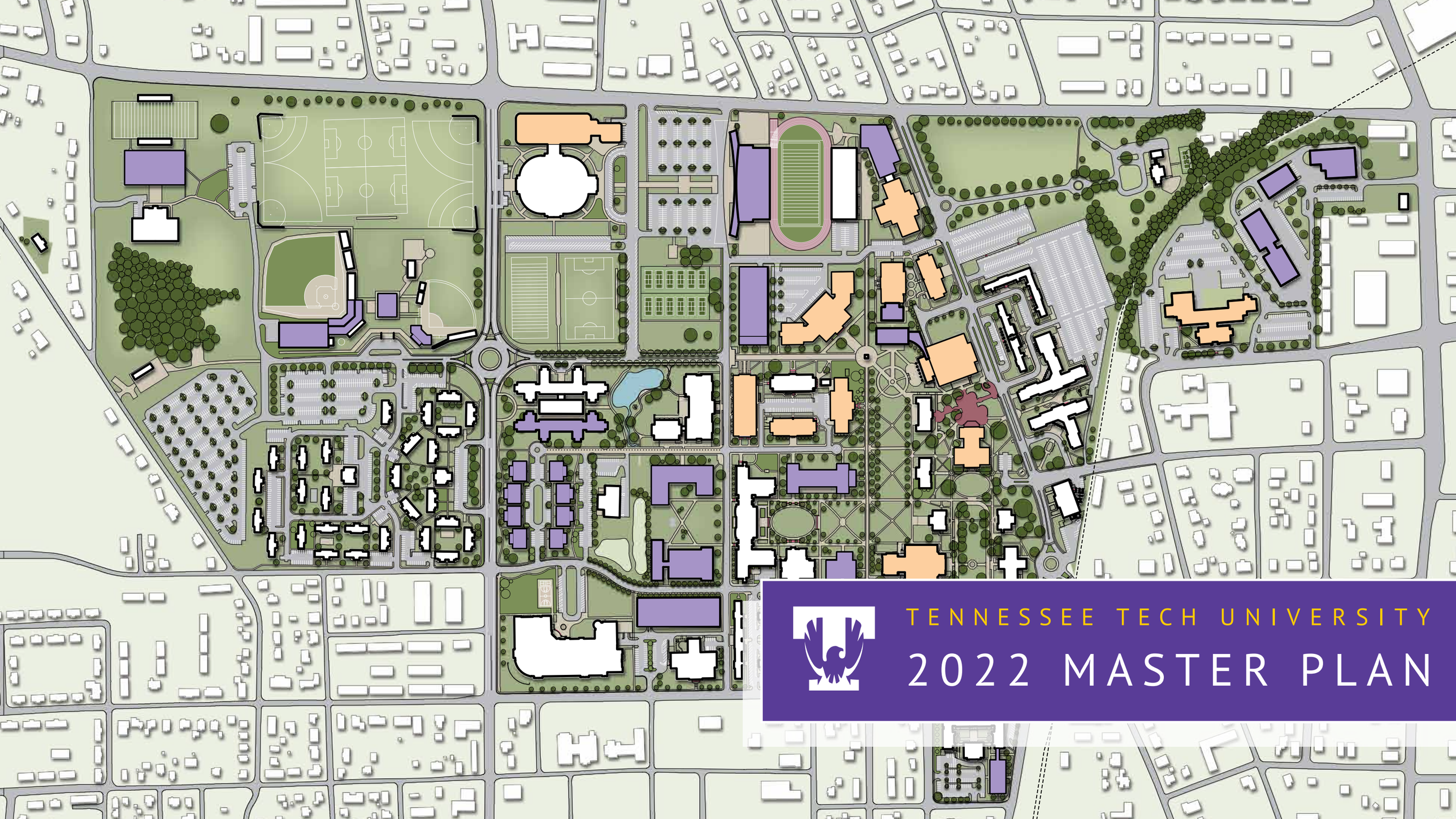
TENNESSEE TECH UNIVERSITY
2022 MASTER PLAN

ACADEMIC EXCELLENCE ● COMMUNITY ENGAGEMENT ● MEANINGFUL INNOVATION ● STUDENT SUCCESS ● SUPPORTIVE ENVIRONMENT ● VALUE CREATION

CORE PRINCIPLES

LIVE WINGS UP

TENNESSEE TECH UNIVERSITY

MISSION

Tennessee's technological university creates, advances, and applies knowledge to expand opportunity and economic competitiveness. As a STEM-infused, comprehensive institution, Tennessee Tech delivers enduring education, impactful research, and collaborative service.

VISION

Tennessee Tech will achieve national prominence and impact through its engaged students, dedicated faculty, and career-ready graduates known for their creativity, tenacity, and analytical approach to problem solving.

STRATEGIC GOALS

EDUCATION FOR LIFE ● INNOVATION IN ALL WE DO ● EXCEPTIONAL STEWARDSHIP ● ENGAGEMENT FOR IMPACT

ACKNOWLEDGEMENTS

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Dr. Claire Stinson, Vice President for Planning & Finance
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APPROVALS

TTU Board of Trustees	10 March 22
Tennessee Higher Education Commission	19 May 22
Tennessee State Building Commission	09 June 22

WHAT IS A MASTER PLAN?

A master plan is a shared vision for the physical development of the campus that will guide future decision making. Tennessee Tech's 2022 Master Plan will advance and coordinate short and long-term projects and investments on all University property over the coming decade. The framework of the master plan is to provide a vision with flexibility. Therefore, to respond to current needs and shifting priorities, a master plan is intended to be a living document: a structure upon which the planning process can continue and evolve.

Important moments of Tennessee Tech's past, present, and future were taken into consideration, creating the path for physical development. To keep up with the ever changing and complex challenges of higher education, this master plan calls for bold and innovative actions. The predominate element of the master plan is to address space needs throughout the campus. Along with these actions, the plan calls for improvements to the campus environment and infrastructure, which includes transportation and parking. The master plan also includes potential operational shifts to reach higher efficiencies, effectiveness, and sustainability.

Ultimately, the master plan is centered upon student retention and recruitment and promoting student success. The success of students is of critical interest to the advancement of the State of Tennessee. Therefore, the master plan is a tool to convey the university's vision for its physical environment to the state through and with the assistance of the Tennessee Higher Education Commission (THEC). The State Building Commission (SBC) will then utilize the master plan to assess requests to implement the plan and determine assistance through capital appropriations.

Figure 0.1 Campus Aerial at Derryberry Hall

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SECTION 1

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Tech Tomorrow represents a dynamic strategic plan for the University. The plan incorporates new mission and vison statements, a list of core principles and four guiding strategic goals. The strategic goals are:

Education for Life
Tennessee Tech provides education that unleashes the potential and passion within our students and prepares them for successful careers and culturally enriched lives. Tech also provides educational opportunities, programs, credentials, and degrees to fuel the lifelong learning necessary for enduring achievement.

Innovation in All We Do
Tennessee Tech innovates in all we do, embracing and deploying our technological foundation in our education, research, service, and stewardship.

Exceptional Stewardship
Tennessee Tech is committed to optimizing resources and continuously improving effectiveness, efficiency, and return on investment for students.

Engagement for Impact
Tennessee Tech fosters partnerships with government, business, and non-profit organizations to advance economic and workforce development, create and disseminate knowledge, serve the public good, and generate cultural impact.

The primary purpose of the University is to serve the citizens of the state, in particular, those in the rural Upper Cumberland Region. The university's focus is to provide a technologically advanced education to empower students. The goal of the Master Plan is to enhance the physical environment that will provide the setting for the mission and goals of the University to be accomplished. Therefore, the master plan will address issues such as space needs, existing building and infrastructure maintenance, potential new building placement, vehicular and pedestrian circulation, parking and greenspace as well as more subjective issues such as the perception of the University and the creation of an open, engaging and collaborative environment.

The 2014 Master Plan presented 10, 20, and 30 year visions. The major initiatives were:

- Development of an Integrated Science Building
- Greening the Campus
- Reallocation of Parking
- Refinement of Vehicular Circulation
- Development of an Intramural Building
- General Athletic Improvements

To a great degree, as of this writing, most of these priorities have been accomplished, are in progress or have a portion which is significantly under way. As illustrated on the following page, the improvements represent the realization of a significant portion of the 30-year Vision.

Building upon the concepts generated in the 2014 Master Plan, the 2022 Master Plan is intended to provide a comprehensive tool for planning in the future. The plan supports current and future institutional goals and initiatives that strive to enhance academic quality, improve student collaborative learning, and continue the overall beautification of campus. The proposed strategies and recommendations provide a blueprint for flexible growth that allows TTU to achieve the following objectives:

- Elevate perception of the campus to help recruit students and faculty and engage alumni and donors
- Develop an engaging environment to encourage students to remain on campus
- Maintain the academic core by locating all learning facilities within the central district
- Enhance the Historic Quadrangle by defining renovation and repurposing strategies, where functional and feasible
- Maintain architectural integrity of the campus vernacular
- Enhance and create campus greenspace with expanded and interconnected linking of quadrangles
- Relocate parking from the campus core by distributing lots around the perimeter of campus
- Develop strategically located parking garages
- Promote a pedestrian and bike friendly campus with reduced vehicular circulation
- Strengthen the campus perimeter to create a clear and perceivable boundary for the University
- Create a "front door" to the campus from the Seventh Street and Willow Avenue intersection and from the approach onto the campus along University Drive.
- Continue the progressive rehabilitation of aging buildings and infrastructure

The Tennessee Technological University 2022 Master Plan provides a combination of text and diagrams that provide an overview of existing campus conditions along with corresponding recommendations for future improvements. The student population at TTU was nearing 12,000 around 2010. Due to specific anticipated factors, the population declined over the following decade to the current population of 10,177 students paralleling a similar decline statewide. This master plan involves measures to improve and enhance the overall student experience and education to pave a path back to a 12,000-student population and beyond. Therefore, instead of setting an artificial date horizon, the goal of this master plan is to envision a campus that can accommodate 12,000 students and then establishing the next horizon as 15,000 students.

The master plan document is divided into three primary sections: Existing Campus, Future Vision and an Appendix with various detailed studies and supporting documentation.

