Vision 2020

The Medical University of South Carolina
Site and Facilities Master Plan

April 1999
# EXECUTIVE SUMMARY

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Under separate cover are the remaining Volumes of this Master Plan. These additional Volumes contain the details of analysis and evaluation, the planning guidelines, and documentation of the planning process.

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INTRODUCTION

Goals for the Master Plan included the maximum utilization of the current land holdings of MUSC and the enhancement of intercollegiate, interdisciplinary collaboration. Consequently, future development should focus on increasing the density of buildings within the central campus. This density will reduce travel times for students and faculty, will foster improved communications, will allow for a near doubling of occupied space on campus, and will be consistent with the site-building densities typically found on the Charleston peninsula.

Critical to the success of this Master Plan is the incorporation of major garden areas between buildings as intentional, planned projects. These gardens will create a sense of openness and will enhance the pedestrian-friendliness of the campus.
The MUSC campus in 1999.

This aerial view, looking west toward West Ashley, shows the potential build-out of the campus. The taller white building to the left of the sketch is the Rutledge Tower. The Administration Building is in the center of the sketch. The proposed improved site utilization through increased site density is apparent when compared to the photograph of the campus in 1999.

This view is looking west along Bee Street from the Ashley Street intersection. Note St. Luke’s Chapel in the foreground. To the left of the Chapel is shown the Basic Sciences Building and its addition; behind the Chapel are shown the three future research buildings.
The Medical University of South Carolina is entering an exciting and challenging era. The University has achieved international recognition and national acclaim as a premier biomedical research, educational, and clinical institution. While continuing to enhance its reputation, MUSC will now focus on developing its campus into a physical environment that fosters and enables growth in excellence and is reflective of the reputation of the institution.

Since his arrival in 1982, President James B. Edwards, DMD, has led the University through unprecedented growth. The total University budget has had a 570% increase with the percentage of State contributions actually decreasing from 45% of total to 15% of total. Research programs have grown by more than 400%; the hospital is consistently recognized as one of the best in the US. The facilities have increased by 72%. With his retirement planned for June 1999, Dr. Edwards seeks to complete this Master Plan so that the vision he has held for the campus, “Vision 2020”, can be understood and continued.

This document represents that 20-year vision for the campus and facilities of the Medical University of South Carolina. This Campus Wide Master Plan considers all aspects of the institution. Included are development guidelines for educational facilities, research buildings, patient care areas, infrastructure, and campus landscaping. The Plan includes recommendations for land use, traffic and pedestrian circulation, and connections to the surrounding neighborhoods. The Plan suggests upgrades to the infrastructure and approaches to managing the deferred maintenance.

Throughout the planning process, the team has kept the University’s Strategic Plan as the center of focus. Because facilities are the springboard for strategic initiatives, there has been a concerted effort to ensure that the campus and facility planning will support the goals of the Strategic Plans of the University, the individual colleges, and the Medical Center.
There are three overriding goals that have driven the planning solutions leading to the 20-year vision:

1. **Beautify the Campus** — Add to and enhance the feeling of openness and “green space”. Build upon the natural and constructed landscapes of the Charleston peninsula. Clearly define and identify the edges of and gateways to the campus.

2. **Improve the Current Space** — Recognizing that most of the current space on campus is relatively dated, upgrade facilities to meet the functional and efficiency demands of current practices in research, education, and patient care. Bring the infrastructure and building systems to a standard sustainable for the 20-year planning horizon.

3. **Create New Space** — Identify space required, beyond what is currently available, to support current and future programs. Identify facilities which, over time, would be more cost-effective to replace rather than to upgrade. Identify sites for future facilities.

The Plan includes a concept for a system of interconnected green space and clearly identified campus edges and gateways.

Identified within the Plan are those buildings that require upgrades to systems in order to support ongoing programs for the next twenty years.

The Master Plan also suggests proposed locations for new facilities.
1 ACKNOWLEDGEMENTS

The process leading to this Plan has involved interviews and meetings with hundreds of individuals. Input has been received from selected faculty, the deans, the vice presidents, and the Student Government Association. Multiple conversations have been held with the City of Charleston Planning Department and its Director, Yvonne Fortenberry. Discussion sessions have been held with the presidents of all the immediate neighborhood associations. Over 500 students, faculty, and staff responded to the “Idea Exchange” opportunities presented around campus via mail-in comment cards and on the “Idea Page” through the internet.

The MUSC group with the most time and energy invested in this planning process were the members of the Facilities Planning Committee. These individuals were active for almost eighteen months prior to beginning the planning process, determining the goals of and parameters for a master plan. From June of 1998 through February of 1999, this committee met regularly with the consultant team -- reviewing findings, evaluating concepts, and setting direction.

This Campus Wide Master Plan is, in reality, the culmination of the work of the Facilities Planning Committee. This committee, in keeping with its original charge, now has the responsibility of overseeing the implementation of the Master Plan.
The Facilities Planning Committee included:

(a) Thomas G. Basler, Ph.D.
Director, Libraries and Learning Resource Ctr

Janis P. Bellack, Ph.D., R.N.
Associate Provost, Educational Planning

Gilbert B. Bradham, M.D.
Dean, Student Life

John F. Cormier, Pharm.D.
Associate Provost, Institutional Assessment

Rosalie K. Crouch, Ph.D.
Dean, College of Graduate Studies

Hal S. Currey
Associate Dean, Operations, College of Medicine

Richard W. DeChamplain, D.M.D.
Dean, College of Dental Medicine

Johnnie L. Early, II, Ph.D.
Dean, College of Pharmacy

William J. Fisher
VP for Development

Robin L. Hardin
Director, Student Programs

(b) Valerie West, Ed.D.
Interim Dean, College of Health Professions

Jacquelyn K. Jones
Human Resources Management

Maureen R. Keefe, Ph.D.
Dean, College of Nursing

(c) Susan Haskill
Interim Controller and Asst. Treas.

James F. Menzel
Executive Dir., Enrollment Services

David C. Neff
Administrator, Ambulatory Care

(d) Gretchen Wriston
President, Student Gov’t. Assoc.

W. Stuart Smith
Interim V/P for Clinical Operations and CEO

John C. Sutusky, Ph.D.
Director, Planning

George F. vonKolnitz, IV, P.E.
Director, Engineering

(e) Adrian Reuben, M.D.
President, Faculty Senate

FOOTNOTES:
(a) Committee Chair
(b) Replaced Dr. John Johnson
(c) Replaced Howard Lundy
(d) Replaced Keith Sale
(e) Replaced Dr. Donald Weist
The work of the Facilities Planning Committee was reviewed regularly by the Oversight Committee, comprised of the President and Vice-Presidents. It was the responsibility of the Oversight Committee to hear the reports and recommendations of the Facilities Planning Committee and to present these recommendations to the Board of Trustees.

Members of the Oversight Committee include:

- Dr. James B. Edwards, President
- Mr. Stephen Jones, Executive Assistant to the President
- Dr. Layton McCurdy, VP for Clinical Affairs
- Dr. Raymond S. Greenberg, VP for Academic Affairs and Provost
- Mr. Robert C. Gallager, VP for Finance and Administration
- Dr. Rosalee Crouch, Associate Provost for Research and Dean, College of Graduate Studies
- Mr. William Fisher, Executive Director of Development
- Mr. Marion Woodbury, CEO – UMA/CFC
- W. Stuart Smith, VP for Clinical Operations and Executive Director, Medical Center

Several individuals contributed significantly beyond their responsibilities on the Facilities Planning Committee:

- Robert C. Gallager, Vice President for Finance and Administration
- Mr. Gallager commissioned the Facilities Planning Committee and recognized the need for this planning study.
- John C. Sutusky, Director of Planning
- George F. (Tony) von Kolnitz, Director of Engineering
- John Malmrose, Assistant Director of Engineering
- Thomas C. Basler, Director of Libraries & Learning Resource Centers
- Hal Currey, Associate Dean for Operations, College of Medicine
- Sandra Wade, Director of Facilities Management, Medical Center
- Denise O. Beres, Program Coordinator, Planning

These individuals were the day-to-day contacts and provided the special insight required to see this effort to completion.
The consultant team for this engagement included:

**Team Leaders:**
- **Education** — Kevin Utsey, Perkins & Will, Charlotte
- **Research** — Dan Watch, Perkins & Will, Atlanta
- **Patient Care** — Jim Bynum, Perkins & Will, Atlanta
- **Facilities Assessment** — Elizabeth Moore, Perkins & Will, Atlanta
- **Operations** — George Bourassa, Vanderwell Engineers, Orlando
- **Campus Development** — Gary Justice, Perkins & Will, Atlanta

**Team Members:**
- Glen Neighbors, Ayers Saint Gross
- Sara Smith, Ayers Saint Gross
- Dan White, Perkins & Will, Chicago
- Marcy Snyder, Perkins & Will, Atlanta
- Kelley Cooper, Perkins & Will, Atlanta
- Patty Shpilberg, Perkins & Will, Atlanta
- Richard Herring, Perkins & Will, Atlanta
- Cynthia Fonseca, Perkins & Will, Atlanta
- Diana Davis, Perkins & Will, Atlanta
- Ron Parsley, Perkins & Will, Chicago
- Dan Fagen, Perkins & Will, Chicago
- Paul Nelson, Perkins & Will, Chicago
- Jesus Huerta, Perkins & Will, Chicago

**Principal-in-Charge, Project Director**
Leslie M. Saunders, Perkins & Will, Atlanta
### MISSION AND VISION

(As shown on The Medical University of South Carolina’s web page.)

#### 2.1 Mission Statement

The Medical University of South Carolina (MUSC) is a public institution of higher learning the purpose of which is to preserve and optimize human life in South Carolina and beyond. The university provides an environment for learning and discovery through education of health care professionals and biomedical scientists, research in the health sciences and provision of comprehensive health care.

The University is committed to fulfilling its responsibilities:

- To educate students to become caring, compassionate, ethical, and proficient health care professionals and creative biomedical scientists;
- To recruit and develop dedicated, scholarly teachers who inspire their students to life-long learning in the service of human health;
- To offer educational opportunities to graduates, faculty and staff, to other biomedical scientists and practicing health professionals, and to the public;
- To seek and welcome students, scholars, and staff regardless of gender, race, age, nationality, religion or disability, recognizing the benefits of diversity;
- To conduct research in the health sciences, advancing knowledge and encouraging new responses to health care needs;
- To provide excellence in patient care, in an environment that is respectful of others, adaptive to change, accountable for outcomes, and attentive to the needs of underserved populations;
- To advance economic development by introducing new technology and fostering research links with industry and other academic institutions;
- To optimize the use of all resources, including the financial support from the state and revenues generated from research, clinical operations, and philanthropy;
- To provide leadership to the state in efforts to promote health and prevent disease;
- To serve as a state resource in health policy, education, and related matters for other institutions and the general public.
Executive Summary, University Strategic Plan

The five-year strategic plan of the Medical University of South Carolina (MUSC) will guide its academic and healthcare pursuits into the next millennium. It provides a perspective on the richness and diversity of the University community and offers insights about the University's core purpose -- to preserve and optimize human life.

As an academic institution, the Medical University pursues three interrelated missions -- education, research, and clinical service. This plan attempts to address the dramatic funding and organizational changes faced by each of these missions. To benefit from these changes, MUSC must be able to respond quickly and thoughtfully. The University must rely on cooperative and visionary leadership that has the support of a diverse professional workforce, the strength of accountable allocation of resources, and immediate relevance through an expanded community involvement.

