## CAPUS VASTER NORTH CAROLINA CENTRAL UNIVERSITY

**NCCentral** + **VINES** ARCHITECTURE



OCTOBER 22, 2020

**SE NCCentral** + **VINES** ARCHITECTURE

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NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

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## **MASTER PLAN DEVELOPMENT**

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN



## INTRODUCTION

North Carolina Central University (NCCU) is a public, Historically Black University with an enrollment of over 8,000 students. Located in Durham, North Carolina, NCCU is one of seventeen campuses in the University of North Carolina System. NCCU has a long history of leadership in the Civil Rights and Social Justice Movements, and it has direct connections to Black Wall Street, which was a hub of African American business and finance in Durham during the late 1800s and early 1900s. The campus is located approximately one mile south of downtown Durham and three miles east of Duke University.

The University's previous comprehensive master plan was completed in 2007 and updated in 2017. The 2018 Comprehensive Campus Master Plan incorporates newly identified capital projects as well as much needed renovation of current facilities and reallocation and repurposing of existing space to support campus growth and institutional goals. The new campus master plan evaluates and proposes recommendations for new capital building projects, land and space use, space need priorities, transportation and accessibility, safety, utility and infrastructure needs, and campus landscape concepts.





## MASTER PLANNING **PROCESS**

The campus master planning development was divided into two phases: Phase I prioritized space needs, established goals, and identified areas of the campus to be designated as Millennial Campus. The Millennial Campus plan is focused on opportunities to enhance Research and Innovation, develop Entrepreneurial Partnerships, and promote Health, Wellness, and Academic Success. The remaining comprehensive plan was developed in Phase II.

The Comprehensive Campus Master Plan represents the aspirations and needs of a diverse Student Body (present and future), Faculty, Administration, Alumni and University Partners. NCCU formed an Executive Campus Master Plan Committee to engage directly with the design team and provide feedback regarding the development of the master plan. The committee included members representing Academics, Research, Student Affairs and Housing, Business and Auxiliary Services, Athletics, Facilities and Operations, and the Chancellor's Strategic Plan Committee. The Design Team worked with the Committee from the start to determine the goals and principles for the master plan. Throughout the Master Plan development process, the Design Team refined and clarified these goals and principles as they conducted work session meetings with other representative groups from the University. The following is the complete list of engagement and work session meetings conducted during the master planning process:



PROJECT SCOPING
KICK-OFF MEETING - MP Committee
LEGAL AND COMMUNICATIONS
ACADEMIC AFFAIRS
STUDENT AFFAIRS
STUDENT ENGAGEMENT
MILLENNIAL CAMPUS WORK SESSION
CAMPUS SAFETY AND TRANSPORTATION
INFORMATION TECHNOLOGY
ATHLETICS
RESEARCH AND SPONSORED PROGRAMS
BUSINESS AND AUXILIARY SERVICES
CHANCELLOR UPDATE
MILLENNIAL CAMPUS WORK SESSION

January 2018 January 2018 January 2018 January 2018 January 2018 January 2018 February 2018 February 2018 February 2018 February 2018 February 2018 February 2018 March 2018 March 2018

MP COMMITTEE	March 2018
SITE AND UTILITIES	June 2018
CAMPUS SAFETY AND TRANSPORTATION	June 2018
SPACE PRIORITIZATION – MP Committee	June 2018
PROVOST UPDATE	July 2018
PARKING AND TRANSPORTATION N	ovember 2018
BOARD OF TRUSTEES N	ovember 2018
CHANCELLOR UPDATE	January 2019
SITE AND UTILITIES	February 2019
MP COMMITTEE	April 2019
FACULTY SENATE	April 2019
MP COMMITTEE	April 2019
PROJECT PRIORITIZATION AND PHASING - MP Committee	May 2019
PROJECT PRIORITIZATION AND PHASING – MP Committee	August 2019



#### STUDENT ENGAGEMENT

## MASTER PLAN **PROCESS**



2 ASSESSMENT + ANALYSIS





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4 PLAN DEVELOPMENT + DESIGN



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INFORMATION
GATHERING
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ANALYSIS









FINAL MP

#### STEP 1+2 ASSESSMENT + ANALYSIS

#### ACTIONS:

- + CONDUCT CLIENT TEAM MEETING
- + ASSESS EXISTING CONDITIONS
- SPACE INVENTORY / ENROLLMENT
   SPACE UTILIZATION
- · SPACE UTI
- UTILITY & INFRASTRUCTURE
- · UTILITY O INFRASTRUCTURE
- CIRCULATION, PARKING & TRANSPORTATION
- + CONDUCT FOCUS GROUP INTERVIEWS
- + DEVELOP PRELIMINARY ACADEMIC SPACE PROGRAM
- + CONDUCT CLIENT TEAM MEETING
- + CONDUCT CAMPUS ADVISORY COMMITTEE MEETING
- + CONDUCT COMMUNITY ADVISORY GROUP MEETING

#### STEP 3+4 VISION + ALTERNATIVES

#### <u>ACTIONS:</u>

- + REVIEW STRATEGIC PLAN(S)
- + DEVELOP OVERALL CAMPUS VISION
- + DEVELOP MILLENNIAL CAMPUS VISION
- + CREATE CAMPUS FRAMEWORK PLAN ALTERNATIVES
- + DEVELOP PRELIMINARY CAMPUS DESIGN GUIDELINES
- + CONDUCT CLIENT-TEAM MEETING
- + CONDUCT CAMPUS ADVISORY COMMITTEE MEETING
- + DEVELOP PREFERRED CONCEPTUAL DEVELOPMENT PLAN
- + DEVELOP MILLENNIAL CAMPUS APPLICATION SUPPORT DOCUMENTS

#### STEP 5 **FINAL PLAN**

#### ACTIONS:

+ DEVELOP ACTION PLAN

- + FINALIZE CAMPUS DESIGN GUIDELINES
- + CONDUCT CLIENT TEAM MEETING
- + CONDUCT CAMPUS ADVISORY COMMITTEE MEETING
- + CONDUCT COMMUNITY ADVISORY GROUP MEETING
- + FINALIZE CAMPUS MASTER PLAN
- + PRESENT PLAN (AS NEEDED)







## **STRATEGIC PLANNING** INITIATIVES

Coinciding with the campus master planning process was the development of the Chancellor's Strategic Plan (2019-2024). The design team worked with the University to develop a Campus Master Plan that supports the Chancellor's Strategic plan as well as the earlier Student Affairs Strategic Plan, leveraging opportunities with campus development in a coordinated effort to achieve institutional goals in both the short and long term. Some of the strategic initiatives the design team identified relevant to campus development include:

- Developing a collaborative campus culture that eliminates siloed planning and establishes an environment that is cross collaborative in nature and involves developing partnerships across campus, throughout the community, Triangle region and North Carolina
- · (Chancellor's Strategic Plan)
- Reinforce and invest in improved security measures to enhance campus safety and well-being
- · (Chancellor's Strategic Plan)
- Improve and build new infrastructure to better accommodate the NCCU community as it grows and thrives
- (Chancellor's Strategic Plan)
- Enhance the student experience by providing exceptional
- customer service and exemplifying transformative leadership [Student Affairs Strategic Plan]
- Provide student-centered collaborative programs leading to
- student success and professional development
- (Student Affairs Strategic Plan)
- Develop innovative and engaging experiences for students and the university community
- (Student Affairs Strategic Plan)
- Support student development through collaborations between
- the university and local, regional and global communities
- · [Student Affairs Strategic Plan]

The Campus Master Plan addresses the need for expanded research space on campus; Public-Private Partnerships on the proposed Millennial campus support academic goals and provide opportunities to generate revenue which can support future research, technology, and capital improvements. An immediate priority is the need for expanded academic classroom space that can accommodate today's rapidly changing technological environment. Other needs include expanded Student Housing, on-campus parking, and access to more options for food all of which support the strategic initiatives noted above. In addition to these space needs, the Campus Master Plan addresses the need for improved security and anticipates the need for expanded utility infrastructure as the University grows.

NCCU has identified other strategic priorities that can only be fully realized through integrative and long-term campus planning. These aspirational goals consider the full experience of students and faculty as they live, work, and engage on campus, with the surrounding community and beyond. NCCU's Mission Statement states the University, "with a strong tradition of teaching, research, and service. prepares students to become global leaders and practitioners who transform communities...Our students enhance the quality of life of citizens and the economic development of North Carolina, the nation, and the world." The Campus Master Plan addresses these long-term goals by looking at the interconnectivity of buildings and open campus spaces, and by considering the relationship of academic and research space to less formal spaces for students to socialize, study and engage creatively. The Campus Master Plan also considers important physical and institutional relationship to Durham and the surrounding community.

The Master Plan Goals identified reflect a range of immediate needs along with NCCU's aspirational vision for its future. Through sustained, long-term planning, the Comprehensive Campus Master Plan seeks to develop a dynamic campus environment that supports collaboration, innovation, and a strong sense of identity and community.

## MASTER PLAN DESIGN GOALS

- 1. CREATE AN EXPERIENCE ON CAMPUS THAT EXPOSES STUDENTS TO DIVERSITY, TECHNOLOGY, INFORMATION, AND IDEAS THAT PREPARE THEM TO BE JOB-READY IN A GLOBAL ENVIRONMENT
- 2. REDEVELOP THE ACADEMIC AND HISTORIC CORE AND ENHANCE THE **IDENTITY AND SENSE OF PLACE** ON NCCU'S CAMPUS
- 3. IMPROVE ACCESS AND CIRCULATION WITHIN THE CAMPUS
- 4. STRENGTHEN **CONNECTIVITY** TO THE SURROUNDING COMMUNITY AND DOWNTOWN DURHAM
- 5. PROVIDE FACILITIES THAT FOSTER INTERDISCIPLINARY COLLABORATION AND SUPPORT STRATEGIC PARTNERSHIPS WITH OTHER INSTITUTIONS, BUSINESSES AND COMMUNITIES

- 6. DEVELOP AND IMPROVE **SOCIAL GATHERING AND MEETING SPACES** FOR STUDENTS AND FACULTY THAT SUPPORT AN INTELLECTUAL AND CREATIVE CAMPUS ENVIRONMENT
- 7. PROVIDE GREATER **VISIBILITY** FOR NCCU'S RESEARCH, ACADEMICS, ATHLETICS, AND OTHER PROGRAMS AND CAMPUS ACTIVITIES
- 8. IMPROVE AND BUILD NEW **INFRASTRUCTURE AND SECURITY** TO BETTER ACCOMMODATE THE NCCU COMMUNITY AS IT GROWS AND THRIVES
- 9. DEVELOP A SUSTAINABILITY FRAMEWORK
- 10. BUILD ON **NCCU'S LEGACY** AS A LEADING HBCU AND ITS HISTORY OF SOCIAL ACTIVISM, COMMUNITY SERVICE AND COMMUNITY LEADERSHIP





NCCU BRITE



## 2018 CAMPUS + **3-5 YEAR OUTLOOK**

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN





## **HISTORY + SIGNIFICANCE**

North Carolina Central University (NCCU) was founded in 1910 in Durham, North Carolina. It is the oldest publicly funded liberal arts college for African-Americans in the nation. Located in the Research Triangle, NCCU has an enrollment of 8,200 students (Fall 2018) who hail from North America, Africa, Asia, South America and Europe.

The university offers bachelor's degrees in 100 disciplines, master's degrees in more than 40 areas, and a Ph.D. in Integrated Biosciences. NCCU's signature graduate and undergraduate degrees are housed in seven colleges and schools: College of Arts and Sciences; College of Behavioral and Social Sciences; School of Business; School of Education; School of Graduate Studies; School of Law; and School of Library and Information Sciences. Identified as a Community Engaged Institution by the Carnegie Foundation for the Advancement of Teaching, the NCCU community lives by the institution's motto of "Truth and Service." NCCU became the first state-supported university in North Carolina to require community service for graduation.

NCCU is a leader in the scientific study of health disparities, offering students the opportunity to gain laboratory skills and experience working with faculty researchers and pharmaceutical and biotechnology industry professionals. The Biomanufacturing Research Institute and Technology Enterprise (BRITE) and Julius L. Chambers Biomedical/ Biotechnology Research Institute (BBRI) collaborate frequently with pharmacy and biotech companies in and outside of the Research Triangle region. In 2017-2018, the university generated more than \$26.8 million in grants and other funding for sponsored research to support groundbreaking research into health issues that disproportionally affect minority and underserved populations, including Type 2 diabetes, cardio-metabolic diseases, as well as prostate, breast and pancreatic cancers.



# CULTURAL Context

**NCCU TODAY**: DURHAM AND THE TRIANGLE REGION

A key component of the Master Plan is to prioritize the positioning of NCCU strategically to take advantage of the rapid and vibrant growth of Durham and the Research Triangle Region. NCCU has tremendous potential to engage and be a part of the resurgence and redevelopment of nearby Downtown Durham and the Triangle's continued growth as a nationally recognized center of technology and culture.

Strategies of the Master Plan consider critical adjacencies to the campus including, residential neighborhoods, commercial districts and access to public transportation. Other strategies such as development of the Lawson Street and Fayetteville Street Corridors will create thresholds between the campus and the city, enhance the identity of the University and Campus and provide opportunities for engagement through programs, visibility of activity, and engagement and interaction.



#### NCCU URBAN CONTEXT / NEIGHBORHOODS



NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

#### NCCU URBAN CONTEXT / NEIGHBORHOODS

# CONNECTIVITY TO **DURHAM**



#### NCCU URBAN CONTEXT, TRANSIT

## **CHALLENGES + OPPORTUNITIES**

#### SECURITY

While there is a desire to maintain an open and inviting campus atmosphere, the University recognizes the need to balance this with security concerns. Security issues have primarily been caused by non-students coming onto campus. NCCU is currently implementing campus standards for card-access, security cameras and adequate campus lighting. Other strategies include designing open spaces and building entrances to promote activity and provide high visibility. NCCU's greatest asset is its students and the vibrant sense of community thriving on campus; designing and planning active streetscapes and green spaces that support social activity and recreational opportunities is an important step in maintaining a comfortable and safe campus environment.

#### ACCESSIBILITY AND PARKING

On-campus parking is a challenge at NCCU, as it is on most campuses. The master plan proposes strategies to reduce parking demand (including policy changes) as well as developing structured parking to increase capacity. Parking does provide an opportunity to generate revenue, and new parking decks are proposed to be located within the Millennial Campus where the revenue can be retained to support strategic and operational needs. It should also be noted that the imbalance of parking demand and supply causes added stress on adjacent neighborhoods as students seek temporary parking along city streets in these areas. Students parking in neighborhoods will never go away entirely but recommended parking strategies included in the Campus Master Plan will offer potential relief to neighborhoods adjacent to NCCU.





NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

# **D3 PRIORITY SPACE NEEDS ASSESSMENT**

## **PRIORITY SPACE NEEDS** ASSESSMENT

For the development of the Campus Master Plan, the Design Team conducted a comprehensive space needs assessment. Through work session meetings with faculty, administrative staff and students, a list of current and anticipated future space needs has been developed. The space needs assessment includes academic and student life spaces, research and lab space as well as outdoor rec and athletics facilities.

Significant construction projects to be completed in the next 3-5 years will offer learning environments that are technology rich and foster collaborative, active learning. Equally important are the proposed renovations, including HVAC replacement and Audio / Visual Technology upgrades in existing classrooms. Utilization rates in these older classrooms are understandable low. Student comfort, attention and physical health are a concern in many of these spaces. Utilization rates in existing academic spaces can impact state funding for new projects so the proposed renovations are a high priority.

The priority space needs assessment was used to develop the proposed Capital Building Projects detailed in Section 07.

## MASTER PLAN **PROGRAM PRIORITY NEEDS LIST**

#### ACADEMIC

EXPANSION OF STEM CLASSROOM AND LAB SPACE EXPANSION OF HUMANITIES CLASSROOM SPACE FINE ARTS PERFORMANCE THEATER NEW SCHOOL OF BUSINESS FLEX SPACE FOR GRADUATE AND COMMUTER STUDENTS FLEX MEETING AND STUDY SPACE LIBRARY REPLACEMENT (OR SUBSTANTIAL RENOVATION)

#### RESEARCH + INTERDISCIPLINARY

#### INNOVATION HUB

FLEXIBLE LAB SPACE POTENTIAL CORPORATE SPONSORSHIP

HUMAN HEALTH AND PERFORMANCE CENTER ATHLETICS TRAINING EDUCATION PHYSICAL THERAPY TRAINING ATHLETICS LOCKER ROOMS, TRAINING AND ADMINISTRATION POTENTIAL RESEARCH + MEDICAL PARTNERSHIP

#### STUDENT SUPPORT

STUDENT HOUSING EXPANSION TARGET 50% OF FULL-TIME STUDENT POPULATION

STUDENT DINING EXPANSION EXPAND PROPORTIONALLY TO NEW STUDENT HOUSING

ONE-STOP REGISTRAR PARKING

NEW STUDENT CENTER

STUDENT HEALTH SERVICES MOVE AND EXPAND

EAGLE CARD

#### OUTDOOR GATHERING AND SOCIAL SPACES

SPIRITUAL AND MEDITATION SPACES SUPPORTIVE OF DIVERSE STUDENT POPULATION

#### ATHLETICS AND STUDENT RECREATION

AUXILIARY AND RECREATION FIELDS MULTI-USE SPORT FIELDS BAND PRACTICE

TRACK AND FIELD COMPLEX TICKET OFFICE AND FIELDHOUSE CONCESSION UPGRADES

O-KELLY RIDDICK STADIUM IMPROVEMENTS EXPANDED SEATING [15-17K] SUITES [15-20] CONCESSIONS, STORAGE AND RESTROOM UPGRADES PRESS BOX UPGRADE

MCDOUGALD-MCLENDON ARENA EXPANSION



RESIDENCE HALL TWO

CHIDLEY RESIDENCE HALL

CHIDLEY NORTH RESIDENCE HALL

TENNIS AND GOLF COMPLEX 8-12 NCAA REGULATION SIZED COURTS SEATING (500) GOLF SIMULATORS ADMIN, LOCKERS, AND STORAGE CONVOCATION COMPLEX

6-8,000 SEAT CAPACITY CONVOCATION CENTER MIXED USE RESTAURANT AND RETAIL HOSPITALITY AND TOURISM CENTER CULINARY PROGRAM HOTEL SUITE WITH POTENTIAL CORPORATE SPONSORSHIP

#### AUXILIARY

PARKING DECK (1-2) MIXED-USE RESTAURANT + RETAIL

RESIDENCE HALLS AT THE CORNER OF ALSTON AVE + LAWSON ST



## MASTER PLAN STRATEGIES

Many students and faculty in engagement meetings said that they consider the NCCU community to be an extension of their family. The success of NCCU moving forward will build on this sense of community and on its legacy as a leading HBCU. At the same time, NCCU and its campus must develop and grow in order to create a campus experience that exposes students to diversity, technology, information and ideas that prepare them to be job-ready in an ever-changing global environment.

To achieve these aspirational goals commitment to long-term campus planning is required. The Comprehensive Master Plan creates strategies to place new buildings, re-envision existing open spaces and circulation corridors, and reorganize allocation of academic and administrative spaces within existing buildings in order to create a more coherent, integrated campus that supports the University's strategic initiatives.

#### EAGLE CAMPUS PROMENADE

Eagle Campus Drive is an important spine running through the center of campus. Although currently it is an open vehicular road with parking along both sides of the street, Eagle Campus drive has the potential to be developed into a pedestrian friendly promenade with shuttleonly access. Anchoring this campus connector at two highly visible and prominent locations are the George Street and Lawson Street Residence Halls which will be completed by Fall of 2021. The proposed building orientations, the location of entrances, lobbies, and group spaces and views in and out of the buildings are largely driven by their relationship to Eagle Campus Drive.

- Making Eagle Campus Drive a central
- Promenade of the campus
- Reinforce Pedestrian Character of Lawson .
- Connecting Existing and New Green Spaces
- Improving Pedestrian Circulation + Transit Between Districts .
- Improving Parking & Transportation
- Improving Wayfinding

#### LAWSON STREET CORRIDOR

The Lawson Street Corridor has strong potential to be a positive and recognizable district on the NCCU Campus. Mixed Use districts that include both University program and private retail development are an important threshold between University Campuses and the surrounding community. The Lawson Street Corridor is often the first impression prospective students' and other visitors have when arriving to campus.

The most important consideration for creating a successful streetscape is activity, and the Lawson Street Residence and the New School of Business will have a significant contribution to that end. Active streetscapes need to be planned to safely accommodate both vehicles and pedestrians, and traffic calming measures need to be considered.







#### MULTI-HUB CAMPUS

The proposed campus development plan will contribute to better distribution on campus of informal group and social spaces as well as retail and food. Site development will include courtyards and outdoor rec space, also contributing to better distribution of resources and amenities on the campus. Along with the New Student Center and the New School of Business which are both in design phases, NCCU has an opportunity to create a more connected, accessible, and vibrant campus in the next 3-5 years.

Each district contains:

- Housing
- Food + Retail
- Social Gathering Space
- Outdoor + Rec Space
- Academic Programs
- Innovation Opportunity
- Research Programs
- Interdisciplinary Programs .
- Community Outreach
- Leadership Programs





#### CAMPUS CORE

Each district may have its own character which emerges from its context (topography, adjacencies, historic building or new ones). Some areas may have a primary function (for example, moving administrative offices to the perimeter of campus maintaining core academic uses at the center). It is not intended that these districts are to be "siloed" but it recognizes that a uniform "sameness" across campus is not desired either. An important strategic concept in the Campus Master Plan is for the historic core of campus and its buildings to be reallocated to primarily academic use. Facilities and other Administrative Offices and the Facilities Plant are all moved to the perimeter of campus in the long-term plan. The Campus Core (which includes significant renovations to existing buildings located in the core) will become the gravitational center for all Academic life on campus.

Campus Interactions will be supported through

- Shared Classroom Space
- Shared Social Spaces .
- Shared Green Spaces .
- Shared Housing
- Physical Accessibility .
- Shared Virtual Spaces
- Shared Resources



## LAND ACQUISITION

The NCCU campus is currently bound by four primary city streets, Fayetteville Street on the west, Lawson Street on the north, S. Alston Street on the east and Cecil Street on the south. There are also several internal streets bisecting the campus open to vehicular traffic, Nelson Street, George Street, Lincoln Street and Eagle Campus Drive. Future university property acquisitions to the north and south will expand the campus boundary to Dupree Street and Burlington Avenue.





NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

### CAMPUS CHARACTER

The physical environment of a university's campus is an expression of its overall quality, brand, and educational experience. The organization of buildings, districts and open spaces unifies a campus, defines its visual character and protects environmental qualities while promoting places for social and recreational activities. Preserving and building upon the campus's significant buildings and iconic landscape spaces such as the "Library Bowl" (referred to by many students as the "Greek Bowl") in the historic campus core are essential to unifying and maintaining the campus identity.

NCCU is shaped by its pronounced topography, and great care should be taken to maintain the unique balance of formal and informal systems of the campus landscape. Earlier masterplans are dominated by more formal Neo-Georgian quads which suppress the inherent landform that makes NCCU's campus unique and memorable. A compelling planning strategy emerges when it organizes itself around the topography and addresses more sustainable and integrated design strategies. Eagle Campus Drive, for example, winds informally through campus, following the natural topography, providing a corridor linking campus building from Lawson Street to the North to Fayetteville to the Southeast. The Campus Plan takes advantage of this existing corridor by routing shuttle service to locations along the proposed "promenade" will also become a major green pedestrian space anchoring the campus core.

Similarly, the proposed stream restoration project running along the east side of the athletics fields follows the natural topography of the campus. The proposed stream restoration replaces failing stormwater infrastructure with a more efficient and sustainable stormwater management strategy. The stream and adjacent buffer become an iconic element in the landscape and an important green space / corridor for pedestrian circulation along this side of campus.