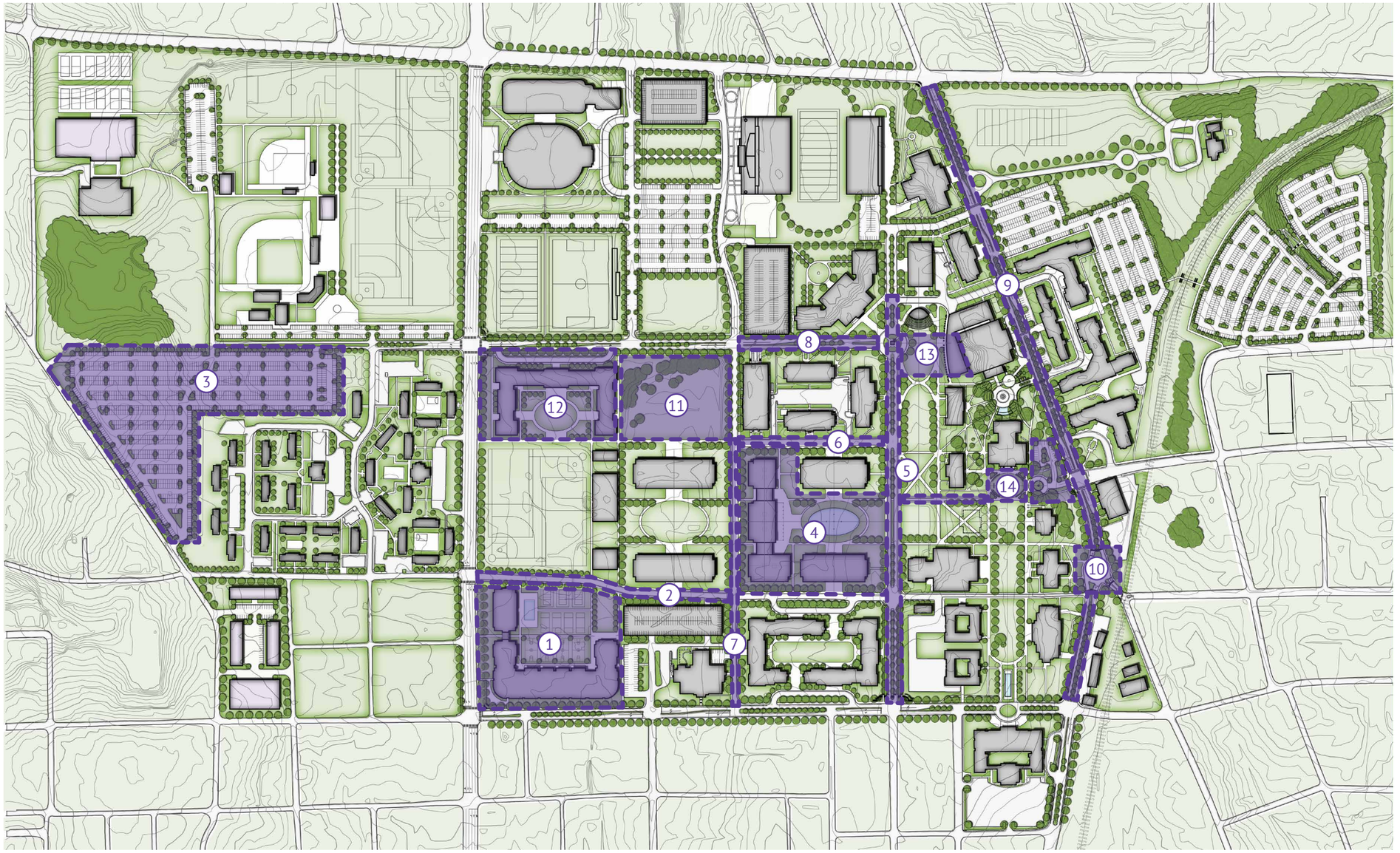


Figure 1.1 30-Year Master Plan (2014) with Current and Realized Projects

30-YEAR MASTER PLAN (2014)

CAPITAL PROJECTS

CAPITAL PROJECTS AT END OF 2021 REALIZED & IN-PROGRESS

1. MARC L. BURNETT STUDENT RECREATION & FITNESS CENTER
2. 8TH AVENUE EXTENSION
3. WEST CAMPUS PARKING
4. LABORATORY SCIENCE COMMONS
5. PEACHTREE MALL
6. W. 10TH STREET
7. STADIUM DRIVE
8. UNIVERSITY DRIVE
9. N. DIXIE STREETSCAPE
10. N. DIXIE & MAHLER ROUNDABOUT
11. ASHRAF ISLAM ENGINEERING BUILDING
12. JJ. OAKLEY INNOVATION CENTER & RESIDENCE HALL
13. ROADEN UNIVERSITY CENTER EXPANSION & LAWN
14. DERRYBERRY LAWN

EXISTING CAMPUS ANALYSIS

The assessment of the existing campus began with a review of the history of the University. This includes the progression of the assemblage of buildings and property to form the campus that exists today. The mission, vision and principles of the University as well as the strategic plan were reviewed to gain an understanding of the goals and values of the institution. An assessment of all physical campus resources was launched to understand in detail both the existing campus infrastructure needs and the ability of the campus to support growth in the future. The campus characteristics were analyzed and documented to illustrate the respective planning elements:

- Allocation and use of buildings around the campus
- Land use within the campus context
- Existing building conditions and suitability for their current or alternative function
- Current inventory of buildings
- Space needs throughout the campus
- Layout and location of green and hard scape along with outdoor gathering spaces
- Current traffic circulation systems (pedestrian and vehicular)
- Current parking resources and capacity
- Current infrastructure systems

The facility and resources studies provided a detailed basis for utilization in planning recommendations.

Figure 1.2 Historic Quad in front of Oakley Hall

CAMPUS VISION

The campus vision was established to address the University's goal of growth in student population to 12,000 students in the near future and then ultimately to 15,000 students. This vision set the parameters for the short-term and long-term master plan concepts. A campus space needs assessment was undertaken to develop an Academic Space Model for the campus. University administration, the deans, and related staff of each college participated in developing the model which included projected student enrollment, faculty and staff support, and research activity. The calculations considered all academic, administrative, student support, and facility support space functions, including their current distribution.

Using benchmarks set by Tennessee Higher Education Commission (THEC), the model identified the current total shortfall of academic space as 119,493 net square feet. The on-going new Ashraf Islam Engineering Building is a funded project which addresses ~63,000 nsf of need. However, when the minimally utilized, severely antiquated space in East Stadium (24,593 sf) is removed, the **total current academic space short fall is 81,003 nsf.** This total academic space deficit grows to 298,278 nsf and 470,321 nsf at the 12,000 and 15,000 student horizons respectively. A similar model was developed for the non-academic spaces. Athletic and student housing needs are addressed with separate independent studies.

Based upon the understanding of the campus and the information developed in the analysis of the existing campus, a series of projects was developed to address the current and future campus space needs. The projects are listed in two categories: Capital Improvement Projects and Disclosure Projects. Capital Improvement Projects are generally new academic related facilities which are funded through state appropriations. As the scale of most building renovations is beyond that which can be addressed through ordinary annual maintenance appropriations, Capital Improvement projects are also included to provide for building renovations.

Disclosure Projects are those which address non-academic needs. These are generally funded through campus resources such as bond financing, donations, fees, or other revenue generation. These projects include areas such as athletics, student housing, food service, other student services, and parking.

A list of Capital Projects and Disclosed Projects is provided on the following pages. The list of capital projects is itemized, for the most part, in the chronological order for which it is proposed. The disclosed projects are listed by groupings of similar project types. The plan drawings which follow illustrate the current campus, the vision for a 12,000 student campus and the vision for a 15,000 student campus.

Figure 1.3 Students in front of Volpe Library

CAPITAL IMPROVEMENT PROJECTS

1. JOHNSON HALL RENOVATION
   - 1a. FOSTER DEMOLITION
2. NEW ENGINEERING BUILDING #1/ FOUNDRY REPLACEMENT
   - 2a. LEWIS HALL DEMOLITION AND FOUNDRY DEMOLITION
3. ACADEMIC CLASSROOM BUILDING
   - 3a. MATTHEWS/DANIEL DEMOLITION
   - 3b. CRAWFORD DEMOLITION
4. BROWN HALL RENOVATION
5. PRESCOTT HALL RENOVATION
6. MEMORIAL GYM RENOVATION
7. NEW ENGINEERING BUILDING #2
   - 7a. SOUTHWEST HALL DEMOLITION
8. BIOLOGY BUILDING
   - 8a. PENNEBAKER HALL RENOVATION
9. PHYSICS BUILDING
10. CLEMENT HALL RENOVATION
11. ACADEMIC WELLNESS CENTER RENOVATION
12. BELL HALL EXPANSION
13. VOLPE LIBRARY RENOVATION
14. BRYAN FINE ARTS IMPROVEMENTS
    - 14a. BRYAN FINE ARTS RENOVATION
    - 14b. BRYAN FINE ARTS ADDITION
15. OAKLEY HALL EXPANSION
16. NEW ENGINEERING BUILDING #3
17. JOHNSON HALL EXPANSION

NOTE: Capital Improvement Projects are listed with the highest priority projects listed first. the first 8-10 projects define a sequence which should be the most linear, cost effective progression of implementation. (refer to Plan on page 74.)

DISCLOSURE PROJECTS

- A. FACILITIES SERVICES COMPLEX
- B. MAJOR ATHLETICS PROJECTS
  - B1. FOOTBALL OPERATIONS BLDG
  - B2. WEST STADIUM REPLACEMENT
  - B3. BASEBALL/SOFTBALL COMPLEX
- C. PARKING GARAGE(S)
  - C1. WINGS UP WAY GARAGE
  - C2. PEACHTREE GARAGE
  - C3. LIBRARY GARAGE
- D. FOOD SERVICE IMPROVEMENTS
- E. INNOVATION HOUSING - PHASE II
- F. SORORITY ROW
- G. ROADEN UNIVERSITY CENTER EXPANSION
- H. PARKING & TRANSPORTATION IMPROVEMENTS - PHASE II
- I. UNIVERSITY TOWER
- J. ART TRAIL
- K. PEACHTREE QUADRANGLE
- L. FOUNDATION HALL DEMOLITIONS

NOTE: The Disclosure Projects are listed by group and are not in a particular priority order. (refer to plan on page 78).

2022 MASTER PLAN BUILDING PROJECTS - 12,000 STUDENT CAMPUS

Figure 1.4 2022 Campus Base Map

2022 CAMPUS BASE MAP

The 2022 Campus Base Map represents the starting point of the 2022 Master Plan.

LEGEND

PROJECTS CURRENTLY UNDER CONSTRUCTION

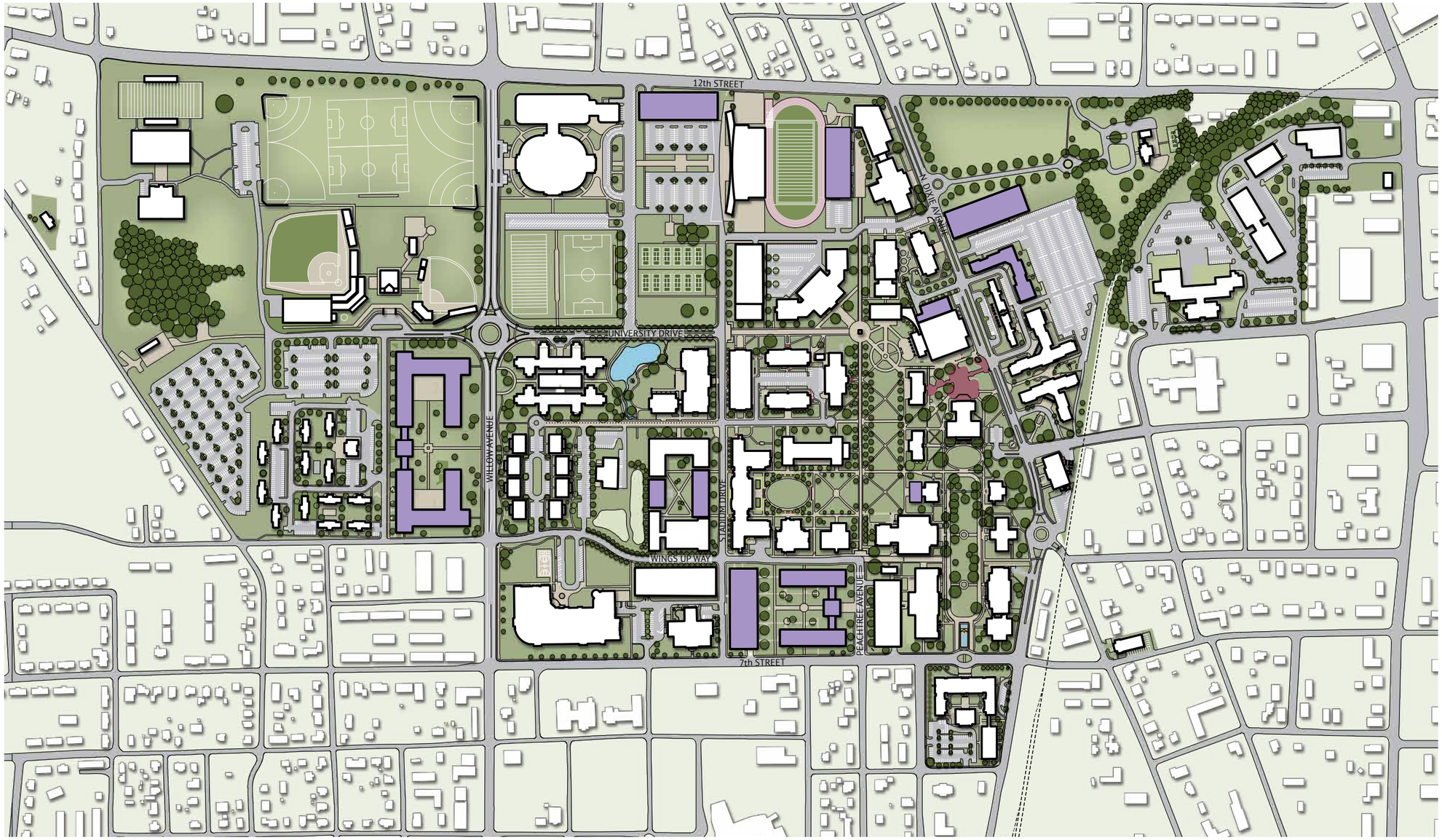
The Campus Master Plan drawing represents the Vision for the 12,000 Student Campus. Refer to the Campus Vision section and the keyed plan on page 98.