The first section of the strategic plan describes the education mission, which emphasizes graduate and postgraduate programs. The goal is to provide the highest quality education for students, professionals, and the people of the State by instilling core competencies and values, fostering lifelong learning, and improving public access to health information. Specific objectives address the coordination of and accountability for educational programs, expansion of educational experiences in the community, strengthening of the infrastructure to support the educational mission, reaffirmation of the University's commitment to a diverse workforce and student population, and an evaluation of progress in achieving these objectives.

Recruitment and retention of outstanding investigators are critical to attaining the MUSC goal of becoming a nationally recognized, premier research institution in selected fields of study. Additional objectives in the second section of the plan address the continuing need to strengthen and expand the systems that support research endeavors. These support systems range from providing state-of-the-art laboratories, to processing grants efficiently, to facilitating the transfer of new knowledge to commercial and public benefit. One nationally recognized measure of success in attaining the goal of premier status will be the level of research funding from external sources.

The third section of the strategic plan recognizes MUSC's role in providing the highest quality health care to South Carolinians through its network of primary and specialty care providers. The goals articulated in this plan are to serve the health needs of the State's citizens, to promote integration of appropriate health care systems, and to ensure that clinical sites are available for serving the education and research missions. The strategic plan advocates patient- and community-centered clinical care systems that involve comprehensive, coordinated practices, fully integrated across disciplines and colleges. The integration of inpatient and outpatient services, which necessitates a strong hospital with specialty services balanced with a network of primary care providers, will become increasingly important as the University carries out its three missions in a managed care environment.
Vision 2020

The last section [of the Strategic Plan] addresses issues and clarifies the processes involved with implementation of this strategic plan, including the establishment of priorities and determination of resource requirements. In addition, the plan proposes to continually evaluate its appropriateness against the changing environment and to assess progress toward achieving its goals.

Strategic plans in a changing environment are “by definition” unfinished. This plan is no exception. It is intended to serve as a platform to focus discussion, seek feedback, and make appropriate revisions that reflect a responsive and proactive organization.
A BRIEF HISTORY OF MUSC
(As shown on The Medical University of South Carolina’s web site)

The Medical University of South Carolina has served the citizens of South Carolina since 1824. It has expanded from a small private college for the training of physicians to a state university with a medical center and six colleges for the education of a broad range of health professionals, biomedical scientists and other health related personnel.

3.1 College of Medicine
The Medical College of South Carolina was incorporated in December 1823 as a private institution of the Medical Society of South Carolina. The faculty bore full responsibility for the college until 1913 when the state assumed ownership of the school. The Medical College opened in 1824 with a faculty of seven Charleston physicians and 30 students. The first students graduated on April 4, 1825. The institution has served continuously since its founding, except for a four-year cessation during the Civil War. Following the Civil War, the college was reorganized and continued to operate -- at one point with as few as two students. The 1909 Flexner Report noted that there were 34 faculty, all part time, and 213 students whose fees were the only support of the school. To achieve progress, additional financing was clearly necessary. In late 1913 the state legislature was successfully petitioned to transfer ownership of the school to the state. Incorporation of the medical college into the state’s higher education system allowed teaching and service roles to expand steadily in the twentieth century.

3.2 College of Pharmacy
By faculty resolution, resulting in an amendment to the charter in 1881, the Medical College created a Department of Pharmacy that was, like its mother institution, the first of its kind in the South. The School of Pharmacy was organized in 1882, discontinued after two years, then resumed on a permanent basis in 1894, offering the degree of Graduate in Pharmacy (Ph.G.). The program leading to a degree of Bachelor of Science in Pharmacy was begun in 1936. A Doctor of Pharmacy degree program was begun in 1973, and a Ph.D. program in pharmaceutical sciences was initiated in 1982 (the latter administered through the MUSC College of Graduate Studies in collaboration with the University of South Carolina).

3.3 College of Nursing
A two-year training course for nurses was started in 1884 in Roper Hospital. In 1919, the Roper Training School for Nurses was incorporated into the Medical College of South Carolina and expanded to a three-
3.4 College of Graduate Studies
Graduate instruction in the basic sciences was offered for the first time in 1949, with programs in anatomy, chemistry, pathology, pharmacology, and physiology. A program in microbiology was added the following year. The first Master of Science degree was conferred in 1951; the Doctor of Philosophy degree was awarded for the first time in 1952. A Committee on Graduate Studies managed graduate training programs until 1965, when the School of Graduate Studies was formally organized as the fourth branch of the institution (joining Medicine, Pharmacy and Nursing). Graduate programs in biometry were initiated in 1970, molecular and cellular biology and pathobiology in 1978, pharmaceutical sciences in 1982, and environmental sciences in 1994.

3.5 College of Dental Medicine
In 1952, the South Carolina Dental Association recommended that a school of dentistry be established as a unit of the Medical College of South Carolina. The state legislature authorized the development of the School of Dental Medicine the following year, but it was not until 1964 that the legislature provided the funds to implement the 1953 authorization. The first students were admitted in 1967, and the first class of 21 students received D.M.D. degrees in June 1971.

3.6 College of Health Professions
Three hospital-based training programs (Medical Technology, Cytotechnology, and Radiologic Technology) became the nucleus of a Division of Technical Training, recognized as a separate branch of the Medical College in 1964. The School of Allied Health Sciences, now the College of Health Professions, was formally organized in 1966, and expanded to offer over 20 different training options in the paramedical field. In 1984, lower division certificate and associate degree programs were transferred administratively to Trident Technical College (with the College of Health Profession functioning as the primary clinical affiliate). The college now offers eight baccalaureate and seven master's degree programs. The College of Health Professions also offers degree programs at satellite sites in Greenville, Columbia, and Rock Hill, S.C.
The Medical University of South Carolina was one of the first medical schools in the United States to establish, in 1834, an infirmary specifically for teaching purposes. In the 1840s the college also entered into agreements for clinical training opportunities at the Poorhouse, the Marine Hospital, and the local "dispensary." In 1856, Roper Hospital was opened, and for 100 years Roper was the Medical College's primary teaching hospital.

The Medical College recognized the need for its own facilities to expand clinical teaching opportunities, as well as to serve as a major referral center in South Carolina for diagnosis and treatment of disease. The ten-story Medical University Hospital accepted its first patients in 1955. In 1985 the name of the hospital and its clinics was changed to MUSC Medical Center, reflecting its function in an academic health institution and its wide range of services to the public. This comprehensive facility is now comprised of three separate hospitals (the University Hospital, the Institute of Psychiatry, and the Children's Hospital). The Medical Center includes centers for specialized care (Heart Center, Transplantation Center, Hollings Cancer Center, Digestive Disease Center).

Numerous outpatient facilities include Rutledge Tower, the Family Medicine Center, University Diagnostic Center, and affiliated faculty practice association ambulatory care centers. In the past ten years, $200 million in capital improvements for the Medical Center focused resources on improved quality of patient care and accessibility of services. In fiscal year 1998, there were over 27,000 inpatient admissions and over 500,000 outpatient visits. MUSC also manages the Charleston Memorial Hospital adjacent to the campus.

Among the programs which have earned distinguished reputations at the Medical University of South Carolina are: neuroscience, substance abuse, cardiovascular medicine, drug sciences, perinatal medicine, burn care, ophthalmology, hearing loss, genetics, rheumatology, and cancer care.

3.8 University Status

In 1950 the title of the chief executive officer was changed from dean to president, with separate deans for each of the schools. By the late 1960s, with six fully operational schools of professional education in the health sciences, the Medical College of South Carolina had become an institution of university size and scope. In 1969, the state legislature changed the name to the Medical University of South Carolina. By this act it established MUSC as the state's only free standing academic health sciences center, exclusively providing a full range of professional education, clinical services and biomedical research.
In 1970 the six schools of the University were designated as colleges, each with its separate administration and faculty organization. Each college awards appropriate degrees along standard academic lines connected with its educational activities. All professional education programs, and the MUSC Medical Center, are accredited by the appropriate professional accrediting agency.

3.9 South Carolina Area Health Education Consortium

One of the most pressing problems in health care delivery and disease prevention across the nation concerns the geographic distribution of health professionals. The Medical University serves as the "home" institution for the South Carolina Area Health Education Consortium (AHEC), a statewide consortium of teaching hospitals and rural health education centers. Since 1972 South Carolina AHEC has influenced the education, supply, retention, and geographic distribution of health care professionals statewide, particularly in smaller, underserved communities. South Carolina AHEC programs include undergraduate and graduate level medical education, nursing, allied health, pharmacy and dental education, as well as all family practice residency programs in the state. South Carolina AHEC maintains partnerships between the university and communities across the state, as evidenced by more than 200 full time faculty members and hundreds more part time and consulting faculty who teach in South Carolina AHEC programs in virtually every county of the state.

3.10 Growth in the Past 30 years

In the 80 years since the Medical University became a state institution, its growth was gradual up to the 1940s and phenomenal since then, particularly in the past 30 years. Student enrollments have jumped from 571 in 1965 to almost 2,300 students in the fall of 1994 (not including post doctoral residents in medicine, dental medicine and pharmacy); the full time faculty has grown from approximately 200 to over 1,000 (including approximately 500 FTE teaching faculty). The library has more than 230,000 bound volumes, approximately 2,500 journal subscriptions, 7,000 Audio/Visual volumes, 3,900 microfilm titles, and a vast array of online resources. More than $66,000,000 was awarded to MUSC in 1994-95 for sponsored research.

Expansion in enrollments and programs has been made possible by ambitious programs of physical plant development that have seen the institution grow from one building in 1913 to a 40-acre medical complex, with more than 80 buildings. Since 1985, five new buildings have been constructed: East Wing and Children's Hospital (1986), Institute of Psychiatry (1988), North Tower (1993), Harper Student Center (1993), Hollings Cancer Center (1993). The Strom Thurmond Biomedical Research Center and the Gazes Cardiac Institute, are a joint facility of MUSC and the U.S. Department of Veterans Affairs.
OVERVIEW OF EXISTING CONDITIONS

The Facilities Planning Committee saw that one of the most important goals of this planning exercise was the analysis and evaluation of the conditions of the existing site and facilities. Consequently, the initial step in the process was an in-depth review of the current facilities’ capital resources. The consultant team – comprised of functional analysts, architects, campus planners, and engineers – spent several days touring all the facilities and completing evaluation forms.

The evaluators were divided into several teams, each with a specific focus:

1. Site utilization, campus zoning, and campus-city issues
2. Infrastructure issues of the campus and buildings
3. Architectural conditions of all the buildings
4. Educational and academic facilities
5. Research facilities
6. Functionality of all patient care areas

The combined analysis and evaluations of each team contributed to the concepts, guidelines, and recommendations included in this Campus Wide Master Plan. Detailed documentation of these analyses and guidelines may be found in the additional volumes of this master plan.