Providing and maintaining an aesthetic and ecological network of pedestrian and open space corridors will encourage a walkable and enjoyable pedestrian-centered campus characterized by an intimate scale, organized open space, and strong internal connections. As pedestrian corridors are improved and clearly defined, the campus will be perceived as a more cohesive whole with distinct and memorable spaces working together. Campus connectors will vary by type, function and scale to include streetscapes, promenades, walks, plazas, nodes, terraces, greens, quads, and recreation fields.

Additionally, soft, permeable campus edges integrated with the community, campus standards for site amenities and materials creating a consistent, high-quality public realm and unified campus fabric, and screening back-of-house operations to minimize the visual impact of service areas will enhance the character of the campus. A Campus Landscape Master Plan is recommended to establish design guidelines and harmonic theme of materials, site lighting, signage and wayfinding, site furnishing and preferred sustainable plant material to define and strengthen the campus identity and character.

Gateways provide a unique sense of arrival, invitation, and transition identifying primary campus entrances along major corridors at key locations. Gateways often include several of the following elements: signage/wayfinding, iconic structural features and landmarks, significant architectural buildings, landscaping, lighting, and public art. Although each gateway may be somewhat unique, repeated themes in color and brand will provide continuity, enhance the appearance, and demonstrate pride in the community. Proposed gateway locations are at the intersections of Fayetteville and Lawson Streets, Lawson and South Alston Streets, South Alston and Cecil Streets, and Cecil and Fayetteville Streets. Each of these gateways lie along primary multimodal, streetscape corridors enhancing the experience for motorist, pedestrians and cyclist.

## CAMPUS **DISTRICTS + CORRIDORS**

Where in the past university master plans sought to define siloed academic districts, the campus of the future needs to respond much more quickly to shifting educational pedagogies, placing greater emphasis on transdisciplinary collaboration and hybridization. The idea of a more networked, integrated and connected campus fabric for NCCU is more critical than ever. Spaces for quiet study, group interaction, outdoor recreation and food options are to be distributed equitably throughout campus. Ease of access should be ensured for persons with disabilities.



STUDENT SERVICES CORRIDOR







RESEARCH + STEM



## **LAWSON STREET** CORRIDOR

As the NCCU Campus expands northward, the uses and character of East Lawson Street between S. Alston Avenue and Fayetteville Street is transitioning from a residential neighborhood to a vibrant mix of university related uses along both sides of the street. Creating an activated "college street" environment while coexisting with vehicular and bicycle traffic along a public street will require coordination with the City of Durham. Proposed narrowing of vehicular travel lanes and/or incorporating dedicated bicycle lanes or sharrows and reducing the speed limit along this section of roadway will promote traffic calming and connection to the campus core. In addition to pedestrian crosswalks at the intersections of S. Alston Avenue, Lincoln, Merrick and Fayetteville Streets, selective mid-block crossings are proposed at key locations where students will naturally desire to cross to college buildings and activities. For safety, pedestrian crossings will incorporate various colorful, painted street art crosswalks with Rapid Flashing Beacon Signals [RFBS] activated when pedestrians approach to cross the street at midblock crossing locations. To accommodate increase pedestrian activity, walks are to be widen from five-feet to eight-feet or more with enlarged plazas and gathering nodes at various locations along both sides of the roadway. An enhanced streetscape with street trees, plantings, lighting, signage and furnishings will create a sense of place and campus identity.



NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

## **EXISTING CONDITIONS**



VIEW LOOKING WEST DOWN LAWSON STREET



CAMPUS 2018

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN



WEST LAWSON

## P3 LAWSON STREET **RESIDENCE HALL** DESIGN APPROACH

The design strategy for the Lawson Street Residence is to bring student activity and visibility to the street front. Student common areas are located along the street, opening to a two-story lobby at the corner of Lawson and Lincoln Street. At this prominent corner of the building, social space is located at each level, providing incredible views out over the Athletics fields. Vibrant color, University branding|graphics and student activity create the foreground and focus of the Lawson Street Residence.

Upper level study spaces and group meeting spaces are oriented with views to the north, overlooking a courtyard space, and to the south, looking down Eagle Campus Drive. The design team has developed a strategy that balances the need for activity at street level while distributing social and study spaces of varying size throughout the building on all levels.

There are two primary entrances to the building, one at the second level near the intersection of Lawson and Eagle Campus drive, and another at the lower level at the intersection of Lawson and Lincoln, (adjacent to the parking deck). Open lobby, social, and group study spaces connect the lower level and second level entries, accommodating the grade of the site and providing accessible entries.

NEW LAWSON ST RESIDENCE HALL 1 NEW SURFACE PARKING LOT 2

EAGLE CAMPUS PROMENADE

3



LAWSON HALL

EAGLE CAMPUS DRIVE



#### LAWSON STREET DISTRICT, SURFACE 678







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#### FUTURE BUILDING

# **GATEWAY** PRECINCT

The public streets bordering the NCCU Campus, Fayetteville, E. Lawson, Cecil Streets, and S. Alston Avenue, have been identified and adopted in various plans by the City of Durham, the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO), and the North Carolina Department of Transportation (NCDOT) for future complete streets with bicycle facilities. In addition to the existing pedestrian walks along these streets, dedicated bike lanes, sharrows, and paved side paths or combination of bicycle facilities could be implemented with street trees, lighting, signage and furnishings. The funding and timing is unknown at this time, but may be prioritized with demonstrated need. The University is encouraged to have an on-going, open dialogue with various public agencies in partnering and input with proposed improvements. Multi-modal access will provide a soft inviting edge to the campus, an alternative mode for the "last mile" from public transportation, and connection to the surrounding community and downtown Durham.



NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

## **EXISTING CONDITIONS**





CAMPUS 2018

VIEW FROM INTERSECTION OF LAWSON ST + ALSTON AVE
# P3 CHIDLEY SOUTH RESIDENCE HALL

### DESIGN APPROACH

The new Chidley Residence Hall will provide much needed apartment style housing to the campus, helping to diversify NCCU's housing inventory. The additional private space provided by apartment housing will help efforts to retain upper classmen. Space has also been allocated on each level to accommodate small group study.

The design team proposes to build to the edges of the site, creating a semi-enclosed courtyard buffered from adjacent sites (and Alston Avenue to the east) in order to provide quiet outdoor space. The courtyard opens on the west to sweeping views of the main campus and the athletics fields. The main lobby anchors the courtyard to the east.

Landscape and hardscape are designed to connect new and existing pathways, including a primary pedestrian path leading over to the campus core by way of the "Jesus Steps."

The site development of Chidley will also address the site of old Chidley Hall which is being demolished. A pathway / corridor will be developed connecting the new residence hall with existing residence halls and new retail to the north and beyond to the new School of Business. This end of campus is somewhat fragmented now, and the new Residence hall and site development provide an opportunity to knit these spaces together while further defining the campus edge along Alston Avenue.

P

NEW SCHOOL OF BUSINESS
NEW CHIDLEY SOUTH RESIDENCE HALL
FIRST FLOOR RETAIL DINING
FUTURE ENTREPRENEURSHIP LAB

- 5 FUTURE HOSPITALITY
- 6 PLANNED GOTRIANGLE

1 2

3

4

POTENTIAL SITE FOR NEW PARKING DECK



ACADEMIC SHARED ACADEMIC HOUSING ATHLETICS + STUDENT REC STUDENT SERVICES IMPORTANT OPEN SPACE CAMPUS SUPPORT LAWSON ST CORRIDOR IMPROVEMENT AREA

# EAGLE CAMPUS DRIVE CAMPUS CORE STUDENT SERVICES CORRIDOR

The North Carolina Central University's historic academic core and connection to the Mary Townes Science Building are well defined and traveled pedestrian corridors creating a sense of place, identity and enjoyable walking experience through campus. As pedestrian travel moves outward from the central campus to the east and south, walks and connectivity are less distinct with undesignated pedestrian routes often through parking lots and within streets. This creates an unsafe and unenjoyable experience. Pedestrian are therefore less likely to walk throughout campus, but to drive, park and move vehicles to the next campus location. To promote a walkable campus, a well-defined interconnecting pedestrian network grid is proposed along "green ribbons" of open space, quads and streetscapes creating a safe environment, campus identity and connectivity throughout campus. To preserve the historic academic core and connections to the heart of campus and student activities, Eagle Campus Drive is proposed to become a pedestrian promenade with nodes for social gatherings and connections to other parts of campus. The promenade's character will be defined as a 20-26-foot wide pedestrian/ bike way with specialty paving, street trees/landscaping, lighting and site furnishings. Vehicular access will be limited to the campus shuttle/ circulator, emergency, service and accessible parking. Pedestrian/bike connections from other parts of campus will converge at plazas and nodes along Eagle Campus Promenade for informal gatherings, various events, game-day activities leading into the stadium, food trucks, and known on campus as a place "to see and be seen."

# EAGLE CAMPUS DRIVE



ONE-STOP / COMMUNITY HEALTH CENTER ···

# **EXISTING CONDITIONS**





CAMPUS 2018

VIEW LOOKING NORTH OF EAGLE CAMPUS DRIVE

EAGLE CAMPUS PROMENADE, SURFACE 678



NORTH CAROLINA CENTRAL UNIVERSITY

CAMPUS MASTER PLAN







# **EXISTING CONDITIONS**



CAMPUS 2019



"GREEK BOWL"

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

# P3 GEORGE STREET RESIDENCE HALL

### DESIGN APPROACH

The George Street Residence Hall is located adjacent to the south end of the Historic Core of NCCU along Eagle Campus Drive. The site of the new Residence Hall and the adjacent site [where Baynes Hall is being demolished] form an important link to future development on the south end of campus, including the New Student Center and proposed practice and student recreation fields between Cecil and Martha Streets.

The primary entry and two-story lobby to the north open to Eagle Campus Drive on the lower level. The lobby connects through the building to a second entry to the south at the second level, addressing grade change and providing accessible entries. Secondary key-access only entries are located on each end of the building. The lower level classroom has windows facing Eagle Campus drive along what will become a primary path leading to the New Student Union. The classroom is located off the main lobby near the front desk in the event that there is a need for non-residents to have access to it. Given the **central location of the residence hall on campus**, other program considerations may include

- Fed-Ex or similar package drop-off and pick-up
- Covered area for personal bikes or lime bike docking station
- Electronic schedulers for use of classroom as group meeting space

As with the Lawson Street Site, active spaces at the ground level along with vibrant color and University branding|graphics create the foreground of the George Street Residence while the brick façade of the residential zones reinforce the character of the existing campus.



- 1 NEW GEORGE ST RESIDENCE HALL
- 2 NEW STUDENT CENTER
- 3 HUMAN HEALTH AND PERFORMANCE
- 4 ONE-STOP CENTER /
- STUDENT & COMMUNITY HEALTH SERVICES 5 INNOVATION LAB
- 6 STUDENT DINING
- 7 NEW ACADEMIC BUILDING
- 8 LEARNING COMMONS / LIBRARY RENOVATION
- 9 ACADEMIC SPACE RENOVATIONS
- P NEW PARKING DECK



STUDENT SERVICES CORRIDOR



NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

ALFONSO ELDER STUDENT UNION

# **EXISTING CONDITIONS**



VIEW LOOKING EAST DOWN GEORGE ST

CAMPUS 2018

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN



# **ATHLETIC** FIELDS

The steep topography, location and layout of the track and field and O'Kelly-Riddick Stadium with the proposed daylighting of the stream create a barrier from the heart of campus to the east campus resident halls, Walker Physical Education Complex and School of Nursing. Currently a narrow path between two fences and the "Jesus Steps" transitioning thirty feet of grade change are the primary connection between the two areas of campus. This creates a perception of being unsafe when traveling at night or unpopulated times. It is recommended this linear space be evaluated and designed to create a safe, welcoming connection and experience. Some alternatives may include opening and enlarging the space between the fences, providing landings or terraces to rest or gather on the slope, or some type of iconic, elevated pedestrian structure providing not only for connection, but also a landmark destination symbolic with the university.



NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

### MULTI-USE TRAIL ALONG PROPOSED STREAM

With the daylighting of the existing stream through campus, there is an opportunity to provide a 10' wide asphalt multi-use trail adjacent to the stream. This will provide a much-needed north-south pedestrian and bike connection with amenity areas for interactive social gathering places, and reflective resting spaces in a unique environment. As part of the stream enhancement, there are funding sources to assist with design and implementation of the multi-use trail.

..... 0'KELLY STADIUM

# **EXISTING CONDITIONS**



TRACK AND FIELD (LEFT) O'KELLY STADIUM (RIGHT)



CAMPUS 2018

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN campus planning D5

# **RESEARCH + STEM**

The University, under the auspices of the Division of Research and Sponsored Programs in conjunction with its six colleges and schools NCCU has established its Research System Approach to Innovation and Sustainability. This system approach involves basic research ranging from biomedical/biotechnology to pharmaceutical sciences to social and behavioral sciences focused on solving problems that affect the citizens of North Carolina. It is also conducting research in health disparities, nanotechnology/carbon nanotubes, robotics, polymers and green energy. Research efforts at NCCU are designed not only to prepare students as the next generation of scientists; but, to address current and future challenges that impact our society economically and/or socially.

North Carolina Central University's research activities are carried out through two major research institutes, Julius L. Chambers Biomedical/ Biotechnology Research Institute (BBRI), and, The Golden Leaf Foundation Biomanufacturing Research Institute and Technology Enterprise (BRITE). In addition to the two major research institutes, NCCU offers academic degrees through its two colleges (College of Arts and Sciences and the College of Behavioral and Social Sciences) and four schools (School of Business, School of Education, School of Library and Information Sciences and School of Law), which are intimately involved in ongoing research activities. The 2018 campus master plan includes several new capital projects to further the advancement of research and sponsored programs at NCCU and establishes a northern and a southern research cluster gravitating around the two research institutes BRITE and JLC-BBRI. A new expansion at Mary-Townes/BRITE facility provides additional laboratory space for the home of STEM and biotechnological. An expansion of JLC-BBRI in the southern research cluster is set to prioritize health disparities and translational research on campus. The new human health and performance center (HHPC) can be utilized by researchers conducting human health and performance research. Additional research space for population/epidemiology research may also be considered as part of this facility's program south of the stadium.

RESEARCH EXPANSION .....

HUMAN HEALTH AND PERFORMANCE CENTER

PARKING DECK

INNOVATION LAB / RESEARCH BUILDING .....

# **EXISTING CONDITIONS**



CAMPUS 2018



BRITE

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN



# **PEDESTRIAN + BIKE** CIRCULATION

One of the challenges to planning and implementing a walkable/ bikeable campus is the rolling topography and significant grade changes. The NCCU campus elevations fall over 90-feet, from the northwest corner of campus near the Mary Townes Science Building with an approximate elevation of 390' falling to an approximate elevation of 300' near the School of Education in the southeast area of campus. Internally, elevations drop sharply over 30' from Eagle Campus Drive to the track and field and O'Kelly-Riddick Stadium with another 30' rise to the east campus residence halls. Pedestrian and bike routes are planned to help navigate the topography and provide a safe, enjoyable walking/biking experience while providing connectivity to all areas of campus.

In conjunction with pedestrian walks, bike paths and racks throughout campus promote healthy, sustainable modes of transportation. A campus bike share program could offer an alternative form of travel. Designated bike paths, lanes, and "sharrows" or shared bike lanes connecting throughout campus, often in combination with pedestrian walks, street trees, lighting and furnishings will encourage users with safe and enjoyable routes. These "complete street" designs could be utilized on internal campus roads, Nelson, Cecil, Lincoln, Dupree and Burlington Streets, to accommodate the safe and enjoyable pedestrian, bicycle and vehicular traffic experiences.

### **BICYCLE FACILITIES**

Fayetteville Street from East Ulmstead Street to Nelson Street lies between two City of Durham bicycle improvement projects. On the northern end of the corridor, the City is in the process of upgrading the bicycle facilities on Fayetteville Street between Main Street and East Ulmstead Street. Specifically, the design will install buffered bicycle lanes from Main Street to Pettigrew Street, bicycle lanes across the I-85 bridge, and buffered bicycle lanes from Lakewood Avenue to East Ulmstead Street. On the southern end of the corridor, the City recently installed bicycle lanes on Fayetteville Street from Nelson Street to Pilot Street.

The section of roadway between these two projects (from East Ulmstead Street to Nelson Street) does not have any existing bicycle facilities and passes through the NCCU campus. To provide connectivity between these two projects, it is recommended that sharrows be installed along northbound and southbound Fayetteville Street from East Ulmstead Street to Nelson Street.



# + GO TRIANGLE CAMPUS SHUTTLE ROUTES

The campus master plan proposes a more active campus core and an outward shift in parking for students, faculty, staff, and visitors. This includes the closure of Eagle Campus Drive to vehicles and parking and the conversion of the roadway into a pedestrian promenade. As a result, the campus shuttle routes should be revised to better serve the change in activity areas, while efficiently moving people from the parking zones and around campus. Two campus shuttle plans are recommended: a main shuttle plan and a gameday shuttle plan.

**CAMPUS SHUTTLE** 

In the main shuttle plan, the red shuttle route is similar to the two existing shuttle routes. The shuttle would run along the perimeter of campus with expansion to the new property acquisitions, including Burlington Avenue and Dupree Street. The blue shuttle route would run along the interior of the campus in a counterclockwise direction, whereas the red shuttle route would run in a clockwise direction. Together, the routes are expected to enhance the reliability and convenience of non-single occupancy vehicular travel. In the gameday shuttle plan, the campus would be served by two shuttle routes which will carry spectators from the parking zones to the stadium. The first route serves the parking zones and activity centers on the northern part of campus, while the second shuttle route serves those on the southern part of the campus.

### FAYETTEVILLE / LAWSON INTERSECTION

The signalized intersection of Lawson Street at Fayetteville Street currently experiences queuing issues during peak periods. This is due to the combination of high through volumes on Fayetteville Street, the lack of protected (green arrow) left turn phases, and the presence of conflicting pedestrian and transit activity. Volumes and delays are expected to slowly increase over the years as the campus and city population increases. There are obstacles to capacity improvements such as widening, due to existing land uses on each corner of the intersection. One available option is to implement protected left turn phases (either protected only or protected/permitted). However, protected left turn phases come at a cost of reducing green time for the through movements. This option will increase queues and delays on the through movements, particularly on Fayetteville Street. As such, protected left turn phases are not recommended during peak hours but could be implemented off peak using an alternate phasing time of day plan. A second option is a left turn prohibition during peak periods, as this would reduce the number of conflicting movements in the intersection. Coordination with the City would be needed as to which left turn movements could be restricted.





# **GAME DAY SHUTTLE**

In the gameday shuttle plan, the campus would be served by two shuttle routes which will carry spectators from the parking zones to the stadium. The first route serves the parking zones and activity centers on the northern part of campus, while the second shuttle route serves those on the southern part of the campus.





# **VEHICULAR CIRCULATION** + PARKING

### **HIGH VISIBILITY CROSSWALK PRIORITIZATION**

To increase pedestrian safety and create a unified campus theme, painted street art crosswalks are recommended on the Lawson Street and Fayetteville Street corridors. These corridors will have University classrooms and destinations along both sides of the street, and the crosswalks will help pedestrians safely cross the high-volume roads by increasing visibility of the pedestrian crossing paths.

Three priority levels were used to define the implementation strategy for the painted crosswalks:

- Priority 1 crosswalks include all signalized intersections within the review limits. For the signalized intersections, it is recommended that the crosswalks include a pedestrian signal head with countdown timer, ADA ramps, and where necessary, accessible pedestrian signals.
- Priority 2 crosswalks include unsignalized intersections that are currently experiencing high pedestrian volumes or are expected to experience high pedestrian volumes due to the proposed master plan improvements. These improvements include the conversion of Eagle Campus Drive into a pedestrian promenade, the proposed multi-use trail along the stream, and the proposed student center east of Fayetteville Street. For priority 2 crosswalks, it is recommended that the crosswalks include Rapid Flashing Beacon Signals (RFBS) which activate a light to alert drivers to stop to allow pedestrians to cross the street.
- Priority 3 crosswalks include locations that have a lower volume of existing or future pedestrians or high-volume locations that are close to a Priority 1 or Priority 2 crosswalk. For priority 3 crosswalks, it is recommended that the crosswalks only include ADA ramps.

### FAYETTEVILLE STREET BICYCLE ACCOMMODATIONS AND MEDIAN ENHANCEMENTS

A bicycle accommodation and median enhancement review were conducted along Fayetteville Street around the campus limits. The goal of this evaluation was to enhance bicycle connectivity around the campus to encourage cycling and to improve safety and create a sense of place on Fayetteville Street near campus.

### **MEDIAN IMPROVEMENTS**

Fayetteville Street between Dupree Street and Burlington Avenue is currently a three-lane roadway, with one travel lane per direction and a center left turn lane. An assessment of this section was conducted to see if any enhancements can be implemented. Four sections of the roadway were identified to be treated with planted medians, with median breaks at intersections and mid-block crosswalks.

In addition to the aesthetic benefits of planted medians, they improve safety by reducing conflict points, can reduce travel speeds, provide a physical separation between the opposing travel lanes, and can serve as pedestrian refuge islands at crossings. Planted medians can also improve air quality and help to reduce stormwater runoff.

The sections identified for median enhancements include:

- Favetteville Street from south of Lawson Street to north of Brant Street
- This area is currently occupied by a two-way left turn lane, and there are no driveways or streets in this section.
- The median can be terminated prior to the dedicated left turn lanes at Lawson Street and Brant Street in order to preserve left turn storage.

Signal timing at the intersection of Fayetteville Street and Lawson Street may need to be reviewed to ensure the northbound left turn queue is contained, as overflow queue storage in the two-way left turn lane would no longer be available.

Favetteville Street from Brant Street to Formosa Avenue Currently, the center lane is striped with diagonal yellow lines, and there are no driveways in this section. This is an ideal candidate location for a planted median.

Fayetteville Street from south of Formosa Avenue to Pekoe

### TABLE 2: LAWSON STREET CROSSWALK PRIORITIZATION

PRIORITY 1	PRIORITY 2	PRIORITY 3
Fayetteville Street	Eagle Campus Drive	New Business School
Merrick Street	Proposed Multi-use Path	
Lincoln Street		
Alston Avenue		

### TABLE 3: FAYETTEVILLE STREET CROSSWALK PRIORITIZATION

PRIORITY 1	PRIORITY 2	PRIORITY 3	
Lawson Street	Dupree Street	Dunbar Street	
Brant Street	Formosa Avenue	Dunstan Avenue	
Cecil Street	Eagle Campus Drive	Moline Street	
Burlington Avenue	George Street	Shepard House	
	Nelson Street	Lee Biology Building	
	Martha Street		
	Columbia Avenue		

### Avenue/Eagle Campus Drive

The University plans to realign Eagle Campus Drive directly across from Pekoe Avenue, as opposed to its current offset alignment. The realigned Eagle Campus Drive will be closed to all traffic except University shuttles and will be a westbound one-way road. This realignment will provide an opportunity to consolidate the intersection, reducing both its effective width and the number of conflicting movements.

There is only one [1] residential driveway in this section, which could remain, either being limited to right in / right out or remaining as full access if a median break is provided.

Fayetteville Street from south of Pekoe Avenue to George Street On the northern half of this section, there is a left turn lane which serves left turns both at Pekoe Avenue and at two [2] residential driveways. There are no left turns at the southern half of this section, in part due to the one-way westbound configuration of George Street.

Therefore, the existing northbound left turn lane onto Pekoe Avenue could be preserved, and a short-planted median could be installed in the southern half of this section.