LEGEND

- NEW BUILDING
- RENOVATED BUILDING

Figure 1.5 12,000 Student Campus Master Plan

12,000 STUDENT CAMPUS MASTER PLAN



The Campus Master Plan drawing represents the Vision for the 15,000 Student Campus. Refer to the Campus Vision section and the keyed plan on page 99.

LEGEND

- NEW BUILDING
- RENOVATED BUILDING

Figure 1.6 15,000 Student Campus Master Plan

15,000 STUDENT CAMPUS MASTER PLAN

SECTION 2

EXISTING CAMPUS ANALYSIS

PLANNING PROCESS

The objective of the Tennessee Tech University 2022 Master Plan is to create a detailed and thorough guide for future investments in buildings, campus grounds, and infrastructure on the campus. After completing an analysis of conditions on campus, a space needs assessment was conducted to analyze the academic, administrative and student related functions as they relate to the Tennessee Higher Education Commission – Space Allocation Guidelines. The THEC model was developed as a tool to provide a guide for the appropriate proportioning of space and its allocation across the various areas of uses such as classrooms, labs, offices, research space, etc. The formulas utilized are based, in large part, upon faculty count and responsibilities and student count. This will be described in further detail in Section 3. Student housing and athletics were addressed in separate independent studies.

As the physical conditions and space needs for buildings are gathered, other parameters are also studied to gain an assessment of the physical environment of the campus. This includes areas such as parking, traffic and pedestrian circulation, greenspaces and hardscape, landscaping, infrastructure, land use, campus precincts or zoning.

With an understanding of the existing campus conditions, the planning process evolves to envisioning potential and crafting a vision for the future of the campus. While hampered by a planning process that ran parallel to the COVID pandemic, the TTU planning process is designed to be participatory and encourages feedback from a large variety of groups on campus. Stakeholders involved in the process include the students, faculty and staff, administration, and the Board of Trustees. The design team included Bauer Askew Architecture, Dober Lidsky Mathey, Smith Seckman Reid, Inc., KCI Technologies and Hodgson Douglas Landscape Architects.

This document is organized to illustrate the planning process which is determining where have we been- “Existing Campus Analysis” and envisioning where are we going- “Campus Vision”.

Figure 2.1 Students Collaborating

MISSION & GOALS

The University's purpose is to serve the Upper Cumberland region with superior educational opportunities. The juxtaposition of the rural nature of the region and the technological focus of the University speaks to the inherent character of the Tennessee Tech student combining work ethic and intellect. As one of the leading universities in the state, Tennessee Tech produces practical graduates from a broad range of academic disciplines who are prepared for the workforce and able to compete in a technologically driven world. TTU Students have the freedom to explore and discover their passions with a supportive community of faculty to guide them.

The Strategic Plan, Tech Tomorrow, outlines the priorities to guide the direction of the University.

Mission

Tennessee's technological university creates, advances, and applies knowledge to expand opportunity and economic competitiveness. As a STEM-infused, comprehensive institution, Tennessee Tech delivers enduring education, impactful research, and collaborative service.

Vision

Tennessee Tech will achieve national prominence and impact through its engaged students, dedicated faculty, and career-ready graduates known for their creativity, tenacity, and analytical approach to problem solving.

Additionally, Tennessee Tech has six core principles engrained into their campus vision. These principles are: Academic Excellence, Community Engagement, Meaningful Innovation, Student Success, Supportive Environment, and Value Creation. With these core principles in place, Tech empowers students to aim high and explore their passions to lead them to be successful, responsible, and caring contributors to their community and society.

To achieve the mission and vision of the University and implement the core principles, Tennessee Tech's four strategic goals are:

- Education for Life
- Innovation in All We Do
- Exceptional Stewardship
- Engagement for Impact

Therefore, the goal of the master plan is to create a physical environment for students to thrive, faculty to excel and research to flourish; an environment that recruits and retains students and faculty, welcomes alumni, inspires donors, and engages to rural community- An environment to serve the Upper Cumberland area with an uncompromised purpose.

Figure 2.2 Historic Quadrangle looking south to Bell Hall

HISTORY

Tennessee Tech began in 1915 as the Tennessee Polytechnic Institute (TPI). The campus was formerly known as Dixie College which was incorporated in 1909. The beginning of the Initial Era of campus was made up of only eighteen undeveloped acres, one administrative building and two student dormitories; the current Derryberry, Kittrell and Bartoo Halls respectively.

During the 1920's and 30's, TPI overcame near closure during the Great Depression and received accreditation as a college-level institution which helped the campus expand to thirteen buildings including buildings for science, engineering and home economics, a heating plant, machine and woodworking shop and the President's home. This included buildings currently known as: Daniel Hall, Lewis Hall, TJ Farr, Memorial Gym, Oakley Hall, and Henderson Hall.

William Everett Derryberry became the president in 1940 and served the campus for the next thirty-four years. He guided the University through the significant drop in enrollment during World War II. The TPI campus, however, saw significant growth during the Post-War Era. A bulk of dormitories were built to accommodate the large number of students entering college after the war. Derryberry was the University's longest-serving president and helped expand the campus, raise enrollment, and improve the curriculum. During the Mid Century Era, the campus enrollment grew from only 700 students to an impressive 7,000 with the faculty growing from 31 faculty

Figure 2.3 Aerial of TTU Campus in 1934

members to 276. During this time, the campus gained numerous new buildings, all which dawned the Georgian and Classical Revival styles and established an architectural unity among the buildings of the era. These buildings included: in the 40's, the Foundry, Old Maintenance, and Jere Whitson Building; in the 50's, Matthews Hall; in the 60's, Crawford Hall, Foster Hall, the Walton House, Clement Hall, Bruner Hall, the Capital Quad residence halls, Brown Hall, East and West Stadium, Tech Village East, Pennebaker Hall, and the Dixie Avenue residence halls; in the early 70's, Johnson Hall, Roaden University Center, Prescott Hall, Ellington|Warf, and Tech Village West. The buildings from the 60's and early 70's represented a significant shaping of the campus during Dr. Derryberry's presidency. He also oversaw multiple milestones of the University including integration in the 1960s and the name being officially changed to Tennessee Technological University in 1965.

The last quarter of the 20th century was guided by presidents Arliss Roaden, Wallace Prescott and Angelo Volpe. During this time, TTU aspired to achieve national recognition for excellence in engineering and creating a multipurpose university. Facilities added to the campus during the Roaden presidency included the Hooper Eblen Center, Bryan Fine Arts as well as the Crafts Center. During the Late Century era, academic and athletic programs drew attention as a new arena, fitness center, Agriculture arena and barn, and library were added to the campus.

Dr. Robert Bell served as president for the first dozen years of the 21st century. During Dr. Bell's presidency, Tennessee Tech became nationally recognized as a Best Value College. Buildings added during his presidency included: New Hall South, Bell Hall, Ray Morris Hall, New Hall North and the Athletic Performance Center.

Dr. Philip Oldham's presidency has been characterized by a strong focus on students. The students first initiative has epitomized his desire to help student reach their potential. Likewise, he has had a similar drive to enhance the identity and fulfill the potential the University. The impressive expansion of the University in recent years includes: the Intramural Sports Fieldhouse, Student Recreation Center, Laboratory Science Commons, Stonecipher Lecture Hall with a new Ashraf Islam Engineering Building and Innovation Center and Residence Hall underway.

Today, the Tennessee Tech University main campus spans approximately 257 acres and has over 10,000 students enrolled. There are over 80 buildings on campus with that number continuing to grow. Tech offers a multitude of academic disciplines set to prepare graduates for a technologically driven environment. These disciplines are broken up to form eight schools and colleges: Agriculture and Human Ecology, Arts and Sciences, Business, Education, Engineering, Fine Arts, Interdisciplinary Studies, and Nursing. Tennessee Tech continues to adapt and expand its programs and campus to allow its students to succeed in an ever-changing world.

