. What are the benefits of an on-campus location for your office of extramural programs? Are there benefits to an off-campus location for this function?

F. Please describe your training programs and the way in which they influence space needs. To what extent are these accommodated in the laboratory setting and to what extent in classroom or conference space?

G. Please describe your current and anticipated long range animal use, the types and numbers of animals required and the functional, management and cost considerations that affect the location of the animal holding facilities.

H. Please describe your activities in the Clinical Center and, also, how these relate to the work of other ICD's in the Clinical Center.

3. Growth

A. What are the factors that precipitate growth, what forms may growth take, and to what extent can these be predicted?

B. Describe constraints which limit or preclude your response to pressures for growth.

C. To what extent do stipulations attached to funding dictate the activities of your ICD?

4. Long-Range Plan

A. Please discuss your long-range plan and your anticipated schedule for its implementation.

B. What impact would each of the following objectives, as presented in the Framework for Discussion of Strategies for NIH, have on your mission, programs and long-range plan?
1. Critical Science and Technologies
2. Research Capacity
3. Intellectual Capital
4. Stewardship of Public Resources
5. Public Trust

C. How and what extent, are each of the following anticipated by your long-range plan?
1. robotics
2. computerization
3. communications
4. other technologies

5. Functional and Operational Relationships

A. Please describe important locational relationships between administrative offices, programs, laboratories, and branches within your ICD.

B. Please describe important locational relationships between your ICD and activities within your ICD, and other ICD's and components of those ICD's.

C. Please discuss the degree to which your long range plan will change the organization of your ICD, functional relationships within the ICD and the organizational and functional relationships of your ICD to other components of the NIH.

6. Campus Quality

A. How do quality of life issues; i.e.; the nature of the site; the size, character and location of buildings; opportunities for socialization and collegiality provisions for recreation, dining and other amenities; convenience of access and parking; proximity of affordable housing; etc; affect your ability to achieve your mission, and what aspects of the campus are particularly important to you in this regard?

B. Human Resource Needs

1. Personnel

A. Please tabulate on Attachment D1 your current staffing by position and activity area.

B. Please tabulate on Attachments D2 through D4 estimated staff require ments by position and activity for programs to be continued and for anticipated new programs needed to support implementation of your long range plan, at short-mid and long-term (20 years) stages, as it is described in noted of the interview on Mission and Objectives.

C. Please discuss the composition of research teams, the range of staffing variations for these teams, and the team composition that might be considered average or representative of basic research activity.

D. Please discuss your staffing of Clinical Center activities and identify support services provided to you that are not under your direct control.

2. Computerization and Other Technology

A. How do you anticipate personnel planning will be affected by computer-ization, communications, automation, robotics and other technology?

C. Physical Resources

1. Facilities

A. Please be prepared to identify, on building plans to be brought to the interview by the architect, the locations and perimeters od spaces occupied by your ICD and of those spaces shared with other ICD's.

B. What changes do you anticipate in facility requirements based on computerization, communications, automation, robotics, and other technologies?

2. Standards

A. Do you maintain space standards for personnel and activities? Id so, please provide.

B. In each activity category, i.e., administrative offices, laboratories and support areas, please identify representative current spaces that respond well to the needs of that activity and be prepared to visit these spaces and describe how they are responsive to the needs of activity.

Appendix C

Missions of the NIH Institutes and Centers

The National Cancer Institute

The National Cancer Institute (NCI) is a component of the National Institutes of Health (NIH), one of eight agencies that compose the Public Health Service (PHS) in the Department of Health and Human Services (DHHS). The NCI, established under the National Cancer Act of 1937, is the Federal Government's principal agency for cancer research and training. The National Cancer Act of 1971 broadened the scope and responsibilities of the NCI and created the National Cancer Program. Over the years, legislative amendments have maintained the NCI authorities and responsibilities and added new information dissemination mandates as well as a requirement to assess the incorporation of state-of-the-art cancer treatments into clinical practice.