Fayetteville Street and Alton Avenue are both NCDOT-maintained roads. Coordination with NCDOT and the City of Durham will need to take place regarding proposed medians, bicycle improvements, and crosswalks.

### STREET CHANGES

### REALIGNMENT OF EAGLE CAMPUS DRIVE AT PEKOE AVENUE

The current intersection of Eagle Campus Drive with Fayetteville Street and off-set Pekoe Avenue is unsafe and the location of multiple accidents. Currently, the City has safety control bollards in Fayetteville Street prohibiting Eagle Campus Drive left-turn movements. To

improve safety and circulation, the Master Plan proposes the realignment of Eagle Campus Drive with Pekoe Avenue. Coordination and approval with the City of Durham Transportation will be required. This intersection improvement will improve safety and permit right and left-out movements for the campus shuttle, emergency and service vehicles as well as pedestrian crossing Fayetteville Street.

### ROUNDABOUT AT NELSON AND LINCOLN STREETS

Vehicular circulation internal to the campus is congested at the intersection of Nelson and Lincoln Streets with four-way stops. To promote the safe and efficient circulation of vehicles and campus shuttles in all directions, a round-about is proposed. Further study will be needed to determine the design layout and grades for the roundabout improvement.

### MARTHA STREET CLOSURE

As the University acquires properties to the south, the street closure of Martha Street will be needed to accommodate the future recreation fields and parking. A short stub portion of the street will be required to remain open off Favetteville Street for access to the Solid Rock Full Gospel Church.

## PARKING

As the University continues to expand, maintaining an adequate parking supply remains a key objective. Upcoming projects within the short term (5 years) include a P3 student housing project with three (3) new student housing buildings (this will also eliminate the aging Baynes Residence Hall and George Street Apartments), the new Student Center, and a new School of Business. A Parking Plan was completed for the University in February 2019, which evaluated the parking impacts of this growth, and provided recommendations. These included:

- Implement a park and ride program using off-site parking and . shuttle service
- Provide a new surface parking next to future Lawson Street Residence Hall with 160 spaces
- Improve utilization of Latham Deck by incentivizing more students to park in Latham Deck as opposed to surface parking. Convert a portion of existing student parking to metered parking
- Improve the viability of bicycle use by expanding bike parking across campus and promoting a bike-sharing program
- Incentivize carpooling by providing parking discounts and preferred parking spaces to carpoolers
- Improve utilization of reserved staff parking by converting some reserved parking areas to zoned staff parking

### **NEW STUDENT HOUSING AND FRESHMAN PARKING**

In addition to the future Lawson Street, George Street, and Chidley Alston Street residence halls, NCCU is considering adding a fourth residence hall in the northeast quadrant of Lawson Street at Merrick Street, with a capacity for 450 beds.

Also, as the University is landlocked, future growth comes at a cost of existing surface parking which must be eliminated to construct new buildings. It is expected that approximately 700 spaces will be lost due to infill projects, including 122 spaces at the Lawson Street surface lot, 192 spaces at the O'Kelly Riddick lot, 288 spaces at the Nelson Street lot, 13 spaces at the Criminal Justice rear lot, and 85 spaces along Eagle Campus Drive. These losses will partially be offset by new surface parking lots such as the proposed Lawson Street lot (160 spaces), but the remaining parking will need to come from another source, such as a new parking deck.

Future parking demand was reviewed for four [4] scenarios: with and without the proposed new residence hall, both with and without a freshman parking prohibition. Currently, freshmen are allowed to park on campus, though only inside the Latham Deck. The results shown in Table 1 indicate the future parking needed at 5-year intervals.

Based on these projections, it is recommended that the proposed New Student Union (Nelson Street) Parking Deck be built with enough capacity to satisfy the parking demand based on the implemented policies. If the demand cannot be satisfied with one deck, a second deck should be provided on the eastern side of the campus.

By prohibiting on-campus parking for freshmen, the university can prioritize open space and other space use needs on campus. The policy encourages freshmen to live on-campus and utilize alternative modes of transportation, such as walking, biking, and transit.

### **DISPLACED PARKING**

### LEROY WALKER PHYSICAL EDUCATION COMPLEX & SCHOOL OF NURSING CIRCULATION

With the removal of the surface parking lot for the stream daylighting and enhancements at the LeRoy Walker Physical Education and Recreation Complex, a 20' minimum wide one-way drive is proposed for emergency and service access, drop-off/pick-ups, and ADA parking spaces. Vehicular circulation is proposed to continue around the complex and exit campus adjacent to Chidley South Student Housing or continue towards the School of Nursing drive/surface parking via a new drive connection. This connection will alleviate dead-end drives/ parking and the need to turn around.

The daylighting of the existing stream will displace approximately 135 total spaces from the surface parking lots adjacent to the Lawson Parking Deck and 189 spaces from the surface parking lot adjacent to the LeRoy Walker Physical Education and Recreation Complex. These parking spaces are being relocated to a new 400 space parking deck proposed adjacent to the new Student Center with access off Nelson and Cecil Streets and an approximate 400+ space surface parking lot at the south side of campus off Burlington Avenue adjacent to the proposed recreation fields. The strategic location of the new parking deck and recreation fields surface lot with the existing Lawson Street parking deck and the Mary M. Townes Science Building surface parking lot will provide parking for commuter students, faculty and staff within a five minute walk of all points of campus. The campus shuttle will pick-up/drop-off from these parking areas and circulate throughout the campus for who cannot or do not want to walk. Restricting intracampus drives and promoting a "park once" policy will reduce trips from one part of campus to another and enhance a walkable campus.

### TABLE 1: ADDITIONAL PARKING NEEDED

ADDITIONAL PARKING REQUIRED			
FRESHMAN ON-CAMPUS PARKING ALLOWED		FRESHMAN ON-CAMPUS PARKING NOT ALLOWED	
	WITH DORMITORY	WITHOUT DORMITORY	WITH DORMITORY
24	24	Surplus (401)	Surplus (401)
746	782	321	272
957	993	532	483
1,180	1,216	755	706

Based on annual arowth rates of 1.1% for students and 1.0% for faculty and staff

Accounts for approximately a 700-space loss in existing parking, assumed to occur between 2024 and 2029





# **MILLENNIAL CAMPUS DESIGNATION**

NCCU seeks approval for 32.14 acre Millenial Campus that will enhance the institution's research, teaching, and service missions as well as the enhance the economic development of the region served by the institution.

Expands the "Best and Most Valuable Use" opportunities for existing University properties or property to be acquired North and South of the Campus.

Will reduce cost and enhance revenues for the University Public Private Partnership (P3) Student Housing Project

Will enable the University to prepare for the opportunities of the Durham-Orange Light Rail Train Terminus Station



# **MILLENNIAL CAMPUS VISION**

North Carolina Central University advances research in the biotechnological, biomedical, informational, computational, behavioral, social, and health sciences.

Building off the successes of:

- The state-of-the-art Julius L. Chambers Biomedical/ Biotechnology Research Institute (BBRI)
- The Golden Leaf Foundation Biomanufacturing Research Institute and Technology Enterprise (BRITE)
- The Institute for Homeland Security and Workforce Development

The University will continue and expand its collaborations with pharmacy and biotech companies in nearby Research Triangle Park, advance the University's strategic goals while enhancing student success, economic development of the region, especially those rural, faith, low-income, and low-wealth communities.



## BENEFITS OF THE MILLENNIAL CAMPUS

Will support the Universities first Public Private Partnership (P3) 1,2xx bed Student Housing Project (Summer 2018)

- Will allow for 40 year gorund lease agreement
- · Accelerate approval process
- · Preserve debt capacity

Broaden corporate and private collaborations at the New College of Business: NC Connect Bond project site

Allow for creation of Innovation and Incubator Space

Provide ability to attract and enhance STEM programs, market or commercialize intellectual property

Fulfill Campus expansion vision both north and south of the existing campus of the current Master Plan.

Support local development by creating synergies with the Durham-Orange Light Rail station





# **STRATEGIC PRIORITIES**



# PHASE ONE APPROVED

### 30.6 AC RES TO SUPPORT CONSTRUCTION OF

- + 1,240 BEDS (823 NET) ON THREE SITES
- + PARKING
- + CHIDLEY DINING AND RETAIL SERVICES CENTER
- + NEW SCHOOL OF BUSINESS
- + COMMUNITY & STUDENT RECREATION + ATHLETICS

The University, under the auspices of the Division of Research and Sponsored Programs in conjunction with its six colleges and schools NCCU has established its Research System Approach to Innovation and Sustainability. This system approach involves basic research ranging from biomedical/biotechnology to pharmaceutical sciences to social and behavioral sciences focused on solving problems that affect the citizens of North Carolina. It is also conducting research in health disparities, nanotechnology/carbon nanotubes, robotics, polymers and green energy. Research efforts at NCCU is designed not only prepare students as the next generation of scientists; but, to address current and future challenging that impacts our society economically and/or socially.

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# PHASE TWO PROPOSED

### 24.48 AC RES TO SUPPORT DEVELOPMENT OF

- + A CONVOCATION CENTER
- + STEM RESEARCH COMPLEX
- + HEALTH AND HUMAN PERFORMANCE CENTER
- + STUDENT & COMMUNITY INTEGRATED HEALTH CENTER
- + STUDENT RECREATION COMPLEX

The University, under the auspices of the Division of Research and Sponsored Programs in conjunction with its six colleges and schools NCCU has established its Research System Approach to Innovation and Sustainability. This system approach involves basic research ranging from biomedical/biotechnology to pharmaceutical sciences to social and behavioral sciences focused on solving problems that affect the citizens of North Carolina. It is also conducting research in health disparities, nanotechnology/carbon nanotubes, robotics, polymers and green energy. Research efforts at NCCU is designed not only prepare students as the next generation of scientists; but, to address current and future challenging that impacts our society economically and/or socially.

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MILLENNIAL CAMPUS f D f B



# **NEW** BUILDING PROJECTS

24/7 COLLABORATIVE RESEARCH & LEARNING CENTER FINE ARTS PERFORMANCE THEATER LIBRARY REPLACEMENT/RENOVATION INNOVATION HUB LAB RESEARCH EXTENSION AT BRITE HUMAN HEALTH + PERFORMANCE CENTER NEW ACADEMIC BUILDING STUDENT DINING EXPANSION ONE STOP CENTER STUDENT HEALTH SERVICES CONVOCATION COMPLEX HOSPITALITY AND TOURISM CENTER MCDOUGAL-MCLENDON ARENA EXPANSION PARKING DECK - CECIL ST. FACILITIES ADMINISTRATION + OPERATIONS CENTER





# FINE ARTS PERFORMANCE CENTER

SIZE 60,000 GSF

LEVELS TWO

SUMMARY PUBLIC SPACES - LOBBIES, ENTRANCES, ETC. PROGRAM LIST THEATER + STUDIO THEATER SUPPORT SPACES MEETING ROOMS, OFFICES, ETC.

CURRENT \$510 / SF CONSTRUCTION COST / SF

TOTAL CCC \$30.7 MILLION

TOTAL CURRENT **\$41.4 MILLION** PROJECT COST



The proposed 60,000 GSF Fine Arts Performance Center can accommodate one large Performance Venue (approximately 3,000 seats) as well as other small to medium sized practice and rehearsal spaces. This facility would complement existing campus performance venues, including The 2007 MP proposed the Fine Arts Building at 78,000GSF; this included three venues: 200 seats, 600 seats, and 3,000 seats. The design team noted that University Theater, (located in Farrison-Newton across Fayetteville from the proposed Fine Arts Building, which has 260 seats. [. University Theater is included in the priority renovation projects currently also proposed in the Master Plan.] The historic BN Duke Auditorium, also located nearby on campus, has 900 seats (also located nearby). Redundancy of venues of similar size could create unnecessary operation and maintenance costs over time with little benefit to the University. The design team recommends maintaining smaller (60,000) GSF.



## NB2 LIBRARY REPLACEMENT

SIZE **100,000 GSF** 

LEVELS THREE

PROGRAM LIST STACKS

SUMMARY PUBLIC SPACES - LOBBIES, ENTRANCES, ETC. **CONFERENCE ROOMS + MEETING SPACES** PRIVATE OFFICES

CURRENT \$430 / SF CONSTRUCTION COST / SF

TOTAL CCC \$43.0 MILLION

TOTAL CURRENT \$58.0 MILLION PROJECT COST



The library is located at the center of the academic core of campus and must address important adjacencies on all sides. Visual connectivity and an entrance opening to the student green to the south should be considered; currently this side of the building is blocked by a mechanical yard. The new library is planned to provide much needed "touch-down" space where students can study and socialize. This type of informal space is lacking in the older academic buildings located in this area of campus.

The current library consists of the original Georgian Style structure and a later addition. Design for a new library should consider maintaining the original structure while replacing the later addition. The cost of preserving the original structure would need to be further evaluated along with consideration of its historic significance. The ROM cost included in the Master Plan is for an entirely new structure.



# **INNOVATION HUB LAB**

SIZE 105,000 GSF

LEVELS THREE

SUMMARY CLASSROOMS PROGRAM LIST LAB SPACES AUDITORIUM + SE

LAB SPACES AUDITORIUM + SEMINAR ROOMS CONFERENCE + MEETING SPACES PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.

CURRENT \$550 / SF CONSTRUCTION COST / SF

TOTAL CCC \$57.4 MILLION

TOTAL CURRENT **\$77.4 MILLION** PROJECT COST



The Innovation Lab Building contains multidisciplinary research spaces that are highly flexible and adaptable. As grant funding priorities change from year to year, research spaces will need to adapt to these changes and the types of research being performed. The facility will include Incubator Space providing opportunities to market or commercialize intellectual property. Opportunities for shared use include Academic Departments, Research, and Public Private Partnerships (PPP). The site for the Innovation Lab is located on the Proposed Phase II Millennial Campus.



## NB# JULIUS L. CHAMBERS BIOMEDICAL / BIOTECHNOLOGY RESEARCH INSTITUTE EXPANSION

SIZE 27,000 GSF

LEVELS TWO

SUMMARY CLASSROOMS PROGRAM LIST LAB SPACES CONFERENCE + MEETING SPACES PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.

CURRENT \$550 / SF CONSTRUCTION COST / SF

TOTAL CCC \$14.85 MILLION

TOTAL CURRENT \$24.5 MILLION PROJECT COST



The 2007 MP proposed an addition or annex equal in size to the existing BBRI building (which is approximately 27,000 GSF). The addition remains a high priority. The expansion of BBRI will prioritize health disparities research on campus. This will not only further enhance biomedical research on campus but will also have the potential to bring more funding to sustain and grow the institute's research enterprise.



## NB4 **BIOMANUFACTURING RESEARCH INSTITUTE AND TECHNOLOGY ENTERPRISE** (BRITE) EXPANSION

SIZE **40,000 GSF** 

LEVELS FIVE

SUMMARY CLASSROOMS PROGRAM LIST LAB SPACES

CONFERENCE + MEETING SPACES PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.

CURRENT \$530 / SF CONSTRUCTION COST / SF

TOTAL CCC \$21.2 MILLION

TOTAL CURRENT \$28.6 MILLION PROJECT COST



A previous feasibility study conducted by NCCU has been used to develop the program and ROM cost for this project. The addition will provide expanded classroom and lab space needed for core science academic departments as well as expanding research and lab space related to Biomanufacturing.



## NB5 **HEALTH AND HUMAN PERFORMANCE CENTER (HHP)**

SIZE 85,000 GSF

LEVELS FOUR

SUMMARY WELLNESS + TRAINING CENTER PROGRAM LIST **PRIVATE OFFICES CONFERENCE + MEETING SPACES** PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.

CURRENT \$460 / SF CONSTRUCTION COST / SF

TOTAL CCC \$39.1 MILLION

TOTAL CURRENT \$52.7 MILLION PROJECT COST



The HHP will include spaces that support Physical Training, Sports Performance Programs, and Strength Conditioning which can be utilized by Athletics, Academic, and Research Programs. In addition to human health and performance research, population and epidemiology research may also be considered in this facility. The new facility, located on the proposed Phase II Millennial Campus, will also support Private Public Partnership (PPP) intended to expand health care training and education and potentially expand access to these services on campus.




Expand on-campus dining is needed to accommodate new student housing coming online in 2020 and 2021 (three residence halls with a net gain of 823 on-campus beds). The existing Pearson Cafeteria is 57,000 GSF. The proposed new Dining facility is 25,000 GSF. The proposed GSF should accommodate additional students living on campus housing as well as anticipated overall student population growth.

## NB7 STUDENT DINING

SIZE **25,000 GSF** 

LEVELS TWO

SUMMARY OPEN DINING COMMONS PROGRAM LIST KITCHEN + FOOD SERVICE PRIVATE OFFICES, ETC. PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.

CURRENT \$540 / SF CONSTRUCTION COST / SF

TOTAL CCC \$13.4 MILLION

TOTAL CURRENT **\$18.1 MILLION** PROJECT COST





SIZE **11,000 GSF** 

LEVELS TWO

SUMMARY OPEN INFORMATION SPACE PROGRAM LIST **PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.** 

CURRENT \$470 / SF CONSTRUCTION COST / SF

TOTAL CCC \$5.2 MILLION

TOTAL CURRENT \$7 MILLION PROJECT COST



The one-stop is a centrally located student services building housing the Registrar's office, and Parking and Eagle Card Services. In addition to transactional and informational "zones," the 12,000 GSF includes administrative and meeting spaces.



### NB9 STUDENT HEALTH SERVICES

SIZE 24,000 GSF

LEVELS TWO

SUMMARY CHECK IN + WAITING ROOMS PROGRAM LIST EXAM ROOMS + TREATMENT OFFICES + SMALL CONFERENCE ROOMS PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.

CURRENT \$480 / SF CONSTRUCTION COST / SF

TOTAL CCC \$11.6 MILLION

TOTAL CURRENT \$15.6 MILLION PROJECT COST



The existing Student Health Building is in poor condition: HVAC systems and building envelope are outdated and in poor condition. The building layout is not well suited to a modern Health facility. The Master Plan proposes repurposing the existing building for administrative use [see renovation projects] and moving Student Health Services.

A previous feasibility study provided by NCCU has been used to develop the program and ROM cost for this project. The ROM cost developed for the Master Plan anticipates a new building. The University is considering repurposing the currently Student Union building (A new Student Center is currently under construction). The design team recommends a more detailed feasibility study to assess repurposing the existing Union. The design team expressed concerns about accessibility and the cost of renovating the existing building. Planning of a new building should consider overall campus connectivity across this site as the campus continues to expand to the south. The new facility, located on the proposed Phase II Millennial Campus, could also support Private Public Partnership (PPP) intended to expand health care training and education and potentially expand access to these services on campus.



## NB10 CONVOCATION CENTER

SIZE 200,000 GSF

LEVELS THREE

SUMMARY OPEN ARENA PROGRAM LIST ARENA SUPPORT SPACES MEETING ROOMS, OFFICES, ETC. PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.

CURRENT \$520 / SF CONSTRUCTION COST / SF

TOTAL CCC \$103.2 MILLION

TOTAL CURRENT **\$139.3 MILLION** PROJECT COST



The proposed Convocation Center, located on the approved Millennial Campus, is a multi-use venue that would accommodate NCCU basketball and volleyball games, tournaments, large University events like graduation, and serve as a rentable venue with the opportunity to generate revenue to support other campus initiatives on the Millennial Campus. The Center will provide opportunities for shared use by Academic Departments, Athletics, the Durham Community and local organizations as well as Public Private Partnerships (PPP).

Early recommendations for the overall size of the facility were based on Appalachian State's Holmes Convocation Center which has 8,325 seats. The Holmes Convocation Center also serves as a precedent for Public Private Partnership in a similar building typology, on a Millennial Campus. Conversations with the City of Durham Sports Commission and other local and regional groups have led the University to consider a higher seat capacity of 12,000 - 15,000. For the purposes of this Master Plan, both an approximately 8,000 seat and 12,000 seat venue have been studied to help guide future planning.

Parking and access are a significant consideration. Structured Parking is recommended and the location along Alston Avenue / Highway 55 will minimize additional vehicular traffic internal to campus.



## NB11 HOSPITALITY AND TOURISM CENTER

SIZE **45,000 GSF** 

LEVELS THREE

SUMMARY HOTEL ROOMS PROGRAM LIST TOURISM CENTER MEETING ROOMS, OFFICES, ETC. PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.

CURRENT \$540 / SF CONSTRUCTION COST / SF

TOTAL CCC \$24.1 MILLION

TOTAL CURRENT \$32.5 MILLION PROJECT COST



Expanding on the New School of Business Building which is expected to be completed in 2021, the Hospitality and Tourism annex includes planning for [10] hotel suites and supporting hospitality spaces that provide experiential learning opportunities for students. Located on the approved Millennial Campus, this facility will broaden corporate and other Private Public Partnerships (PPP) with the School of Business and expand its portfolio of academic offerings and research initiatives.



## NB12 McDOUGALD-McLENDON ARENA EXPANSION

SIZE **40,000 GSF** 

LEVELS TWO

SUMMARY OPEN ARENA PROGRAM LIST ARENA SUPPORT SPACES MEETING ROOMS, OFFICES, ETC. PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.

CURRENT \$580 / SF CONSTRUCTION COST / SF

TOTAL CCC \$23.1 MILLION

TOTAL CURRENT \$31.2 MILLION PROJECT COST



The Current capacity of the Arena is 3,500 with 3,116 seats. The renovation proposes to increase the capacity by approximately 1,000. The original building (constructed in 1950) was planned to accommodate this expansion by removing the non-load-bearing wall at the south end of the court. The ROM cost developed in the Master Plan also includes much needed renovations to the existing facility.



#### PARKING DECKS - NORTH AND SOUTH

The delta in the costs per square foot of the two decks is due to site conditions. The parking deck proposed adjacent to the convocation center may need to increase in capacity along (see notes above)



NG D	ECK - CONVOCATION CENTER	PARKING DECK	NB13B - CECIL ST
SIZE	175,000 GSF	120,000 GSF	SIZE
EVELS	SIX	FOUR	LEVELS
1MARY M LIST	583 PARKING SPACES	400 PARKING SPACES	SUMMARY PROGRAM LIST
RRENT CTION ST / SF	\$110 / SF	\$100 / SF	CURRENT CONSTRUCTION COST / SF
AL CCC	\$19.8 MILLION	\$12.3 MILLION	TOTAL CCC
RRENT COST	\$26.7 MILLION	\$16.6 MILLION	TOTAL CURRENT PROJECT COST



## NB14 **FACILITIES AND OPERATIONS CENTER**

SIZE **30,000 GSF** 

LEVELS TWO

SUMMARY FACILITIES WORK AREAS PROGRAM LIST **OFFICES + CONFERENCE ROOMS** 

CURRENT \$380 / SF CONSTRUCTION COST / SF

TOTAL CCC \$11.5 MILLION

TOTAL CURRENT \$15.5 MILLION PROJECT COST

A priority of the Campus Master Plan is to move non-academic, administrative and operational activities to the perimeter of campus in order to prioritize academics and student services within the campus core. An important component of this initiative is to move the Facilities Management offices out of the Hubbard-Totten Building, and demolish the existing Facilities Plant and Campus Receiving buildings located nearby.

The new Facilities and Operations Center would be located along the south edge of campus, providing convenient access and parking for maintenance vehicles and delivery trucks while reducing the associated vehicular congestion in the center of campus.

The new facility includes administrative offices, maintenance repair and shop spaces, sheltered parking for maintenance vehicles, and other support spaces.



## **RENOVATION** PROJECTS

Academic spaces (classrooms and labs) located throughout older buildings in the core of campus are lacking modern A/V and IT technology necessary to support a contemporary learning environment. There are a significant number of these classrooms and labs that also suffer from failing HVAC and Electrical infrastructure. The design team recommends that renovations to these spaces remain a high priority. In the meantime, these spaces are highly underutilized because of they are not functional.