The assessment teams used standard survey forms and grading scales to determine the existing conditions.
4.1 Overall Campus: Site Utilization

The MUSC campus is remarkable in its contrasts. While some areas present a serene beauty in the balance between planned landscaping and surrounding buildings, other areas present images of low maintenance and unfriendliness. Buildings – each clearly reflective of the times in which it was designed - represent a variety of styles and materials, with no apparent attempts at campus uniformity. There is a good mix of historic and more modern structures, yet the newer buildings are generally not respectful of their older neighbors. Pedestrian routes include both restful, pleasant walkways and automobile-intensive encounters. As an integral part of the fabric of the Charleston peninsula, the campus reflects little of the patterns of landscaping, streetscaping, and building massing which make Charleston the desirable location that it is.
The overall campus has a very low density of buildings and a high percentage of paved areas. The distances between buildings contribute to the perceptions of inefficiency expressed by many of the staff and students. The zoning of functions on the campus is ambiguous, reflective of the University’s history and growth patterns – program growth and trends, coupled with presented opportunities, led to the creation of buildings on available sites. There has not been an obvious attempt to adhere to a formal campus zoning plan.

The lack of density on the MUSC campus is particularly apparent when comparing MUSC with other similar institutions located in dense urban settings. The grid represents a five-minute walk.
Campus boundaries and edges are unclear. The historic brick wall around the area formerly occupied by the Porter Military Academy presents a defined edge, but this pattern is not consistent nor is it continuous.

Vehicular traffic is dictated by the system of city streets and is subject to the local one-way patterns, particularly of Ashley and Rutledge Avenues. There is no opportunity to create a dedicated interior street system, although traffic control measures are potential solutions to the issues.

The University has properly dealt with the majority of service traffic to the campus. The remote warehouse and receiving area at Arco Lane has greatly reduced the amount of large truck traffic on campus. The Medical Center service traffic is directed to the very constricted Sabin Street, often spilling onto Ashley Avenue. Service to other buildings is a mix of defined service yards and on-street access.

Parking is a mix of surface spaces (47% of the on-campus number) and structured decks (53%). Of the total spaces used by MUSC, 28% are off-campus and require transporting students and staff. Medical Center patients and visitors are directed to a pleasant surface lot; however, this lot is not directly accessible from the main entrance of the hospital. A large parking structure serves the outpatient complex (Rutledge Tower) and is generally more convenient for those patients.

Signage is a mix of systems and types. The newer signs seem to follow a prescribed pattern of color, fonts, and style. However, there is no consistency to the utilization of these new signage standards.

The green space bounded by the Medical Center, Administration Building, and Basic Sciences Building (the “Horseshoe”) is a very positive feature of the campus. As the one truly formal and planned outdoor space, this area is heavily utilized. Replicating this idea throughout campus would greatly enhance the overall image and feel of the campus.

The green areas available on the campus are good models for future gardens and courts.

There is a good model for a signage standards program on the campus. Consistent implementation of the program would be beneficial.
4.2 Architectural Conditions

4.2.1 Architectural Assessment

The building inventory of MUSC includes a spectrum of building sizes ranging from small storage sheds to the 650,000 SF Medical University Hospital. The campus buildings incorporate a rich diversity of construction types, an eclectic collection of architectural styles, and ages spanning more than a century and a half. The condition of these buildings spans an equally wide spectrum.

An initial focus of the building review was the determination of which buildings can support the twenty-year vision for the campus. The evaluations considered acceptable functionality as-is, renovations required to meet functionality goals, and need for the replacement or demolition. These analyses were driven by the recognition of a significant amount of deferred maintenance that had grown through the years. Faced with severe budgetary constraints under the State system, the University has historically opted to focus expenditures on new and improved programs and services rather than on upgrades to existing facilities.

Each building on campus was evaluated according to the following systems:

- Exterior architectural envelope -- wall systems, roofs, windows, foundations, and building code issues.
- Interior conditions -- doors, ceilings, floors, interior walls, and life-safety code compliance.
- Infrastructure -- fire protection, plumbing, HVAC, electrical, and medical/scientific gasses.

Two key evaluations resulted from the facility conditions analysis:
1) a determination of "susceptibility to change", or an understanding of the degree of modification required for a building or site to meet its twenty year anticipated uses; and
2) a quantification of the extent of deferred maintenance.

The campus map above indicates the architectural assessment rating of each of the buildings. Lower ratings indicate buildings that were in need of repair or upgrade at the time of the condition survey. It is important to note that some of the deficiencies noted during the surveys have been corrected through maintenance and upgrade projects that were in-progress.
The analysis of susceptibility-to-change showed that there are major facilities that, because of recent capital expenditures and/or sunk costs, act as anchors for campus zoning and functional development. Similarly, there are sites that should be preserved and maintained because of their beauty and historic significance. At the same time, there are buildings that have truly outlived their usefulness, are not appropriate to the functions they house, or are of a size and configuration inappropriate to the value of the site they occupy. There are potential building sites which would be of greater value to MUSC were they occupied by larger, more efficient and functional structures.

This analysis and evaluation contributed to two driving campus development concepts:
- Functional zoning – secondary-tertiary patient care to the southeast, primary patient care to the north, research and academics to the central campus; and
- Campus Expansion – future major facility development should and can be to the northwest.

This drawing shows, for both land and buildings, the susceptibility to change. That is, due to facility condition or highest-and-best use considerations, the likelihood that the building or site will change function or require major changes.
The quantification of deferred maintenance presented special challenges to the review teams. One of the challenges was the development of a methodology for efficiently gathering appropriate building condition information and the analysis of the data in a manner that would appropriately define the deferred maintenance problem.

The methodology developed for capturing this information included utilization of standardized forms. These forms allowed each team to “score” buildings against an objective rating derived from building industry standards and guidelines. The consultant team also collected information through the surveys, interviews with key Engineering Department personnel, and reviews of past studies.

The example above is a partial survey form. The example above is a partial survey form. The example above is a partial survey form. The example above is a partial survey form.

To assess the buildings’ architectural conditions, the consultant team evaluated each component system. Each system represents a portion of the replacement value of a building. By assigning an assessment value to each of the building components, an estimate can be made for the amount of deferred maintenance needed to keep that system functioning for the life of the building. All the major campus buildings were reviewed, totaling over 4.5 Million Square Feet. The compilation of these building evaluations is included in Volume 2 of this Master Plan.

This is an example of a Building Systems Evaluation. Note the twenty-one separate systems rated by the team and note that each system represents a percentage of the total construction cost of that specific facility. The algorithms associated with this evaluation produced an estimated deferred maintenance cost for each building on the campus.
As the review progressed, the survey team began to clearly understand the concerns expressed initially by the Facilities Planning Committee and the extent of problems associated with the considerable backlog of maintenance items.

The questions that became paramount included:

- “How extensive is the deferred maintenance problem, really?”
- “How much of that need can and should be addressed through an aggressive deferred maintenance program and how much can continue to be deferred?”
- “How much funding is needed, and when?”

The preliminary calculations of the extent of the deferred maintenance backlog were surprising, if not shocking. The scope of the problem, as measured by costs-to-remediate, was so large that it was perceived as unmanageable. This dilemma is consistent with similar findings at other campuses across the nation. The decaying campus is a national problem of epidemic proportions. Reports of the alarming decline in the physical condition of most American college campuses are well documented. The MUSC campus is no exception.

One of the first steps was to prioritize the problems by focusing on essential systems. Paring down the needs to those systems essential to support programs and services can reduce the budget impact.

[Note: As shown on the evaluation form on the previous page, the deferred maintenance costs include all building systems, finishes, and components. The calculations for essential components remove costs associated with replacement of floor and wall coverings, window replacements (unless the condition of the windows contributes to a building’s risk factors), and similar conditions].

Additionally, spreading out the costs over the 20-year planning horizon of this Master Plan considerably drops the annual expenditures to a level considered manageable.

The assumptions used as the basis for developing funding scenarios pertaining to deferred maintenance include:

**Assumptions**

<table>
<thead>
<tr>
<th>Current Replacement Value</th>
<th>$495 Million*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Deferred Maintenance Value</td>
<td>$200 Million**</td>
</tr>
<tr>
<td>Essential Deferred Maintenance Items</td>
<td>$75 Million*** (=15% of total facility value)</td>
</tr>
<tr>
<td>Time to reach Equilibrium</td>
<td>20 years</td>
</tr>
<tr>
<td>Annual Deterioration Rate</td>
<td>2.0 %****</td>
</tr>
<tr>
<td>Annual Inflation Rate</td>
<td>3.5 %</td>
</tr>
</tbody>
</table>

*Replacement Value includes replacement at current condition, not replacement at state-of-the-art. This value is from reports provided by Engineering and Planning.

**The total of all deferred maintenance items.

***Industry standards suggest that deferred maintenance should be approximately 5% of total facility value. This ratio is called the "Facility Condition Index" or FCI.

****The annual rate at which facilities continue to deteriorate through normal wear and use.
Four funding scenarios were developed and presented to the Facilities Planning Committee and the Oversight Committee for consideration. These approaches to addressing the deferred maintenance include:

**Option One**  Status Quo -- Funding for deferred maintenance remains at current levels of approximately $2.8 million per year.

This graph illustrates Option One. If MUSC continues to fund deferred maintenance at $2.8 Million per year, adjusted for inflation, then the Facility Condition Index will continue to worsen because the rate of continued deterioration would be added to current conditions. In other words, the situation becomes dire very quickly.

**Option Two**  Achieve the goal of a 5% FCI (Facility Condition Index) in 20 years through increased annual funding for Deferred Maintenance.

In order for essential Deferred Maintenance to equal no more than 5% of total facility value in 20 years, MUSC must allocate approximately $14.5 million per year, adjusted for inflation.
**Option Three**  Maintain the current FCI of 15.2%.

In order for the Facility Condition Index to remain at the 1999 level of 15%, MU must allocate $10.2 Million per year, adjusted for inflation, to Deferred Maintenance.

**Option Four**  Increase Deferred Maintenance funding for 5 years then maintain the FCI at that level.

This scenario shows how the Facility Condition Index could be reduced to a manageable 9% in five years. If it were possible to allocate approximately $16 million per year for five years, the annual expenditures for Deferred Maintenance would then be at $3.5 million per year.
4.2.2 Hurricane Survivability Assessment

South Carolina has been hit by 15 hurricanes in the past 100 years. Records indicate that a hurricane in August of 1893 caused catastrophic damage exceeding that of Hurricane Hugo. Thus, it is reasonable to assume that the Charleston area faces the statistical likelihood of a “one-hundred-year storm” in the foreseeable future. Consequently, a campus master plan must address measures to protect capital and service resources from severe damage.

**Program Vulnerability**

The first step in determining which buildings should be upgraded includes prioritizing the buildings based on their housed programs. It was determined that buildings which house inpatients, essential campus-wide support functions, and critical basic research are those which must be able to withstand a hurricane. These buildings, if severely damaged or evacuated, would pose a threat to life, destruction of valuable research media, and/or considerable loss of revenue and loss of essential services to the community.

The measure of Program Vulnerability was determined by rating the building’s ability to withstand hurricane force winds and high water. If the housed programs were likely to sustain disruption if the building were damaged, then the programs were deemed “vulnerable”. The degree of risk was measured on a scale of one-to-three, with three representing minimal risk to the program. The accompanying graphic illustrates the findings of this evaluation.

The determination of Deferred Maintenance expenditures includes the expenses required to ensure that buildings are able to withstand the next major storm or to be brought back into service almost immediately. There are two elements to this evaluation: Program Vulnerability and Building Survivability. Identifying and understanding these components helps to determine the areas where capital improvements should be made first.