The National Cancer Institute coordinates the National Cancer Program, which conducts and supports research, training, health information dissemination, and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer, rehabilitation from cancer, and the continuing care of cancer patients and the families of cancer patients. Specifically, the Institute:

- Supports and coordinates research projects conducted by universities, hospitals, research foundations, and businesses throughout this country and abroad through research grants and cooperative agreements.
- Conducts research in its own laboratories and clinics.
- Supports education and training in fundamental sciences and clinical disciplines for participation in basic and clinical research programs and treatment programs relating to cancer through career awards, training grants, and fellowships.
- Supports research projects in cancer control.
- Supports a national network of cancer centers.
- Collaborates with voluntary organizations and other national and foreign institutions engaged in cancer research and training activities.
- Encourages and coordinates cancer research by industrial concerns where such concerns evidence a particular capability for programmatic research.
- Collects and disseminates information on cancer.
- Supports construction of laboratories, clinics, and related facilities necessary for cancer research through the award of construction grants.

National Eye Institute

The National Eye Institute (NEI) was established by Congress in 1968 to protect and prolong the vision of the American people. As one of the Federal government's National Institutes of Health (NIH), the NEI conducts and supports research that helps prevent and treat eye diseases and other disorders of vision. This research leads to sight-saving treatments, reduces visual impairment and blindness, and improves the quality of life for people of all ages. NEI-supported research has advanced our knowledge of how the visual system functions in health and disease.

Vision research is supported by the NEI through approximately 1600 research grants and training awards made to scientists at more than 250 medical centers, hospitals, universities, and other institutions across the country and around the world. The NEI also conducts laboratory and patient-oriented research at its own facilities located on the NIH campus in Bethesda, Maryland.

Because of continued Congressional and public support, the national investment in vision research has yielded substantial dividends to treat many potentially blinding eye diseases:

- Diabetic retinopathy. Laser technology is safe and effective in treating this disease that affects more than one-third of the nearly 10 million Americans who have been diagnosed with diabetes.
- Amblyopia. Atropine eye drops can treat amblyopia, the most common cause of visual impairment in children, and work as well as the standard treatment of patching one eye.
- Age-related macular degeneration (AMD). An NEI supported study showed that using high levels of antioxidants and zinc significantly reduces the risk of advanced age-related macular degeneration (AMD) by 25 percent.
- Glaucoma. The NEI has supported research on effective drugs that reduce elevated eye pressure, a significant risk factor for this blinding disease.
- Retinopathy of prematurity. Identifying a treatment called cryotherapy—which involves briefly freezing the outer periphery of the retina—has significantly reduced this potentially blinding eye disease in premature infants.
- Corneal stromal keratitis. NEI research discovered that an oral antiviral drug significantly decreases the recurrence of herpes of the eye and reduces the recurrence of corneal stromal keratitis, the more severe form of the disease.
- Cytomegalovirus (CMV) retinitis. Finding that ganciclovir implants into the eye are effective in treating this disease—which affects people with AIDS—has helped to significantly improve quality of life.
- Uveitis. Safe and effective drugs have been introduced against certain forms of this potentially blinding inflammation of the inside of the eye.
- Retinitis pigmentosa. A number of gene mutations have been identified as causing retinitis pigmentosa, which is a group of inherited diseases that affect more than 100,000 Americans. This research provides the first step in developing new strategies to prevent or control these blinding diseases.
- Leber's congenital amaurosis. NEI-supported scientists have demonstrated that inserting substitute genes into the eye restores sight to dogs born blind with this congenital retinal disease. These results may someday allow scientists to develop treatments that will restore vision to children blind from the same disease.
- Lasers for treatment of AMD, glaucoma, and myopia (nearsightedness). The NEI has contributed to the development of medical lasers to treat the wet form of AMD, diagnose and treat patients with glaucoma, and correct myopia and other refractive errors of the eye.

Although the NEI has done much to promote healthy vision, the future promises to bring even more pioneering advances:

- NEI-supported scientists are working toward transplanting healthy cells into diseased retinas. This research may lead to new treatments for people with blinding retinal diseases, including AMD and retinitis pigmentosa.
- Researchers are exploring gene-based treatments to slow some forms of retinal degeneration.
- NEI-supported scientists are developing "neuroprotection" methods that will prevent or slow glaucoma cell damage and promote the survival of retinal cells damaged by glaucoma.

Part of the NEI mission is to develop public and professional education programs that help prevent blindness, reduce visual impairment, and increase awareness of services and devices that are available for people with low vision. To meet these objectives, the NEI has established the National Eye Health Education Program (NEHEP), a partnership of over 65 professional, civic, and voluntary organizations and government agencies concerned with eye health. The program represents an extension of the NEI's support of vision research, where results are disseminated to health professionals, patients, and the public. The NEI is also the lead Federal agency for the vision and hearing chapter in Healthy People 2010, the nation's blueprint to improve public health.