Figure 2.4 Derryberry Hall in 1960

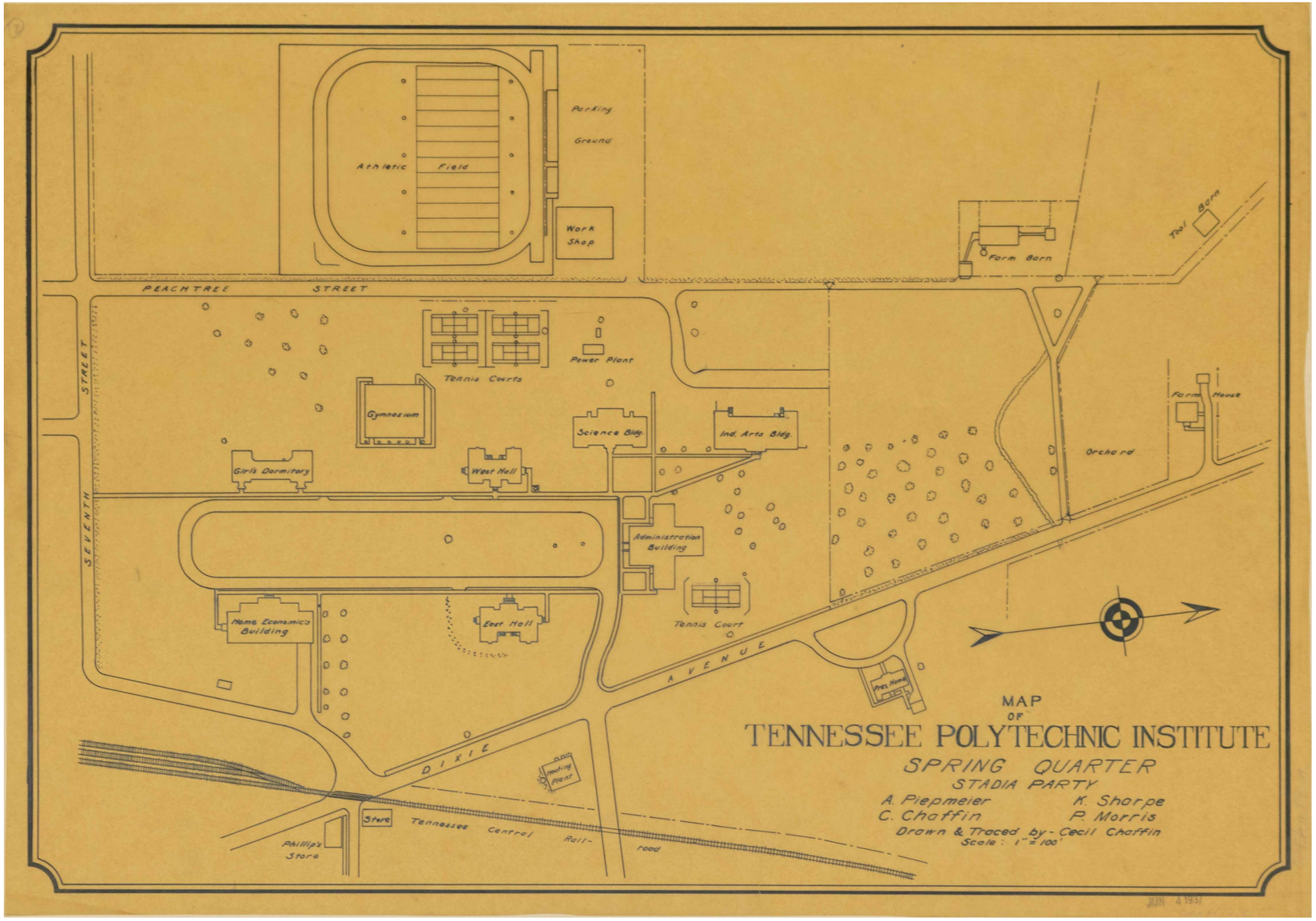


Figure 2.5 Tennessee Polytechnic Institute 1937 Map

Figure 2.6 Dixie College students in 1910s

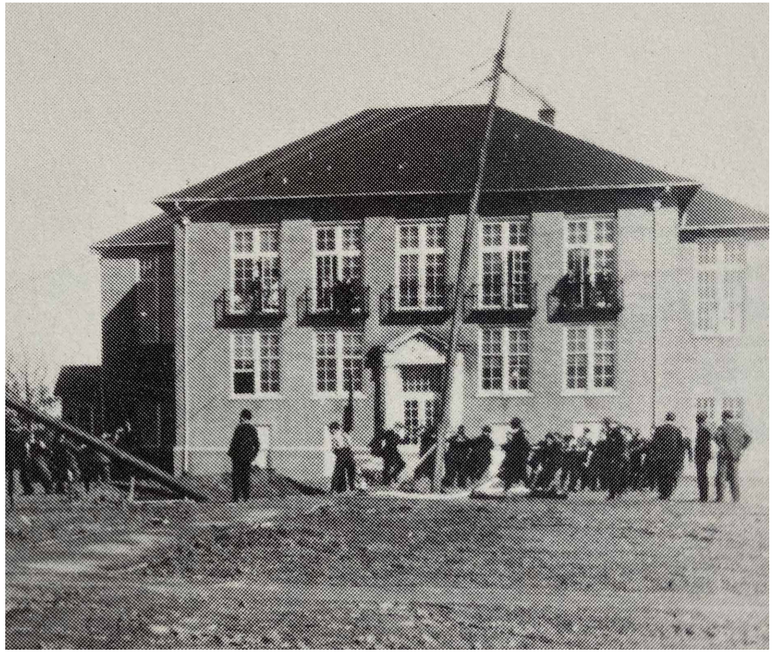
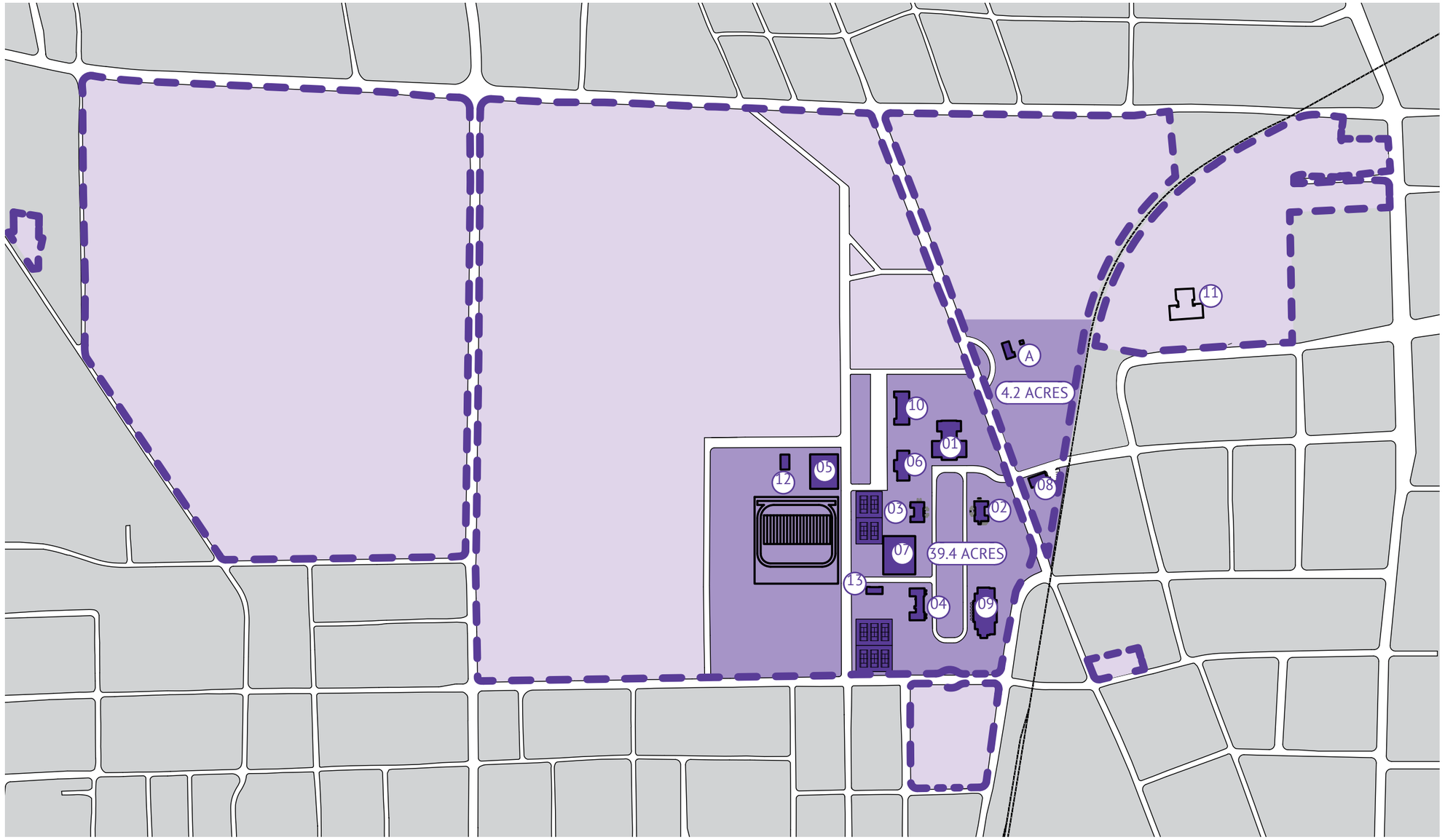


Figure 2.7 Administration Building (Derryberry Hall) Under Construction



INITIAL ERA (1915 - 1944)

EXISTING CAMPUS

01. DERRYBERRY HALL - 1912
02. KITTRELL HALL - 1916
03. BARTOO HALL - 1916
04. DANIEL HALL - 1921
05. LEWIS HALL - 1921
06. TJ FARR BUILDING - 1928
07. HEALTH & P.E. BUILDING - 1929
08. UNIVERSITY SERVICES BUILDING - 1929
09. OAKLEY HALL - 1931
10. HENDERSON HALL - 1931
11. FOUNDATION HALL - 1932
12. FOUNDRY - 1943
13. MILITARY SCIENCE BUILDING -1944

FORMER CAMPUS BUILDING

A. PRESIDENTS HOME

LEGEND

- LIMITS OF PRESENT DAY PROPERTY
- FUTURE LAND ACQUSITION
- LAND OWNERSHIP IN CURRENT ERA
- BUILDINGS BUILT IN CURRENT ERA
- EXISTING BUILDINGS

Figure 2.8 Intial Era Map

HISTORY

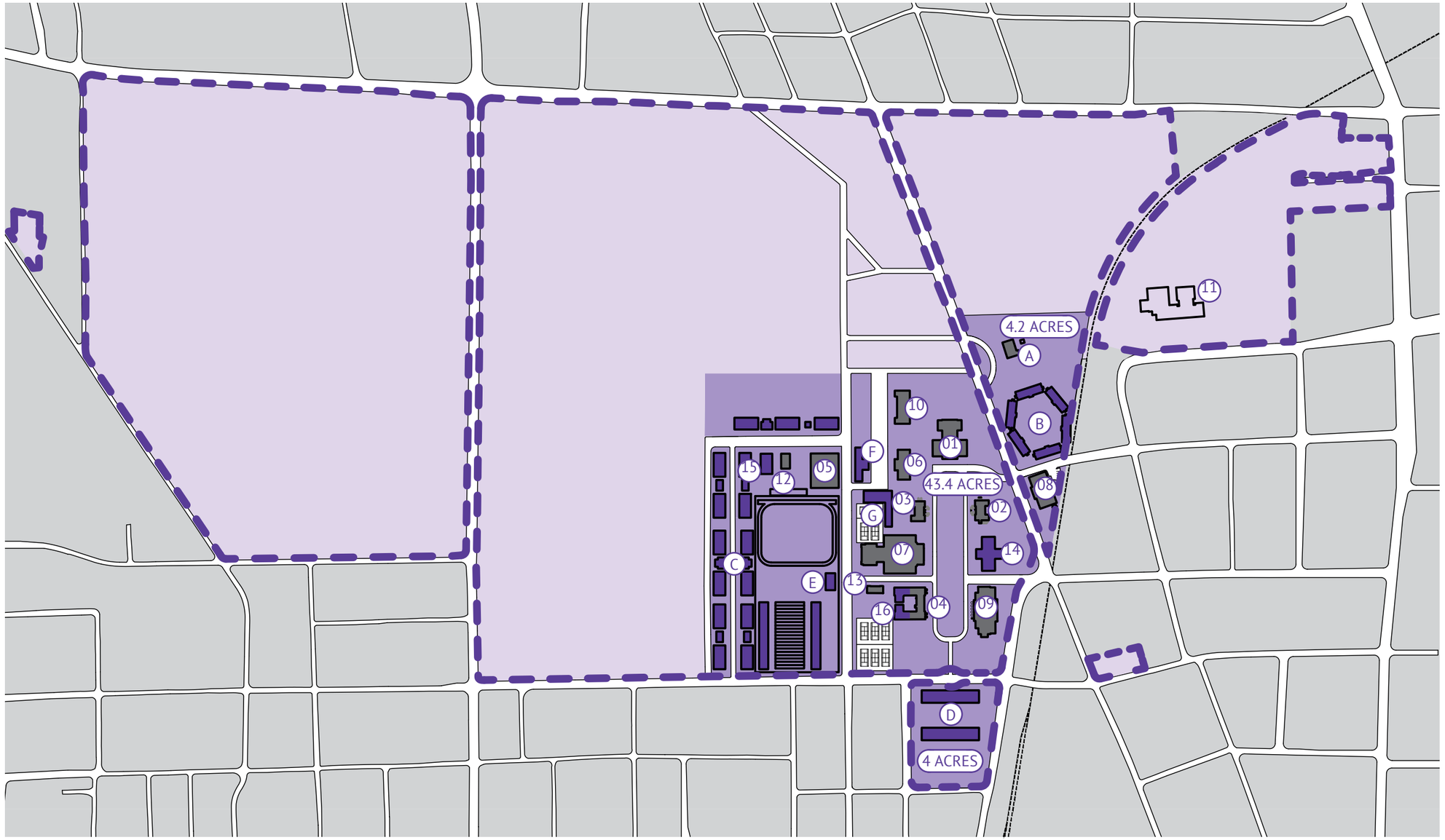


Figure 2.9 Post-War Era Map

POST-WAR ERA (1945 - 1960)

EXISTING CAMPUS

14. JERE WHITSON BUILDING - 1949
15. OLD MAINTENANCE BUILDING - 1949
16. MATTHEWS HALL - 1951

FORMER CAMPUS BUILDING

B. DIXIE COURT (MEN'S DORMITORY)
C. F.P.H.A APARTMENTS
D. WALNUT HALL (MEN'S DORMITORY)
E. FIELD HOUSE
F. CLASSROOM & OFFICE BUILDING
G. STUDENT CENTER BUILDING

LEGEND

- LIMITS OF PRESENT DAY PROPERTY
- FUTURE LAND ACQUSITION
- LAND OWNERSHIP IN CURRENT ERA
- BUILDINGS BUILT IN CURRENT ERA
- EXISTING BUILDINGS