*This graphic shows buildings which house inpatients, key support functions, and/or critical research. The higher the number (the lighter the color), the less likelihood of program disruptions during and after a major storm.*
Building Survivability
Coupled with the determination of program vulnerability is the evaluation of building survivability. If “Program Vulnerability” measures the likelihood of disruption to a service should its building be damaged, then “Building Survivability” measures the likelihood that the building itself would sustain damage during a major storm.

This evaluation considered details such as distance above flood level of major mechanical and electrical equipment; durability of windows; condition and type of roofing; and other building components subject to storm damage. The accompanying graphic shows the findings of this evaluation.

Combining the scores for Program Vulnerability and Building Survivability produced a rating indicating which buildings faced the greatest danger from a storm and, consequently, which buildings should receive hurricane-preparedness upgrades soonest.

The graphic above shows buildings which house inpatients and/or critical research. The higher the number (lighter the color), the less likely to sustain damage.

The numbers were averaged to give us the building survivability rating.

This number represents program vulnerability.
Recommendations for Hurricane Preparedness

- Develop project list for Damage Mitigation
- Relocate critical equipment above flood level
- Install hurricane shutters. Replace windows with laminated glass
- Remove rooftop equipment, if possible
- Reinforce rooftop equipment anchoring

Integrate Disaster Reduction Planning Into Risk Management Plans
- Director of Risk Management

Seek Funding Opportunities
- FEMA, since 1988, claims to have spent $20 billion helping communities with disaster relief
- State Commission on Higher Education suggested at a presentation of the deferred maintenance conditions to approach the state legislature for funding support
- The city of Charleston in association with FEMA has spent nearly $5M to upgrade the storm drainage system

Participate in Project Impact Planning Group
- Contact the Director of S.C. Emergency Preparedness Division
- Participate in local and regional hurricane conferences
- The City of Miami, Dade County, and many of the higher education institutions in Florida have a wealth of relevant information on the impact of Hurricane Andrew.
4.3 Infrastructure Conditions

The conditions of infrastructure systems (HVAC, electrical, fire protection, plumbing, and specialty systems such as fire alarm and medical gases) are generally consistent with the age of the buildings. That is, the infrastructure systems are reflective of “codes” at the time the buildings were constructed but may not have been upgraded to current needs and standards. Noticeable exceptions include some recently-constructed buildings which have marginal or, in certain instances, inadequate building system capacity resulting from decisions to reduce systems capacity as a means of meeting budgetary constraints.

Virtually all campus building systems are in need of maintenance and upgrading, as indicated by the significant list of backlogged maintenance requests on file with the Engineering Department. The Physical Plant staff has done a commendable job of juggling limited funds and manpower in order to maintain building systems and equipment. However, since the University has not included a budgetary line-item for maintenance, these needs have competed with programs and services for the same capital dollars.

While the inventory of building space on campus has grown over the past two decades, the number of Physical Plant personnel assigned to manage and maintain systems has not increased in proportion. As a result, a significant amount of maintenance activities have been either outsourced (increased operating costs) or deferred (continued deterioration). Similarly, equipment components have not been repaired and/or replaced on a preventive basis. Consequently, replacement is required on an urgent basis when a component fails. This approach to “deferred maintenance” is both disruptive to ongoing operations and expensive in the long term because equipment is not operating efficiently.

Most campus buildings are served by infrastructure internal to the building; few buildings or systems are connected in a configuration that provides system redundancy. This lack of system redundancy is particularly true of buildings that house inpatients and/or critical research. Additionally, for many buildings, the main mechanical and electrical equipment is located in areas subject to flooding. Particularly sensitive to this hazard are boilers, chillers and emergency generators. In many buildings, these equipment components are located at grade level and could be submerged under six to eight feet of water during a hurricane or heavy storm.
The survey of individual buildings provided a comprehensive “snapshot” of current conditions. However, the data generated may not directly reflect the extent to which specific renovation projects (such as customizing a laboratory installation for a principal investigator) impact the overall facility infrastructure. Electrical systems, building ventilation and cooling capacities, and other utilities have become “stretched” beyond their expected capabilities. This load burden further increases the risk of equipment failure and may result in early demise of a component.

The infrastructure evaluation team included representatives of the University’s Physical Plant Department to ensure that the surveys reflected the actual experiences of those charged with systems maintenance. Individual buildings were reviewed from the perspective of equipment condition, existing operating problems, and planned corrective measures. Occupants of each building were also consulted to establish their perspective.

The following components were reviewed:

1.0 HVAC
1.1 Boilers 1.6 Terminal devices
1.2 Chillers/pumps 1.7 Exhaust systems
1.3 Air handling units 1.8 Temperature control
1.4 Ductwork 1.9 Automation
1.5 Piping

2.0 Plumbing
2.1 Domestic water 2.4 Laboratory gases
2.2 Sanitary waste 2.5 Fire protection
2.3 Natural gas 2.6 Medical gas systems
2.4 Laboratory gases

3.0 Electrical
3.1 Service 3.5 Emergency power
3.2 Distribution 3.6 Telecommunications
3.3 Lighting 3.7 Security
3.4 Fire alarm

MUSC activities and programs will increasingly depend on supporting infrastructure, including Information Technology. Early planning for infrastructure support and capacity and recognition of the limits of existing infrastructure’s capability to accommodate ever increasing internal loads will be critical to the success of future programs and projects.

A summary of the Infrastructure analyses. Buildings shown with darker colors have systems which are either at-risk or which are less-than-adequate to meet the current demands.
4.4 Functional Assessment

4.4.1 Educational & Academic Facilities

The Medical University of South Carolina is first and foremost an institution for the education of health professionals. The University Strategic Plan states that MUSC is:

To provide the highest quality health sciences education by:

- Instilling requisite knowledge, competencies, and values in its graduates;
- Fostering lifelong learning for practicing health professionals and biomedical scientists;
- Improving public access to health education and information resources.

Consequently, all programs and all facilities are geared toward the transfer of information between teachers and students. The oldest and original buildings on this campus were constructed to house rooms for didactics and laboratories; a clinical activities building was not added until 1954. Even the main basic research facility, the Basic Sciences Building, was constructed as a classroom building when it was added in 1970, though it has, over time, been renovated into predominantly a research laboratory building.

In recent years, the creation of space for student and non-clinical educational activities has included the Wellness Center, renovations to the Library, and renovations for distance-learning facilities. However, much of what is considered “traditional” education still occurs in spaces constructed over twenty years ago when both biomedical training and allied health

The original MUSC facilities were constructed as classroom and learning lab buildings. Many of these have since been modified for administrative, clinical, and research uses.
education were based on one professor lecturing to fifty or more students for extended periods. Little has been done to reflect the current trends toward smaller, interdisciplinary groups of faculty and students.

Similarly, facilities programmed for the enhancement of student life on-campus – study rooms, lounges, seminar rooms and locker rooms – have not kept pace with student needs and changes in educational philosophies. Much of the space originally designed for student support use has, through the years, been captured for use as offices, treatment rooms, and other functions to support clinical and/or research activities.

There have been recent significant increases in spaces dedicated to computer-enhanced learning, particularly within the recent renovations to the Library. Yet, there are few other places where students can immediately connect to the data resources available through the Library and Learning Resources network.

The creation of space to house student-focused activities – classroom-based learning, inter-class period study, and breaks – has been left to the individual colleges to institute and implement. Because of uneven funding across colleges and failure to address these needs holistically, appropriate student spaces have not been equitably supported.

In keeping with the vision and mission embraced in the University Strategic Plan, the implementation of this Master Plan presents the opportunity to refocus funds on educational initiatives. Included in this refocus should be:

- Equitable distribution of funds among patient care, research, and education;
- The creation of spaces dedicated to students within appropriate facilities, existing and future;
- Appropriate and adequate spaces, within all buildings, for both small groups and individual learning;
- A high level of connectivity between all student areas and the information systems resources;
- Consolidated distance learning facilities to increase the effectiveness of support personnel;
- The creation of places specifically intended to support the institutional goals for continuing professional and public education;
- A place intended for and specifically designed to encourage and enhance the interactions among students and faculty of different colleges;
- The creation of small group spaces within the clinical settings to provide for “learning-on-the-fly” and to reduce the stigma associated with faculty and students conferring in the hallways;
- Recognition that the non-traditional student requires specialized spaces in order to thrive and succeed – lockers, lounges, individual study rooms, mail, internet access, etc.
- The provision for identity for each of the colleges while fostering a sense of community within the University;
- Flexibility in facility design to recognize the ever-changing nature of education.
4.4.2 Research Facilities
The initial site visits, data collection and analysis, and space needs analysis indicated a need for measured and controlled increase in the amount of research facilities. With research funding more than quadrupling since 1990 and the reputation of the institution growing exponentially, pressure exists to ensure that there is always ample laboratory and office space to support recruiting efforts and to house grant-funded programs. A logical place to plan for this growth is near both the Basic Sciences Building and the Thurmond/Gazes Buildings. These locations for new facilities would enhance the ability of investigators to engage in both clinical and research activities and would build upon recent capital expenditures.

While student population projections appear to remain constant, the percentage of these students in clinical and wet lab research studies will most likely increase at a steady pace. The greatest student growth projections will occur in the area of health sciences, indicating a future need for more basic research spaces on the campus.

The Office of Research Development, responsible for generating new funding and preparing research proposals, is centrally located and is convenient to investigators. Vivarium (animal) research is currently located in multiple buildings and tends to be program-specific. The College of Medicine sponsors the vast majority of basic research activities. Consequently, most laboratory space is allocated to that College and is scattered around campus. Similarly, other colleges and programs have research laboratories located wherever space is available. While this mixing of research activities aids in achieving the goals of interdisciplinary collaboration, there are inherent inefficiencies by not having research labs closer to the faculty completing the research.

Buildings housing research functions and their square footages are as follows:

<table>
<thead>
<tr>
<th>Research Buildings</th>
<th>Assignable square feet of Research by Bldg.</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>103 C Building*</td>
<td>15,400</td>
<td>1939</td>
</tr>
<tr>
<td>104 D Building*</td>
<td>12,200</td>
<td>1913</td>
</tr>
<tr>
<td>108 Research Building</td>
<td>54,500</td>
<td>1960</td>
</tr>
<tr>
<td>500 Basic Science Building</td>
<td>337,800</td>
<td>1970</td>
</tr>
<tr>
<td>500a Basic Science Addition</td>
<td>100,000</td>
<td>2001</td>
</tr>
<tr>
<td>650 Eye Institute Addition</td>
<td>20,000</td>
<td>1998</td>
</tr>
<tr>
<td>770 Thurmond/Gazes Res. Bldg.</td>
<td>193,600</td>
<td>1996</td>
</tr>
<tr>
<td>850 Psych Animal Facility</td>
<td>2,000</td>
<td>1988</td>
</tr>
<tr>
<td>925 Hollings Cancer Center</td>
<td>64,500</td>
<td>1993</td>
</tr>
<tr>
<td>Subtotal</td>
<td>800,000</td>
<td></td>
</tr>
<tr>
<td>Estimated Total</td>
<td>850,000 gsf**</td>
<td></td>
</tr>
</tbody>
</table>

*Buildings recommended to be demolished to provide space for a new facility.
**Estimated total includes additional smaller research spaces on campus.

There appears to be a lack of consistency in the planning for and design of research space renovations. These projects are not organized, consolidated efforts, but instead are done on an as-needed basis. When laboratory construction is needed, MUSC has no standard guidelines, such as casework, ADA issues, fume hood locations, and other concerns that should be considered to ensure the implementation of good laboratory practices.