Many of the spaces in these older buildings have, over time, been repurposed by an array of unrelated administrative programs and staff. The design team recommends that administrative offices not related to academic programs be consolidated and moved to buildings closer to the perimeter of campus. Both initiatives can contribute to a stronger "academic core" while adding much needed general academic classroom and lab space.

#### PRIORITY RENOVATIONS

HUBBARD-TOTTON BUILDING C.T. WILLIS COMMERCE BUILDING EDMONDS CLASSROOM BUILDING LEE BIOLOGY BUILDING TAYLOR EDUCATION BUILDING STUDENT HEALTH BUILDING UNIVERSITY THEATER



## RR1 **HUBBARD-TOTTON BUILDING**

SIZE **30,000 GSF** 

SUMMARY PUBLIC SPACES - LOBBIES, ENTRANCES, ETC. PROGRAM LIST **CONFERENCE ROOMS + MEETING SPACES** CLASSROOMS AUDITORIUM + SEMINAR ROOMS LAB SPACES

CURRENT \$241.23 / SF CONSTRUCTION COST / SF

TOTAL CCC \$7,236,856

TOTAL CURRENT \$9,407,956 PROJECT COST



Current Use: Facilities Management and Human Resources .

Recommended: Repurpose for academic and related . administrative uses

General R+R needed .....

· Upgraded technology needed



## RR2 **C.T. WILLIS COMMERCE BUILDING**

SIZE **40,000 GSF** 

SUMMARY PUBLIC SPACES - LOBBIES, ENTRANCES, ETC. PROGRAM LIST **CONFERENCE ROOMS + MEETING SPACES** CLASSROOMS AUDITORIUM + SEMINAR ROOMS

CURRENT \$238.07 / SF CONSTRUCTION COST / SF

TOTAL CCC \$9,522,905

TOTAL CURRENT \$12,379,805 PROJECT COST



Current Use: Business School .

Recommended: Repurpose for other academic and related . administrative uses

General R+R needed . .

· Upgraded technology needed



## RR3 **EDMONDS CLASSROOM BUILDING**

SIZE 23,000 GSF

SUMMARY **PUBLIC SPACES - LOBBIES, ENTRANCES, ETC.** PROGRAM LIST **CONFERENCE ROOMS + MEETING SPACES** CLASSROOMS AUDITORIUM + SEMINAR ROOMS

CURRENT \$165.39 / SF CONSTRUCTION COST / SF

TOTAL CCC \$3,803,973

TOTAL CURRENT \$4,945,173 PROJECT COST



Current Use: History Department . .

Recommended: no change in use General R+R needed

. Upgraded technology needed .

## capital building projects D7



- Current Use: science and teaching labs; an unrelated mix of . administrative offices occupy the lower floor Recommended: Move unrelated administrative offices to another
- building and repurpose them for core science and related administrative uses
- · Extensive R+R needed
- Upgraded technology needed

## RR4 LEE BIOLOGY BUILDING

SIZE **30,000 GSF** 

SUMMARY PUBLIC SPACES - LOBBIES, ENTRANCES, ETC. PROGRAM LIST **CONFERENCE ROOMS + MEETING SPACES** CLASSROOMS AUDITORIUM + SEMINAR ROOMS LAB SPACES

CURRENT \$403.82 / SF CONSTRUCTION COST / SF

TOTAL CCC **\$12,114,681** 

TOTAL CURRENT **\$15,749,081** PROJECT COST



## RR5 **TAYLOR EDUCATION BUILDING**

SIZE 37,000 GSF

SUMMARY PUBLIC SPACES - LOBBIES, ENTRANCES, ETC. PROGRAM LIST **CONFERENCE ROOMS + MEETING SPACES** CLASSROOMS AUDITORIUM + SEMINAR ROOMS

CURRENT \$289.58 / SF CONSTRUCTION COST / SF

TOTAL CCC **\$10,714,576** 

TOTAL CURRENT \$13,928,976 PROJECT COST



Current Use: Academic Testing, Graduate Studies, ROTC Recommended: .

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General R+R needed Upgraded technology needed .



## RR6 **STUDENT HEALTH BUILDING**

SIZE 22,000 GSF

SUMMARY PUBLIC SPACES - LOBBIES, ENTRANCES, ETC. PROGRAM LIST **OFFICES + SMALL CONFERENCE ROOMS** CHECK IN + WAITING ROOMS EXAM ROOMS + TREATMENT

CURRENT \$344.75 / SF CONSTRUCTION COST / SF

TOTAL CCC \$7,584,455

TOTAL CURRENT \$9,859,755 PROJECT COST



- Current Use: Student Health Services occupies most of the building; the Hospitality Department occupies part of the top floor; the Graphics Shop and Campus Security Monitoring occupy the basement.
- A new Student Health Building and new Hospitality Department Building have been proposed. The existing spaces can be repurposed for general administrative uses. Extensive R+R needed
- .
- Upgraded technology needed .



## RR7 **UNIVERSITY THEATER**

SIZE **45,000 GSF** 

SUMMARY PUBLIC SPACES - LOBBIES, ENTRANCES, ETC. PROGRAM LIST **THEATER + STUDIO** THEATER SUPPORT SPACES MEETING ROOMS, OFFICES, ETC.

CURRENT \$460.88 / SF CONSTRUCTION COST / SF

TOTAL CCC \$20,739,460

TOTAL CURRENT \$26,961,260 PROJECT COST



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- Located in the Farrison-Newton Building Replacement and repair of theatrical rigging and equipment; add stage monitoring
- AV infrastructure and equipment enhancement and/or replacement
- Theatrical and House Lighting enhancement and/or replacement Replace Fixed Seating and Finishes HVAC and Life Safety Improvements .
- .
- .....

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN



## **RECREATION + ATHLETICS**

Previous feasibility studies provided by NCCU have been used to develop the program and ROM cost for these projects.

#### **PROPOSED PROJECTS**

AUXILIARY AND RECREATION FIELDS TRACK AND FIELD COMPLEX O-KELLY RIDDICK STADIUM IMPROVEMENTS TENNIS AND GOLF COMPLEX





## **AUXILIARY AND RECREATION FIELDS**

RA1

## **TRACK AND FIELD COMPLEX**

SIZE	110,000 GSF	20,000 GSF
SUMMARY PROGRAM LIST	PAVING MULTI-USE SPORTS FIELDS - NATURAL GAS (SOD) MULTI-USE SPORTS FIELDS - ARTIFICIAL TURF (FIELD TURF) BAND PRACTICE - NATURAL GRASS (SOD0 TRACK AND FIELD EVENTS - NATURAL GRASS (SOD) TRACK AND FIELD EVENTS - ARTIFICIAL TURF (FIELD TURF)	NEW JUMP PITS STANDS FIELD HOUSE - OFFICES, LOCKER ROOMS, ETC. MEMORIAL TICKET OFFICE CONCESSIONS UPGRADES
CURRENT CONSTRUCTION COST / SF	\$21.48 / SF	\$233.29 / SF
TOTAL CCC	\$2,362,470	\$4,665,843
TOTAL CURRENT PROJECT COST	\$2,953,070	\$5,832,343

## RA2

- SIZE
- SUMMARY PROGRAM LIST

- CURRENT CONSTRUCTION COST / SF
- TOTAL CCC
- TOTAL CURRENT PROJECT COST



## RA3 **O'KELLY-RIDDICK STADIUM IMPROVEMENTS**

## **TENNIS AND GOLF COMPLEX**

SIZE	135,000 GSF	200,000 GSF
SUMMARY PROGRAM LIST	EXPANDED SEATING SUITES (18) - CORE AND SHELL ONLY NEW CONCOURSES FOR EXPANDED SEATING, ETC. CONCESSIONS, STORAGE AND RESTROOM UPGRADES PRESS BOX UPGRADE LOCKER ROOM UPGRADES LANDSCAPE	TENNIS COURTS - NCAA REGULATION SIZE STANDS/SEATS FIELD HOUSE - ADMIN, LOCKER ROOMS, STORAGE, ETC. GOLF SIMULATORS \$23.68 / SF
CURRENT CONSTRUCTION COST / SF	\$168.80 / SF	\$4,736,213
TOTAL CCC	\$22,787,819	\$5,920,313
TOTAL CURRENT PROJECT COST	\$28,484,819	



## RA4

- SIZE
- SUMMARY PROGRAM LIST

- CURRENT CONSTRUCTION COST / SF
- TOTAL CCC
- TOTAL CURRENT PROJECT COST



## **CURRENT** BUILDING PROJECTS

1 JAMES E. SHEPARD MEMORIAL LIBRARY - WEST WING

2 TV STUDIO RENOVATION

**3** NEW SCHOOL OF BUSINESS

4 P3 GEORGE ST RESIDENCE HALL

**5** P3 LAWSON RESIDENCE HALL

6 P3 CHIDLEY SOUTH RESIDENCE HALL

**7** NEW STUDENT CENTER

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

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# **D8 COMPREHENSIVE MASTER PLAN**



## **EXISTING CAMPUS PLAN** 2018

1	ACADEMIC COMMUNITY SERVICE
	LEARNING PROGRAM BUILDING
2	ALBERT L. TURNER LAW BUILDING
3	ALBERT N. WHITING CRIMINAL JUSTICE
	BUILDING
4	ALEXANDER-DUNN BUILDING
5	ALEONSO ELDER STUDENT UNION
6	ALLIMNI HOUSE
7	ANNIE DAY SHEPARD RESIDENCE HALL
8	ART MUSEUM
9	B.N. DIIKE ANNEX
10	
11	BAYNES RESIDENCE HALL
12	BEN JAMIN S. RUEEIN RESIDENCE HALL
13	BIOMANUEACTURING RESEARCH
10	
	ENTERDRISE
1//	BOWLING LANES
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10	CAMPLIS MINISTRY
20	CENTRAL RECEIVING
21	
22	
23	DENT HUMAN SCIENCES BUILDING
24	EAGLE LANDING RESIDENCE HALL
25	EAGLESON RESIDENCE HALL
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30	GEORGE STREET ADARTMENTS
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32	STUDENT HEALTH BUILDING
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34	HEATING PLANT
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39	I ATHAM PARKING DECK
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41	FRUY T WALKER PHYSICAL EDUCATION
11	COMPLEX
42	MARTHA STREET APARTMENTS
	MANTER OTIVELLA AN ANTENTO

43	MARY M. TOWNES SCIENCE BUILDING
44	MCDOUGALD HOUSE
45	MCDOUGALD-MCLENDON GYMNASIUM
46	MCLEAN RESIDENCE HALL
47	MILLER-MORGAN BUILDING
48	NEW RESIDENCE HALL II
49	NURSING BUILDING
50	O'KELLY-RIDDICK STADIUM
51	PHYSICAL PLANT
52	POLICE AND PUBLIC SAFETY BUILDING
53	PURCHASING DEPARTMENT
54	ROBINSON SCIENCE BUILDING (JOSEPHINE
	DOBBS EARLY COLLEGE HIGH SCHOOL)
55	RUSH RESIDENCE HALL
56	SHEPARD HOUSE
57	STUDENT SERVICES BUILDING
58	SUMMER VENTURES
59	TAYLOR EDUCATION BUILDING
60	TENNIS COURT
61	TRACK AND PRACTICE FIELD
62	TYRONZA RICHMOND RESIDENCE HALL
63	W.G. PEARSON CAFETERIA
64	WILLIAM JONES BUILDING
65	WOMENS' CENTER

## **PROJECT PHASING**

PROPOSED NEW BUILDING PROJECTS
FINE ARTS PERFORMANCE CENTER
LIBRARY REPLACEMENT
INNOVATION HUB: FLEXIBLE LAB SPACE
BBRI ADDITION
RESEARCH EXPANSION AT MARY-TOWNES / BRITE FACILITY
HUMAN HEALTH AND PERFORMANCE CENTER
NEW ACADEMIC BUILDING
STUDENT DINING EXPANSION
ONE-STOP
STUDENT HEALTH SERVICES
CONVOCATION COMPLEX
HOSPITALITY AND TOURISM CENTER
MCDOUGALD-MCLENDON ARENA EXPANSION
PARKING DECK NORTH
PARKING DECK SOUTH
FACILITIES ADMINISTRATION AND OPERATIONS CENTER
PROPOSED RENOVATION PROJECTS

#### PROPOSED RENOVATION PROJECTS

HUBBARD-TOTTON RENOVATION
C.T. WILLIS COMMERCE BUILDING RENOVATION
EDMONDS CLASSROOM BUILDING RENOVATION
LEE BIOLOGY
TAYLOR EDUCATION BUILDING
STUDENT HEALTH BUILDING
UNIVERSITY THEATER

#### **PROPOSED RECREATION AND ATHLETICS PROJECTS**

AUXIL	LIARY AND RECREATION FIELDS
TRAC	K AND FIELD COMPLEX
0-KE	LLY RIDDICK STADIUM IMPROVEMENTS
TENN	IIS AND GOLF COMPLEX

#### INFRASTRUCTURE

EAGLE CAMPUS PROMENADE DEVELOPMENT
LAWSON STREETSCAPE DEVELOPMENT
PEDESTRIAN PATHWAY PLAN DEVELOPMENT
STORMWATER MANAGEMENT

COMPREHENSIVE MASTER PLAN DROJECT PHASING DB

	1 - 10 YEAR	10 - 20 YEAR	20 - 30 YEAR
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#### COMPREHENSIVE MASTER PLAN, 10 YEAR



## **COMPREHENSIVE MASTER PLAN** 10 YEAR

LEE BIOLOGY BUILDING EDMONDS CLASSROOM BUILDING WILLIS COMMERCE BUILDING B. N. DUKE AUDITORIUM TAYLOR EDUCATION BUILDING FINE ARTS BUILDING EDWARDS MUSIC BUILDING STUDENT HEALTH BUILDING DENT HUMAN SCIENCES BUILDING WILLIAM JONES BUILDING ROBINSON SCIENCE BUILDING SHEPARD LIBRARY MCDOUGALD GYM STUDENT SERVICES BUILDING ANNIE DAY SHEPARD HALL MCLEAN HALL RUSH HALL CHIDLEY NORTH HALL PEARSON CAFETERIA ALEXANDER DUNN BUILDING SHEPARD HOUSE CENTRAL HEATING PLANT COTTAGE ONE - EOHS EAGLESON HALL HUBBARD-TOTTON BUILDING BOWLING ALLEY FARRISON NEWTON BUILDING TURNER LAW SCHOOL MILLER-MORGAN BUILDING CRIMINAL JUSTICE BUILDING WALKER COMPLEX RICHMOND HALL RESIDENCE HALL TWO BBRI POLICE / PUBLIC SAFETY BUILDING SCHOOL OF EDUCATION O'KELLY STADIUM TOWNES SCIENCE BUILDING BEN RUFFIN RESIDENCE BRITE BUILDING LATHAM PARKING DECK NURSING BUILDING CENTENNIAL CHAPEL EAGLE LANDING RESIDENCE HALL P3 CHIDLEY SOUTH RESIDENCE HALL **P3 GEORGE ST RESIDENCE HALL** P3 LAWSON ST RESIDENCE HALL NEW STUDENT CENTER

SHEPARD ADMINISTRATION BUILDING

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NEW SCHOOL OF BUSINESS

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

COMPREHENSIVE MASTER PLAN 10 YEAR 10

H I J	- OP / COMMUNITY CAMPUS DINING FACILITY HUMAN HEALTH AND PERFORMANCE CENTER AUXILIARY AND RECREATION FIELDS
0 P	PERFORMING ARTS CENTER PARKING DECKS
R S T	ENTREPRENEURSHIP CENTER LIBRARY ADDITION FACILITIES OPERATIONS
V X Y	FUTURE RESIDENCE HALL TRACK AND FIELD COMPLEX 24/7 COLLABORATIVE RESEARCH <del>&amp;</del> LEARNING CENTER
X1 X2 X3 X4 X5 X6 X7 X8	BAYNES HALL CHIDLEY MAIN GEORGE ST APARTMENTS AE STUDENT UNION CENTRAL RECEIVING PHYSICAL PLANT MC DOUGALD ADMISSIONS ALUMNI HOUSE

#### COMPREHENSIVE MASTER PLAN, 20 YEAR



## **COMPREHENSIVE MASTER PLAN 20 YEAR**

LEE BIOLOGY BUILDING EDMONDS CLASSROOM BUILDING WILLIS COMMERCE BUILDING B. N. DUKE AUDITORIUM TAYLOR EDUCATION BUILDING FINE ARTS BUILDING EDWARDS MUSIC BUILDING STUDENT HEALTH BUILDING DENT HUMAN SCIENCES BUILDING 10 11 WILLIAM JONES BUILDING 12 ROBINSON SCIENCE BUILDING 13 SHEPARD LIBRARY 14 MCDOUGALD GYM 15 STUDENT SERVICES BUILDING ANNIE DAY SHEPARD HALL 16 **17** 18 MCLEAN HALL RUSH HALL 19 CHIDLEY NORTH HALL 20 PEARSON CAFETERIA ALEXANDER DUNN BUILDING 21 22 SHEPARD HOUSE 23 CENTRAL HEATING PLANT 24 25 COTTAGE ONE - EOHS EAGLESON HALL 26 HUBBARD-TOTTON BUILDING 27 BOWLING ALLEY 28 FARRISON NEWTON BUILDING 29 30 TURNER LAW SCHOOL MILLER-MORGAN BUILDING 31 32 33 34 35 36 CRIMINAL JUSTICE BUILDING WALKER COMPLEX RICHMOND HALL RESIDENCE HALL TWO BBRI POLICE / PUBLIC SAFETY BUILDING 37 SCHOOL OF EDUCATION 38 39 40 O'KELLY STADIUM TOWNES SCIENCE BUILDING BEN RUFFIN RESIDENCE 41 BRITE BUILDING 42 LATHAM PARKING DECK 43 NURSING BUILDING 44 CENTENNIAL CHAPEL 45 EAGLE LANDING RESIDENCE HALL P3 CHIDLEY SOUTH RESIDENCE HALL P3 GEORGE ST RESIDENCE HALL P3 LAWSON ST RESIDENCE HALL NEW STUDENT CENTER

SHEPARD ADMINISTRATION BUILDING

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NEW SCHOOL OF BUSINESS

COMPREHENSIVE MASTER PLAN 20 YEAR 20 YEAR

F	INNOVATION LAB / RESEARCH BUILDING
H I J	CAMPUS DINING FACILITY HUMAN HEALTH AND PERFORMANCE CENTER AUXILIARY AND RECREATION FIELDS
L	HOSPITALITY + TOURISM CENTER
N D P Q R S T U V X Y	RESEARCH EXPANSION PERFORMING ARTS CENTER PARKING DECKS TENNIS AND GOLF COMPLEX ENTREPRENEURSHIP CENTER LIBRARY ADDITION FACILITIES OPERATIONS MCDOUGALD-MCLENDON ARENA EXPANSION FUTURE RESIDENCE HALL TRACK AND FIELD COMPLEX 24/7 COLLABORATIVE RESEARCH & LEARNING CENTER
X1 X2 X3 X4 X5 X6	BAYNES HALL CHIDLEY MAIN GEORGE ST APARTMENTS AE STUDENT UNION CENTRAL RECEIVING PHYSICAL PLANT

MC DOUGALD ADMISSIONS

ALUMNI HOUSE

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X8

#### COMPREHENSIVE MASTER PLAN, 30 YEAR



## **COMPREHENSIVE MASTER PLAN 30 YEAR**

LEE BIOLOGY BUILDING EDMONDS CLASSROOM BUILDING WILLIS COMMERCE BUILDING B. N. DUKE AUDITORIUM TAYLOR EDUCATION BUILDING FINE ARTS BUILDING EDWARDS MUSIC BUILDING STUDENT HEALTH BUILDING DENT HUMAN SCIENCES BUILDING WILLIAM JONES BUILDING OBINSON SCIENCE BUILDING SHEPARD LIBRARY MCDOUGALD GYM STUDENT SERVICES BUILDING ANNIE DAY SHEPARD HALL MCLEAN HALL CHIDLEY NORTH HALL PEARSON CAFETERIA ALEXANDER DUNN BUILDING SHEPARD HOUSE CENTRAL HEATING PLANT COTTAGE ONE - EOHS EAGLESON HALL HUBBARD-TOTTON BUILDING BOWLING ALLEY FARRISON NEWTON BUILDING CRIMINAL JUSTICE BUILDING WILLER-MORGAN BUILDING CRIMINAL JUSTICE BUILDING WALKER COMPLEX RICHMOND HALL RESIDENCE HALL TWO BBRI POLICE / PUBLIC SAFETY BUILDING SCHOOL OF EDUCATION O'KELLY STADIUM TOWNES SCIENCE BUILDING BATTE BUILDING LATHAM PARKING DECK NURSING BUILDING
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SHEPARD ADMINISTRATION BUILDING

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NEW SCHOOL OF BUSINESS

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

COMPREHENSIVE MASTER PLAN 30 YEAR DB

F	INNOVATION LAB / RESEARCH BUILDING
G	ONE-STOP / COMMUNITY HEALTH CENTER
Н	CAMPUS DINING FACILITY
1	HUMAN HEALTH AND PERFORMANCE CENTER
J	AUXILIARY AND RECREATION FIELDS
K	CONVOCATION CENTER
L	HOSPITALITY + TOURISM CENTER
М	NEW ACADEMIC BUILDING
N	RESEARCH EXPANSION
0	PERFORMING ARTS CENTER
Р	PARKING DECKS
Q	TENNIS AND GOLF COMPLEX
R	ENTREPRENEURSHIP CENTER
S	LIBRARY ADDITION
Т	FACILITIES OPERATIONS
U	MCDOUGALD-MCLENDON ARENA EXPANSION
V	FUTURE RESIDENCE HALL
Х	TRACK AND FIELD COMPLEX
Υ	24/7 COLLABORATIVE RESEARCH &
	LEARNING CENTER
X1	BAYNES HALL
X2	CHIDLEY MAIN
X3	GEORGE ST APARTMENTS

X3GEURGE STAPARTMENTSX4AE STUDENT UNIONX5CENTRAL RECEIVINGX6PHYSICAL PLANTX7MC DOUGALD ADMISSIONSX8ALUMNI HOUSE

![](_page_98_Picture_0.jpeg)

# 09 INFRASTRUCTURE + UTILITIES

# **STORMWATER** MANAGEMENT

Stormwater regulations will continue to evolve and likely become more stringent. The North Carolina Central University (NCCU) Campus is required to address the water quality requirements of NCDEQ (treat first inch of runoff for 85% total suspended solids removal) and the water quantity requirements of the City of Durham (attenuate the 10year, 24-hour storm on-site]. These regulations will have an impact to projects on the NCCU campus and opportunities exist to mitigate the stormwater impacts on a more campus-wide regional basis verses a site-specific basis. An innovative campus-wide regional approach to stormwater controls will provide a more cost effective solution. It is likely a combination of stormwater options will need to be employed.

As a first step to stormwater planning, a comprehensive Campus Stormwater Master Plan should be implemented. This effort should include an evaluation of all existing drainage basins on campus to identify where capacity and/or constrictions may exist within the existing campus drainage system. The Stormwater Master Plan should also generally define and document existing impervious areas. The completion of a Stormwater Master Plan provides NCCU with a document that can be used for project tracking and also better refine locations and options for regional stormwater control measures based on existing stormwater conveyance systems for water quality and quantity benefits. In addition, coordination can occur with NCDEQ and the City of Durham to document proposed solutions for future projects. This will relieve individual projects of some of the intensive coordination and permitting with the regulatory agencies.