HISTORY

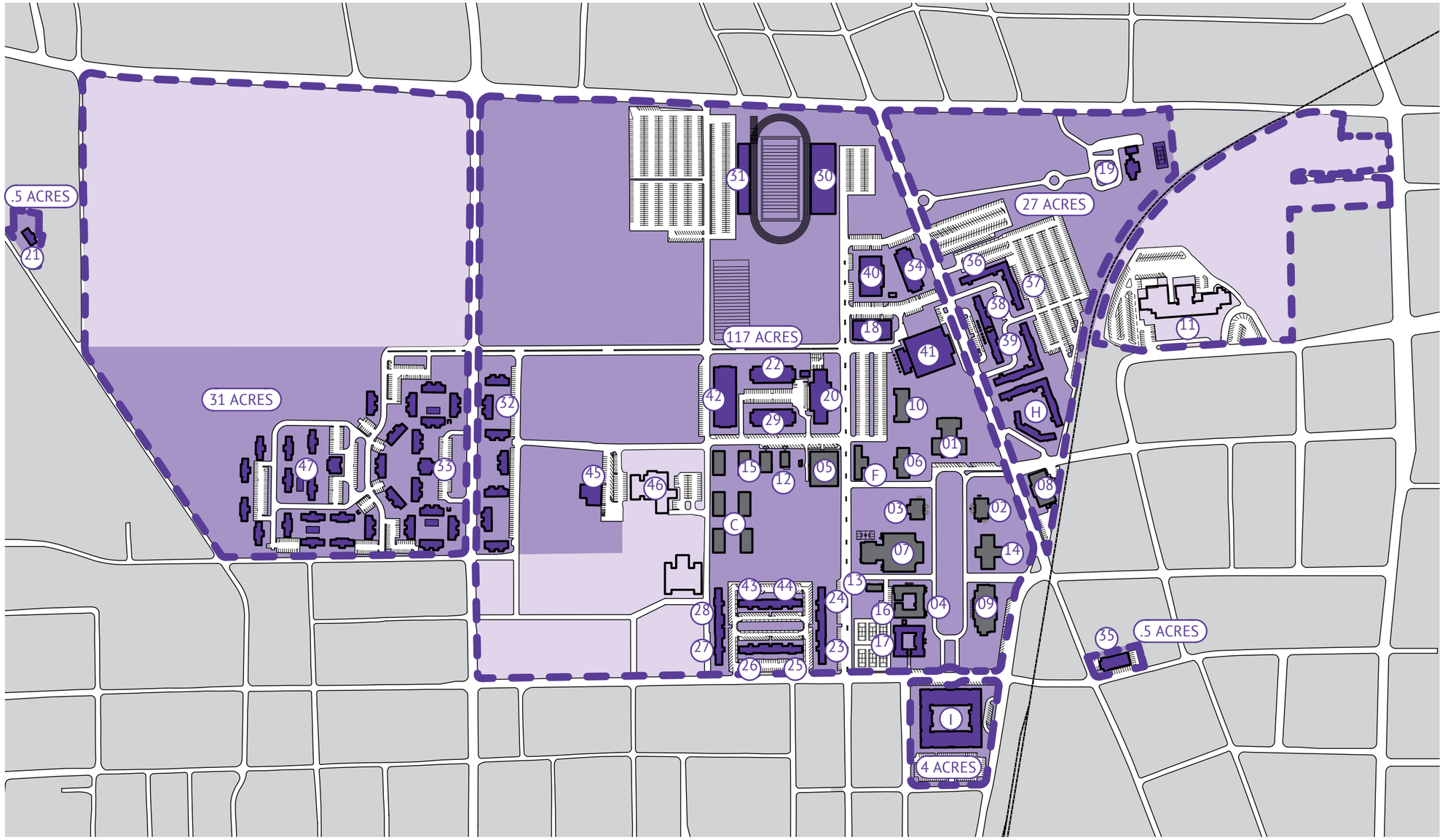


Figure 2.10 Mid-Century Era Map

MID-CENTURY ERA (1961 - 1974)

EXISTING CAMPUS

17. CRAWFORD HALL - 1962
18. FOSTER HALL - 1964
19. WALTON HOUSE - 1964
20. CLEMENT HALL - 1965
21. 1145 N. Franklin Ave. - 1965
22. BRUNER HALL - 1966
23. MADDUX HALL - 1966
24. MCCORD HALL - 1966
25. COOPER HALL - 1966
26. DUNN HALL - 1966
27. BROWNING HALL - 1966
28. EVINS HALL - 1966
29. BROWN HALL - 1967
30. EAST STADIUM - 1967
31. WEST STADIUM - 1967
32. TECH VILLAGE EAST - 1967
33. TECH VILLAGE LAUNDRY - 1967
34. PENNEBAKER HALL - 1968
35. VARSITY BUILDING - 1969
36. JOBE HALL - 1969
37. MURPHY HALL - 1969
38. PINKERTON HALL - 1969
39. M.S. COOPER HALL - 1969
40. JOHNSON HALL - 1970
41. ROADEN UNIVERSITY CENTER - 1971
42. PRESCOTT HALL - 1971
43. ELLINGTON HALL - 1971
44. WARF HALL - 1971
45. OTIS CARROLL BUILDING - 1972
46. SOUTHWEST HALL - 1973
47. TECH VILLAGE WEST - 1973

FORMER CAMPUS BUILDING

H. WOMEN'S RESIDENCE HALLS
I. SMITH QUADRANGLE

LEGEND

- LIMITS OF PRESENT DAY PROPERTY
- FUTURE LAND ACQUSITION
- LAND OWNERSHIP IN CURRENT ERA
- BUILDINGS BUILT IN CURRENT ERA
- EXISTING BUILDINGS

HISTORY

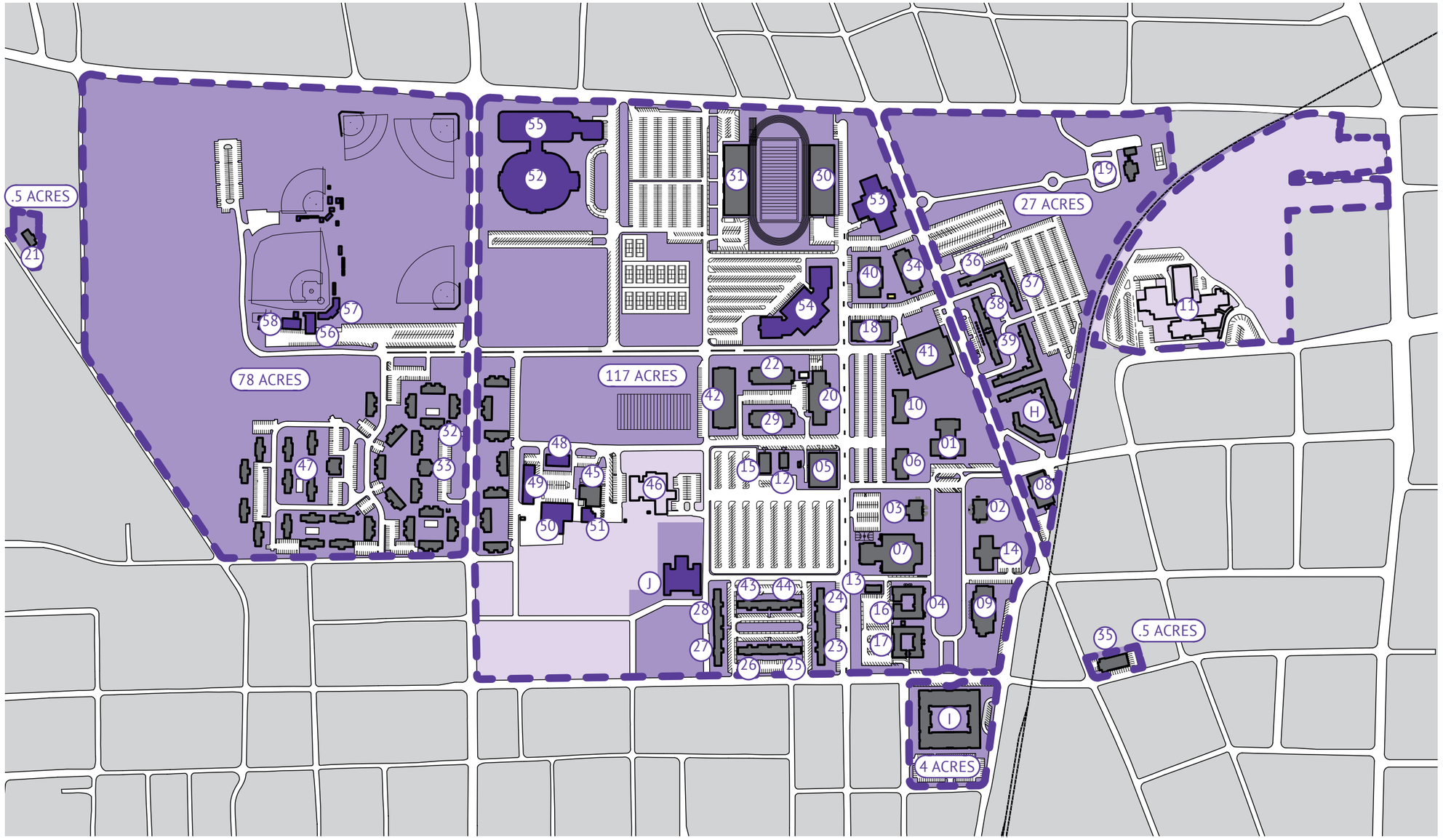


Figure 2.11 Late Century Era Map

LATE CENTURY ERA (1975 - 2000)

EXISTING CAMPUS

48. MAINTENANCE OFFICE BUILDING - 1975
49. GEORGE & RIDLEY CARR BLDG - 1975
50. MAINTENANCE WAREHOUSE - 1975
51. MAINTENANCE GARAGE - 1975
52. HOOPER EBLEN CENTER - 1976
53. BRYAN FINE ARTS BUILDING - 1981
54. VOLPE LIBRARY - 1989
55. ACADEMIC WELLNESS CENTER - 1991
56. BASEBALL CLUBHOUSE - 1995
57. BASEBALL PRESSBOX - 1998
58. BATTING CAGE - 2000

FORMER CAMPUS BUILDING

J. TECH CAMPUS SCHOOL

LEGEND

- LIMITS OF PRESENT DAY PROPERTY
- FUTURE LAND ACQUSITION
- LAND OWNERSHIP IN CURRENT ERA
- BUILDINGS BUILT IN CURRENT ERA
- EXISTING BUILDINGS

HISTORY

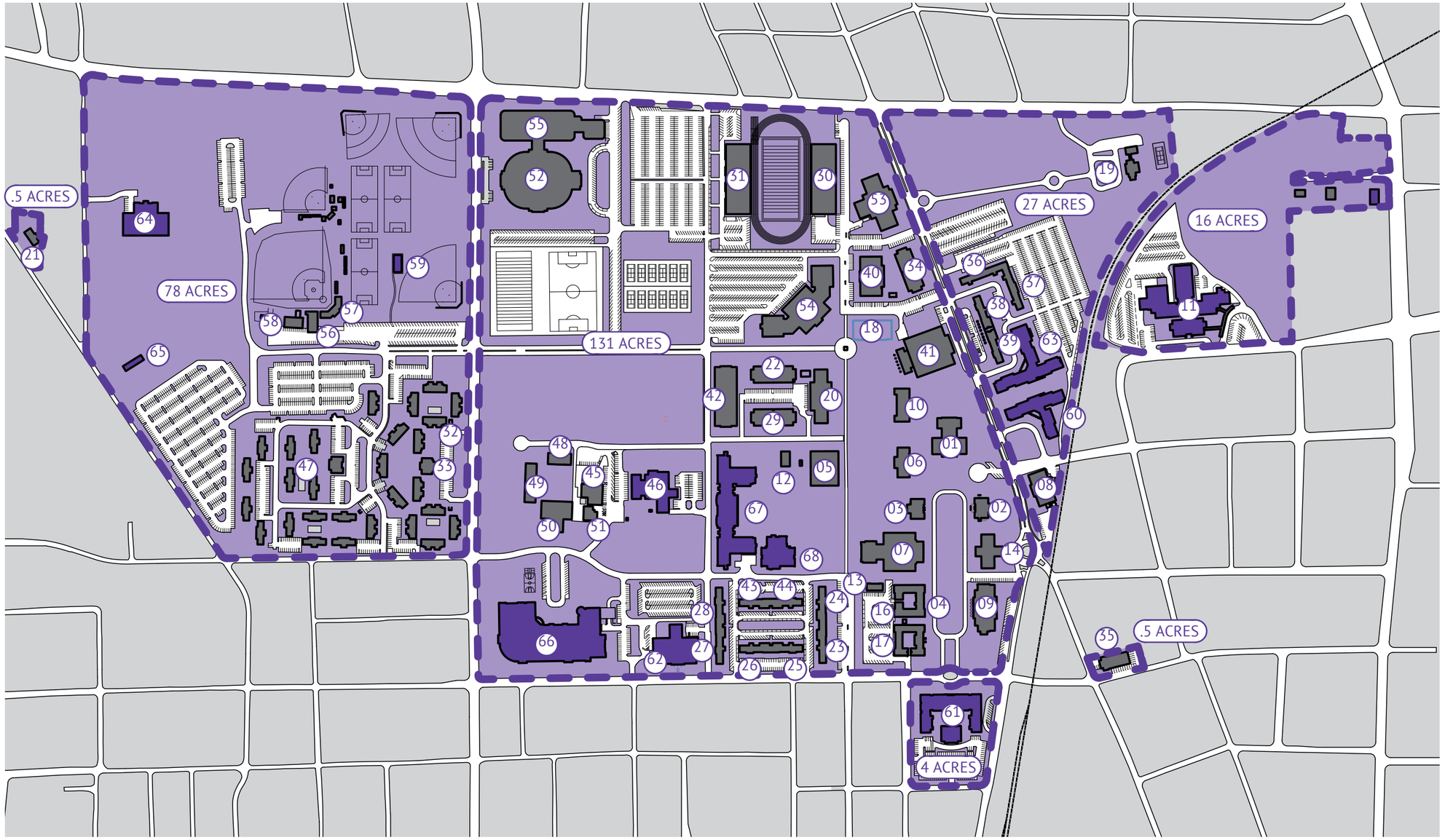


Figure 2.12 21st Century Era Map

21ST CENTURY (2001 - 2020)