Current research facility space is at its maximum capacity, and the need for new space is viewed as
critical. New facilities are necessary both to house current faculty and research needs, and to allow the University to recruit new researchers. The majority of research growth to date has been reactionary, constructing new and renovated labs when state funding is available and hiring new researchers with the influx of new research grants. National Institute of Health grant funding is expected to increase from $28.5 million to $42.6 million in the next five years. With an established master plan and guidelines for future research space on campus, proper growth decisions can be made when grants and state funding are anticipated.

The Master Plan Visioning Session identified the following key points that were considered in the development of the research guidelines:

- Research Buildings should be connected to one another to encourage communication and easier work flow.
- Most felt that four buildings the size of the Thurmond/Gazes Building would be necessary over the next twenty years (800,000 gsf) with a floor plate large enough to be cost effective and efficient (25,000 gsf).
- The next building should expand from the BS II addition, along Bee Street with future buildings added to the west until they meet at the Thurmond/Gazes Building along Courtenay Drive.
- There is a desire for a “high tech” education/library building, which could become the anchor for the campus.
- “Smaller colleges must be a part of R&D plan”.
- Buildings need to be budgeted and designed to address long term flexibility.
- Animal care should primarily be handled locally by each building to service the researchers better.

The animal care space should be provided based on the building need.

- There needs to be a central quarantine facility as part of a central hub for animal care.
- Basic Research (wet labs) should be adjacent to Clinical Research (applied dry labs or offices), similar to Hollings Cancer Research Center.
- Locate human based investigators together.
- Desire to “encourage communication between clinical and basic researchers”.
- Parking should be provided near the clinical research for better patient access.
- Delivery of supplies needs to be addressed.
- Research space is needed in the clinical facilities to allow for clinical research on-site.
- Multi-disciplined areas should be identified as well as specific research areas.
- The students would like to see education and research included in the same building. They prefer classes on the lower floor, with the ability to go upstairs between classes to focus on their research.
- Include Research Administration as a part of each building program. Administration should be a part of each research team.
- No satellite research buildings are desired. The strong preference is to build new research buildings on the existing campus near each other.
- Money needs to be budgeted in each project for information technology, flexibility and shell space.
4.4.3 Patient Care Facilities

The MUSC Medical Center assumes a central role in the three-pronged mission of education of health professionals, research in the health sciences and provision of comprehensive health care at the Medical University of South Carolina. The Medical Center has expanded incrementally over the last four decades with the addition of the Clinical Sciences Building, the Storm Eye Institute, the Children’s Hospital and the North Tower. The combined medical center is approximately 1,300,000 square feet not including the Hollings Cancer Center. Facility growth has evolved around specific service lines, or “Centers of Excellence”, enabling necessary expansion, but without the integration of all clinical services in an efficient configuration.

During the past few years, the MUSC Medical Center has achieved a reputation as one of the top hospitals in the US. Inpatient admissions have increased over 30%, during a time when most hospitals are experiencing severe downturns in utilization. Through various care management techniques, there has been a decrease in the average length of stay. This decrease resulted in a comparable decrease in overall bed utilization. However, the reputation of MUSC as a center for critical care has recently produced a typical patient profile of high acuity, thus straining the capacity of critical care bed areas. Similarly, the higher-acuity patients require greater numbers of diagnostic tests, longer surgery times, and more direct care staff.

It is important to note that this recent growth in intensive inpatient utilization is occurring within a facility designed and constructed over twenty years ago, with portions of the facilities almost fifty years old.
Consequently, the inpatient facilities do not meet the demands being placed upon them, in spite of recent upgrades and renovations.

Most high-acute specialty and sub-specialty outpatient care services have relocated to the Rutledge Tower complex, the former St. Francis Hospital. In that this building was constructed as an inpatient hospital, the outpatient services housed there are well-contained. However, there are some outpatient services, particularly pediatric subspecialties, which have not relocated to the Rutledge Tower due to a lack of space. Lower-acute outpatient services are distributed throughout the service area in primary care centers and physician offices in an effort to not only meet patient needs through improved convenience, but also to reduce congestion on the campus.

In order to fully address and meet the clinical service goals set forth in the Strategic Plan, several facility changes must occur:

- Recognizing the increased acuity of the typical inpatient, bed units must be reconfigured to support “super-acute” patients.
- Travel distances, functional adjacencies, and floor plan layouts of departments must provide for maximum direct care time and must minimize unproductive time.
- Services should be reorganized around “service lines” to support more efficient provision of services.
- As technologies continue to enhance patient care, facilities must provide the infrastructure to support these technologies.
- Specific services are in need of major renovation, relocation, or replacement – Cardiovascular Services, Emergency Services, selected Pediatric Specialties, Women’s Health services.
- Spaces and rooms dedicated to the educational mission must be provided throughout the clinical areas.
- Primary care areas must be created to efficiently support the patient care and educational missions of the Colleges of Nursing, Dental Medicine, Medicine, and Health Professions.

The continued success of the MUSC Medical Center as measured by growth of services, increased patient volumes, financial viability, leading edge technologies and innovative patient care is largely dependent upon MUSC’s ability to manage and retool an aging medical facility. The goal is to position MUSC Medical Center to adapt as needed in a changing health care environment.

Federal financial reimbursement mechanisms, treatment methodologies and patient care delivery models have changed more rapidly than the built environment. MUSC Medical Center has worked diligently to maximize staff efficiency within a structure dating from 1954, in spite of the inherent inefficiencies that have resulted from the age, size and incremental growth of the Medical Center.

Vision 2020 embodies a 20-year vision for the MUSC Medical Center. The Master Plan is not prescriptive, but rather descriptive and directional. Planning Guidelines specific to the Medical Center and patient care delivery have been established to inform campus and Medical Center planning decisions, which result in building initiatives.
Planning Guidelines for the Medical Center include:

- Incremental, phased replacement of the Medical Center;
- Maintaining future opportunities to demolish Medical Center structures which have exceeded a reasonable life-cycle;
- Utilizing as much of the existing diagnostic & treatment chassis as possible;
- Fully integrating existing and new diagnostic & treatment components;
- Maximizing flexibility of medical center spaces;
- Minimizing the amount of backfill in the Medical Center.

Options for upgrading the Medical Center to achieve these guidelines fall into four categories: total replacement, partial replacement, major expansion, and major renovation. The Medical Center has been undergoing regular and significant renovations and expansions since its initial occupancy in 1957. Existing conditions indicate that there are limited opportunities for additional expansions. Recent experience has shown that the existing facility presents inherent limitations to efficient and effective renovations. Similarly, limited land bank coupled with financial restrictions essentially eliminate total replacement as an immediate option.
5 PROJECTED NEEDS

Anticipated growth of physical facilities on the MUSC campus is reflective of three major forces:
1) Continued success of the Clinical Enterprise in capturing market share, particularly in the primary care arena;
2) Continued success of the initiatives in basic and applied research, especially as measured by increases in funded research;
3) The need to replace outdated buildings and/or to house key functions in updated, more appropriate space.

5.1 Education

The University projects that growth in the student population will be minor-to-moderate over the next several years. The current full-time student population of approximately 2,500 is expected to grow by only a few hundred, with much of that growth occurring in distance-learning venues. Consequently, there is no significant increase foreseen in the number of students at the Charleston campus. Faculty growth will be proportional to growth in students and new programs, with the majority of faculty growth anticipated in various areas of research.

Although there is little projected growth in the student population, there is, nevertheless, a need for additional and new space for the various academic programs. Three colleges – Dental Medicine, Pharmacy, and Health Professions – have been cited for space deficiencies during each of their recent accreditation surveys. Some of these deficiencies can be satisfied through renovation projects; however, in that each of these colleges is housed in its original space, many of the cited deficiencies would be best ameliorated through replacement facilities, as funding allows.

In the past, space planning for academic programs has occurred on a per college basis. As new programs and services have been developed, spaces formerly intended for academic use have been renovated into procedure rooms, offices, laboratories, and other non-classroom uses. In keeping with the goals of the University Strategic Plan, future facility planning must recognize the need to preserve individual college identities while enhancing inter-collegiate collaboration. Consequently, the special space needs of classroom and small-group learning must be considered university-wide in all facility design.

The following general guidelines should be followed in future facility planning:
- In all buildings where teaching occurs, create rooms dedicated to small-group instruction.
- Recognizing that efficient classroom utilization precludes excess space, design all classrooms to be capable of supporting multi-sized groups. In particular, very large classrooms should be sub-divisible and/or able to be used effectively by smaller groups.
- Student study spaces for individuals and small groups should be available throughout the campus.
- Computers and data ports should be available to students throughout campus.
- Special places to support student life – lockers, commons, mailrooms, etc. – should be available throughout campus.
- There should be places on campus for moderately sized continuing professional education programs.
Additionally, there are identified specific needs:

- All clinical areas should include study and teaching space.
- The Library and its support areas are in outdated space and should be replaced or expanded and modernized.
- Information technology, while generally adequate at the college levels, suffers from weak connectivity and antiquated infrastructure at the University level. Information technology needs should be updated and maintained at state-of-the-art levels.
- Off-campus, distance learning will continue to be the means of growth in the student population. Receiving sites must be identified and developed.
- The University would benefit from a single location for the reception and information of visitors, alumni, and prospective students.

5.1.1 College of Dental Medicine

- Preclinical laboratories are outdated and do not support current teaching methodologies.
- Clinical practice laboratories do not reflect the patient-friendly environment necessary for faculty and advanced students to be able to compete with community providers.
- The teaching laboratories do not fully support current practices in laser technology, implants, TMJ, etc.
- There are not adequate simulation laboratories.
- There is no formal research space.

The College of Dental Medicine currently occupies approximately 100,000 gross square feet (GSF) in the Basic Sciences Building. It would be virtually impossible to adequately renovate that space while continuing to train dentists and serve patients.

Consequently, a replacement facility should be planned. A replacement facility for the College of Dental Medicine would require 125,000 – 150,000 GSF.

5.1.2 College of Health Professions

- There is inadequate space to support the clinical research and teaching functions.
- There is inadequate dedicated research space.
- There are inadequate spaces for students to congregate and study between classes.
- Technical classrooms are outdated and inadequate.
- Faculty and students are dispersed throughout at least six different buildings; there is no program continuity.

The programs and students of the College of Health Professions would benefit greatly from the construction of a replacement facility that consolidates the faculty and provides appropriate and adequate classroom, laboratory, clinical, and support space. The College currently occupies approximately 63,000 GSF in several different buildings. Recent functional and space programming studies have indicated a need for 100,000 – 120,000 GSF.

5.1.3 College of Graduate Studies

- There is insufficient laboratory space dedicated to the training of graduate and postdoctoral students and fellows.
- Classroom space does not adequately support the technologies for computer modeling.
- As funded basic research continues to increase, space dedicated to graduate education will continue to be threatened.
The faculty of the College of Graduate Studies are taken from other colleges and the programs of the college are appropriately intermingled among other programs; consequently, there is not necessarily a “place” called the College of Graduate Studies. However, the students of the program do require support space and amenities – lockers, study areas, mailrooms, computer access, lounges, etc. As additional research facilities are developed, space for student support should be incorporated.