The NCCU campus lies in the Third Fork Creek Watershed flowing into Jordan Lake, part of the Cape Fear River Basin. The campus drains towards the center and then to the southeast where flow reaches Rocky Creek and subsequently Third Fork Creek. A stream traverses campus from north to south and is underground for much of the distance on campus. The stream has a drainage area of about 170 acres at the northern point where it enters campus and picks up about 90 additional acres where it leaves campus. The stream flows underground for 2,330 LF, beginning at Dupree Street north of the Lawson Street surface parking lot, piped under the parking lot and Lawson Street, between the track and Tyronza Richmond Residence Hall and then between the O'Kelly-Riddick Stadium and the LeRoy T. Walker Physical Education and Recreation Complex. The piped stream continues underground until south of Cecil Street where it daylights to open channel flow at the School of Education, and subsequently flows under S. Alston Avenue into Rocky Creek. Over the years, the piped stormwater infrastructure is beginning to fail with under-sized pipes for the growing campus and sink-holes from a deteriorating, aging pipe system.

Provided below are several innovative and sustainable options to address stormwater requirements on a large scale basis and also afford the potential for stormwater to become an amenity, not a necessity. A combination of integrated stormwater strategies will be needed as a part of a comprehensive Campus Stormwater Master Plan. It is important to note with all of the options, a certain level of maintenance is required to keep the systems operating at a level required by the authorities having jurisdiction.

![](_page_99_Picture_7.jpeg)

![](_page_99_Picture_8.jpeg)

![](_page_100_Figure_0.jpeg)

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

## CAMPUS-WIDE REGIONAL STORMWATER MANAGEMENT OPTIONS:

#### Daylighting the Piped Stream

Daylighting is the process of removing obstructions, such as pipes and pavement - a common practice fifty to sixty years ago, covering streams, creeks or drainage ways and returning stream banks to more natural shapes and functions lost or impaired over time. Daylighting the underground stream flowing through campus from Dupree Street to Cecil Street would allow the off-site drainage to by-pass the campus stormwater management infrastructure. The process of daylighting a stream will increase the area available for water to pass through the channel, increase storage capacity which reduces peak flows and increases flow duration. Daylighting streams improves ecological wildlife and aquatic habitats, improves water quality through nitrogen reduction, and decreases water quantity and localized flooding by eliminating choke points where streams are forced into underground channels. Stream enhancements of landscaping, amenity areas for students and a greenway trail will create a safe and accessible outdoor learning laboratory and interactive social gathering place while integrating an urban creek into the campus environment. When streams are unearthed, they transform a liability into an amenity asset. Raising awareness of buried streams within urbanized environments can engage the community, university staff and students while creating an interest in clean water, community health, and revitalization.

Daylighting projects require monitoring and maintenance in the first few years to ensure the channel and bank are stable and the plantings are established. Once the plantings are established, however, an open stream will require far less ongoing maintenance than a culvert or other gray infrastructure systems.

Stream daylighting can be technically complex and labor intensive requiring engineering, environmental permitting, excavation and extensive plantings. It is recommended a professional with expertise in environmental stream restoration be employed to navigate the complexities and deliver a successful project. Improvements may be phased and even a pilot project considered to assist in mitigating concerns. Because of the complexities of implementation, project costs may be significant, even with in-kind and voluntary labor for plant establishment. Many daylighting projects are eligible for local, state and federal funding including Water Infrastructure Improvement Act, EPA Clear Water Act 319 Grant, brownfield programs, FEMA Hazard Mitigation Assistance and state clean water/drinking water revolving funds to help mitigate the costs.

#### Campus Stormwater Pond

The area immediately west of the open stream channel and jurisdictional wetlands near the School of Education is subject to erosion and scour. An amenity pond could convert a neglected landscape into a beautiful retention pond surrounded by native plantings, meandering walks/greenway trail, and contemplative sitting areas. The combination of bio-retention terraces, constructed wetlands and a precisely calibrated pond would meet stormwater quality and quantity requirements, relieve erosion and mitigate flooding while providing a habitat for numerous naturally occurring species. Care will be needed in designing the pond around the School of Education vehicular drive and pedestrian footbridge.

#### Underground Stormwater

Another campus-wide/regional stormwater control option would be an underground stormwater management system below the proposed recreation fields at the southern edge of campus. The stormwater control measures could be planned and constructed with the fields. potentially adding drainage layers for the fields to provide stormwater quality benefits. While the location of the recreation fields lies south and at lower elevation than the campus core, not all of the campus naturally drains to this location. Studies are needed to confirm a sufficient drainage area with the capacity of an underground stormwater system.

#### SITE-SPECIFIC STORMWATER MANAGEMENT OPTIONS:

#### Bio-retention/ Rain Gardens

A bio-retention or rain garden is a shallow planted depression designed to retain or detain stormwater before it is infiltrated or discharged downstream and will trap or remove suspended solids and filter or absorb pollutants into the soil and plant material. The use of bioretention devices reduces flooding, pollution and damage downstream. They combine engineered stormwater control and treatment with aesthetic landscaping. Bio-retention/rain gardens provide quality and quantity benefits through infiltration, evapotranspiration and detention. Capturing rainwater from building roofs, pavements, and air conditioning condensation and managing/treating the stormwater at the site can be financially more efficient while the smaller device size allows for siting flexibility. Triassic Basin soils present on campus will necessitate underdrains and/or amended soils to assist with infiltration.

#### Green Roofs

New buildings on campus can incorporate green roofs into the overall design with either intensive or extensive green roof options, often while combining with rooftop courtyards. Green roofs can be incorporated within the building footprint, reducing the need for additional land to manage and treat stormwater. Green roofs use vegetation to absorb rainwater and heat, reducing the amount of runoff and improving water quality. In addition, green roofs help decrease energy needs/costs for the building.

#### Permeable Pavement

Permeable paving refers to paving materials that allow stormwater to filter through to the soil below. Permeable paving materials like porous concrete, porous asphalt or unit pavers may look similar to traditional paving materials but allow air and water to pass through the paving material, providing opportunity for temporary storage of stormwater runoff and/or groundwater recharge into the soils below. Heavy clay soils (permeability rate of less than 0.5 inches per hour) will require an underdrain and/or greater depth of subsurface gravel and sand to allow for infiltration and storage of rainwater. Permeable paving systems are not suitable on steep slopes, areas with a previous history of soil or groundwater contamination, or areas where seasonal high water tables exist. Permeable pavements operate best on localized, smaller projects such as parking or pedestrian areas where a reduction in impervious surface area is needed. Currently the City of Durham counts pervious pavements as impervious surface areas. As with all stormwater options, regular maintenance including sweeping are required.

#### OTHER INNOVATIVE AND SUSTAINABLE STORMWATER OPTIONS:

#### Stormwater Reuse for Chiller Cooling Systems

- Rainwater Harvesting Rainwater harvesting is the collection and storage of rainwater in containers. Above and below ground cisterns collect water for toilet flushing or irrigating landscapes.
- Reclaimed Water Use Filtered stormwater is sterilized by ultraviolet light and an ionizer kills algae, bacteria, and viruses without the use of chemicals. This system allows plants to use or grow directly in a water feature and requires less maintenance than standard infiltration systems. The water can then be stored in a cistern for irrigation use or recirculated through an amenity water feature.

![](_page_101_Picture_16.jpeg)

## **STORMWATER MANAGEMENT** PRECEDENTS

![](_page_102_Picture_1.jpeg)

Stream Enhancement Gilkey Creek, Flint, Michigan

Stream Daylighting, Appalachian State University

Vile Creek Stream Enhancement, Alleghany Co., NC

![](_page_102_Picture_6.jpeg)

Shoemaker Green, University of Pennsylvania

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

# **THERMAL** UTILITIES

## **CAMPUS HEATING**

#### EXISTING CONDITIONS

The Central Steam Plant produces and distributes high pressure [100 psi] steam to the majority of buildings on campus. Steam is the source used to provide domestic hot water and building heating.

The Central Steam Plant is located in the heart of campus, adjacent to O'Kelly-Riddick Stadium and the Physical Plant. The building structure appears to be in fair condition but in need of some repairs and renovations. The building lacks an effective ventilation system and proper circulation for combustion air.

The plant consists of 3 steam boilers. Boiler #1 is a Babcock and Wilcox 2-pass D-type boiler installed in 1998 with a rated capacity of 1600 hp [55,200 lbs/hr]. In recent history this boiler has not always been operational. NCCU is working to tune it up with the hope it could provide redundancy and possibly added capacity for peak winter conditions. The operating staff noted

the feedwater system is inadequate for the boiler's listed capacity. They also noted chemical treatment has been inconsistent over the boiler's lifespan, although this has been corrected in the past several years. D-type boilers have a reputation for requiring high-quality feedwater and chemical treatment systems to operate reliably.

Boiler #2 and #3 are Superior Boiler firetube boilers installed in 2011 with rated capacities of 900 hp (31,050 lbs/hr) and 600 hp (20,700 lbs/ hr]. Both are reported to be reliable and in good operating condition. Boiler #3 is considered the "summer boiler".

The operating staff reported Boilers #2 and #3 are adequate for most conditions in the winter; however extreme weather has compromised the plant's capacity. Without reliable operation of Boiler #1, they have a shortage in capacity and no redundancy if either failed.

All boilers are dual fuel fired. Natural gas serves as the primary source and fuel oil #2 as the secondary. Fuel oil is only used when Dominion Energy (formerly PSNC Energy) implements restrictions. It was reported fuel oil was last burned over 2 years ago. The gas service meter is located outside the plant building and is fed from a gas main in East Lawson Street, north of the plant. Above ground fuel oil tanks are located adjacent to the plant building. The operating staff reported Tanks #2 and #3 are not being used, only Tank #1 is currently in service.

The steam distribution and condensate return piping system consists of 55 manholes and a network of box or arch style encasement systems up to 48-inches in height on poured concrete bases and some direct-buried conduits. There is short length of full sized tunnel west from the Steam Plant to Manhole #2 and east to Manhole #48. It was reported that over half of the manholes are flooded due to ground water, steam and condensate leaks.

Over the campus' history, the steam system lacked funding and deteriorated to the point where steam leaks and loss of condensate were common. In recent years, the campus has made a strong effort to repair and improve the conditions. They implemented a four phase plan, Phase 1 (1996), Phase 2 (2003), Phase 3 (2007), Phase 4 (2014), to make improvements. In 2014 NCCU hired a consultant to perform a comprehensive steam leak study based on aerial infrared technology. NCCU reported that while many problems have been fixed, many more still need to be addressed. NCCU staff highlighted 10 manholes that are of particular concern. In addition to the steam leaks, they are losing condensate at an alarming rate.

NCCU staff estimated the system only returns 40 to 50% of the condensate. This results in a significant campus-wide loss of energy, make-up water and water treatment chemicals. Most buildings with a steam service are equipped with steam-powered condensate return pumps. NCCU is working to transition them to electric motor driven pumps to be more reliable.

The steam plant is not equipped with a modern automated energy management system, and therefore the exact amount of energy produced and lost cannot be accurately accounted. NCCU has installed meters they read and record manually and they have fuel usage history which provides energy usage data. Further repairs, replacements and improvements are needed.

The central steam distribution system cannot easily be extended to serve the planned outward expansion. In fact, NCCU has removed buildings from the system to prevent overloading the existing steam plant. The steam plant would need to be expanded to provide additional reliable capacity and the distribution main piping sizes would need to be increased from the plant to the edges of campus. Despite its current deficiencies, the central steam distribution system does represent a significant valuable asset.

#### ANALYSIS

NCCU is considering the future of their heating distribution system. Should the central steam system capacity be increased and the distribution expanded to serve the campus now and in the future? Should it be trimmed back and eventually replaced with de-centralized heating water systems?

Central steam systems were used commonly because they are an efficient way to move energy while providing centralized maintenance, fuel service, chemical treatment, and pollution control. When maintained properly, the equipment tends to be robust and have a long service life. Condensate return piping is often the weak point since it tends to corrode much quicker than steam lines.

Decentralized heating water boilers are becoming more commonly

used today. They are more efficient at lower return water temperatures, compact, and use low temperature flues. When used to serve individual buildings, there is no additional pumping energy required, however when used in regional energy plants their reach should be limited in order to minimize added pumping energy. While the high efficiency condensing boilers provide significant energy savings, the boilers themselves do not have long service lives like their predecessors.

Due to the condition of the boilers and piping as well as the difficulty in finding and retaining qualified plant operators and steamfitters, NCCU has been considering a change. After an exhaustive discussion with NCCU staff members in our 20 February 2019 planning meeting, they determined central steam should be maintained in the heart of campus but newly developed areas of campus expansion should implement decentralized heating water systems.

In its simplest form, high-efficiency boilers would be located at each newly constructed or renovated building on the campus' perimeter. In lieu of steam and condensate return piping, much smaller and less expensive high-pressure natural gas piping would distribute heating energy to each building. In some cases, it might be advantageous to establish a local regional energy plant to serve multiple adjacent buildings within close proximity.

The existing steam system will need a great deal of repair and renovation to be considered reliable for the long-term future. NCCU has made this a priority over the past 2 decades but more work is needed.

NCCU staff reported that there are many instances throughout the years when low quality materials, valves and equipment have been used. Some of these instances could represent weak points in the distribution system. It is likely many of the failures NCCU has experienced over the years is a result of suspect installations and poor maintenance due in large part to alack of funding.

NCCU has 4 dedicated operators and maintenance staff to operate the Steam Plant 24 hours,365 days per year. Strong consideration should be given to increasing staffing levels. We would expect 6 to 8 dedicated staff to provide round the clock supervision and regular maintenance throughout campus.

NCCU has made progress in trimming the steam distribution center back to the campus center. It was reported that Duke Auditorium and Annex and Shepard Administration Building are planned to be removed from steam. Considerations are also being given to BBRI, Walker Natatorium, Latham Parking Deck, McDougald Gymnasium, and Turner Law School. For the purposes of our load projections, we have assumed the Duke Auditorium and Annex, Shepard Administration Building, BBRI and Latham Parking will be removed. If additional buildings are disconnected, it would further reduce the demand on the Steam Plant.

#### HEATING LOAD PROJECTIONS

Buildings currently being fed from the steam plant can be expected to be renovated within the next 30 years. Campus heating load projections have been calculated based on building areas, usages, and estimated load factors. The estimated load factors are derived from historical data for each building type. The projections factor in some diversity to estimate the future connected and demand load of the steam plant. A further accounting of the existing building's boiler and heat exchanger capacities could provide a more accurate estimate.

Refer to Appendix A – 'Campus Master Plan for Heating' for a summary of the campus load projections.

Upon full buildout of the Master Plan, the campus steam load is projected to be slightly less than half (47%) of the heating energy for the campus. Decentralized boilers and other HVAC systems types would represent the other half. The buildings anticipated to remain on steam are estimated to require over 1,800 boiler horsepower. The existing Steam Plant has 2 boilers operating at up to 1,500 total boiler horsepower. The Master Plan does not significantly change the loading of the Steam Plant since buildings planned to be removed from steam are largely offset by new building area being added where tapping the existing infrastructure is practical.

The Steam Plant at its full capacity would have 2,500 boiler horsepower available for peak conditions plus an additional 600 boiler horsepower in reserve for summer conditions. At full strength the plant should have excess capacity for peak conditions and provide sufficient redundancy for most, if not all, of the typical heating season. Investing in the Steam Plant to regain full capacity and reliability should be a top priority. Further study and attention should begiven to restoring or replacing Boiler #1; improving the feedwater pumping and storage system; improving natural gas service pressure; improving combustion air flow; and replacing existing controls with a digital control and monitoring system integrated into a campus energy management system. Steam Plant building structure and envelope repairs, building heating and cooling system replacements, fuel oil pumping and storage system improvements, steam distribution system repairs, and the addition of qualified maintenance staff should also be considered high priorities.