EXISTING CAMPUS

59. BASEBALL RESTROOM BUILDING - 2003
60. NEW HALL SOUTH - 2003
61. ROBERT AND GLORIA BELL HALL - 2006
62. RAY MORRIS HALL - 2008
63. NEW HALL NORTH - 2008
64. ATHLETIC PERFORMANCE CENTER - 2010
65. INTRAMURAL SPORTS FIELDHOUSE - 2016
66. STUDENT RECREATION CENTER - 2020
67. LABORATORY SCIENCE COMMONS - 2020
68. STONECIPHER LECTURE HALL - 2020

LEGEND

- LIMITS OF PRESENT DAY PROPERTY
- FUTURE LAND ACQUSITION
- LAND OWNERSHIP IN CURRENT ERA
- BUILDINGS BUILT IN CURRENT ERA
- EXISTING BUILDINGS

HISTORY

UNIVERSITY PROPERTY

Tennessee Tech University is located in the city of Cookeville within Putnam County, Tennessee. Situated on the northern side of Cookeville and surrounded by the hospital and residential neighborhoods, TTU's Main Campus is positioned between 12th Street and 7th Street and is bisected by North Dixie Avenue and by North Willow Avenue. In addition to the main campus and local properties, TTU owns several other properties outside of Cookeville. These regional properties are Shipley Farm (Putnam County), Oakley Farm (Overton County), and the Appalachian Center for Craft (Dekalb County). While the University owns a variety of sites, the planning efforts for this 2022 Master Plan focus on TTU's main campus.

The Shipley Farm property, approximately 2.2 miles west of the campus, represents a significant resource for the University. While currently dedicated primarily to agriculturally oriented endeavors including the agriculture pavilion and TTU farm, the property with its gently rolling topography could be considered for supplemental land uses in the future.

The Oakley Farm property was a gift by Millard V. Oakley and wife, J.J. Oakley to Tennessee Tech. This donation helped broaden the University's horizon and improve the School of Agriculture. The property has been recognized by the Tennessee Historical Society as a Pioneer Century Farm. The family of Millard Oakley had farmed this land for more than 200 years. Since 2009, TTU students have worked with the cattle and in the hydroponic greenhouses to study plant growth and genetics. Oakley Farm is one of the largest laboratories of its kind for producing research on livestock, water quality, soils, and crop production.

The Austin Farm is located in Cumberland County. It is just north of I-40 and the city of Crossville approximately 36 miles from the main campus.

The Appalachian Center for Craft is a satellite campus of the nationally accredited School of Art, Craft & Design within TTU's College of Fine Arts. The craft center property is located within the Center Hill Lake area and is leased from the US Corp of Engineers. The mission of the Appalachian Center for Craft is to promote excellence in American craft by teaching both tradition and innovation in professional studio craft, and fostering access to the highest quality craft education, craft artists, craft works, and events in a community arts context.

The Crossville Campus will be a satellite campus within the downtown area of Crossville. The facility consists of a three-story office building and two single story interconnected warehouse buildings. The campus includes the 2.5 acres site with the buildings as well as a .50 and .11 acre lots across the street with 52 and 15 parking spaces respectively. The campus will begin as a research facility with opportunities to lease space to businesses and agencies with similar research focuses. The office building is anticipated to be redeveloped as an academic facility to serve as a satellite teaching facility for the Cumberland County and Upper Cumberland area. The property is currently owned by the TTU Foundation.

University Property	
Property	**Acres**
Main Campus	**256.98**
Primary Campus Area	239.26
Foundation Hall	13.30
E. 11th Street & N. Washington Ave	3.38
1145 North Franklin Ave	0.55
TTU Alumni Building	0.49
Local Property (TTU Foundation Owned)	**126.04**
TTU Golden Eagle Golf Club	126.04
Regional Property	**2639.42**
Shipley Farm (Putnam County)	303.70
Hyder Farm (Putnam County)	27.70
Oakley Farm (Overton County) (Tech Farms, LLC)	1,400
Austin Farm (Cumberland County)	405
Appalachian Center for Craft (Dekalb County)- (Leased)	500
Crossville Campus (Cumberland County)	3.02
Total Property	**3022.44**

Table 2.1 TTU Property

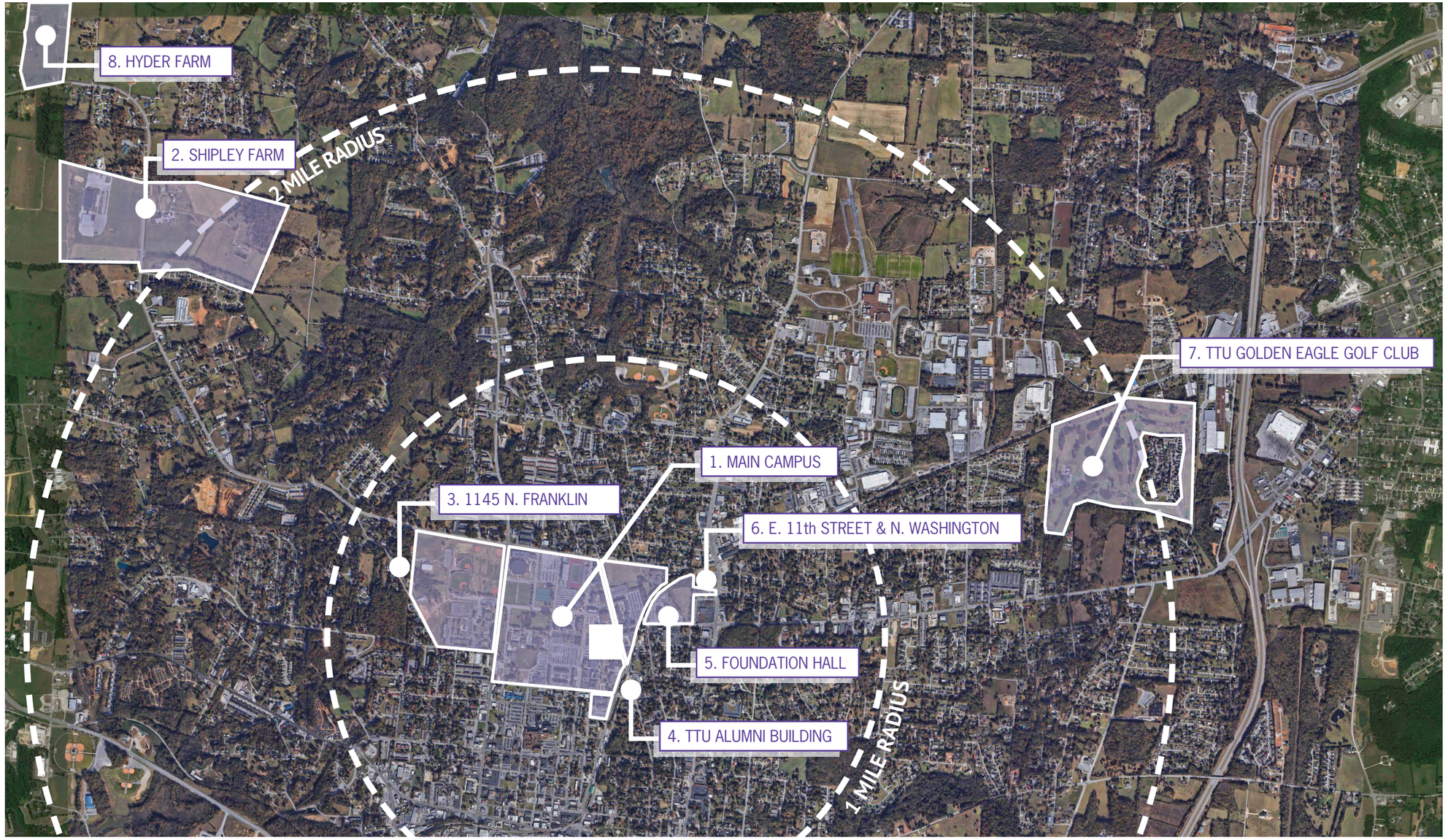


Figure 2.13 2020 Cookeville Aerial Map

2020 COOKEVILLE AERIAL MAP

NORTH

0' 2,000' 4,000'