5.1.4 College of Pharmacy
- The current space is totally inadequate to support the programs.
- The College is regularly cited for space deficiencies by its accrediting bodies.
- Due to space limitations, technology has not been able to match trends and needs.
- Programs and faculty are dispersed among several buildings; continuity is difficult to maintain.
- The main building is among the oldest on campus and does not have the infrastructure necessary to support leading-edge research, education, and clinical practice.

This college has among the least functional space at MUSC. Planned renovations to augment research space will be beneficial but will not satisfy or address long-term needs. A new facility of 75,000 – 100,000 GSF, in addition to the planned off-campus Pharmaceutical Development Center, will be necessary to support the program long-term.

5.1.5 College of Nursing
- The College of Nursing is greatly lacking in seminar space.
- Students require large group spaces which are unavailable.

- Clinical experience space is not adequate.
- There is insufficient Preclinical Skills Laboratory space.

The College of Nursing can benefit from many of the same student amenity and educational support spaces discussed earlier. A major thrust of the College is the collaborative practice models which require practice space contiguous with the Clinical Enterprise. These spaces are predominantly off-campus.

5.1.6 College of Medicine
- Nature of classrooms has shifted from large group lectures to smaller discussions among faculty and students from multiple colleges.
- Seminar rooms are needed more than lecture halls.
- Students require locker/lounge areas, small-group study spaces, and access to information.

The College of Medicine is tied directly to the chassis supporting the clinical enterprise. By definition, a sizable proportion of the teaching space for medical students is the actual clinical setting. Consequently, as clinical areas are developed – both on and off campus – consideration must be given to the creation of spaces dedicated to group discussion/teaching and to student amenities.
5.2 Research

Research is the fastest growing activity on the campus. The growth is anticipated to be 10% - 15% per year for the foreseeable future. Research does and will continue to involve all colleges and programs and presents a key opportunity for interdisciplinary collaboration. The proximity of research to both educational and clinical activities is important not only for opportunities to collaborate, but also for efficient use by faculty and students. Most of the recent construction on campus has been for basic research programs and required research support. Nevertheless, the projected growth in research programs will continue to surpass available space.

Facilities need to be renovated and constructed to support the high demands of information technology and state-of-the-art research instrumentation.

An “incubator” research facility is desired in order to encourage the development of health and bioscience-based companies founded on MUSC research.

Designated research space needs to be provided for in each of the University’s colleges. Research labs and support spaces are currently inadequate in the colleges of Dentistry, Health Professions, Nursing and Pharmacy.

5.3 Patient Care

Renovations or new construction are needed to accommodate additional centers for interdisciplinary clinical practice, education, and research. These spaces should be designed for a wide range of patient care collaborations. Off campus services should be designed to provide greater access to education and research functions, possibly requiring a higher level of information technology connectivity. All facilities need to be planned to support a more technological infrastructure in order to maintain state-of-the-art patient care facilities and instrumentation and allow for the introduction of the electronic medical record.

Space must also be planned for the growth of various clinical programs. More space for emergency services is needed due to the shift towards outpatient care. Cardiac and vascular services are also projected to increase in demand, requiring spaces to serve their inpatient and outpatient needs. Pediatric clinics are also projected for future expansion, but will not be able to be accommodated within the Rutledge Tower.

Within the individual colleges, various clinical needs have been identified. The College of Dental Medicine is finding a change in focus to providing more implant, orthodontic and digitalized radiography services, which will require a restructuring of their clinics. With Health Professions expanding their Rehabilitation Sciences and Clinical Services programs, access to clinical space for their faculty is becoming crucial. And an interest in more collaborative community-based Nursing practice models, similar to that in the Union Heights area, is of growing concern.
## Vision 2020

### Existing and Planned Space Utilization, by College or Program

<table>
<thead>
<tr>
<th>College or Program</th>
<th>Dental Medicine</th>
<th>Graduate Studies</th>
<th>Health Professions</th>
<th>Medicine</th>
<th>Nursing</th>
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<th>Patient Services</th>
<th>Integrated Services</th>
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<th>College or Program</th>
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<td><strong>Grand Total</strong></td>
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Planned Campus Capacity: 8,565,694

* Instructional and research space of the College of Graduate Studies is reflected under other colleges, primarily the College of Medicine.

Patient Services numbers do not include space managed by MUSC for Charleston County at Charleston Memorial Hospital and McElrnan Banks Ambulatory Care Clinic (160,282 GSF).

Patient Services numbers do not include off-campus UMA space (153,800 GSF).

Pharmacy numbers do not include 48,000 GSF in a planned off-campus Pharmaceutical Development Center.

Total Planned Campus Capacity assumes demolition or disposition of selected existing buildings.

SOURCES: MUSC Planning Department and Perkins & Will calculations
6 PLANNING DRIVERS

6.1 The Charge from the Facilities Planning Committee

When commissioned by the Facilities Planning Committee, the consultant team received the following charge:

6.1.1 Evaluate the Conditions of the Existing Buildings
It was recognized that much of the current infrastructure and buildings were in need of upgrades, repairs, and major maintenance. For several years, routine maintenance had been deferred in favor of expenditures on new programs and services. The Committee wanted to know the extent of deferred maintenance required in order for the current facilities to be part of the 20-year vision.

6.1.2 Evaluate the Utilization of Current Land and Buildings
Determine if MUSC is achieving highest-and-best use of its capital resources.

6.1.3 Determine the need for new construction
Will there be a need for MUSC to add buildings to its inventory? What programs should these buildings house? Should some older structures be replaced by newer, state-of-the-art facilities?

6.1.4 Prioritize the Needs
MUSC does not have unlimited cash on hand; it’s status as a state institution places limitations on its access to cash and credit. Consequently, the identified required and proposed expenditures must be prioritized and presented in phased packages.

6.1.5 Establish a Vision of Campus Development for the Next 20 Years
Any attempt to predict the nature, culture, and needs of an institution 20 years into the future is a guess, at best, and probably will be proven wrong. However, a master plan which predicts likely growth and development and which clearly defines development zones and guidelines ensures that, as development does occur, it is contained within a framework which provides order, consistency, and flexibility.

6.2 The Parameters of Vision 2020, as Defined by the Facilities Planning Committee

6.2.1 Compliance with the Strategic Plans of the University and the Individual Colleges
• Maximize the effective use of existing resources.
• Create linkages among the various disciplines and programs; provide opportunities for and encouragement of inter-disciplinary collaboration.
• Produce a balanced approach to meeting the needs of Education, Research, and Patient Care.
• Support and enhance on-campus and distance learning as well as public and continuing education.
• Provide flexibility to the development potentials for the clinical enterprise.
• Ensure continued financial viability.
• Support sustained and justifiable growth.
6.2.2 Planning for Opportunities
- Create a framework in which future facility opportunities can fit easily.
- Incorporate Projects already Planned or Anticipated as of April 1999.
  - Research Building II
  - Vascular Institute/Emergency Department
  - Renovations to the College of Pharmacy
  - Expansion of the Cancer Center
  - Center for Health Sciences Communications
  - College of Dental Medicine
  - Pediatric Research Facility

6.2.3 A Campus Reflective of the Reputation of MUSC
- A campus and facilities which enhance recruitment and retention.
- Uniform guidelines for architecture, landscaping, renovations, streetscapes, signage, etc.
- A sense-of-place; the recognition that one is at MUSC through the use of clearly defined edges, boundaries, and gateways.
- Within the uniformity of a common university setting, recognizable identities for the individual colleges.
- User friendliness – convenient, easy-to-access parking; short travel distances; comfortable and safe pedestrian routes; obviously-planned building locations and interconnected gardens; reflection of the beauty of Charleston.
- Facilities which project leading-edge rather than make-do.
- Consolidation of central programs and services at 171 Ashley Avenue rather than unbundling services to remote locations.

6.2.4 A Positive Working Relationship with the City
- Defined boundaries.

- Achievable, workable master plan for development.
- Rezoning of the campus to facilitate planned development.
- Efforts to contribute to the City’s goals for the area.
- Continual dialog with the adjacent residential neighborhoods.
- Design guidelines and standards.
7 PLANNING CONCEPTS

The product of the analyses, evaluations, and considerations of the planning process is this physical vision for the MUSC campus – Vision 2020.

7.1 Key Planning Precepts
This physical vision, the master plan, is driven by several overriding planning concepts:

- **Continued Growth at 171 Ashley Avenue** – Rather than acquire significant additional parcels, spreading the services and functions farther apart than they are now, and encroaching into the adjacent neighborhoods, growth should be contained within the current MUSC superblock. Through carefully managing the growth and effecting a reasonable degree of density on the campus, the current land bank can support up to twice the amount of building area currently in use by MUSC while expanding the amount of formal green space on campus.

- **Create a Pedestrian Campus** – Create enough parking around the perimeter of the campus to meet the needs of the faculty, students, staff, patients, and visitors. Allocate the parking to specific user groups. Create well-defined, attractive, secure walking routes between destinations. Create gardens and courtyards between buildings to provide additional outdoor relaxation and education opportunities.

- **Use Buildings to Define Gardens** – The major garden spaces should be deliberate and planned projects, not just residual landscaping. The design of these gardens as integral parts of the buildings around them will create the image of “outdoor rooms” and will make these spaces more pleasant. Each garden presents a naming opportunity for major donors.

- **Zone the Campus into Areas of Function** – The southeast precinct is maintained as the secondary-tertiary patient care zone. Central campus should contain the majority of educational and research activities. The north and west should be used for primary care clinical activities. This zoning will build upon current use patterns, will work within the concept of perimeter parking, will help patients, especially, find their destinations without having to enter the central campus, and will effect the highest-and-best-use of the current land bank.

- **Contribute to the City’s Goals for the Calhoun and Spring-Cannon corridors.**

Vision 2020 – the campus as it could be in twenty years.
7.2 Specific Planning Considerations

1. The City's goal to develop this area as an effective gateway to Charleston. MUSC can participate by recognizing Courtyard as a major entrance to the city, by developing new facilities at Courtyard & 5th and adding space at the ground level of the parking deck.

2. Perkins & Will

3. Perkins & Will

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15. Perkins & Will
The Medical University of South Carolina, like many other state-owned institutions, cannot accurately predict capital expenditures. The timing of renovations and new construction is frequently dictated by political acts of the legislature, serendipitous acts of benefactors, and/or emergency needs arising from weather disasters or systems failures.

Consequently, these suggested “phases” of activity recognize that specific projects or actions may be deferred or may occur earlier, depending on uncontrollable external influences.

7.3 Immediate Planning Goals

There are several actions which, if undertaken in the near term, will help eliminate imminent problems. There are other activities that will show a concerted effort toward implementation of the Plan and can be achieved with minimal expense.

• **Initial Beautification & Campus Identity Activities** – Suggested actions include sidewalk and street improvements along President Street, Courtenay Drive, and Bee Street; working with the city and the power company to bury utility lines throughout the campus; and implementation of the signage program.

• **Survival Remediation and Selected Deferred Maintenance** – Those buildings which house critical infrastructure, inpatient care, or research functions should be upgraded for protection against hurricane winds and high water in order to ensure that those facilities can remain operational during and after a major storm.

• **Consolidation / Evolution of IT** – The central infrastructure of the Information Technology system is in need of immediate upgrades, particularly the central computer room and requisite support areas.