KEY     NAME     SPT     BTUKSOFT     MBH     MBH     MBH       A     P3 Cargo South Residence Hall     161,065     33     4,832     4,833       D     New Schutz Carlor     100,005     40     4,000     4,000       D     New Schutz Carlor     100,000     40     2,000     2,800       F     Innovation Lab and Reasench Building     105,000     50     1,220     1,250       F     One-SbyD, Commity Health Carlor     4,800     40     3,400     3,400       Concesting, Commity Health Carlor     4,800     40     3,400     3,400     3,400       Human Health Performance Carlor     2,000     40     2,000     3,000     1,200       Heagaing and Performance Carlor     40,000     40     2,000     2,400     2,400       P Parking Dek/ (DX) (Coll Strein)     40,000     40     1,000     1,000       I Intrage Readence Hall     100,000     40     1,000     1,000       I Intrage Readence Hall     100,000     40     1,000     1,000		BUILDINGS		HEATING C	APACITY	STEAM	HW BOILER
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B     P3 (23)     2333     2333     2333       C     P3 Lunes Stret Reduces Hall     00,325     30     3100     3400     4000       D     New Schoot Corter     00,000     40     4000     4000     4000       F     Increation Lab and Research Building     105,000     40     22,000     25,000     40.00     40.00       F     Increation Lab and Research Building     25,000     40     22,000     40.00     80.00     80.00       Concesting Control Center     20,000     40     2,000     2,000     40.00     80.00     80.00       Nee search Expension I Towns D BNTE     40,000     40     2,000     2,000     1,	Δ	P3 Chidley South Residence Hall	161 083	30	1 832		/ 832
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D     New Student Center     100,000     400     4,000     4,000       F     Investorie Disard Research Building     105,000     50     5,250     5,250       F     Investorie Disard Research Building     105,000     50     1,250     1,480       H     ComesSpic Community Health Center     55,000     40     4,000     3,400       I     Human Healting Participants     740,000     40     2,000     3,000       I     Human Healting Carter     60,000     40     2,000     2,000     2,000       I     Heapstlay and Carter     60,000     40     2,000     2,000     2,000       Performance Ant Conter     60,000     40     1,000     3,000     1,000       I     Meany Dack (D) (Carter)     60,000     40     1,000     3,000     1,000       I     Meany Dack (D) (Carter)     60,000     40     1,000     3,000     1,000       I     Litray Addstin     1,044     1,414     1,414     1,414     1,414     1,414     1,414	C	P3 Lawson Street Residence Hall	103,325	30	3,100		3,100
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F     Introvation Lab and Research Building     105,000     50     5.280     5.280     5.280       Cmo-Slap, Community Maill Center     25,000     50     1.200     1.400       Human Healting Tourism Center     20,000     40     3,000     3,000       Incogniting and Proference Center     20,000     40     3,000     3,000       Incogniting material Tourism Center     40,000     30     2,000     2,000       Research Expansion of Tourism Center     40,000     40     2,400     2,400       Peritry Desk (D) (Coccasion Center Parking)     40,000     40     1,200     1,200       R Entrysmeunitip Center     60,000     40     1,200     1,200     1,200       V Exity Desk (D) (Coccasion Center Parking)     30,000     40     1,200	E	New School of Business	70,000	40	2,800		2,800
□     □	F	Innovation Lab and Research Building	105,000	50	5,250		5,250
Image Lating Facture     2600     3.00     1.200     2.200     2.200     2.200     2.200     2.200     2.200     2.200     2.200     2.200     2.200     2.200     2.200     2.200     2.200     2.200     1.200 <td>G</td> <td>One-Stop / Community Health Center</td> <td>35,000</td> <td>40</td> <td>1,400</td> <td>1 250</td> <td>1,400</td>	G	One-Stop / Community Health Center	35,000	40	1,400	1 250	1,400
C     Convestion Center     200,000     40     8,000     8,000     8,000       I     Heighting torbuint Center     45,000     40     1,800     1,800       M     New Andemic Building     75,000     40     2,400     2,400       Parking Deck (D) (Convocation Center Parking)     175,000     40     2,400     2,400       Ferrepresensity Conter     60,000     40     1,200     1,200       Parking Deck (D) (Convocation Center Parking)     120,000     40     1,200     1,200       Charpy Addisin     40,000     40     1,200     1,200     1,200       V     Future Residence Hall     100,000     30     3,000     3,000       1     Shegard (Holey) Administration Building     2,32,00     40     1,520     1,520       2     Lase Biology Building     2,3544     40     1,544     1,544       4     Willis Commarce Building     2,1539     40     866     866       1     Book Armax     6,400     50     1,502     1,502       <		Human Health and Performance Center	25,000	40	3 400	1,200	3 400
L Hespfahly and Tourism Center 45,000 40 1,000 3,000 2,000 2,000 2,000 2,000 2,000 2,000 2,000 Performance Ast Center 0,000 40 2,400 2,400 Parking Dek (DX) (Constrained Parking) 175,000 Performance Ast Center 0,000 40 2,400 2,400 Parking Dek (DX) (Constrained Parking) 175,000 Performance (DX) (Constrained Parking) 120,000 40 1,000 1,000 1,000 Teaches 1,000 40 4	ĸ	Convocation Center	200.000	40	8.000		8.000
M     New Academic Building     75,000     40     3.000     3.000       N     Research Expansion I Towner RIPTE     40,000     40     2.400     2.400       P Parking Deck (DX) (Concotallo Center Parking)     120,000     7     7     7       P Parking Deck (DX) (Concotallo Center Parking)     120,000     40     1.600     1.600       I Entropreneums (D center)     60,000     40     1.600     1.600     1.200       V Future Residence Hall     100,000     40     1.600     1.600     3.000       1 Shepard (Heey) Administration Building     32,000     40     1.280     2.200     2.000     3.000 <td>L</td> <td>Hospitality and Tourism Center</td> <td>45,000</td> <td>40</td> <td>1,800</td> <td></td> <td>1,800</td>	L	Hospitality and Tourism Center	45,000	40	1,800		1,800
N     Research Expansion at Scatter     40,000     50     2,000     2,000       P Parking Dek (DX) (Constantin Center Parking)     175,000     -	М	New Academic Building	75,000	40	3,000	3,000	
0     Performance Arts Center Parking     60,000     40     2.400     2.400       P Parking Dek (DX) (Convolation Center Parking)     120,000     1.600     1.600     1.600       Entrepreneuting Center     60,000     40     1.600     1.600     1.600       U Mary Addition     40,000     40     1.600     1.600     1.600       V Future Residence Hall     100,000     30     3.000     3.000     3.000       1     Shepart (How) Administration Building     23,200     40     1.280     1.280       2     Lee Biology Building     23,844     60     1.419     1.419     1.419       4     Wills Commerce Building     37,550     40     1.544     1.544     1.544       5     Duke Ankithing     21,713     50     1.185     1.185     1.185       6     Tayler Education Building     21,713     50     1.185     1.185       7     Fine Arts Building     21,713     50     1.185     1.185       7     Tayler Education Building     21,717	Ν	Research Expansion at Townes / BRITE	40,000	50	2,000		2,000
P = Parking Use(UX) (Constanting)     175,000       P = Parking Use(UX) (Constanting)     175,000       R = Entrepreneursitip Center     60,000     40     2,400     1,000       R = Entrepreneursitip Center     60,000     40     1,200     1,000       I = Entrepreneursitip Center     30,000     40     1,200     1,200       V = Future Residence Hall     100,000     30     3,000     40     1,280     1,280       Lee Biology Building     23,332     75     2,200     2,300     40     1,280     1,280       Lee Biology Building     23,532     75     2,200     2,300     40     1,544     1,544     1,544       Ducke Autoricum     13,341     50     697     503     300     3000     1,502     806       E there Arts Building     21,559     40     1,502     1,502     806     866     866     866     866     866       E there Arts Building     21,579     75     1,644     1,444     1,700     1,700     1,700       Ducke	0	Performance Arts Center	60,000	40	2,400		2,400
Image base (Lo)     Locology base     Locol	Р	Parking Deck (DX) (Convocation Center Parking) Parking Deck (DX) (Cooil Street)	175,000				
S     Library Addition     Library Addition     Library Addition     Library Addition     Library Addition       T     Frainlies Operations     30,000     40     1,200     1,200       McDougal-McLendon Arena Expansion     40,000     40     1,200     3,000     3,000       Ishepart (Hoey) Administration Building     22,000     40     1,280     1,280       Lee Biology Building     23,824     60     1,419     1,419       Wills Commerce Building     38,612     40     1,544     697       Duke Anditorium     13,341     60     697     6466     666       Edwards Music Hall     23,701     60     1,502     1,502     1,000       9     Student Health Building     22,111     40     880     880     1,000       9     Dort Humans Sciences Building     23,316     75     1,743     1,749       13     Shepard Memorial Library     102,384     50     1,274     737       13     Brepard (Horoy Library     102,384     50     1,274     1,749 <	R	Entrepreneurship Center	60,000	40	2 400		2 400
T     Facilise Operations     30,000     40     1,200     1,200       V     Future Residence Hall     100,000     30     3,000     1,600       1     Shepart (Hoey) Administration Building     32,000     40     1,280     1,280       2     Lee Biology Building     23,332     75     2,200     2,000       3     Edmonts Classroom Building     23,844     60     1,449     1,449       4     Wills Commerce Building     38,812     40     1,544     1,544       5     Duke Anditorium     13,341     50     697     697       Duke Antibusit Hall     23,750     40     1,562     1,552     1,855       6     Edwards Music Hall     23,710     50     1,185     1,865       7     Frine Arts Building     22,179     75     1,648     1,648       1     Jones Building     23,316     75     1,749     1,749       1     Jones Building     23,316     75     1,749     1,749       1     Basto	s	Library Addition	40.000	40	1.600	1.600	2,400
U     McDougdé-McLendon Arene Expansion     40,000     40     1.600     1.600       V     Future Residence Hall     100,000     30     3,000     3,000       2     Lee Biology Building     23,323     75     2,200     2,200       2     Lee Biology Building     23,444     60     1,419     1,419       4     Wills Commerce Building     38,612     40     1,544     1,542       5     Duke Auftorium     1,341     50     677     677       Duke Autorium     21,639     40     686     866       6     Edwards Music Hall     23,701     50     1,185     1,185       Art Musien     20,000     50     1,000     1,000     1,000       9     Student Health Building     22,317     40     860     860     1,000       9     Student Kealth Building     21,979     75     1,488     1,488     1,000       9     Student Kealth Building     23,159     60     1,570     1,570     1,570	Т	Facilities Operations	30,000	40	1,200	,	1,200
V     Future Residence Hall     100.000     30     3.000     3.000       1     Shepard (Hosy) Administration Building     29.32     75     2.200     2.200       2     Edmonds Classroom Building     23.844     60     1.419     1.419       4     Wills Commerce Building     33.812     40     1.544     50       5     Duke Annex     6.000     50     330     320       6     Traylor Education Building     21,639     40     666     866       6     Edwards Music Hall     23,755     1.648     1.648     1.000       9     Student Heath Building     22,017     50     1.185     1.185       1     Jones Building     23,316     75     1.749     1.749       1     Jones Building     23,159     60     1.570     1.570       1     Jones Building     23,16     57     1.749     1.749       1     Jones Building     23,16     57     1.749     1.749       1     Jones Building	U	McDougald-McLendon Arena Expansion	40,000	40	1,600	1,600	
1     Shepard (Hoey) Administration Building     32,000     40     1,280     1,280       2     Lee Briotogy Building     23,832     75     2,200     2,200       3     Edmonts Classroom Building     38,812     40     1,544     1,544       4     Wills Commerce Building     38,812     40     1,502     320       6     Taylor Education Building     37,550     40     1,502     1,502       7     Fine Arts Building     21,633     40     666     666       8     Edwards Music Hall     23,701     50     1,105     1,105       41     Uses Building     21,979     75     1,648     1,000       9     Student Health Building     23,161     75     1,749     1       1     Shepard Merrorial Library     102,344     50     5,118     5,118       1     Jones Building     23,516     50     1,264     1,264       1     Jones Building     23,545     50     1,264     1,264       1     Mo	V	Future Residence Hall	100,000	30	3,000		3,000
1     Shepard (Holey) Animiserization Building     32,000     40     1,280     1,280     2,200       3     Edmonds Classicom Building     23,844     60     1,419     1,419     1,419       4     Wills Commerce Building     38,612     40     1,564     697     697       5     Duke Auditorium     13,341     50     697     697     697       7     Fine Arts Building     21,533     40     866     866     866       6     Edwards Nusci Hail     23,701     50     1,185     1,185     1,185       7     Fine Arts Building     22,071     50     1,000     1,000     1,000       9     Student Health Building     22,179     75     1,648     1,643     1,479       1     Jones Building     23,316     75     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     1,749     <				10	4 000	4 000	
2     24.32     73     2.000     2.000       2     Edmons Classroom Building     23,944     60     1,419     1,419       4     Wills Commerce Building     38,612     40     1,544     1,544     697       5     Duke Annex     6,400     50     320     320     320       6     Taylor Ecuzation Building     37,550     40     1,662     666     666       1     The Arts Building     21,639     40     866     866     666       1     Jones Autorita Nusci Hall     23,701     50     1,000	1	Shepard (Hoey) Administration Building	32,000	40	1,280	1,280	
→     United Statistic     Col     F, F, S     F, F, S       5     Duke Auditorium     13,341     50     697     697       5     Duke Auditorium     13,341     50     697     697       7     Taylor Education Building     37,550     40     1,562     1,502       6     Taylor Education Building     21,539     40     866     866       8     Edwards Music Hall     23,701     50     1,165     1,185       4     Museum     20,000     50     1,000     1,000       9     Student Health Building     22,011     40     880     880       10     Dent Human Sciences Building     23,316     75     1,749     1,749       13     Shapard Menorial Library     10,2364     50     1,570     1,544       14     McDouglad Gymnasium     61,565     50     3,078     3,078       15     Student Seidence Hall     25,584     50     1,264     1,264       15     Mulean Aresidence Hall     23,66	2	Lee Blology Building Edmonds Classroom Building	29,332	75 60	2,200	2,200	
5     Duke Autorium     13,941     50     697     1.000     697       Duke Annex     6,400     50     320     320     320       7     Fine Arts Building     21,639     40     866     866       8     Edwards Nusic Hall     23,701     50     1,1655     1,185       8     Edwards Nusic Hall     23,701     50     1,000     1,000       9     Student Health Building     22,117     40     880     880       10     Dent Human Sciences Building     23,316     75     1,548     1,648       11     Jones Autiding     23,316     75     1,749     1,749       13     Shepard Memorial Library     102,364     50     1,370     1,770       14     McDougal Gymnasium     61,565     50     3,078     3,078       15     Student Sevidence Hall     24,640     50     1,232     1,232       16     Challey North Residence Hall     23,650     1,170     1,77       175     Stass     <	4	Willis Commerce Building	38 612	40	1,413	1,413	
Duke Annex     6,400     50     320     320       6     Taylor Education Building     37,550     40     1,502     7       7     Fine Arts Building     21,633     40     866     866       8     Edwards Music Hall     23,701     50     1,185     1,185       Art Maseum     20,000     50     1,000     1,000       9     Student Health Building     21,379     75     1,648     1,648       11     Jones Building     23,316     75     1,749     1,749       12     Robison Science Building     26,159     60     1,570     1,570       15     Student Sevices Building     26,159     60     1,570     1,570       15     Student Sevices Building     26,159     60     1,570     1,570       16     Shepard Residence Hall     24,400     50     1,224     1,232       175     Heads     56,80     0     735     735       18     Robit Residence Hall     13,800     50     6	5	Duke Auditorium	13,941	50	697	1,011	697
6     Taylor Education Building     37,550     40     1,502     1,502       7     Fine Arts Building     21,353     40     866     866       8     Edwards Music Hall     23,701     50     1,185     1,185       Art Museum     20,000     50     1,000     1,000     1,000       9     Student Health Building     22,1979     75     1,648     1,648       10     Dent Human Sciences Building     23,316     75     1,749     1,749       13     Shapard Memorial Library     102,384     50     5,118     5,118       14     McDougaid Gymnasium     61,565     50     3,078     3,078       15     Student Senidence Hall     42,640     50     1,232     1,232       16     Shapard Memorial Library     102,854     50     1,264     1,264       16     Shapard Menoial Library     102,364     50     1,232     1,232       17     McLean Residence Hall     25,524     50     1,232     1,232       19 </td <td></td> <td>Duke Annex</td> <td>6,400</td> <td>50</td> <td>320</td> <td></td> <td>320</td>		Duke Annex	6,400	50	320		320
7     Fine Arts Bulding     21,539     40     866     866       8     Edwards Music Hall     23,701     50     1,185     1,185       Art Museum     20,000     50     1,000     1,000     1,000       9     Student Health Sulding     21,979     75     1,648     1,648       11     Jones Bulding     123,316     75     1,749     1,749       12     Robios Science Bulding     23,316     75     1,749     1,749       13     Stopard Memoral Library     102,334     50     5,118     5,118       14     McDougld Gymnasium     61,565     50     3,078     3,078       15     Student Residence Hall     25,284     50     1,264     1264       16     Chiday Morth Residence Hall     13,800     50     6,800     600       16     Chiday Morth Residence Hall     13,830     40     175     175       175     Heating Plant     6,835     40     276     276       175     Heating Plant	6	Taylor Education Building	37,550	40	1,502	1,502	
8     Edwards Music Hall     23,701     50     1,185     1,185       Art Musseum     20,000     50     1,000     1,000       9     Student Health Building     22,011     40     880     800       10     Dent Human Sciences Building     21,979     75     1,648     1,648       11     Jones Building     18,428     40     737     737       12     Robison Sciences Building     23,316     75     1,749     1,749       13     Shegard Aevices Building     26,159     60     1,570     1,570       15     Student Nervices Building     26,159     60     1,570     1,570       15     Student Sevices Building     24,640     50     1,222     1,224       16     Rush Residence Hall     25,264     50     6,800     6,800       17     McLean Residence Hall     25,264     50     7,75     4,318     4,318       14     Aexander-Dum Building     18,363     40     176     175       2 <t< td=""><td>7</td><td>Fine Arts Building</td><td>21,639</td><td>40</td><td>866</td><td></td><td>866</td></t<>	7	Fine Arts Building	21,639	40	866		866
Art Museum     20,000     50     1,000     1,000       9     Student Health Building     21,979     75     1,648       1     Jones Building     18,426     40     73     737       1     Robison Science Building     23,316     75     1,749     1,749       13     Shepard Memorial Library     102,384     50     5,118     5,118       14     McDougd Grymnasium     61,656     50     3,078     1,570       15     Student Services Building     26,159     60     1,232     1,232       16     Shapard Memorial Library     13,3600     50     6,260     2,203       17     McLean Residence Hall     13,3600     50     6,680     6,680       10     Pearson Cafeferia     57,567     75     4,318     4,318       1     Avas Ander-Dunn Building     18,383     40     175     175       1     Pearson Cafeferia     6,895     40     2,76     2,747       2     Hobbard - Eduta Bilding     7,9494	8	Edwards Music Hall	23,701	50	1,185		1,185
9     Student Reality and Sciences Building     22,111     40     600     600       Dent Human Sciences Building     11,279     75     16,446     1,479     1737       1     Jones Building     23,316     75     1,749     1,749       1     Jones Science Building     23,316     75     1,749     1,749       1     McDougald Cymmasium     61,665     50     3,078     3,078       1     MuLean Residence Hall     44,050     50     1,264     1,264       1     Onder Residence Hall     25,284     50     1,264     1,264       1     Onder Celerai     57,567     75     4,318     4,318     4,318       1     Alexander-Dum Building     18,363     40     175     175       2     Shapard House (DX)     4,380     40     175     175       2     Shapard House (DX)     4,380     40     175     175       2     Shapard House (DX)     4,380     40     234     334       2     <	_	Art Museum	20,000	50	1,000	000	1,000
Delt fulliation     El, M.S.     T.S.     T.S.     T.S.     T.S.     T.S.       1     Joines Building     12, 426     40     T.S.     T.T.49     T.T.49       15     Shapard Memorial Library     102, 364     50     5, 118     5, 118       16     Shapard Memorial Library     102, 364     50     5, 174     5, 70       15     Student Services Building     26, 159     60     1, 570     1, 570       16     Shapard Residence Hall     24, 640     50     1, 232     1, 232       17     McLean Residence Hall     23, 600     50     6, 680     6, 680       20     Pearson Cafeteria     57, 567     75     4, 318     4, 318       21     Alexander-Dum Building     18, 63     40     175     175       21     Alexander-Dum Building     18, 63     40     276     276       22     Shepard House (DX)     4, 380     40     234     234       23     Eagleson Residence Hall     84, 258     65     5, 477	9 10	Student Health Building	22,011	40	000	000	
12   Robison Science Building   23,316   75   1,749   1,749     13   Shepard Memorial Library   102,364   50   5,118   5,118     14   McDougal Gymnasium   61,665   50   3,078   3,078     15   Student Services Building   26,159   60   1,570   1,570     16   Shepard Residence Hall   44,050   50   2,203   2,203     17   McLean Residence Hall   25,284   50   1,284   1,284     16   Childy North Residence Hall   133,600   50   6,680   6,680     20   Pearson Cafeteria   57,567   75   4,318   4,318     21   Alexander-Dunn Building   18,863   40   175   175     23   Shepard House (LX)   4,380   40   175   175     24   EOHS Cottage   2,612   50   131   131     25   Eagleson Residence Hall   6835   40   2,34   234     28   Farrison-Newton Communication Building   79,844   40   3,196   3,394	10	Jones Building	18 426	40	737	737	
13     Shepard Memorial Library     102,364     50     5,118     5,118       14     McDougald Gymnasium     61,665     50     3,078     3,078       15     Studen Services Building     26,159     60     1,570     1,570       16     Shepard Residence Hall     24,640     50     1,232     1,224       17     McLean Residence Hall     25,284     50     1,264     1,264       19     Childey North Residence Hall     133,600     50     6,680     6,680       20     Pearson Cafeteria     57,567     75     4,318     4,318       21     Alexander-Dunn Building     18,363     40     175     175       24     EOHS Cottage     2,612     50     131     131       25     Eagleson Residence Hall     84,258     65     5,477     5,4477       26     EOHS Cottage     2,612     50     131     131       26     Basing Plant     6,838     40     234     234       27     Bowing Alley	12	Robison Science Building	23.316	75	1.749	1.749	
14   McDougald Gymnasium   61,655   50   3,078   3,078     15   Student Services Building   26,159   60   1,570   1,570     15   Student Residence Hall   24,640   50   1,222   1,232     17   McLean Residence Hall   25,284   50   1,264   1,264     18   Rush Residence Hall   133,600   50   6,680   6,680     20   Pearson Cafeteria   57,667   75   4,318   4,315     21   Alexander-Dunn Building   18,363   40   735   735     23   Spepard House (DX)   4,380   40   175   175     24   EOHS Cottage   2,612   50   131   131     25   Eagleson Residence Hall   84,258   65   5,477   5,477     24   EOHS Cottage   2,612   50   131   131     25   Eagleson Residence Hall   84,268   65   5,477   5,477     24   Euter Building   29,250   40   1,170   1,170     26   Tumer Law Bu	13	Shepard Memorial Library	102,364	50	5,118	5,118	
15   Student Services Building   26,159   60   1,570     16   Shepard Residence Hall   44,050   50   2,203   2,203     17   McLaan Residence Hall   24,640   50   1,232   1,232     18   Rush Residence Hall   25,284   50   1,264   1,264     10   Childey North Residence Hall   133,600   50   6,680   6,680     12   Shepard House (DX)   4,380   40   75   175     23   Shepard House (DX)   4,380   40   75   175     24   EOHS Cottage   2,612   50   11   11   11     25   Eagleson Residence Hall   84,258   65   5,477   5,477     25   Heating Plant   6,895   40   2,324   24     26   Hubbard-Toton Building   84,861   40   3,394   3,394     37   Turmer Law Building   79,894   40   3,196   3,196     38   Miller-Morgan Building   29,086   1,1163   1,163   1,163     38   R	14	McDougald Gymnasium	61,565	50	3,078	3,078	
16   Shepard Residence Hall   24,640   50   2.203   2.203     17   McLean Residence Hall   24,640   50   1.232   1.232     18   Rush Residence Hall   25,284   50   1.264   1.264     19   Chidley North Residence Hall   133,600   50   6.680   6.680     20   Pearson Cafeteria   57,667   75   4,318   4,318     21   Alexander-Dunn Building   18,363   40   175   175     21   Beating Plant   6,895   40   276   276     24   EOHS Cottage   2,612   50   131   131     25   Eagleson Residence Hall   84,258   65   5,477   5,477     24   Hubbard-Toton Building   29,250   40   1,170   1,170     26   Hubbard-Toton Communication Building   84,861   40   3,394   3,394     27   Turner Law Building   79,894   40   3,196   3,196     31   Whiting Criminal Justice Building   29,086   40   1,163   1,622	15	Student Services Building	26,159	60	1,570	1,570	
11   Ruck Residence Hall   24,940   50   1,252   1,254     12   Ruck Residence Hall   133,600   50   6,680   6,680     12   Pearson Cafeteria   57,567   75   4,318   4,318     14   Alexander-Dunn Building   13,363   40   175   175     12   Shepard House (DX)   4,380   40   175   175     14   EOHS Cottage   2,612   50   131   131     15   Eagleson Residence Hall   84,258   65   5,477   5,4477     17   Bowling Alley   5,838   40   224   234     28   Farrison-Newton Communication Building   29,250   40   1,170   1,170     17   Bowling Alley   5,838   40   234   234   3,394     29   Turner Law Building   46,296   40   1,463   1,463     30   Walker Physical Education Complex   144,386   50   7,219   3,57     33   Richmond Residence Hall   67,146   50   3,357   3,557	16	Shepard Residence Hall	44,050	50	2,203	2,203	
18   NUSH Residence Hall   22,264   50   1,264   1,264     19   Childly Noth Residence Hall   133,600   50   6,680   6,680     20   Pearson Cafeteria   57,567   7.5   4,318   4,318     21   Alexander-Dum Building   18,863   40   7.75   7.5   4,318   4,318     21   Alexander-Dum Building   18,863   40   7.75   7.5   7.5   7.5     23   Shepard House (DX)   4,380   40   7.75   7.477   7.5     24   EOHS Cottage   2,612   50   131   131     25   Eagleson Residence Hall   84,261   40   3,394   234   234     25   Farrison-Newton Communication Building   84,861   40   3,196   3.196     30   Miller-Morgan Building   29,084   40   3,196   3.196     31   Whilker Physical Education Complex   144,386   50   7,219   7,219     31   Richmond Residence Hall   67,146   50   3,357   3,357   3	17	McLean Residence Hall	24,640	50	1,232	1,232	
13   Onlinely Noull resolution fail   15,000   50   0,000     20   Pearson Cateberia   57,567   75   4,318   4,318     21   Alexander-Dunn Building   18,363   40   775   775     22   Shepard House (DX)   4,380   40   175   175     24   EOHS Cottage   2,612   50   131   131     25   Eagleson Residence Hall   84,258   65   5,477   5,477     24   Hubbard-Totton Building   29,250   40   1,170   1,170     26   Hubbard-Totton Building   84,861   40   3,394   3,394     29   Turner Law Building   79,894   40   3,196   3,196     30   Miller Morgan Building   29,086   40   1,163   1,163     29   Turner Law Building   29,086   40   1,163   1,163     31   Whiting Criminal Justice Building   29,086   40   1,163   1,433     30   Walker Physical Education Complex   144,386   50   7,219   7,357 <td< td=""><td>18</td><td>Rush Residence Hall</td><td>25,284</td><td>50</td><td>1,204</td><td>1,204</td><td></td></td<>	18	Rush Residence Hall	25,284	50	1,204	1,204	
23   Alexander-Dunn Building   18,363   40   735   735     22   Shepard House (DX)   4,380   40   175   175     23   Heating Plant   6,895   40   276   276     24   EOHS Cottage   2,612   50   131   131     25   Eagleson Residence Hall   84,258   65   5,477   5,477     26   Hubbard-Totton Building   29,250   40   1,170   1,170     26   Hordward-Norton Building   84,861   40   3,394   3,394     27   Turmer Law Building   79,894   40   3,196   3,196     30   Miller-Morgan Building   29,086   40   1,852   1,852     31   Whiting Criminal Justice Building   29,086   40   1,163   1,163     32   Walker Physical Education Complex   144,386   50   7,219   7,219     33   Richmond Residence Hall   67,146   50   3,357   3,357     34   Michaux School of Education   118,207   40   4,728   4,728	20	Pearson Cafeteria	57 567	50 75	4 318	4 318	
2     Shepard House (DX)     4,380     40     175     175       23     Heating Plant     6,895     40     276     276       24     EOHS Cottage     2,612     50     131     131       25     Eagleson Residence Hall     84,258     65     5,477     5,477       26     Hubbard-Totton Building     29,250     40     1,170     1,170       27     Bowling Alley     5,838     40     234     234       28     Farrison-Newton Communication Building     84,861     40     3,394     3,394       29     Turmer Law Building     79,894     40     3,196     3,196       30     Miller-Morgan Building     46,296     40     1,63     1,852       31     Whiting Criminal Justice Building     29,086     40     1,63     1,852       31     Whiting Criminal Justice Building     29,086     40     1,63     1,852       31     Weaker Physical Education Complex     144,386     50     7,219     7,219       32	21	Alexander-Dunn Building	18,363	40	735	735	
23   Heating Plant   6,895   40   276   276     24   EOHS Cottage   2,612   50   131   131     25   Eagleson Residence Hall   84,258   65   5,477   5,477     276   Hubbard-Totton Building   29,250   40   1,170   1,170     27   Bowling Alley   5,838   40   234   234     28   Farrison-Newton Communication Building   84,861   40   3,196   3,196     30   Miller-Morgan Building   79,894   40   3,196   3,196     31   Whiting Criminal Justice Building   29,086   40   1,163   1,163     31   Wolking Physical Education Complex   144,386   50   7,219   7,219     32   Walker Physical Education Complex   144,386   50   7,219   7,219     33   Richmond Residence Hall   67,146   50   3,357   3,357     34   New Residence Hall II   67,146   50   3,357   3,557     35   Chambers Bio Research Institute (BBRI)   38,500   75   2,888<	22	Shepard House (DX)	4,380	40	175		175
24     EOHS Cottage     2,612     50     131     131       25     Eagleson Residence Hall     84,258     65     5,477     5,477       26     Hubbard-Totton Building     29,250     40     1,170     1,170       27     Bowling Alley     5,838     40     234     234       28     Farrison-Newton Communication Building     84,861     40     3,394     3,394       29     Turmer Law Building     79,894     40     3,196     3,196       30     Miler-Morgan Building     29,086     40     1,163     1,163       31     New Residence Hall     67,146     50     3,357     3,357       32     Walker Physical Education Complex     144,386     50     7,219     7,219       33     Richmond Residence Hall     67,146     50     3,357     3,357       35     Chambers Bio Research Institute (BBRI)     38,500     75     2,888     2,888       30     OYGelly-Riddick Stadium     33,125     40     1,325     1,325  <	23	Heating Plant	6,895	40	276	276	
25   Eagleson Residence Hall   84,258   65   5,477   5,477     26   Hubbard-Totton Building   29,250   40   1,170   1,170     27   Bowling Alley   5,838   40   234   234     28   Farrison-Newton Communication Building   84,861   40   3,394   3,394     29   Turner Law Building   79,894   40   3,394   3,394     30   Miller-Morgan Building   29,086   40   1,163   1,163     30   Walker Physical Education Complex   144,386   50   7,219   7,219     31   Richmond Residence Hall   67,146   50   3,357   3,357     32   Chambers Bio Research Institute (BBRI)   38,500   75   2,888   2,888     35   Chambers Bio Research Institute (BRI)   38,500   75   2,888   2,888     36   Police and Public Safety Building (DX)   4,090   40   1,64   164     37   Michaux School of Education   118,207   40   1,325   1,325     39   Townes Science Building   115,017 <td>24</td> <td>EOHS Cottage</td> <td>2,612</td> <td>50</td> <td>131</td> <td>131</td> <td></td>	24	EOHS Cottage	2,612	50	131	131	
26   Hubbard-Totton Building   29,250   40   1,170   1,170     27   Bowling Alley   5,838   40   234   234     28   Farrison-Newton Communication Building   84,861   40   3,394   3,394     29   Turmer Law Building   79,894   40   3,196   3,196     30   Miller-Morgan Building   29,086   40   1,163   1,163     31   Whiting Criminal Justice Building   29,086   40   1,163   1,163     32   Walker Physical Education Complex   144,386   50   7,219   7,219     33   Richmond Residence Hall   67,146   50   3,357   3,357     34   New Residence Hall   67,146   50   3,357   3,357     35   Chambers Bio Research Institute (BBR)   38,500   75   2,888   2,888     36   Police and Public Safety Building (DX)   4,090   40   164   164     37   Michaux School of Education   118,207   40   1,325   1,325     38   Orkelly-Riddick Stadium   33,125	25	Eagleson Residence Hall	84,258	65	5,477	5,477	
27   Bowling Alley   5,838   40   234   234     28   Farrison-Newton Communication Building   84,861   40   3,394   3,394     29   Turmer Law Building   79,894   40   3,196   3,196     30   Miller-Morgan Building   29,086   40   1,163   1,163     31   Whiting Ciminal Justice Building   29,086   40   1,163   1,163     32   Walker Physical Education Complex   144,386   50   7,219   7,219     33   Richmond Residence Hall   67,146   50   3,357   3,357     34   New Residence Hall   67,146   50   3,357   3,357     35   Chambers Bio Research Institute (BBR)   38,500   75   2,888   2,888     4   Police and Public Safety Building (DX)   4,090   40   164   164     37   Michaux School of Education   118,207   40   1,325   1,325   3     38   O'Kelly-Riddick Stadium   33,125   40   1,325   1,325   3   5   660   8,626   8,626 <td>26</td> <td>Hubbard-Totton Building</td> <td>29,250</td> <td>40</td> <td>1,170</td> <td>1,170</td> <td></td>	26	Hubbard-Totton Building	29,250	40	1,170	1,170	
26   Parison-reaction communication banding   64, 661   440   3, 354   3, 354     27   Turmer Law Building   79, 894   40   3, 196   3, 196     30   Miller-Morgan Building   29,086   40   1, 163   1, 163     31   Whiting Criminal Justice Building   29,086   40   1, 163   1, 163     32   Walker Physical Education Complex   144,386   50   7, 219   7, 219     31   Richmond Residence Hall   67, 146   50   3, 357   3, 357     34   New Residence Hall   67, 146   50   3, 357   3, 357     35   Chambers Bio Research Institute (BBRI)   38, 500   75   2, 888   2, 888     36   Police and Public Safety Building (DX)   4,090   40   164   164     37   Townes Science Building   118,207   40   4,728   4,728     30   Ykeliy-Riddick Stadium   33,125   40   1,325   1,325     30   Townes Science Building   94,233   50   4,712   4,712     41   Biomanufacturing Research In	2/	Bowling Alley	5,636	40	234	234	2 204
10   10   10   50,100   50,100     50   Miller-Morgan Building   42,296   40   1,852   1,852     31   Whiting Criminal Justice Building   29,086   40   1,163   1,163     32   Walker Physical Education Complex   144,386   50   7,219   7,219     33   Richmond Residence Hall   67,146   50   3,357   3,357     35   Chambers Bio Research Institute (BBRI)   38,500   75   2,888   2,888     36   Police and Public Safety Building (DX)   4,090   40   164   164     37   Michaw School of Education   118,207   40   4,728   4,728     38   O'Kelly-Riddick Stadium   33,125   40   1,325   1,325     39   Townes Science Building   115,017   75   8,626   8,626     40   Ruffin Residence Hall   0   94,233   50   4,712   4,712     41   Biomanufacturing Research Institute and Technology   65,000   75   4,875   4,875     42   Latham Parking Deck Retail Space   19	20	Famison-Newton Communication Building	70 80/	40	3,394	3 196	3,394
31   Whiting Criminal Justice Building   29,086   40   1,163   1,163     32   Walker Physical Education Complex   144,386   50   7,219   7,219     33   Richmond Residence Hall   67,146   50   3,357   3,357     35   Chambers Bio Research Institute (BBRI)   38,500   75   2,888   2,888     36   Police and Public Safety Building (DX)   4,090   40   164   164     37   Michaux School of Education   118,207   40   1,325   1,325     39   Townes Science Building   115,017   75   8,626   8,626     40   Ruffin Residence Hall   94,233   50   4,112   4,712     41   Biomanufacturing Research Institute and Technology   65,000   75   4,875   4,875     42   Latham Parking Deck Retail Space   19,000   40   760   760     43   Nursing Building   69,000   40   2,760   2,760   4     44   Latham Parking Deck Retail Space   19,000   40   760   760   760     43<	30	Miller-Morgan Building	46.296	40	1.852	1.852	
32   Walker Physical Education Complex   144,386   50   7,219   7,219     33   Richmond Residence Hall   67,146   50   3,357   3,357     34   New Residence Hall   67,146   50   3,357   3,357     34   New Residence Hall   67,146   50   3,357   3,357     35   Chambers Bio Research Institute (BBRI)   38,500   75   2,888   2,888     36   Police and Public Safety Building (DX)   4,090   40   164   164     37   Michaux School of Education   118,207   40   4,728   4,728     37   Townes Science Building   115,017   75   8,626   8,626     40   Ruffin Residence Hall   94,233   50   4,712   4,712     41   Biomanufacturing Research Institute and Technology   65,000   75   4,875   4,875     42   Latham Parking Deck Retail Space   19,000   40   760   760     43   Nursing Building   69,000   40   2,760   2,760     44   Centennial Chapel   945	31	Whiting Criminal Justice Building	29,086	40	1,163	1,163	
33   Richmond Residence Hall   67,146   50   3,357   3,357     34   New Residence Hall II   67,146   50   3,357   3,357     35   Chambers Bio Research Institute (BBRI)   38,500   75   2,888   2,888     35   Chambers Sic Research Institute (BBRI)   38,500   75   2,888   2,888     36   Police and Public Safety Building (DX)   4,090   40   164   164     37   Michaux School of Education   118,207   40   4,728   4,728     37   Townes Science Building   115,017   75   8,626   8,626     38   OrKelly-Riddick Stadium   33,125   40   1,325   1,325   1,325     39   Townes Science Building   115,017   75   8,626   8,626   8,626     34   Ruffin Residence Hall   94,233   50   4,712   4,712   4,712     41   Biomanufacturing Research Institute and Technology   65,000   75   4,875   4,875     42   Latham Parking Deck Retail Space   19,000   40   2,760   2,760	32	Walker Physical Education Complex	144,386	50	7,219	7,219	
34     New Residence Hall II     67,146     50     3,357     3,357       35     Chambers Bio Research Institute (BBRI)     38,500     75     2,888     2,888       36     Police and Public Safety Building (DX)     4,090     40     164     164       37     Michaux School of Education     118,207     40     4,728     4,728       38     O'Kelly-Riddick Stadium     33,125     40     1,325     1,325       39     Townes Science Building     115,017     75     8,626     8,626       40     Ruffin Residence Hall     94,233     50     4,712     4,712       41     Biomanufacturing Research Institute and Technology     65,000     75     4,875     4,875       42     Latham Parking Deck Retail Space     19,000     40     760     760       43     Nursing Building     100,000     50     5,000     5,000     5,000       44     Centennial Chapel     945     40     38     38     38       45     Eagle Landing Residence Hall     100,00	33	Richmond Residence Hall	67,146	50	3,357	3,357	
35   Chambers Bio Research Institute (BBRI)   38,500   75   2,888   2,888     36   Police and Public Safety Building (DX)   4,090   40   164   164     36   Police and Public Safety Building (DX)   4,090   40   4,728   1,428     37   Michaux School of Education   118,207   40   4,728   4,728     38   O'Kelly-Riddick Stadium   33,125   40   1,325   1,325     39   Townes Science Building   115,017   75   8,626   8,626     40   Ruffin Residence Hall   94,233   50   4,712   4,712     41   Biomanufacturing Research Institute and Technology   65,000   75   4,875   4,875     42   Latham Parking Deck Retail Space   19,000   40   760   760     43   Nursing Building   0945   40   38   38     45   Eagle Landing Residence Hall   100,000   50   5,000   5,000     Chidley Residence Hall   To be removed)   95,000   5,000   5,000   5,000     Elder Student Center (To be replaced by	34	New Residence Hall II	67,146	50	3,357	3,357	
36   Police and Public Safety Building (UX)   4,090   40   164   164     37   Michaux School of Education   118,207   40   4,728   4,728     37   Michaux School of Education   118,207   40   4,728   4,728     38   O'Kelly-Riddick Stadium   33,125   40   1,325   1,325     39   Townes Science Building   115,017   75   8,626   8,626     40   Ruffin Residence Hall   94,233   50   4,712   4,712     41   Biomanufacturing Research Institute and Technology   65,000   75   4,875   4,875     42   Latham Parking Deck Retail Space   19,000   40   760   760     43   Nursing Building   69,000   40   2,760   2,760     44   Centennial Chapel   945   40   38   38     45   Eagle Landing Residence Hall   100,000   50   5,000   5,000     Chidley Residence Hall (To be removed)   95,000   Eider Student Center (To be replaced by One Stop)   39,575   Physical Plant (To be replaced by One Stop)   39,575 <td>35</td> <td>Chambers Bio Research Institute (BBRI)</td> <td>38,500</td> <td>75</td> <td>2,888</td> <td></td> <td>2,888</td>	35	Chambers Bio Research Institute (BBRI)	38,500	75	2,888		2,888
37   minchatx School of Education   110,207   40   4,728   4,728     38   O'Kelly-Niddick Stadium   33,125   40   1,325   1,325     39   Townes Science Building   115,017   75   8,626   8,626     40   Ruffin Residence Hall   94,233   50   4,712   4,712     41   Biomanufacturing Research Institute and Technology   65,000   75   4,875   4,875     42   Latham Parking Deck Retail Space   19,000   40   760   760     43   Nursing Building   69,000   40   2,760   2,760     44   Centennial Chapel   945   40   38   38     45   Eagle Landing Residence Hall   100,000   50   5,000   5,000     Chidley Residence Hall (To be removed)   95,000   5,000   5,000   5,000     Baynes Residence Hall (To be replaced by One Stop)   39,575   99,575   78,123   87,849     DIVERSITY FACTOR =   75%   75%   75%     TOTAL CONNECTED LOAD (MBH) =   165,972   78,123   87,849 </td <td>36</td> <td>Police and Public Safety Building (DX)</td> <td>4,090</td> <td>40</td> <td>164</td> <td></td> <td>164</td>	36	Police and Public Safety Building (DX)	4,090	40	164		164
5 C Tear, Hadran Guadani 00, 120 To 1,020 1,020   30 Townes Science Building 115,017 75 8,626 8,626   40 Ruffin Residence Hall 94,233 50 4,712 4,712   41 Biomanufacturing Research Institute and Technology 65,000 75 4,875 4,875   42 Latham Parking Deck Retail Space 19,000 40 2,760 760   43 Nursing Building 69,000 40 2,760 2,760   44 Centennial Chapel 945 40 38 38   45 Eagle Landing Residence Hall 100,000 50 5,000 5,000   Childey Residence Hall (To be removed) Baynes Residence Hall (To be removed) 95,000 Elder Student Center (To be replaced by One Stop) 39,575   Physical Plant (To be replaced by Facilities Ops Bildg.) 10,707 10,707 78,123 87,849   DIVERSITY FACTOR = 75% 75%   TOTAL CONNECTED LOAD (MBH) = 165,972 78,123 87,849   DIVERSITY FACTOR = 75% 75%   TOTAL CAPACITY (MBH) = 124,479 58,592 65,886	37 38	O'Kelly-Riddick Stadium	33 125	40 40	4,720	1 325	4,/20
40   Ruffin Residence Hall   94,233   50   4,712   4,712     41   Biomanufacturing Research Institute and Technology   65,000   75   4,875   4,875     42   Latham Parking Deck Retail Space   19,000   40   760   760     43   Nursing Building   69,000   40   2,760   2,760     43   Nursing Building   69,000   40   2,760   2,760     44   Centennial Chapel   945   40   38   38     45   Eagle Landing Residence Hall   100,000   50   5,000   5,000     Childey Residence Hall (To be removed)   95,000   Elder Student Center (To be replaced by One Stop)   39,575   Physical Plant (To be replaced by Gos Bidg.)   10,707     TOTAL CONNECTED LOAD (MBH) = 165,972   78,123   87,849     DIVERSITY FACTOR =   75%   75%     TOTAL CAPACITY (MBH) =   124,479   58,592   65,886	39	Townes Science Building	115 017	75	8 626	1,020	8 626
41   Biomanufacturing Research Institute and Technology   65,000   75   4,875   4,875     42   Latham Parking Deck Retail Space   19,000   40   760   760     43   Nursing Building   69,000   40   2,760   2,760     44   Centernial Chapel   945   40   38   38     45   Eagle Landing Residence Hall   100,000   50   5,000   5,000     Childley Residence Hall (To be removed)   Baynes Residence Hall (To be removed)   95,000   Elder Student Center (To be replaced by One Stop)   39,575     Physical Plant (To be replaced by Facilities Ops Bldg.)   10,707   78,123   87,849     DIVERSITY FACTOR =   75%   75%     TOTAL CAPACITY (MBH) =   124,479   58,592   65,886	40	Ruffin Residence Hall	94,233	50	4,712		4,712
42   Latham Parking Deck Retail Space   19,000   40   760   760     43   Nursing Building   69,000   40   2,760   2,760     44   Centennial Chapel   945   40   38   38     45   Eagle Landing Residence Hall   100,000   50   5,000   5,000     Chidley Residence Hall (To be removed)   Baynes Residence Hall (To be removed)   95,000   Elder Student Center (To be replaced by One Stop)   39,575     Physical Plant (To be replaced by Facilities Ops Bidg.)   10,707   78,123   87,849     DIVERSITY FACTOR =   75%   75%     TOTAL CAPACITY (MBH) =   124,479   58,592   65,886	41	Biomanufacturing Research Institute and Technology	65,000	75	4,875		4,875
43   Nursing Building   69,000   40   2,760   2,760     44   Centennial Chapel   945   40   38   38     45   Eagle Landing Residence Hall   100,000   50   5,000   5,000     Chidley Residence Hall (To be removed)   Baynes Residence Hall (To be removed)   95,000   5,000   5,000     Eider Student Center (To be replaced by One Stop)   39,575   9   98,575   76%     Physical Plant (To be replaced by Facilities Ops Bidg.)   10,707   105,972   78,123   87,849     DIVERSITY FACTOR = 75% 75% 75%     TOTAL CAPACITY (MBH) = 124,479   58,592   65,886	42	Latham Parking Deck Retail Space	19,000	40	760		760
44   Centennial Chapel   945   40   38   38     45   Eagle Landing Residence Hall   100,000   50   5,000   5,000     Chidley Residence Hall (To be removed)   95,000   80,000   5,000   5,000   5,000     Elder Student Center (To be replaced by One Stop)   39,575   94,575   76,123   87,849     DIVERSITY FACTOR = 75%   75,75%     TOTAL CONNECTED LOAD (MBH) = 165,972   78,123   87,849     DIVERSITY FACTOR = 75%   75%     TOTAL CAPACITY (MBH) = 124,479   58,592   65,886	43	Nursing Building	69,000	40	2,760	2,760	
43     Eagle Landing Mesidence Hall     100,000     50     5,000     5,000       Chidley Residence Hall (To be removed)     95,000     84     5,000     5,000       Baynes Residence Hall (To be removed)     95,000     39,575     5     5     5       Physical Plant (To be replaced by Facilities Ops Bidg.)     10,707     10,707     78,123     87,849       DIVERSITY FACTOR = 75% 75% 75%       TOTAL CAPACITY (MBH) = 124,479     58,592     65,886	44	Centennial Chapel	945	40	38		38
Chicle y Residence Hall (To be removed) Baynes Residence Hall (To be removed) 95,000 Elder Student Center (To be replaced by One Stop) 39,575 Physical Plant (To be replaced by Facilities Ops Bidg.) 10,707 TOTAL CONNECTED LOAD (MBH) = 165,972 78,123 87,849 DIVERSITY FACTOR = 75% 75% 75% TOTAL CAPACITY (MBH) = 124,479 58,592 65,886	45	Eagle Landing Residence Hall	100,000	50	5,000		5,000
Eider Student Certain (To be replaced by One Stop)     39,575       Physical Plant (To be replaced by One Stop)     10,707       TOTAL CONNECTED LOAD (MBH) = 165,972       165,972       78,123       87,849       DIVERSITY FACTOR = 75%       TOTAL CAPACITY (MBH) = 124,479		Childley Residence Hall (To be removed)	95,000				
Operation     Operation <t< td=""><td></td><td>Elder Student Center (To be replaced by One Stop)</td><td>39.575</td><td></td><td></td><td></td><td></td></t<>		Elder Student Center (To be replaced by One Stop)	39.575				
TOTAL CONNECTED LOAD (MBH) =     165,972     78,123     87,849       DIVERSITY FACTOR =     75%     75%     75%       TOTAL CAPACITY (MBH) =     124,479     58,592     65,886		Physical Plant (To be replaced by Facilities Ops Blda.)	10,707				
TOTAL CONNECTED LOAD (MBH) =     165,972     78,123     87,849       DIVERSITY FACTOR =     75%     75%     75%       TOTAL CAPACITY (MBH) =     124,479     58,592     65,886							
DIVERSITY FACTOR = 75% 75% 75% 75% TOTAL CAPACITY (MBH) = 124,479 58,592 65,886		TOTAL	CONNECTED	LOAD (MBH) =	165,972	78,123	87,849
TOTAL CAPACITY (MBH) = 124,479 58,592 65,886			DIVERS	ITY FACTOR =	75%	75%	75%
			TOTAL CAP	ACITY (MBH) =	124,479	58,592	65,886