National Heart, Lung, and Blood Institute

The National Heart, Lung, and Blood Institute (NHLBI) provides leadership for a national program in diseases of the heart, blood vessels, lung, and blood; blood resources; and sleep disorders. Since October 1997, the NHLBI has also had administrative responsibility for the NIH Woman's Health Initiative.

The Institute plans, conducts, fosters, and supports an integrated and coordinated program of basic research, clinical investigations and trials, observational studies, and demonstration and education projects. Research is related to the causes, prevention, diagnosis, and treatment of heart, blood vessel, lung, and blood diseases; and sleep disorders. The NHLBI plans and directs research in development and evaluation of interventions and devices related to prevention, treatment, and rehabilitation of patients suffering from such diseases and disorders. It also supports research on clinical use of blood and all aspects of the management of blood resources. Research is conducted in the Institute's own laboratories and by scientific institutions and individuals supported by research grants and contracts.

For health professionals and the public, the NHLBI conducts educational activities, including development and dissemination of materials in the above areas, with an emphasis on prevention.

The NHLBI supports research training and career development of new and established researchers in fundamental sciences and clinical disciplines to enable them to conduct basic and clinical research related to heart, blood vessel, lung, and blood diseases; sleep disorders; and blood resources through individual and institutional research training awards and career development awards.

The Institute coordinates relevant activities in the above areas, including the related causes of stroke, with other research institutes and federal health programs. Relationships are maintained with institutions and professional associations, and with international, national, state, and local officials as well as voluntary agencies and organizations working in the above areas.

National Human Genome Research Institute

The National Human Genome Research Institute (NHGRI) led the National Institutes of Health's (NIH) contribution to the International Human Genome Project, which had as its primary goal the sequencing of the human genome. This project was successfully completed in April 2003. Now, the NHGRI's mission has expanded to encompass a broad range of studies aimed at understanding the structure and function of the human genome and its role in health and disease.

To that end NHGRI supports the development of resources and technology that will accelerate genome research and its application to human health. A critical part of the NHGRI mission continues to be the study of the ethical, legal and social implications (ELSI) of genome research. NHGRI also supports the training of investigators and the dissemination of genome information to the public and to health professionals.

The direction and vision for the future for NHGRI and for genomics research - *A Vision for the Future of Genomics Research* - was released in April 2003, coinciding with the 50th anniversary of James Watson and Francis Crick's seminal publication of the structure of DNA.

National Institute on Aging

The National Institute on Aging (NIA), one of the 25 institutes and centers of the National Institutes of Health, leads a broad scientific effort to understand the nature of aging and to extend the healthy, active years of life. In 1974, Congress granted authority to form the National Institute on Aging to provide leadership in aging research, training, health information dissemination, and other programs relevant to aging and older people. Subsequent amendments to this legislation designated the NIA as the primary federal agency on Alzheimer's disease research.

The NIA's mission is to improve the health and well-being of older Americans through research, and specifically to:

Support and conduct high quality research on:

- aging processes
- age-related diseases
- special problems and needs of the aged
- Train and develop highly skilled research scientists from all population groups
- Develop and maintain state-of-the-art resources to accelerate research progress
- Disseminate information and communicate with the public and interested groups on health and research advances and on new directions for research.

National Institute on Alcohol Abuse and Alcoholism

NIAAA provides leadership in the national effort to reduce alcohol-related problems by:

- Conducting and supporting research in a wide range of scientific areas including genetics, neuroscience, epidemiology, health risks and benefits of alcohol consumption, prevention, and treatment
- Coordinating and collaborating with other research institutes and Federal Programs on alcohol-related issues
- Collaborating with international, national, state, and local institutions, organizations, agencies, and programs engaged in alcohol-related work
- Translating and disseminating research findings to health care providers, researchers, policymakers, and the public

National Institute of Allergy and Infectious Diseases

The National Institute of Allergy and Infectious Diseases (NIAID) is a component of the National Institutes of Health (NIH). NIAID conducts and supports research that strives to understand, treat, and ultimately prevent the myriad infectious, immunologic, and allergic diseases that threaten hundreds of millions of people worldwide.