• **Parking Garage #5** – Additional parking convenient to the patient care areas will enhance customer perceptions, will help ameliorate the parking shortage on campus, and will demonstrate a commitment to respecting the scale of the area to the neighborhoods.

• **Planning for Research Building III** – In order for RB III to be in place in time, it is necessary to begin the facility planning process prior to the determination of the immediate need for the space.
7.4 Short Term Planning Goals

These goals represent many projects already in the planning or investigation stages and projects, which, because of the time required by the state processes would be realized in two-to-five years.

- **Phase I Hospital Replacement/Vascular Institute & Emergency Department** – This project is recognized by the Hospital as a means of meeting its need for updated high-tech diagnostic and treatment space as well as expanded capacity for inpatient functions. While two sites have been identified as potential locations for the hospital expansion, analysis has shown that the site north of the Medical Center offers the best long-term growth for the campus. Therefore, the recommended site to the north will be referred to throughout the remainder of this document. A detailed description of these two options is provided in section 7.6.9 of this summary.

- **Satellite Energy Plant** – The site proposed for the Vascular Institute is also a site for the satellite energy plant for that zone of the campus.

- **College of Dental Medicine, College of Health Professions, College of Pharmacy** – Each of these colleges is in need of significant space improvements, realized through either new construction or major renovations. One or more of the facilities planned for Bee Street would be appropriate for these functions.

- **Research Building III** – Construction of this Research facility should occur during this phase of implementation.

- **Cancer Center Expansion** – This facility is in need of expansion and will receive funding from external sources.

- **Parking Deck #6** – This parking structure will create needed parking for faculty, staff, and students; will contribute to the City’s goals for the Spring/Cannon corridor; and will provide an appropriate relocation opportunity for Engineering, thus allowing for more patient/visitor parking close to the Medical Center.

- **Selected Beautification & Campus Identity Activities** – Each phase of implementation should include continuation of the street and sidewalk enhancement program. This phase should include at least one of the planned major garden areas.

- **Selected Deferred Maintenance** – Additional items from the deferred maintenance list should be completed during this phase.

- **IT Connections / Redundancy** – As each new building is constructed, the IT redundancy loop should be expanded.
7.5 Mid Term Planning Goals

These are projects and activities which, because of funding or need, will be required in three-to-ten years.

- **College of Nursing** – This college should ultimately be co-located with the other colleges along Bee Street. The current CoN building can be used for central administrative functions relocated from the Harborview building.
- **Center for Biomedical Communications** – This central academic/student services facilities belongs in the center of campus for both symbolic and functional reasons.
- **Research Building IV** – The next research facility will be required during this phase.
- **Basic Sciences Building Renovation** – Renovations to create additional research space will be necessary when the College of Dental Medicine relocates.
- **Rutledge Deck Expansion** – should the University choose to acquire this property, an expansion to the Rutledge Deck could occur during this phase of implementation.
- **Selected Beautification & Campus Identity Activities** – Each phase of implementation should include continuation of the street and sidewalk enhancement program. This phase should include at least one of the planned major garden areas.
- **Selected Deferred Maintenance** – Additional items from the deferred maintenance list should be completed during this phase.
- **IT Connections / Redundancy** – As each new building is constructed, the IT redundancy loop should be expanded.

- **Satellite Energy Plants** – As facilities are constructed, it should be determined which buildings will house one of the satellite energy plants.
7.6 Long Term Planning Goals

These are projects that will most likely be undertaken in the ten-to-twenty year horizon.

- **Additional Parking** – When needs are identified, Parking Structures #7 and #8 can be added, taking into account the need to relocate functions in order to clear the proposed sites.
- **Removal of Original Library Building** – With the construction completed to the Center for Biomedical Communications, the original library building may be removed, providing space for the Hospital replacement and additional green areas on the campus.
- **Phase II Hospital Replacement** – The Hospital expansion will be constructed adjacent to the Phase I expansion location.
- **Research Buildings V and VI** – The next two research facilities will come on-line during this phase. These projects will also complete the pedestrian walkway/service drive along the back of the Bee Street buildings.
- **Opportunity Building** – The site directly east of the Harper Student Center has not been assigned a specific use and is available to the University for the appropriate “opportunity”. However, it is important that the general campus planning concepts be respected when planning for that building.
- **Potential Campus Housing, Offices, Academics** – The property could be added to the MUSC holdings and developed as offices, housing and/or academic space not requiring a direct link to the other buildings on campus.

- **Selected Beautification & Campus Identity Activities** – Each phase of implementation should include continuation of the street and sidewalk enhancement program. This phase should include at least one of the planned major garden areas, street alignments to facilitate traffic movement and development of green spaces in connection with the City’s improvements.
- **Selected Deferred Maintenance** – Additional items from the deferred maintenance list should be completed during this phase.
- **IT Connections / Redundancy** – As each new building is constructed, the IT redundancy loop should be expanded.
- **Satellite Energy Plants** – As facilities are constructed, it should be determined which buildings will house one of the satellite energy plants.
7.7 Planning Details

7.7.1 Proposed Building Massing

These parking decks should be six-to-seven stories. As a means of presenting a “friendlier” image to approaching traffic, each deck should provide commercial space either at the ground level or as a building attached to the deck. All new parking structures should borrow from the aesthetic common in the Charleston business district.

The “Bee Street Buildings” should be approximately 200,000 GSF in order to accommodate desired programs. However, to be consistent with the historic image of Bee Street, these buildings must appear at a lower scale at the street level. This can be achieved by building four stories facing Bee Street and rising to seven stories set back from the street. Because of research activities, the heights are dictated by the existing Basic Sciences Building and the level of lab exhaust from it (all the lab exhausts should be at the same level to avoid backdrafts into air supplies of adjacent buildings).

The Center for Biomedical Communications should ideally be five stories. The rotunda wing should be three levels plus a feature roof structure.

Parking Deck #5 should be faced on the east by a structure that is no more than fifty feet high and reflective of the residential areas to the east. NOTE: it is desirable to preserve a portion of the old Charleston High School building – that façade would be an appropriate face for this deck.
With the construction of the four proposed parking decks, total spaces on campus will be approximately 9,500. MUSC currently utilizes 6,400 spaces, including leased spaces at remote lots. The locations of the proposed parking decks are in response to use patterns: Deck #5 is for patients of and visitors to the Medical Center and Rutledge Tower; #6, together with the existing #4 deck, serves the northwest quadrant; Decks #7 and #8 will serve central campus and the future development of the southwest quadrant.
Vehicular circulation patterns will follow existing city streets. A new service drive will be created parallel to Bee Street in conjunction with the proposed pedestrian walkway system. Pedestrian circulation will be along a combination of the existing, but enhanced, sidewalk network and along new walkways connecting the proposed gardens. Secondary pedestrian circulation can be created between buildings via a second-floor bridge system. This internal walkway system will facilitate interdisciplinary collaboration and transfer of research media among buildings.
7.7.4 Planning Details – Proposed Utility Plants

The campus would benefit greatly from a central energy plant. Central provision of major utilities provides for utility redundancies in the event of a systems failure. System redundancy is the best means of ensuring that the functions of a building aren’t halted and that valuable contents of buildings (e.g., research elements and animals) aren’t compromised. However, the construction of a central energy plant would not be cost effective at this point. Consequently, it is proposed that satellite plants be created at strategic locations around campus. These plants will provide redundancy for that campus zone. Each plant should be located on the top floor of its host building in order to protect the equipment from storm surge damage.
The control of service traffic is a primary means of improving campus image and reducing traffic congestion. MUSC has already addressed this issue by using facilities at Arco Lane for receiving and distribution. To the degree practical, additional service functions should be moved to that, or another, off-site location (i.e., central collection of hazardous and biomedical waste). Service traffic can and should also be controlled by dictating times of day when certain deliveries are not allowed on campus. A critical concept for service traffic under this plan is the creation of a service drive to the south of the proposed Bee Street buildings. This drive will follow the design guidelines of the pedestrian walkways, but will be structured to support vehicular traffic.
It is imperative that, for a major academic and research campus like MUSC, the fiberoptic connections around campus never fail. Consequently, the creation of a redundant fiber loop is essential to the future of MUSC. The current connectivity is limited to single lines between a small number of buildings; there is no means for backup should a line become dysfunctional. A fiberoptic cable loop around campus, connecting all buildings, will provide the redundancy required to maintain connections. Also, it is advantageous to have computer and computing support personnel central and close to those whom they support. Since there is already significant investment in the “computer room” in the south Psych Annex building (the former “Support Services building”), it is most cost-effective to centralize computer support activities to that site.
Carefully planned and implemented landscaped areas, both formal and informal, are important to the “campus feel”. A goal of Vision 2020 is the creation of a network of interconnected gardens, each about the size of the “horseshoe”, by which pedestrians can pass through campus. These gardens are integral to the buildings around them; visible and inviting to passengers in passing vehicles and respond to and work with the City’s concepts for green spaces along both the Calhoun and Spring-Cannon corridors. Around Charleston and at MUSC there are numerous examples of successful garden areas that can be models for future projects.
7.7.8 Planning Details – Streetscapes and Gateways

**Concept for Gateways and Edges**

Areas around the campus where formal and consistent streetscaping can add definition to the campus boundaries.
Options for upgrading the Medical Center fall into four categories: total replacement, partial replacement, major expansion, and major renovation. The Medical Center has been undergoing regular and significant renovations and expansions since its initial occupancy in 1957. At this time, there are limited opportunities for additional expansions. Recent experience has shown that the existing facility presents inherent limitations to efficient and effective renovations. Similarly, limited land bank coupled with financial restrictions essentially eliminate total replacement as an immediate option.

Consequently, partial replacement is the option for renewal that is the most practical and affords the best long-term return. However, there are limited opportunities for partial replacement. Two sites are available for the magnitude of construction required over time. One site is south of the Medical Center, north of the Sebring-Aimar House, and east of the College of Pharmacy building. The second site is north of the Medical Center and takes much of the “horseshoe”. Both sites allow for new construction adjacent to the existing hospital buildings, thus providing necessary connections. Both sites can support the large footprint necessary to replace key diagnostic and treatment services. Both sites allow for phased implementation of the partial replacement option.

However, each site presents detriments. The south site requires demolition and/or relocation of several historic and educational/research structures. The extent of new construction would dwarf the remaining historic houses and would be in conflict with the planning goals of the City for the development of the Calhoun Street corridor. Due to the current configuration of the Medical Center, connections between the existing and new would compromise circulation patterns. The new construction would seriously impact the current energy plant and service/delivery docks. If used to create a new “front door” for the hospital, the Medical Center entry would then be remote from the rest of the campus, contrary to goals of this Master Plan.

The north site involves the reconfiguration of the “horseshoe” and the eventual demolition of the Administration Building. Consequently, construction of new space to house Administration and Library must occur beforehand. Due to the current configuration of the Medical Center, connections between the existing and new would require complete replacement of some key departments. There would be significant disruption of the University’s main entry point during construction.