TOTAL CAPACITY (BOILER HP) = 3,722

1,752

TOTAL CAPACITY (LBS/HR) = 128,405 60,440 67,965

1,970

![](_page_105_Figure_2.jpeg)

![](_page_105_Picture_4.jpeg)

FUTURE CAMPUS HEATING WATER AND STEAM SYSTEM

## REGIONAL ENERGY PLANTS

site.

The Master Plan is based on the concept of three regional energy plants, one in each of the North, South and East Regions with utility corridors that would be interconnected over time. The regional plants should be designed and constructed in such a way as to plan for expansion without the need for significant downtime or utility relocations.

**CAMPUS COOLING** 

The NCCU campus does not have a central chilled water system. The typical campus building has a single dedicated air-cooled chiller.

Water-cooled chillers are used to serve 10 buildings. Several buildings are conditioned with split-systems including 3 new residence halls

under construction, Chidley South, Lawson Street, and George Street

NCCU would like to move toward centralized chilled water distribution.

A single central chilled water plant and multiple regional plants were

Establishing a single central chilled water plant to serve the existing campus and outward expansion was determined to be impractical. In order for the plant capacity to be made available for new buildings

planned on the north, west and south sides of campus and renovations on the existing campus, the initial piping distribution network would need to be extensive. The investment required for the plant and piping would be tremendous in order to serve the first few buildings.

Multiple regional plants is a more practical solution to achieve NCCU's long-term goal of consolidating chillers. Regional plants can be constructed as part of campus expansion to initially support new buildings but eventually extend into new and old areas of campus as needed to support additional new construction and major renovations.

Over time the distribution system can continue to grow.

Determining and preserving utility for current and future use is important. Defined utility corridors would allow the distribution system to grow in planned directions and at proper sizes. Planned correctly,

from each regional plant can be shared and provide redundancy.

these distribution systems can be interconnected such that capacity

Potential building sites for a regional plant should be located in an area of anticipated expansion. It should be on a site on the outer perimeter without being on a highly visible face of campus. The site will need

adequate access to power and water and have good vehicle access.

Chilled water plants can be noisy therefore selecting sites without

Most of NCCU's anticipated growth is on the north and south sides of campus, therefore establishing a north and south regional plant

could be ideal. A third plant on the east side could also be considered. The Master Plan includes several new parking structures which might provide an opportunity. Parking structures tend to be more utilitarian, have excellent street access, and are less sensitive to noise. A regional plant could be built adjacent to or in combination with a parking deck

close neighbors is important.

**EXISTING CONDITIONS** 

Residence Halls.

considered.

The South Regional Energy Plant (South REP) could be established with the construction of the new Innovation Lab and Research Building and parking deck planned along Cecil Street. The projected load range of 550 to 600 tons should be sufficient to support establishing the plant.

	BUILDINGS		CAPACITY	ESTIMATE
KEY	NAME	SQFT	SQFT/TON	TONS
A	P3 Chidley South Residence Hall	161 083	400	403
В	P3 George Street Residence Hall	94,634	400	237
Ċ	P3 Lawson Street Residence Hall	103,325	400	258
D	New Student Center	100,000	250	400
Е	New School of Business	70,000	250	280
F	Innovation Lab and Research Building	105,000	200	525
G	One-Stop / Community Health Center	35,000	300	117
н	Campus Dining Facility	25,000	200	125
I K	Ruman Realm and Performance Center	200,000	250	340 800
I	Hospitality and Tourism Center	200,000	200	150
м	New Academic Building	75.000	300	250
N	Research Expansion at Townes / BRITE	40.000	200	200
0	Performance Arts Center	60,000	250	240
Ρ	Parking Deck (DX) (Convocation Center Parking)	175,000		
Ρ	Parking Deck (DX) (Cecil Street)	120,000		
R	Entrepreneurship Center	60,000	300	200
S	Library Addition	40,000	300	133
Т	Facilities Operations	30,000	400	75
U	McDougald-McLendon Arena Expansion	40,000	250	160
V	Future Residence Hall	100,000	400	250
1	Shepard (Hoey) Administration Building	32,000	300	107
2	Lee Biology Building	29,332	200	147
3	Edmonds Classroom Building	23,644	300	79
4	Willis Commerce Building	38,612	300	129
5	Duke Auditorium	13,941	250	56
	Duke Annex	6,400	250	26
6	Taylor Education Building	37,550	300	125
7	Fine Arts Building	21,639	250	87
8	Edwards Music Hall	23,701	250	95
0	Art Museum	20,000	300	67
9 10	Suudenii Healm Bullaing	22,011	300	13
10	Deni numan Sciences Building	21,979	300	13
10	Robison Science Ruilding	10,420 22 210	200	01 117
12	Notion Science Duiluing Shenard Memorial Library	20,010	200 300	2/1
14	McDougald Gymnasium	61 565	300	205
15	Student Services Building	26,159	300	87
16	Shepard Residence Hall	44.050	300	147
17	McLean Residence Hall	24,640	300	82
18	Rush Residence Hall	25,284	300	84
19	Chidley North Residence Hall	133,600	300	445
20	Pearson Cafeteria	57,567	200	288
21	Alexander-Dunn Building	18,363	300	61
22	Shepard House	4,380	500	9
23	Heating Plant	6,895	500	14
24	EOHS Cottage	2,612	300	9
25	Eagleson Residence Hall	84,258	300	281
26	Hubbard-Totton Building	29,250	300	98
27	Bowing Alley	5,838	400	15
28	Farrison-Newton Communication Building	84,861	300	283
29	i umer Law Building Miller Mergen Building	19,894	300	200
ა0 ვ1	Whiting Criminal Justice Building	40,290 20.000	300	104
32	Willing Children Justice Dulluing	29,000	300 250	9/ 578
33	Richmond Residence Hall	67 1/16	200	224
34	New Residence Hall II	67 146	300	224
35	Chambers Bio Research Institute	38,500	200	193
36	Police and Public Safety Building	4,090	300	14
37	Michaux School of Education	118,207	300	394
38	O'Kelly-Riddick Stadium	33,125	500	66
39	Townes Science Building	115,017	200	575
40	Ruffin Residence Hall	94,233	300	314
41	Biomanufacturing Research Institute and Technology	65,000	200	325
42	Latham Parking Deck Retail Space	19,000	350	54
43	Nursing Building	69,000	200	345
44	Centennial Chapel	945	400	2
45	Eagle Landing Residence Hall	100,000	300	333
	Chidley Residence Hall (To be removed)			
	Baynes Residence Hall (To be removed)	95,000		
	Elder Student Center (To be replaced by One Stop)	39,575		
	Physical Plant (10 be replaced by Facilities Ops Bldg.)	10,707		
	ΤΟΤΑΙ	L CONNECTED L	OAD (TONS) =	12,989
		DIVERS	ITY FACTOR =	75%

TOTAL CAPACITY (TONS) = 9,742

![](_page_106_Figure_5.jpeg)

The proposed location would be on an edge of campus that is buffered by athletic fields planned between Cecil and Burlington Streets. Cecil and Burlington are not major thoroughfares so visibility should be less of an issue. The primary utility corridor could follow the Pearsontown Trail Corridor north toward the campus center and expand further south if needed. The main east-west corridor in this area would be established along Cecil Street.