The Institute's mission is driven by a strong commitment to basic research and the understanding that the fields of immunology, microbiology, and infectious disease are related and complementary. NIAID research centers on the four cornerstones of its Strategic Plan — immune-mediated diseases (and immune tolerance), HIV/AIDS, emerging infectious diseases, and vaccines.

National Institute of Arthritis and Musculoskeletal and Skin Disease

The mission of the National Institute of Arthritis and Musculoskeletal and Skin Diseases is to support research into the causes, treatment, and prevention of arthritis and musculoskeletal and skin diseases, the training of basic and clinical scientists to carry out this research, and the dissemination of information on research progress in these diseases.

National Institute of Biomedical Imaging and Bioengineering

The mission of the National Institute of Biomedical Imaging and Bioengineering is to improve health by promoting fundamental discoveries, design and development, and translation and assessment of technological capabilities in biomedical imaging and bioengineering, enabled by relevant areas of information science, physics, chemistry, mathematics, materials science, and computer sciences. The Institute plans, conducts, fosters, and supports an integrated and coordinated program of research and research training that can be applied to a broad spectrum of biological processes, disorders and diseases and across organ systems. The Institute coordinates with the biomedical imaging and bioengineering programs of other agencies and NIH Institutes to support imaging and engineering research with potential medical applications and facilitates the transfer of such technologies to medical applications.
In support of its mission the Institute will:

- Support research and research training through existing NIH funding mechanisms, and take the lead in exploring novel approaches for funding technology development and interdisciplinary research.
- Form partnerships with NIH Institutes and Centers to translate fundamental discoveries into research and applications for specific diseases, disorders, or biological processes.
- Coordinate with other government agencies to translate fundamental or crosscutting discoveries and developments in imaging and engineering, and related areas of information science and technology assessment, into biomedical applications.
- Encourage and support the development of relevant standards and guidelines that will enable widespread adaptability for biomedical imaging, bioengineering, and related information science and technology and computation, by taking a leadership and coordinating role for the NIH.

National Institute of Child Health and Human Development

The National Institute of Child Health and Human Development (NICHD) is part of the National Institutes of Health, the biomedical research arm of the U.S. Department of Health and Human Services. The mission of the NICHD is to ensure that every person is born healthy and wanted, that women suffer no harmful effects from reproductive processes, and that all children have the chance to achieve their full potential for healthy and productive lives, free from disease or disability, and to ensure the health, productivity, independence, and well-being of all people through optimal rehabilitation.

National Institute on Deafness and Other Communication Disorders

The National Institute on Deafness and Other Communication Disorders (NIDCD) is one of the Institutes that comprise the National Institutes of Health (NIH). NIH is the Federal government's focal point for the support of biomedical research. NIH's mission is to uncover new knowledge that will lead to better health for everyone. Simply described, the goal of NIH research is to acquire new knowledge to help prevent, detect, diagnose, and treat disease and disability. NIH is part of the U.S. Department of Health and Human Services.

Established in 1988, NIDCD is mandated to conduct and support biomedical and behavioral research and research training in the normal and disordered processes of hearing, balance, smell, taste, voice, speech, and language. The Institute also conducts and supports research and research training related to disease prevention and health promotion; addresses special biomedical and behavioral problems associated with people who have communication impairments or disorders; and supports efforts to create devices which substitute for lost and impaired sensory and communication function.

It is estimated that more than 46 million people in the United States suffer some form of disordered communication. NIDCD has focused national attention on disorders of human communication and has contributed to advances in biomedical and behavioral research that will improve the lives of millions of individuals with communication disorders. NIDCD has made important contributions to the body of knowledge needed to help those who experience communication disorders and to advance research in all aspects of human communication.

NIDCD accomplishes its mandate through the Division of Intramural Research, which conducts research in laboratories at the NIH, and the Extramural Research Program, a program of research grants, career development awards, individual and institutional research training awards, center grants, and contracts to public and private research institutions and organizations. As a whole, the Institute supports and conducts approximately 600 research projects. The Institute also conducts and supports research and research training in disease prevention and health promotion and the special biomedical and behavioral problems associated with people having communication impairments and disorders.

NIDCD's extramural grant portfolio demonstrates a balance of basic and clinical research. The intramural research program spans a variety of topics, including, but not limited to, the development of a vaccine against otitis media, the identification and characterization of genes responsible for hereditary hearing impairment, genes associated with neoplasms affecting human communication, and treatment of voice disorders.