TTU LOCAL PROPERTY

1. Main Campus
   1 William L. Jones Dr.
   Cookeville, TN 38505

2. Shipley Farm
   2395 Gainesboro Grade
   Cookeville, TN 38501

3. 1145 North Franklin Avenue
   Cookeville, TN 38501

4. TTU Alumni Building
   705 N Dixie Avenue
   Cookeville, TN 38501

5. Foundation Hall
   242 E 10th Street
   Cookeville, TN 38501

6. E 11th Street & N Washington Avenue
   Cookeville, TN 38501

7. TTU Golden Eagle Golf Club *
   1500 Country Club Road
   Cookeville, TN 38501

8. Hyder Farm
   3087 Gainesboro Grade
   Cookeville, TN 38501

DERRYBERRY HALL

* FOUNDATION OWNED PROPERTY

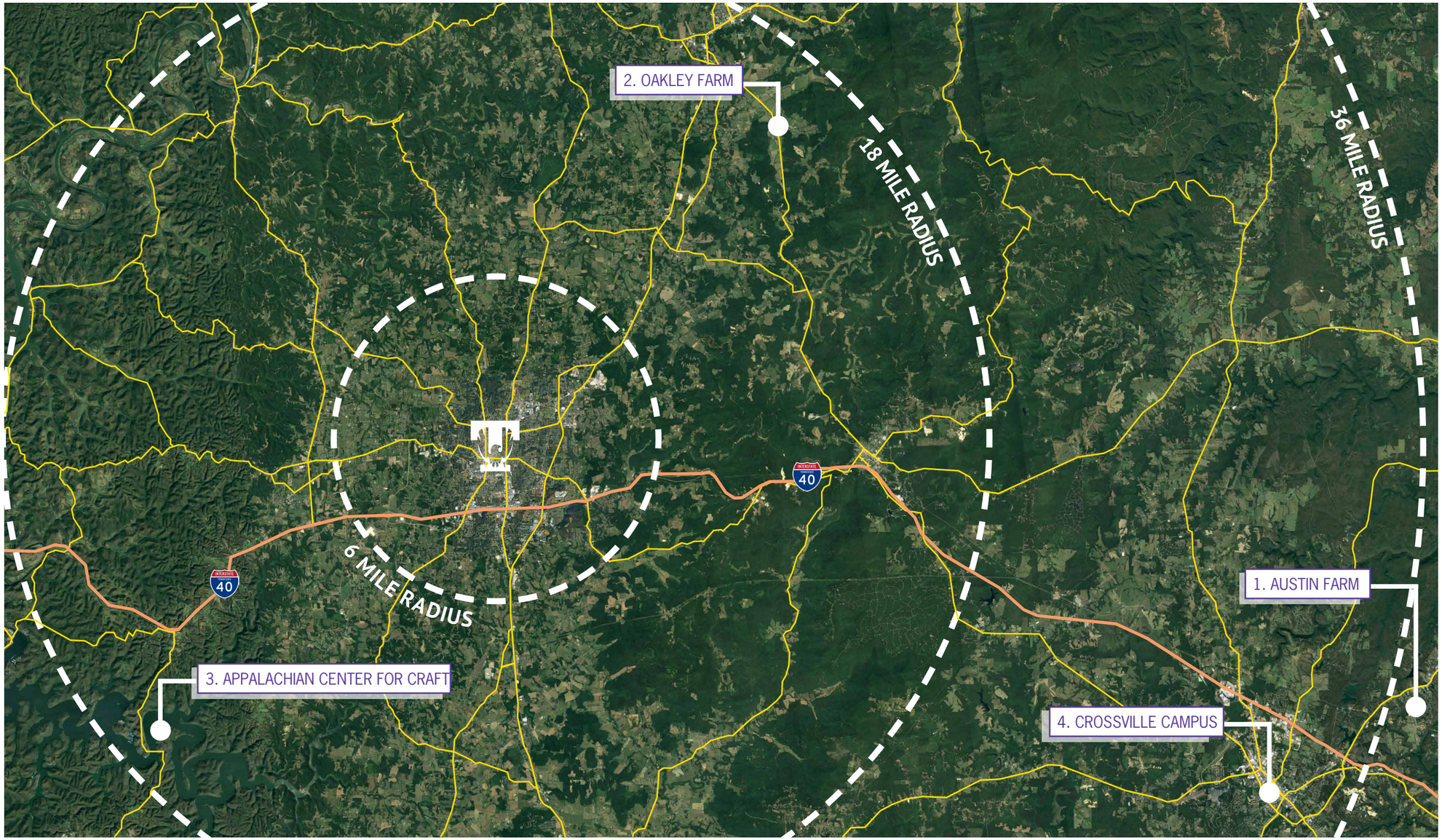


Figure 2.14 Regional Aerial Map

REGIONAL AERIAL MAP

TTU REGIONAL PROPERTY

1. Austin Farm (Cumberland County)
   884 Swicegood Road
   Crossville, TN 38555

2. Oakley Farm (Overton County)
   1198 Rickman Monterey Hwy
   Livingston, TN 38570
   - The Oakley Farm property is a Pioneer Century Farm used by the School of Agriculture where students work with cattle and in hydroponic greenhouses.

3. Appalachian Center for Craft - (Leased) (Dekalb County)
   1560 Craft Center Dr
   Smithville, TN 37166
   - The Appalachian Center for Craft is a satellite campus of TTU's School of Art, Craft & Design.

4. Crossville Campus - (Cumberland County)
   174 Fourth Street
   Crossville, TN 38555
   - The Crossville Campus is expected to be a satellite campus for research and general academic offerings in the local upper Cumberland area

TENNESSEE TECH UNIVERSITY (MAIN CAMPUS)

LAND ACQUISITION

Since its founding in 1915, Tennessee Technological University has continued to expand its presence in Cookeville to accommodate its growing population. The 2014 Acquisition Plan outlined a significant number of properties to acquire. The four blocks of property at the corner of Willow and Seventh are now owned by the University and have been developed into the new Recreation and Fitness Center. Other properties that have been added to the main campus include several properties at N. Franklin Avenue and 11th Street.

The current Acquisition Plan outlines multiple properties that the University should consider for acquisition. These properties are identified in two categories: high priority and long range. The high priority sites represent properties that could be utilized in the near future. They are located along the south border of Tech Village, the block between Dixie and Mahler Avenue, and the remaining properties that fill up the corner of Twelfth and North Washington Avenue. The long range areas include properties that should be considered, if available, and will likely require accumulation over time. The long range sites lie within the residential neighborhood blocks adjacent to the main campus to the north, west, and east, as well as the two blocks to the south directly west of the Bell Hall site. Likewise, land that becomes available near or adjacent to other currently owned property should also be considered, such as an expansion of the Shipley Farm property.

Away from the main campus, the property acquired by the TTU Foundation on Fourth Street in downtown Crossville should be considered the Crossville Campus of TTU.

Figure 2.15 Mahler Avenue, north of West 7th Street

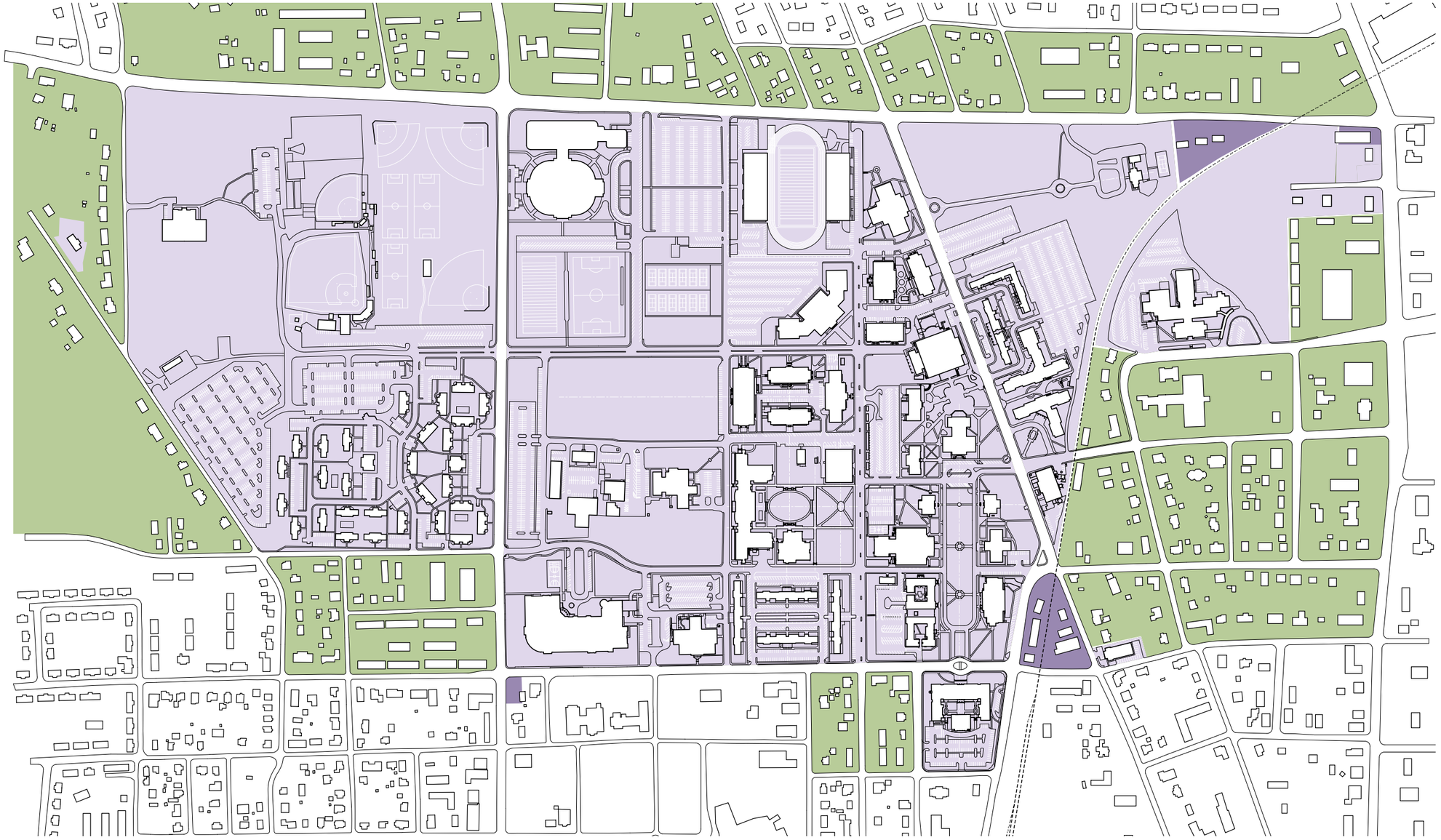


Figure 2.16 2022 Acquisition Map

2022 ACQUISITION MAP

LAND ACQUISITION

EXISTING BUILDING CONDITION

The information on the following pages provides an analysis of the quality of space that currently serves these functions. The Capital Projects and Planning department maintains documentation on each building on campus. This includes information on each space in every building as well as an overall assessment of the physical condition of each building. The Physical Facilities Inventory and Survey (PFIS) includes a detailed analysis with a ranking for all the building systems to provide an overall assessment score for the building.

The PFIS score starts at 100 for new buildings and generally decreases over time as the physical condition of the building decreases. With the abundance of buildings on campus with low scores, the scale for presenting the information was applied generously to provide a focus on the buildings with the greatest need. PFIS scores of greater than 80 generally indicate new or recently renovated buildings. Scores in the 70's indicate buildings in good shape generally, but in need of renovation. Scores in the 60's indicate buildings that were serviceable, but in need of renovation. Scores in the 40's and 50's indicate buildings in need of removal and replacement.

The PFIS score is an objective indicator of the buildings that should be considered for general or capital maintenance renovations. Over the past decade, the University has progressively renovated the majority of the smaller, older buildings on campus. This initiative has focused on the buildings that could be renovated through the prudent use of capital maintenance allocations. The scale of the upcoming buildings to be renovated will require a dedicated capital appropriation to accomplish.

The buildings indicated for demolition due to the condition of the building include Lewis Hall, the Foundry, Foster Hall, Matthews and Daniels. Other buildings indicated for demolition include the current Facilities Planning and Maintenance complex which is slated to be relocated to the northeastern corner of the campus. Southwest Hall and portions of Foundation Hall are indicated for future demolition to provide for other functions such as a future Engineering Quadrangle and remote parking, respectively.

Another factor for consideration when analyzing the space needs on campus is the suitability of each building for it's current function. The matrix following the PFIS information illustrates the relationship between the physical condition of the building and the suitability of the space for the program functions within the building. The buildings that are in the best condition and the most appropriate for their program are located toward the top right corner of the matrix. Conversely, the buildings that are in the poorest condition and are the least appropriate for their program are located in the lower left corner of the matrix. The Suitability rating was generally subjective and was based upon numerous factors including flexibility of space, appropriateness for current pedagogy and location.