The East Regional Energy Plant [East REP] could be established with the construction of the new Convocation Center and Arena, a significant cooling load by itself, and adjacent parking deck. The projected load range of 750 to 850 tons should be sufficient to support establishing the plant. The proposed location would also be on the edge of campus, however residential neighbors directly across the street should be considered. It is assumed that a project the size and scale of a Convocation Center would need to mitigate the impact

## INFRASTRUCTURE + UTILITIES

FUTURE CAMPUS CHILLED WATER SYSTEM

on the surrounding residential neighborhoods. An alternate location between the new Hospitality and Tourism Center and existing Latham Parking Deck might lessen the impact.

The North Regional Energy Plant (North REP) could be established with the addition and renovation of Mary Townes Science Building and new construction along Lawson Street Corridor. The projected load range of 1,000 to 1,200 tons should be sufficient to support establishing the plant. The plant could be a stand-alone structure on the edge of campus or attached to the planned Townes Building Addition. The primary utility corridor would extend parallel to Lawson Street to initially feed future expansion and renovations east of the plant. The Lawson Street corridor could also be expanded to the west if needed in the future. A secondary utility corridor could be established south toward the heart of campus to support future renovations. The Lawson Street Corridor would also serve as the primary east-west utility corridor to tie North REP and East REP together.

The primary north-south utility corridor to tie East REP and South REP is less direct. The existing corridor between O'Kelly-Riddick Stadium and Walker Physical Education Center might be ideal, however the potential stream restoration and storm water drainage issues along this route could be problematic. Alston Avenue is a major thoroughfare and the campus has already fully developed that edge of campus, which makes it a difficult, disruptive, and expensive route for major utilities in the future. The recommended pathway between buildings is aided by the planned demolition of Old Chidley Residence Hall.

The utility corridor between North REP and South REP follows what is anticipated to be the least disruptive pathway on the south and west edges of campus.

Eagle Campus Drive is planned for redevelopment into a more pedestrian friendly pathway. It is also ideal for utility pathways to the heart of the campus. Currently Eagle Campus Drive has a significant

![](_page_107_Picture_4.jpeg)

amount of infrastructure crisscrossing below ground. A long-term approach of reorganizing the utilities along this thoroughfare is recommended as they age into the need for replacement and major repairs.

In a multi-phase approach, Phase 1 for each regional energy plant would include construction of the building, infrastructure, sufficient capacity to serve the initial connected load, and a redundant or "N+1" chiller. Subsequent phases would increase capacity based on plans for new construction, major renovations, or chiller replacement projects within the plant's service region.

As the distribution systems grow the distance separating the regional loops will shrink. Once the regional energy plants can be tied into a common loop, NCCU will benefit from being able to back-feed and shift load.

If sized properly, the loop capacity should be robust enough to backfeed a zone if an associated plant fails or is taken out of service for annual maintenance. The loop would also allow the chilled water capacity to shift with campus demands and reduce the need for oversizing each plant.

#### COOLING LOAD PROJECTIONS

The regional energy plants should be planned for current needs and long-term future growth, including expansion beyond the scope of this Master Plan. Based on our projections, each regional energy plant is anticipated to have up to 3,500 tons within the Master Plan full buildout; however, choosing a site and planning for long-term capacities of up to 5,000 tons is recommended.

Campus cooling load projections have been calculated based on building areas, usages, and estimated load factors. The estimated load factors were derived from historical data for each building type and adjusted based on existing chiller sizes. The projections were factored for some diversity.

NCCU has several buildings that currently do not use chilled water. Within the typical 30-year life-cycle of campus building HVAC systems, there will be an opportunity to convert them to chilled water; therefore the projections include most campus buildings.

Refer to Appendix B - 'Campus Master Plan for Cooling' for a summary of the campus load projections.

![](_page_107_Picture_15.jpeg)
PROJECT DESCRIPTION	REASON	URGENCY	BUDGET	
Steam Plant equipment repair and renovation.	Restore plant capacity and improve operation of Boiler #1, feedwater system and combustion air.	High	\$850,000	
Steam distribution repairs and replacements (Phase 5).	Repair steam and condensate return leaks including 5 flooded manhole. (Phase 5)	High	\$325,000	
Remove Duke Auditorium and Annex from steam.	Disconnect from end-of-line steam distribution branch that is in need of extensive repair and abandon MH #25,25A, 26, 27, 28 & 29. Install new boiler system and natural gas supply service.	High	\$500,000	
Replace chillers 20+ years.	e chillers 20+ years. Richmond Residence Hall, Residence Hall II, School of Education, Edmonds Classroom Building, and Robinson Science Building (1 of 2).		\$2,000,000	
		TOTAL	\$3,675,00	
		ANNUAL	\$735,000	

#### **SHORT-TERM PROJECTS** 0-5 YEARS

PROJECT DESCRIPTION	REASON	URGENCY	BUDGET
Remove McDougal Gymnasium from steam in conjunction with McDougal Gymnasium Addition project.	Disconnect from steam distribution at MH #36. Install new boiler system and natural gas supply service as part of renovations and addition.	Low	\$250,000
Remove Criminal Justice Building from steam.	Disconnect from end-of-line steam distribution branch that is in need of extensive repair and abandon MH #46. Install new boiler system and natural gas supply service.	Low	\$250,000
Replace chillers 10+ years.	Robinson Science Building (1 of 2), Taylor Education Building, and William Jones Building.	Low	\$650,000
East Regional Energy Plant (Phase 1) built in conjunction with new Convocation Center and Parking Deck. (Initial 800 tons of capacity with infrastructure for up to 3,500 tons.)	Establish new REP. Phase 1 shall include building structure and chiller capacity for Convocation Center.	Low	\$22,000,000
South Regional Energy Plant (Phase 1) built in conjunction with new Innovation Lab / Research Building and Parking Deck. (Initial 600 tons of capacity with infrastructure for up to 3,000 tons.)	Establish new REP. Phase 1 shall include building structure and chiller capacity for Convocation Center.	Low	\$18,000,000
		TOTAL	\$41,150,000
		ANNUAL	\$4,115,000

PROJECT DESCRIPTION	REASON	URGENCY	BUDGET
Steam Plant natural gas and fuel oil system repair and renovation.	Increase reliability of fuel sources.	Moderate	\$300,000
Steam distribution repairs and replacements. (Phase 6)	Repair steam and condensate return leaks including 5 flooded manholes. (Phase 6)	High	\$325,000
Remove Shepard Administration Building from steam.	Disconnect from end-of-line steam distribution branch that is in need of extensive repair and abandon MH #24. Install new boiler system and natural gas supply service.	Moderate	\$500,000
Remove Latham Parking from steam.	Disconnect from end-of-line steam distribution branch that crossed Lawson Street and abandon line back to MH #15. Install new gas-fired equipment.	Moderate	\$250,000
Reroute steam mains around Walker Natatorium.	Remove steam mains in poor condition that are routed under Walker Building.	Moderate	\$750,000
Remove BBRI Building from steam.	Disconnect from steam distribution at MH #8. Install new boiler system and natural gas supply service.	Moderate	\$500,000
Remove Turner Law School from steam.	Disconnect from steam distribution at MH #46. Install new boiler system and natural gas supply service.	Moderate	\$500,000
Replace chiller 15+ years.	McDougal Gymnasium, Farrison Newton Building, Turner Law Building, and Willis Commerce Building.	Moderate	\$1,750,000
North Regional Energy Plant (Phase 1) built in conjunction with Townes Science Building Addition. 	Create new chiller plant to replace chillers at Townes and BRITE, add capacity for addition, and establish plan for future new construction and renovations in the North Region.	Moderate	\$20,000,000
North Regional Energy Plant Expansion (Phase 2)	Expand North REP capacity and underground distribution piping to feed Ruffin Residence Hall (14 year chillers).	Moderate	\$1,500,000
		TOTAL	\$26,375,000
		ANNUAL	\$5,275,000

#### **FUTURE PROJECTS** 21-30 YEARS

## South Regional Energy Plan Expansion (Phase 2)

East Regional Energy Pla Expansion (Phase 2)

PROJECT DESCRIPTIO place chillers 0-9 years.

#### MID-TERM PROJECTS 6-10 YEARS

### LONG-TERM PROJECTS 11-20 YEARS

N	REASON	URGENCY	BUDGET
	Expect recently installed chillers to be replaced within 20-25 years. (Est. budget = \$1,000,000/year)	Low	\$10,000,000
	Expand East REP capacity and underground distribution piping to feed School of Business and new Hospitality Center, new Academic Building, and new Entrepreneurship Center.	Low	\$4,000,000
	Expand South REP capacity and underground distribution piping to feed new Facilities Operations Buildings.	Low	\$1,500,000
		TOTAL	\$15,500,000
		ANNUAL	\$1,550,000

## PROPOSED THERMAL ENERGY DISTRIBUTION PROJECTS

# WATER + SANITARY SEWER **INFRASTRUCTURE**

## WATER

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#### **EXISTING CONDITIONS**

North Carolina Central University (NCCU) maintains a water system that serves domestic and fire water needs for the campus. The water system consists for 4-inch through 12-inch water mains. Typical appurtenances including valves and fire hydrants are located within the water system. We understand that all water mains located on NCCU property are owned and maintained by NCCU.

The water system is supplied by the City of Durham water system through various interconnections. There are eight interconnections to the City of Durham water system. The interconnections are located at:

- Cecil Street (Alston Avenue, south of Albert Turner Law Building)
- Lawson Street (Richmond Residence Hall and New Residence Hall II)
  - Lawson Street (Eagle Campus Drive)
- Fayetteville Street (Brant Street)
- Fayetteville Street (George Street)
- Fayetteville Street (Cecil Street)
- Alston Avenue (School of Nursing)
- Alston Avenue (Chidley North and Chidley South FUTURE)

Generally, each building on the NCCU campus has a City of Durham water meter and an NCCU owned backflow preventer. At some of the interconnections NCCU has master backflow preventers at the water system service entrance. Since the City of Durham meters are located at individual buildings, the point of delivery to NCCU is considered the building backflow preventer. From a water quality/service reliability viewpoint the City of Durham is responsible for all water quality compliance to the backflow preventer. In addition, the City of Durham is the permitted public water supply that serves the NCCU campus. There are several areas on campus where flow and pressure requirements for new construction projects cannot be achieved.

#### PERMITTING REQUIREMENTS



Modifications or improvements to the water system located on the NCCU campus must be permitted through the City of Durham. Reviews are conducted as part of the City of Durham Construction Drawing review process. While buildings on the NCCU Campus are reviewed by the State Construction Office for fire flow requirements (fire hydrant demand), the City of Durham Reference Guide for Development establishes requirements for water main permitting to for projects that are served by the City of Durham water system. The City of Durham requirements includes the fire hydrant demand + the sprinkler demand + the peak domestic demand for the building.

The City of Durham permitting requirement should be considered for future projects as this may impact the water system and dictate required improvements in the future.

#### RECOMMENDED EVALUATIONS AND IMPROVEMENTS

Several additional evaluations and improvements to the NCCU water system should be considered. A summary of these item is provided below:

- Complete a hydraulic model of the NCCU water system. This must be close coordinated with the City of Durham. A hydraulic model will provide NCCU with a hydraulic evaluation of the water system and highlight areas where improvements may be required to support future projects.
- Implement new 12-inch water main around the south and east sides of the proposed Student Union to provide additional water capacity to the campus.
- Consider installing backflow preventers at each of the connections to the City of Durham water system. This will provide NCCU with a private water system. NCCU will be required to perform all water quality and compliance monitoring if this is implemented. Additional pressure loss introduced by the new backflow preventers should also be evaluated as part of the hydraulic modeling efforts. The additional pressure loss could create issues with providing required flow and pressure to existing buildings and further fire system compliance concerns. If flow and pressure allows, keep existing meters at the buildings to allow for NCCU to conduct internal water use monitoring.
- For the Millennial Campus, evaluate a water loop within in the campus with approximately two connections to the City of Durham system. By constructing the water system in this manner, meter and impact fees with the City of Durham will be minimized.



## **SANITARY SEWER**

#### EXISTING CONDITIONS

An existing sanitary sewer system is located on the NCCU campus. The minimum main size is 8-inch diameter. Building service lines are typically less than 8-inch diameter. The existing sanitary sewer system is owned and maintained by NCCU. The sanitary sewer system receives an undetermined flow from an upstream residential neighborhood to the northwest. Pipe materials and known condition of certain critical pipes are generally unknown at this time, although there are some terra cotta pipes. No known capacity issues have been identified.

#### PERMITTING REQUIREMENTS

Modifications or improvements to the sanitary system located on the NCCU campus must be permitted through the City of Durham. Reviews are conducted as part of the City of Durham Construction Drawing review process. Many connections to the sanitary sewer system are deemed permitted by regulation since it is a new building service connecting to the sanitary sewer.

#### RECOMMENDED EVALUATIONS AND IMPROVEMENTS

Several additional evaluations and improvements to the NCCU sanitary system should be considered.

- Coordinate with the City of Durham to determine if there are known capacity issues and determine if any improvements have been identified by the City of Durham. There may be cost sharing opportunities for future improvements.
- Any upstream development that could affect the University's sewer capacity should be monitored and concerns communicated to the City of Durham
- Locate terra cotta pipes and do a condition assessment to determine if significant inflow and/or infiltration is occurring.

#### WATER-SEWER COST ESTIMATE

PROJECT DESCRIPTION	REASON	URGENCY	BUDGET	
Professional Services - Water	Complete a hydraulic model of the NCCU water system.	High	\$100,000	
Implement new 12-inch water main	Provide additional water capacity to the campus by routing around the south and east sides of the proposed Student Union.	High	\$135,000	
Install backflow preventers and water meters	Installation of backflow preventers and meters at each connection with the City of Durham's water system to provide NCCU with a private water system.	Moderate \$730,000		
Implement a water loop	nent a water loop Installation will minimize the meter and impact fees associated with the connection to the City of Durham.		\$310,000	
Professional Services - Sanitary Sewer	onal Services - Sanitary Locate terra cotta pipes and provide a condition assessment to determine if significant inflow and/or infiltration is occurring.		\$100,000	
		TOTAL	\$1,375,000	
		ANNUAL	\$1.375.000	

# **ELECTRICAL SYSTEM + FIBER** INFRASTRUCTURE

## **ELECTRICAL SYSTEM**

#### EXISTING CONDITIONS

The majority of North Carolina Central University's (NCCU) campus is being served by a university owned 12.47kV (MV) Switchgear which is located on Lawson Street, adjacent to Lanthern Parking Deck. The MV Switchgear with 1200A bus that is currently being served by two [2] 12,470V circuits that are by Duke Energy. There are four [4] compartments being utilized on Side A and also on Side B. There are two [2] MV loops serving the campus from Side A and Side B. There are two [2] compartments on Side A and Side B available for expansion.

The Lawson Street Substation has two (2) main circuits:

- Loop 1 Primarily serves Eastern portion of the campus and has a peak demand of 3439.2 KW
- Loop 2 Primarily serves Western portion of the campus and has a peak demand of 3259.2 KW

NCCU has contracted out a 3rd party company to assist with any maintenance and/or upgrades that are needed for the existing electrical infrastructure. Existing MV loop verification/assessment was done by Stanford White in 2007. There are approximately 50 buildings being served from NCCU's Medium Voltage Switchgear. Based on the recent electrical assessments and insulation testing, the conductors are in satisfactory working condition.

#### CURRENT ELECTRICAL LOAD

Based on recent electrical infrastructure assessment and Duke Energy meter reports, the total demand load for NCCU's campus is approximately XXXX. There is approximately XXXX MVA spare capacity that can be added to the existing substation.

#### EXISTING ELECTRICAL LOAD SUMMARY

LOCATION	DEMAND LOAD		
Lawson Street Substation	6.7 MVA		
Available Capacity	0 MVA		

There are four (4) buildings that will be demolished to reduce the demand by 1.1MVA.



### CURRENT ELECTRICAL DISTRIBUTION

#### FUTURE ELECTRICAL LOAD PROJECTIONS

The University plans to add approximately 3.5MVA of load in the next 3 years. These buildings include the P3 George Street Apartments, the New Student Center and the new School of Business. The campus is centralized and the university plans to expand south and north. It would be beneficial to provide a new substation to serve a portion of central campus, while taking some load off the existing substation, as well as newer buildings being proposed. The university is planning to construct 18 new buildings and 9 additions/renovations to existing buildings.

#### NEW NCCU CAMPUS LOADS

				Electrical (KVA)		
BLDG #	BUILDING NAME	SQFT	ESTIMATED W/ SQFT	PHASE 1	PHASE 2	PHASE 3
А	P3 Chidley Apartments	161,083	6.9	1,111		
В	P3 George Street Apartments	94,634	12	1,136		
С	P3 Lawson Street Apartments	103,325	11.3	1,168		
D	New Student Center	100,000	10	1,000		
E	New School of Business	70,000	28	1,960		
F	Innovation Lab/Research Bldg	105,000	25	2,625		
G	One-Stop/Health Center	35,000	15	525		
Н	Campus Dining	25,000	25		625	
I	Human Health and Performance Center	85,000	25		2,125	
J	Auxiliary and Recreational Fields					
К	Convocation Center	200,000	20		4,000	
L	Hospitality/Tourism Center	45,000	20		900	
М	New Academic Bldg	75,000	25		1,875	
Ν	Research Expansion	40,000	15		600	
0	Performing Arts Center	60,000	25		1,500	
Р	Parking Decks	295,000	10			2,950
Q	Tennis and Golf complex					
R	Entrepreneurship Center	60,000	25			1,500
S	Library Addition	40,000	15			600
Т	Facilities Operations	30,000	20			600
U	McDougald-McLendon Arena Expansion	40,000	20			800
V	Future Residence Hall	100,000	10			1,000
х	Track and Field Complex			-		-
					-	-
		Additional	Campus Load Subtotal	9.525	11.625	7,450

NORTH CAROLINA CENTRAL UNIVERSITY CAMPUS MASTER PLAN

OPTION 1 - CAMPUS WIDE MV LOOP



## **OPTIONS FOR THE FUTURE**

#### OPTION 1

Install a new MV substation, which will provide two [2] additional loops for the campus, on the corner of Martha St. and Fayetteville St. This will serve new recreational fields and to take some load off of the existing substation. Provide new duct bank along Fayetteville Street towards Eagle Dr., cross central campus and then south on Lincoln St. to complete a loop. This Substation will be dedicated to the southern and western portions of future expansion beyond 10 years. Substation 1 (near Lanthem Parking Deck) will then be dedicated to any northern and eastern expansion. Both substations will serve specific buildings on central campus to provide redundancy. Any load that is taken off Substation 1, buildings currently being served directly by Duke Energy can be placed on Substation 1. This will let NCCU have full control of the campus' electrical distribution and switch off/on during specific times of the year for energy savings.

#### **OPTION 2**

Upgrade existing electrical infrastructure/cabling and only have select new/existing buildings to be served off the existing MV loops. This will mean that some buildings that will be located on the outskirts of campus that is not already on NCCU's MV loops will be served by Duke Energy. This option does not let NCCU facilities to control the entire campus' distribution and it will increase risk of outages that NCCU has previously reported for other buildings.

#### INFRASTRUCTURE + UTILITIES ELECTRICAL + INFORMATION TECHNOLOGY INFRASTRUCTURE OPTION 2 - EXISTING MV LOOP AND DUKE ENERGY

#### OPTION 3

NCCU commits to having entire campus on their own MV loops but proceed in phases. As newer buildings are constructed, they would be served directly by Duke Energy. NCCU will then provide the electrical infrastructure and a new substation in the near future to support newer buildings This allows upfront cost savings while funding can be raised to provide the electrical infrastructure to add the newly constructed buildings and/or existing buildings that are currently being served by Duke Energy.

#### **IMPROVEMENTS TO CONSIDER**

Whichever option that NCCU chooses to move forward with, it is recommended for the medium-voltage (MV) switches to be replaced with new MV switches in the next 10 years. Currently, all MV switches are 12-15 years old and are all manufactured by Federal Pacific. Federal Pacific is not a recommended manufacturer.

## TELECOMMUNICATIONS SYSTEM

#### **EXISTING CONDITIONS**

NCCU campus has two (2) Fiber/Telecommunications Cores and four (4) Distros. These Cores and Distros serve the entire campus and are connected to each other by underground duct banks. New single-mode fiber has been installed to each building in the past 12 months. The Cores are connected to each other by two separate connections. The Distros have two (2) cabling routes, one to each core.

- Shepard Library (Core)
- School of Education (Core)
- Nursing Building (Distro-1)
- Lanthem Parking Deck (Distro-2)
- Pearson Cafeteria (Distro-3)
- Mary Townes Science Building (Distro-4)

#### CURRENT LOAD

Latest fiber map is from April 29, 2018. An updated fiber map from NetUnlimited to see any changes since April 29, 2018. From a site visit in 2018 for the P3 project, NetUnlimited is not 100% confident on knowing exactly what is underground other than what the fiber map shows. Below are what each Distro serves:

- Distro-1 is currently the demarcation for the eastern portion of the campus.
- Distro-2 is currently the demarcation for the northern portion of the campus.
- Distro-3 is currently the demarcation for the central portion of campus.
- Distro-4 is currently the demarcation for the western portion of the campus.

#### **OPTIONS FOR FUTURE**

Create an additional distro in the new recreational fields vicinity. Provide new underground raceways and duct banks along Fayetteville street and Martha Street. This will allow for new buildings between Nelson Street and Martha Street to School of Education core. This work should be implemented after the new Student Center has been completed and coordinated with the implementation of this master plan.

Telecommunications upgrades include replacing UPS systems in the Cores and distros.



#### INFRASTRUCTURE + UTILITIES D9 ELECTRICAL + INFORMATION TECHNOLOGY INFRASTRUCTURE D9 PROPOSED FIBER LOOP