National Institute of Dental and Craniofacial Research

The mission of the National Institute of Dental and Craniofacial Research (NIDCR) is to promote the general health of the American people by improving their oral, dental and craniofacial health. Through the conduct and support of research and the training of researchers, the NIDCR aims to promote health, prevent diseases and conditions, and develop new diagnostics and therapeutics.

National Institute of Diabetes and Digestive and Kidney Disease

The National Institute of Diabetes and Digestive and Kidney Diseases conducts and supports research on many of the most serious diseases affecting public health. The Institute supports much of the clinical research on the diseases of internal medicine and related subspecialty fields as well as many basic science disciplines.

The Institute's Division of Intramural Research encompasses the broad spectrum of metabolic diseases such as diabetes, inborn errors of metabolism, endocrine disorders, mineral metabolism, digestive diseases, nutrition, urology and renal disease, and hematology. Basic research studies include biochemistry, nutrition, pathology, histochemistry, chemistry, physical, chemical, and molecular biology, pharmacology, and toxicology.

NIDDK extramural research is organized into divisions of program areas:

- Division of Diabetes, Endocrinology, and Metabolic Diseases
- Division of Digestive Diseases and Nutrition
- Division of Kidney, Urologic, and Hematologic Diseases

The Division of Extramural Activities provides administrative support and overall coordination. A fifth division, the Division of Nutrition Research Coordination, coordinates government nutrition research efforts.

The Institute supports basic and clinical research through investigator-initiated grants, program project and center grants, and career development and training awards. The Institute also supports research and development projects and large-scale clinical trials through contracts.

National Institute on Drug Abuse

NIDA's mission is to lead the Nation in bringing the power of science to bear on drug abuse and addiction

Recent scientific advances have revolutionized our understanding of drug abuse and addiction. The majority of these advances, which have dramatic implications for how to best prevent and treat addiction, have been supported by the National Institute on Drug Abuse (NIDA). NIDA supports over 85 percent of the world's research on the health aspects of drug abuse and addiction. NIDA supported science addresses the most fundamental and essential questions about drug abuse, ranging from the molecule to managed care, and from DNA to community outreach research.

NIDA is not only seizing upon unprecedented opportunities and technologies to further understanding of how drugs of abuse affect the brain and behavior, but also working to ensure the rapid and effective transfer of scientific data to policy makers, drug abuse practitioners, other health care practitioners and the general public. The NIDA web page is an important part of this effort. The scientific knowledge that is generated through NIDA research is a critical element to improving the overall health of the Nation. Our goal is to ensure that science, not ideology or anecdote, forms the foundation for all of our Nation's drug abuse reduction efforts.

NIDA was established in 1974, and in October 1992 it became part of the National Institutes of Health, Department of Health and Human Services. The Institute is organized into divisions and offices, each of which plays an important role in programs of drug abuse research.

National Institute of Environmental Health Sciences

Human health and human disease result from three interactive elements: environmental factors, individual susceptibility and age. The mission of the National Institute of Environmental Health Sciences (NIEHS) is to reduce the burden of human illness and dysfunction from environmental causes by understanding each of these elements and how they interrelate. The NIEHS achieves its mission through multidisciplinary biomedical research programs, prevention and intervention efforts, and communication strategies that encompass training, education, technology transfer, and community outreach.

National Institute of General Medicine Sciences

The National Institute of General Medical Sciences (NIGMS) primarily supports basic biomedical research that is not targeted to specific diseases or disorders. Because scientific breakthroughs often originate from such untargeted studies, NIGMS-funded work has contributed substantially to the tremendous progress that biomedical research has made in recent years. The Institute's training programs help provide the most critical element of good research: well-prepared scientists.

NIGMS is one of the National Institutes of Health (NIH), the principal biomedical research agency of the Federal Government. NIH is a component of the U.S. Department of Health and Human Services.

Each year, NIGMS-supported scientists make major advances in understanding fundamental life processes. In the course of answering basic research questions, these investigators also increase our knowledge about the mechanisms involved in certain diseases. Other grantees develop important new tools and techniques, many of which have applications in the biotechnology industry. In recognition of the significance of their work, a number of NIGMS grantees have received the Nobel Prize and other high scientific honors.