While each site presents advantages and disadvantages in the near-term, it seems that the north site offers the best long-term solution:

- The Medical Center entry remains integral to the University, enhancing the image of continuity.
- There is maintained a buffer space between Calhoun Street and the Medical Center: the City’s planning goals are recognized and incorporated.
- Key infrastructure elements of the Medical Center are not compromised and can be more easily upgraded.
- Existing Medical Center circulation patterns can be more easily reinforced and enhanced.
- The central campus green space can be enhanced and focused on the proposed new education support facility.
- Doughty Street can be re-connected to facility wayfinding through campus.
- Fewer existing buildings and functions must be demolished and/or relocated.
The “Bee Street” buildings present the opportunity to create facilities that truly enhance the strategic goals of intercollegiate collaboration. Each of these proposed buildings, in order to meet the land-use density goals of the master plan, must be large – approximately 200,000 gross square feet. As previously stated, to be consistent with the historic image of Bee Street, these buildings will rise to four stories facing Bee Street and the upper three floors will be twice set back at 15-foot increments. In order to work within budgets, each building can be constructed in two phases of 100,000 GSF each. The collaboration opportunities come from the functional mix in the facility. The lowest floors can and should house academic offices, classrooms, practice labs, student support areas, lecture rooms, etc. It is these floors that can easily become the sites of and identities for the individual colleges. The upper floors are most appropriate for research space and labs. The actual components of each building will be determined during the identification of the Program-of-Requirements early in the design stages. The top of each building should house – within constructed space, not on the roof – the mechanical and electrical equipment for that building and, possibly, one of the satellite energy plants discussed above. The lowest level of each building will be unoccupied, due to flood control factors. Consequently, these areas can be designed to secure and conceal service activities for the building.
7.7.11 Planning Details – Proposed Center for Biomedical Communications

The Center for Biomedical Communications will be located at one of the most visible sites on Campus. At the intersection of President Street and Jonathan Lucas, the Center will truly be the center of campus. The functions housed within the building will assure that students and faculty access the building regularly, if not daily. This location will facilitate one of the primary goals of the building: to foster valuable and meaningful interaction and discussion among the students and faculty of the various colleges and disciplines.

As an early addition to the campus within the framework of the Master Plan, this building will help to shape the future development of MUSC. Its style, siting, landscaping, and interdisciplinary functions exemplify the excellence of education for which the Medical University of South Carolina is known. The prominence of the building will also identify it as a key destination, a place attractive to visitors and alumni. Consequently, the MUSC Museum and Gallery will be viewed by all visitors to campus, further enhancing and bolstering the reputation of the institution. The building will provide the University with the opportunity to establish an outstanding Health Sciences Communications Center that will become the intellectual hub of the Medical University of South Carolina campus.

The Center will stimulate and broaden opportunities for curriculum revision, new educational approaches, distance learning, and perhaps most importantly in the long-term, communication with the communities which the Medical University serves.
8 IMPLEMENTATION

By itself, this documentation of “Vision 2020”, the Campus Master Plan for the Medical University of South Carolina is a good reminder of conversations held and ideas generated during a twelve-month period from April 1998 to April 1999. However, it is only through disciplined implementation that this document will actually be a master plan for renewal, growth, and development.

It is important to remember that this planning effort was the first formal attempt by MUSC to create a planning framework that encompasses all aspects of the University. The Facilities Planning Committee, commissioned in April of 1997, was the first body established to represent the physical needs of all colleges, programs, and endeavors. The University has invested much in this committee and the members of the Committee have given their personal energy and time in seeing to the completion of this planning effort.

Consequently, the future success of the Master Plan as a working tool rests with the continued work of the Facilities Planning Committee. These individuals and their successors can be the medium of ensuring that the concepts presented through this document are carried forward.

8.1 Charge to the Committee

Upon its establishment in 1997, the Facilities Planning Committee was seen as the body that would oversee the continued development of the physical support for University programs. The formal charge to the Committee was:

The University Facilities Planning Committee shall develop a comprehensive plan (Facilities Master Plan) for the development of physical resources requisite to support the institution’s strategic and academic plans. The Committee will review and advise on all major capital projects to ensure appropriate consistency and priority within the approved Master Plan.

The specific charges to the Committee included:

- Oversee the preparation and development of a comprehensive University Facilities Master Plan designed to support the achievement of the University’s institutional strategic and academic plans.
- Update and revise the University Facilities Master Plan at least every five years or more often if changes in the environment so dictate.
- Maintain a working knowledge of the University’s institutional strategic plan, academic and financial plans, and the Facilities Master Plan in order to provide advice concerning all proposed major University facility projects.
8.2 Facilities Planning Committee

Project Review Process

This documentation of the Campus-Wide Facilities Master Plan represents the completion of the first charge to the Committee. In order to continue in the fulfillment of its charge, the Committee must have in place a formal, recognized, and supported process of project review.

While there are many different approaches to these types of committees, there are several principles which, if adhered to, will help ensure that the continued work of the Committee is successful. These principles include:

8.2.1 Regular Meetings w/Full Attendance

The Committee should have a set time, at least once per quarter, to meet. These meetings are for the purpose of evaluating new requests for capital improvements, to review outstanding requests, and to review progress of projects under way. Recognizing that the strength of the Facilities Planning Committee rests in its university-wide representation, each meeting should be attended by all members or designated representatives.

8.2.2 Pre-set Agenda

Prior to each meeting, each committee member should receive an agenda outlining the topics for discussion and complete descriptions of each item so that those who wish to can conduct preliminary investigations.

<table>
<thead>
<tr>
<th>Date:</th>
<th>Review #: ONE TWO THREE</th>
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<tbody>
<tr>
<td>College/Department:</td>
<td></td>
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<tr>
<td>Proposed Project:</td>
<td></td>
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<tr>
<td>Description:</td>
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**REVIEWABILITY** Does this project have a significant impact on other colleges or programs; does it alter the fabric of the campus; does it use funds potentially allocated to other activities?

- YES The Project is Reviewable by this Committee.
- NO Proceed at the discretion of the Dean

**FORM**

- The Proposal is consistent with the Functional Zoning of the Master Plan.
- The Proposal is consistent with the appropriate Guidelines and Standards of the Master Plan.
- The Proposal does not require a variance with City Requirements.
- The Proposal meets the appropriate standards of quality.

**FUNCTION**

- The Proposal affords adequate access to the intended users.
- The Proposal adequately meets the submitted & reviewed Program of Requirements.
- The Proposal includes appropriate degrees of flexibility/adaptability.
- The Proposal enhances improved delivery of the housed activity/service.
- Infrastructure is adequate to support the proposal.

**ECONOMY**

- The Proposal’s Master Budget Worksheet is complete, accurate, and realistic.
- There is likelihood that the Proposal will achieve a reasonable return-on-investment.
- The Proposal is likely to achieve a long-term benefit for the University.
- Funding Sources for the Proposal have been identified and are reasonable.

**TIME**

- The Master Budget Worksheet reflects anticipated cost escalation during the implementation phases.
- The project schedule reflects the anticipated delays of the state review and approval process.
- The project schedule is realistic and confirms that the Proposal can be delivered timely.

Prior to review by the full Committee, each project should be evaluated to determine if it requires review. This initial review can be conducted by a sub-committee or individuals approved by the Committee. A form similar to this one may be useful in the review.
8.2.3 Standardized Project Reports
In order to simplify the process and to ensure equal consideration of all proposals, each request for capital improvement should be presented in a standard format containing standardized information. These request forms should be screened well in advance of the quarterly meetings to ensure completeness and, if necessary, to allow those with requests time to resubmit.

8.2.4 Authority to Recommend
One of the charges of the Committee is to “…advise on proposed major capital projects…” The advice of the Committee must be recognized at the highest levels, including the Board, as valid and valuable.

8.2.5 Willingness to Recommend
Because of the broad representation on the Committee, there will occasionally be requests that directly enhance or detract from certain programs. The members of the Committee must be willing to make recommendations which are for the best of the University as a whole. Willingness to Accept Recommendations -- Once recommendations are made, both the University leadership and the committee members must accept and conform to the recommendations.

8.2.6 Disciplined Implementation
The vision of and concepts for development set forth in this document are based on extensive input and analyses and reflect the collective wisdom of the Facilities Planning Committee. Future modifications to this Plan must be similarly produced. Consequently, any deviation from these recommendations, particularly if a deviation is in response to a whim or personal agenda, will undermine the planning process, denigrate the value of the Facilities Planning Committee, and ensure that a master plan is not followed.

8.2.7 Post-Occupancy Evaluations
Every project, once complete, should be evaluated to ensure that it has remained consistent with the original goals and to determine if there are appropriate modifications to the review process which would improve future reviews.

The process of project implementation should be predictable and consistent. All University resources should be included.
8.3 Standard Report Formats

8.3.1 Program of Requirements

One of the most important documents to be prepared for each request for capital expenditure is the Program-of-Requirements. The POR is a detailed description of the proposed project, including not only the space required, but also the total costs. The preparation of a POR will be an opportunity for the college or department making the request to gain for itself an understanding of the full impact of a request. The basic contents of a POR include:

A. General Information
   1. Name of Project
   2. Scope of Project
   3. Total Project Budget
   4. Project Justification
   5. Site Description
   6. General Characteristics
      a. of the Facility
      b. of the Programs
   7. Participants in the Process

B. Summary of Facilities
   1. Space / Room Lists
   2. Functional Narratives
      a. Overall
      b. By Function
      c. By Room
   3. Equipment Needs

C. Operational Plan

8.3.2 Master Budget Worksheet

The other “most important” document to be prepared with each capital request is the Master Budget Worksheet. This worksheet is a reminder that the total costs of a project include more than just construction; project costs also include moving, recalibration of equipment, furnishings, storage, grand-opening parties, etc.
8.4 Keys to a Successful Master Plan

A standard criticism of a Master Plan is that it doesn’t offer the flexibility to adapt to changing parameters. Consequently, this Campus-Wide Facilities Master Plan purposely avoids attempts at prescriptive dictates and focuses instead on guidelines and principles. The Facilities Planning Committee wanted a document that acted for the University as a “road map”; a document that indicates multiple approaches to reaching the same goals. In keeping with its original charter, the Committee recognizes that among its responsibilities is the regular updating to this plan, particularly as parameters and influences change.

There are several conditions which, when in place at an institution, will ensure the success of a planning endeavor. These conditions are true whether the planning is strategic, financial, or facility.

8.4.1 Buy-In at the Highest Levels

When the President and Vice-Presidents concur with and support the planning principles and endeavor to incorporate those principles into their thinking, the remainder of the institution will also incorporate the planning principles. It is when “deals” are made or personal agendas are pushed ahead of institutional goals that planning fails.

The Oversight Committee, comprised of the University President and the Vice-Presidents, have been closely involved in this planning process. They have reviewed and discussed all the concepts, have expressed concerns, and have directed modifications to some concepts. Consequently, this Master Plan reflects the concurrence of the University leadership.

8.4.2 Commitment to Implementation

By concurring with the guiding principles of the Master Plan, the Facility Planning Committee and the Oversight Committee have stated their intent to implement these planning recommendations. It is important that, as parameters change in the future, the plan not be abandoned but rather be modified and updated to reflect current conditions.

8.4.3 Champions at all Levels

The Oversight Committee is the University leadership. The Facilities Planning Committee represents Deans and Directors. The endorsement of both these groups is critical to the success of the Master Plan. However, the implementation of the Plan will actually be addressed by managers and other individuals at various levels within the University. Thus, it is important that the planning principles documented in this report be shared throughout the University, explained, and understood.

8.4.4 Enablers at all Levels

Similarly, the processes of implementing the Plan will involve employees, staff, faculty, and students. Those who will be directly involved in the various aspects of implementation must be enabled and encouraged to participate.
The Medical University of South Carolina
Campus-Wide Facilities Master Plan