National Institute of Mental Health

The National Institute of Mental Health conducts Strategic Planning for specific research areas as well as for the Institute as a whole. NIMH staff and experts, including the public, carry out this process of reviewing current research, and assessing areas of need and scientific opportunity. Generally both immediate goals and long-range goals are outlined as a guide to decisions about the NIMH research portfolio. Strategic planning often involves National Mental Health Advisory Council members and sometimes is in response to a request by that Council. The reports are usually internal documents to guide research planning.

National Institute of Neurological Disorders and Stroke

The mission of NINDS is to reduce the burden of neurological disease - a burden borne by every age group, by every segment of society, by people all over the world.
To support this mission, NINDS:

- Conducts, fosters, coordinates, and guides research on the causes, prevention, diagnosis, and treatment of neurological disorders and stroke, and supports basic research in related scientific areas.
- Provides grants-in-aid to public and private institutions and individuals in fields related to its areas of interest, including research project, program project, and research center grants.
- Operates a program of contracts for the funding of research and research support efforts in selected areas of institute need.
- Provides individual and institutional fellowships to increase scientific expertise in neurological fields.
- Conducts a diversified program of intramural and collaborative research in its own laboratories, branches, and clinics.
- Collects and disseminates research information related to neurological disorders.

National Institute of Nursing Research

The National Institute of Nursing Research supports clinical and basic research to establish a scientific basis for the care of individuals across the life span-from management of patients during illness and recovery to the reduction of risks for disease and disability, the promotion of healthy lifestyles, promoting quality of life in those with chronic illness, and care for individuals at the end of life. This research may also include families within a community context. According to its broad mandate, the Institute seeks to understand and ease the symptoms of acute and chronic illness, to prevent or delay the onset of disease or disability or slow its progression, to find effective approaches to achieving and sustaining good health, and to improve the clinical settings in which care is provided. Nursing research involves clinical care in a variety of settings including the community and home in addition to more traditional health care sites. The NINR's research extends to problems encountered by patients, families, and caregivers. It also focuses on the special needs of at-risk and underserved populations, with an emphasis on health disparities. These efforts are crucial in the creation of scientific advances and their translation into cost-effective health care that does not compromise quality.

NINR accomplishes its mission by supporting grants to universities and other research organizations as well as by conducting research intramurally at laboratories in Bethesda, Maryland. The research fosters interdisciplinary collaborations to ensure a comprehensive approach to research on health promotion, illness, and disabling conditions. This approach is especially relevant in research such as that aimed at long-term care for the elderly, the special needs of women across the life span, bioethical issues related to genetic testing and counseling, biobehavioral aspects of managing the prevention and treatment of infectious diseases, end of life care, and environmental influences on risk factors related to chronic illnesses. NINR research includes all age groups and is based on adequate gender and minority representation.

NINR's intramural investigations, with an interdisciplinary, patient-focused approach to human health and illness, are particularly suited to the research environment on the NIH campus. The unique clinical research facilities offer diverse opportunities for professional exchange and collaboration on questions related to patient care and quality of life. These studies also provide training opportunities that acquaint scientists with the research issues and clinical strategies employed by investigators in nursing research.

In addition, the Institute supports comprehensive research training and career development programs to prepare individuals with requisite skills to conduct nursing research in an interdisciplinary setting.

National Library of Medicine

The National Library of Medicine (NLM), on the campus of the National Institutes of Health in Bethesda, Maryland, is the world's largest medical library. The Library collects materials in all areas of biomedicine and health care, as well as works on biomedical aspects of technology, the humanities, and the physical, life, and social sciences. The collections stand at more than 7 million items—books, journals, technical reports, manuscripts, microfilms, photographs and images. Housed within the Library is one of the world's finest medical history collections of old and rare medical works. The Library's collection may be consulted in the reading room or requested on interlibrary loan. NLM is a national resource for all U.S. health science libraries through a National Network of Libraries of Medicine.

Centers

Center for Information Technology

To provide, coordinate, and manage information technology, and to advance computational science.

The vision of CIT is to be a vital partner in the discovery of biomedical knowledge.

Center for Scientific Review

- Serves as the central receipt point for all research and training grant applications submitted to the NIH. Also receives some of the applications submitted to other components of the Department of Health and Human Services (DHHS) and refers them to these components;

- Assigns all NIH applications to the appropriate institutes or centers for consideration for funding and also to the scientific review groups within CSR or other institutes or centers for review;
- Provides the scientific merit review of most research grant and fellowship applications submitted to the NIH;
- Provides staff support to the Office of the Director, NIH, in the formulation of grant and award policies and procedures; and
- Assists other NIH components in providing information on the NIH peer review system and information about the research grant and fellowship application process and procedures to the scientific community, the Congress, other NIH staff, and the general public.

John E. Fogarty International Center

Over the past four generations, public health tools and interventions resulting from research have dramatically improved life expectancy and quality of life. However, significant disparities continue to exist in global health status. Low- and middle-income nations suffer over ninety percent of the burden of premature mortality as measured in lost years of life. These countries, constituting three-quarters of the world's population, now share a double burden: The persistent cluster of infectious diseases and malnutrition that are responsible for 16 million deaths per year, of which many are children; and a growing incidence of chronic disease and disabilities due to increased life spans and new risk exposures that accompany the demographic transition.

In the United States, health disparities are evident within and among population groups. Genetic and environmental factors, nutrition, access to health education and services, behavior, and other factors are implicated in varying degrees as contributors to these disparities. Research advances made abroad may have a positive impact on U.S. populations through improvements in education or counseling strategies; development of diagnostics, drugs or intervention technologies; or through identification of new avenues of research that ultimately lead to health care interventions. In addition, basic knowledge gained through research studies conducted abroad contribute to the scientific foundation upon which U.S. and international medical studies are built.

Adapting research advances in biomedicine to populations at home and abroad requires a continuing commitment to basic science as well as rigorous clinical and applied studies. To address these needs, the Fogarty International Center (FIC) forges collaborations with a range of domestic and international partners in international research and training to pursue three core objectives. The first is to accelerate the pace of discovery and its application by enabling scientists worldwide to share conceptual insights, analytic methods, data sets, patient cohorts or special environments. The second is to engage and assist both young and established U.S. investigators to address scientific challenges related to global health. And the third is to help develop a cadre of highly capable young foreign investigators positioned to cooperate with U.S. scientists in areas of the world that, due to geography, population structure, or disease burdens, provide unique opportunities to understand disease pathogenesis, anticipate disease trends, or develop interventions.

These objectives form the conceptual basis for current FIC programs related to HIV/AIDS, emerging infectious diseases, maternal and child health, population research and demographic science, medical informatics, drug discovery from biodiversity, as well as fellowship programs for young Americans, with emphasis on under represented minorities. The disciplinary fields described are pursued through a range of funding mechanisms, including institutional training grants, cooperative agreements, small research grants, fellowships, and multilateral initiatives involving international organizations.

The Fogarty International Center promotes and supports scientific research and training internationally to reduce disparities in global health.

National Cancer for Minority Health and Health Disparities

The National Center for Complementary and Alternative Medicine (NCCAM) is 1 of the 27 institutes and centers that make up the National Institutes of Health (NIH). The NIH is one of eight agencies under the Public Health Service (PHS) in the Department of Health and Human Services (DHHS).

NCCAM is dedicated to exploring complementary and alternative healing practices in the context of rigorous science, training complementary and alternative medicine (CAM) researchers, and disseminating authoritative information to the public and professionals.

Our four primary areas of focus are

- Research. We support clinical basic science research projects in CAM by awarding grants across the country and around the world; we also design, study, and analyze clinical and laboratory-based studies on the NIH campus in Bethesda, Maryland.

- Research Training and Career Development. We award grants that provide training and career development opportunities for predoctoral, postdoctoral, and career researchers.

- Outreach. We sponsor conferences, educational programs, and exhibits; operate an information clearinghouse to answer inquiries and requests for information; provide a Website and printed publications; and hold town meetings at selected locations in the United States.

- Integration. To intergrate scientifically proven CAM practices into conventional medicine, we announce published research results; study ways to intergrate evidence-based CAM practices into conventional medical practice; and support programs to develop models for incorporating CAM into the curriculum of medical, dental, and nursing schools.

National Center for Research Resources

The mission of the National Center on Minority Health and Health Disparities (NCMHD) is to promote minority health and to lead, coordinate, support, and assess the NIH effort to reduce and ultimately eliminate health disparities. In this effort NCMHD will conduct and support basic, clinical, social, and behavioral research, promote research infrastructure and training, foster emerging programs, disseminate information, and reach out to minority and other health disparity communities.

The NCMHD envisions an America in which all populations will have an equal opportunity to live long, healthy and productive lives.

National Center for Research Resources

The National Center for Research Resources (NCRR) serves as a “catalyst for discovery” by creating and providing critical research technologies and shared resources. This infrastructure underpins biomedical research and enables advances that improve the health of our Nation's citizens.

Biomedical research investigators supported by the Institutes and Centers of the National Institutes of Health require a broad array of technologies, tools and materials critical to their research efforts. From the models required for research on diseases and disabilities, to the biomedical technology and instrumentation necessary to elucidate cellular and molecular structure, to the clinical settings in which to conduct studies to discern the cause of disease and in which novel clinical trials of new therapies can be developed, biomedical researchers must have access to the necessary resources in order to continue to make progress against human disease and disability.

The NCRR has a unique responsibility at the National Institutes of Health: to develop critical research technologies and to provide cost-effective, multidisciplinary resources to biomedical investigators across the spectrum of research activities supported by the NIH. This has four major facets:

Create resources and develop technologies that are cost-effective, accessible and responsive to the research needs of the biomedical research community. To meet these needs the NCRR must be in the vanguard of evolving trends in basic and clinical research so that resources will be available to facilitate that research.

Provide shared clinical, primate and biotechnology resources for use by investigators supported by all the NIH Institutes and Centers. These resources, primarily centers, serve more than 10,000 researchers, supported through well over $1 billion of categorical research resource Institute funds, thus leveraging those funds for more cost-effective and efficient research.

Develop quick, flexible approaches to new and emerging biomedical research needs and opportunities. These innovations often involve high-risk research, but the payoffs may be substantial.

Strengthen the nation's biomedical research infrastructure through programs to develop and enhance the capacity of minority institutions and centers of emerging excellence to participate in biomedical research, to increase the exposure of K-12 students and their teachers to the life sciences, to improve the condition of research animal facilities, and to construct or renovate facilities for biomedical and behavioral research.

The NCRR plays a key role in addressing pressing trans-NIH research issues, such as access to state-of-the-art instrumentation and biomedical technologies; containment of the escalating costs of highly sophisticated clinical research; development of appropriate, specialized research models both animal and nonanimal; and remedying the shortage of independent clinical investigators and the under representation of minority investigators. Present and future program directions emphasize "smart," network-connected technologies, computer-aided drug design, development and testing of gene and molecular therapies, bioengineering approaches to decrease health care costs, and enhanced training and career development for patient-oriented research.

Warren Grant Maguson Clinical Center

The NIH Clinical Center will serve as a premier center for clinical research. A model of collaborative excellence, the NIH Clinical Center will lead through innovation in the design, conduct, training, and impact of clinical research.

The NIH Clinical Center is the clinical research facility of the National Institutes of Health. It provides patient care, services, training, and the environment in which NIH clinician-scientists creatively translate emerging knowledge into better understanding, detection, treatment, and prevention of human diseases for the health of a diverse nation.

The Standards for Clinical Research, established in 2001, set forth some essential principles and processes for the conduct of clinical research in the NIH intramural research programs. A clinical standards review process using these standards was initiated in the summer of 2000.

The Bench-to-Bedside Program encourages collaborations between basic and clinical investigators across the NIH institutes in order to translate scientific findings into clinical applications. Since its inception in 1998 more than 175 proposals have been submitted and 32 projects have been funded. In addition to institute resources, a new source of funding has been identified: The NIH Office of Rare Diseases will be supporting five projects at $100,000 per award per year for two years. The projects must focus on an area of science/research directly related to a rare disease.

The Office of Protocol Services was established in 2002 to provide principal investigators with tools and applications that help simplify the entire protocol process. One such effort, ProtoType, will simplify the protocol writing process by providing recommended language cassettes for protocol and consent form use. The application will assure that regulatory requirements are met by providing help on relevant parts of the protocol and by linking to NIH Clinical Center policies.

Clinical Research Information System (CRIS), the Clinical Center's next-generation clinical information infrastructure, is a $60 million project that will link and support patient care, research and management. This phase of the CRIS project replaces and expands the Clinical Center's current hospital information system known as the Medical Information System, or MIS. Once complete, at least 24 distinct information systems will feed into two CRIS hubs, the Clinical Data Repository and the Clinical Data Warehouse.