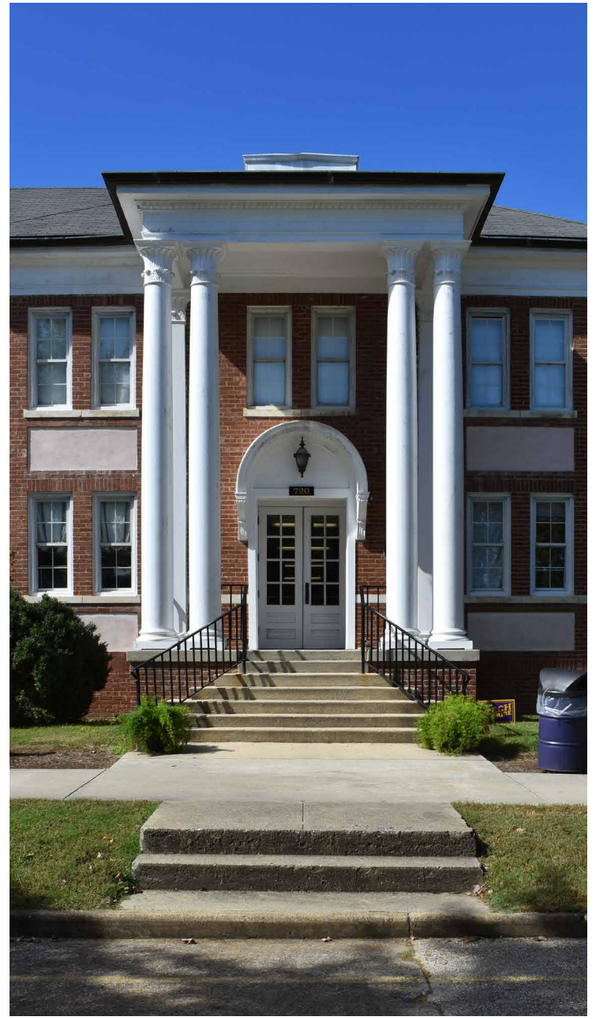


Figure 2.17 Daniel Hall

Bldg ID	Abbrev.	Building Name	Built	Function	Gross SF	Site Suitability	Physical Building Rating	Program Suitability
101	DBRY	Derryberry Hall	1912	Office	57,877	80	56.2	70
102	KITT	Kittrell Hall	1916	Classroom/ Office	19,015	70	88.4	90
103	JWB	Jere Whitson Bldg	1949	Classroom/ Office	38,267	60	88.7	30
104	OKLY	Oakley Hall	1931	Classroom/ Office	54,635	70	89.5	90
105	MGYM	Health & P.E. Building	1929	Physical Education	87,181	50	49.1	40
106	BFA	Bryan Fine Arts Building	1981	Fine Arts	55,110	70	75.5	60
107	BART	Bartoo Hall	1916	Classroom/ Office	18,326	60	87.4	40
108	FARR	T J Farr Bldg	1928	Classroom/ Office	26,299	50	75.6	80
109	HEND	Henderson Hall	1931	Classroom/ Office	35,831	60	81	40
110	RUC	Roaden University Center	1971	Student Center	149,800	70	58.5	80
111	FOST	Foster Hall	1964	Science	60,743	60	54.8	20
112	JOHN	Johnson Hall	1970	Classroom/ Office	68,171	80	72	90
113	PENN	Pennebaker Hall	1968	Science	59,679	90	60.8	80
120	MBRC	Marc L. Burnett Student Recreation & Fitness Center	2020	Other Aux. Enterprise	153,527			
125	USVC	Univ Services Bldg.	1929	Physical Plant Service	19,619	50	45.4	20
132	BELL	Robert and Gloria Bell Hall	2006	Classroom/ Office	66,302	100	100	100
134	DANL	Daniel Hall	1921	Classroom/ Office	18,356	60	43.2	20
135	MATT	Matthews Hall	1951	Classroom/ Office	25,199	50	41.7	20
136	ROTC	Military Science Building	1944	Office	5,722	50	64.8	70
142	LSC	Laboratory Science Commons	2020	Classroom/ Office	148,188		100	
143	SLH	Stonecipher Lecture Hall	2020	Classroom/ Lecture Hall	17,652		100	
145	LEWS	Lewis Hall	1921	Engineering	26,592	60	48.7	50
146	FDRY	Foundry	1943	Engineering	3,604	80	57.6	90
148	CLEM	Clement Hall	1965	Engineering	62,887	80	62.5	50
149	BRWN	Brown Hall	1967	Engineering	55,001	70	68.7	80
150	PRSC	Prescott Hall	1971	Engineering	111,955	50	72.6	80
151	BRUN	Bruner Hall	1966	Science	57,668	60	70.6	80
152	LIBR	Angelo & Jennette Volpe Library	1989	Library	132,645	90	84.9	70
154	ESTA	East Stadium	1967	Physical Education	91,851	50	47.1	20
155	WSTA	West Stadium	1967	Physical Education	94,638	60	44.9	20
157	HOOP	Hooper Eblen Ctr	1976	Physical Education	128,232	60	74.4	100
158	AWC	Academic Wellness Center	1991	Other Auxiliary Enterprise	77,895	80	72.3	80
159	RMH	Ray Morris Hall	2008	Engineering	25,300	100	95.7	100
160	SWH	Southwest Hall	1973	Office	23,500	100	94.8	100
170	APC	Athletic Performance Ctr.	2010	Physical Education	25,609	100	100	100
176	MTNO	Mntn Office Bldg	1975	Physical Plant Service	5,303	80	80.7	100
177	MTNS	George & Ridley Carr Building	1975	Physical Plant Service	8,825	90	81.2	80
178	WHSE	Maintenance Warehouse	1975	Physical Plant Service	26,258	70	83.7	100
179	MTNG	Maintenance Garage	1975	Physical Plant Service	3,500	40	61.2	60
180	CHIL	Otis Carroll Building	1972	Physical Plant Service	11,764	90	84.4	100
191	WELD	MIT Welding Storage	1981	Instructional Shop	240	100	100	100
192	FNDH	Foundation Hall	1932	Classroom/ Office	134,228	90	64.1	90
193	VARS	Varsity Building	1969	Classroom/ Office	13,472	100	99.2	100
200	WALT	Walton House	1964	Dormitory	10,869	100	82.9	100
201	JOBE	Jobe Hall	1969	Dormitory	35,462	100		100
202	MURP	Murphy Hall	1969	Dormitory	31,170	100		100
203	PINK	Pinkerton Hall	1969	Dormitory	26,635	100		100
204	MSCP	M.S.Cooper Hall	1969	Dormitory	28,684	100		100
205	NEWN	New Hall North	2008	Dormitory	94,400	100		100
206	NEWS	New Hall South	2003	Dormitory	92,680	100		100

Table 2.2 Building Rating and Suitability Chart

INVENTORY AND FACILITY ASSESSMENT

Bldg ID	Abbrev.	Building Name	Built	Function	Gross SF	Site Suitability	Physical Building Rating	Program Suitability
207	CRAW	Crawford Hall	1962	Dormitory	42,042	100		100
208	MDDX	Maddux Hall	1966	Dormitory	28,718	100		100
209	MCRD	Mccord Hall	1966	Dormitory	27,217	100		100
210	COOP	Cooper Hall	1966	Dormitory	23,512	100		100
211	DUNN	Dunn Hall	1966	Dormitory	23,507	100		100
212	BRNG	Browning Hall	1966	Dormitory	28,163	100		100
213	EVIN	Evins Hall	1966	Dormitory	28,059	100		100
214	ELLG	Ellington Hall	1971	Dormitory	23,438	100		100
215	WARF	Warf Hall	1971	Dormitory	23,507	100		100
227	TVEH	Tech Vlge East H	1967	Apartment Building	6,198	100		100
228	TVEJ	Tech Vlge East J	1967	Apartment Building	6,198	100		100
229	TVEK	Tech Vlge East K	1967	Apartment Building	6,198	100		100
230	TVEL	Tech Vlge East L	1967	Apartment Building	6,198	100		100
231	TVEM	Tech Vlge East M	1967	Apartment Building	6,198	100		100
232	TVEN	Tech Village Laundry	1967	Other Auxiliary Enterprise	4,184	100		100
233	TVEO	Tech Vlge East O	1967	Apartment Building	6,198	100		100
234	TVEP	Tech Vlge East P	1967	Apartment Building	6,198	100		100
235	TVEQ	Tech Vlge East Q	1967	Apartment Building	6,198	100		100
236	TVER	Tech Vlge East R	1967	Apartment Building	6,198	100		100
237	TVES	Tech Vlge East S	1967	Apartment Building	6,198	100		100
238	TVET	Tech Vlge East T	1967	Apartment Building	6,139	100		100
239	TVEU	Tech Vlge East U	1967	Apartment Building	6,139	100		100
240	TVEV	Tech Vlge East V	1967	Apartment Building	6,139	100		100
241	TVEW	Tech Vlge East W	1967	Apartment Building	6,139	100		100
242	TVEX	Tech Vlge East X	1967	Apartment Building	6,139	100		100
243	TVWA	Tech Vlge West A	1973	Apartment Building	5,372	100		100
244	TVWB	Tech Vlge West B	1973	Apartment Building	5,372	100		100
245	TVWC	Tech Vlge West C	1973	Apartment Building	5,372	100		100
246	TVWD	Tech Vlge West D	1973	Apartment Building	5,372	100		100
247	TVWE	Tech Vlge West E	1973	Apartment Building	5,372	100		100
248	TVWF	Tech Vlge West F	1973	Apartment Building	5,372	100		100
249	TVWG	Tech Vlge West G	1973	Apartment Building	5,372	100		100
250	TVWH	Tech Vlge West H	1973	Apartment Building	5,372	100		100
251	TVWI	Tech Vlge West I	1973	Apartment Building	5,372	100		100
252	TVWJ	Tech Vlge West J	1973	Apartment Building	5,372	100		100
253	TVWK	Tech Vlge West K	1973	Apartment Building	5,372	100		100
254	TVWL	Tech Vlge West L	1973	Other Academic Facility	5,372	100		50
255	TVWM	Tech Vlge West M	1973	Apartment Building	5,372	100		100
256	TVCC	Tech Cm Cr West	1973	Other Academic Facility	5,727	100		100
300	CCAD	CC Admn.& Gallery	1979	Art Studio	19,640	100	80.2	100
301	CCCW	CC Cool Wing	1979	Art Studio	25,941	100	84.1	100
302	CCGM	CC Glass & Metal	1979	Art Studio	12,348	100	86	100
303	CCCS	CC Clay Studio	1979	Art Studio	13,401	100	85.6	100
304	CCPH	CC Pump House	1979	Physical Plant Service	275			
305	CCWT	CC Water Treatmnt	1979	Physical Plant Service	84			
306	CCMG	CC Mangrs. Resid.	1979	Single Family Dwelling	452	100	100	100
307	CCRA	CC Stud. Resid. A	1979	Apartment Building	3,420	100	100	100
308	CCRB	CC Stud. Resid. B	1979	Apartment Building	3,420	100	100	100
309	CCRC	CC Stud. Resid. C	1979	Apartment Building	3,420	100	100	100
310	CCRD	CC Stud. Resid. D	1979	Apartment Building	3,420	100	100	100

Table 2.2 Building Rating and Suitability Chart

INVENTORY AND FACILITY ASSESSMENT

Bldg ID	Abbrev.	Building Name	Built	Function	Gross SF	Site Suitability	Physical Building Rating	Program Suitability
402	SFSB	Farm Sheep Barn	1965	Farm Building	5,856	100	88.9	100
403	SFSW	Farm Show Barn	2000	Farm Building	4,608	100	98	100
404	SFCL	Farm Corral	1976	Farm Building	3,600			
406	SFPH	Farm Pump House	1991	Farm Building	27			
407	HBBN	Hyder/Burks Barn	1993	Horse Barns, Warm-up	48,964	100	97.2	100
408	HBAR	Hyder/Burks Arena	1995	Arena, Expo Center	77,116	100	98	100
409	SFAS	Ag. Engineering Shop	1973	Farm Building	1,560			
410	SFLF	Farm Loafing Barn	1970	Farm Building	10,020	100	81.6	100
411	SFMB	Farm Milking Barn	1970	Farm Building	4,880	100	73.4	100
414	SFRR	Farm Restroom Building	1993	Farm Building	388			
415	SFPS	Farm Picnic Shelter	1991	Farm Building	2,000			
416	SFH1	Farm House #1	1975	Dwelling	4,135	100	84.7	100
417	SFTG	Farm Teaching Greenhouse	1975	Greenhouse	4,624	100	81.1	100
418	SFRG	Farm Research Greenhouse	1981	Greenhouse	2,778	100	83	100
420	SFTT	Farm Turf-Tool Shed	1981	Farm Building	1,440	100	87.6	100
421	SFFB	Farrowing Barn	1991	Farm Building	1,374	100	95	100
422	SFFF	Farm Swine Finishing Floor	1975	Farm Building	2,160			
423	SFCO	Compost Barn	2014	Farm Building	1,200			
424	SFH1	Hay Storage Barn #1	2019	Farm Building	3,200			
425	SFH2	Hay Storage Barn #2	2019	Farm Building	3,200			
426	SFPL	Tennessee Center for Poultry Science	2021	Farm Building	10,255			
430	SFYB	Farm Young Place Barn	2010	Farm Building	2,500			
440	HFBN	Hyder Farm Barn	1938	Farm Building	3,386			
500	AUSH	Austin House	1976	Single Family Dwelling	3,480			
501	AUSG	Austin Garage	1976	Housing Support / Storage	960			

Table 2.2 Building Rating and Suitability Chart

INVENTORY AND FACILITY ASSESSMENT

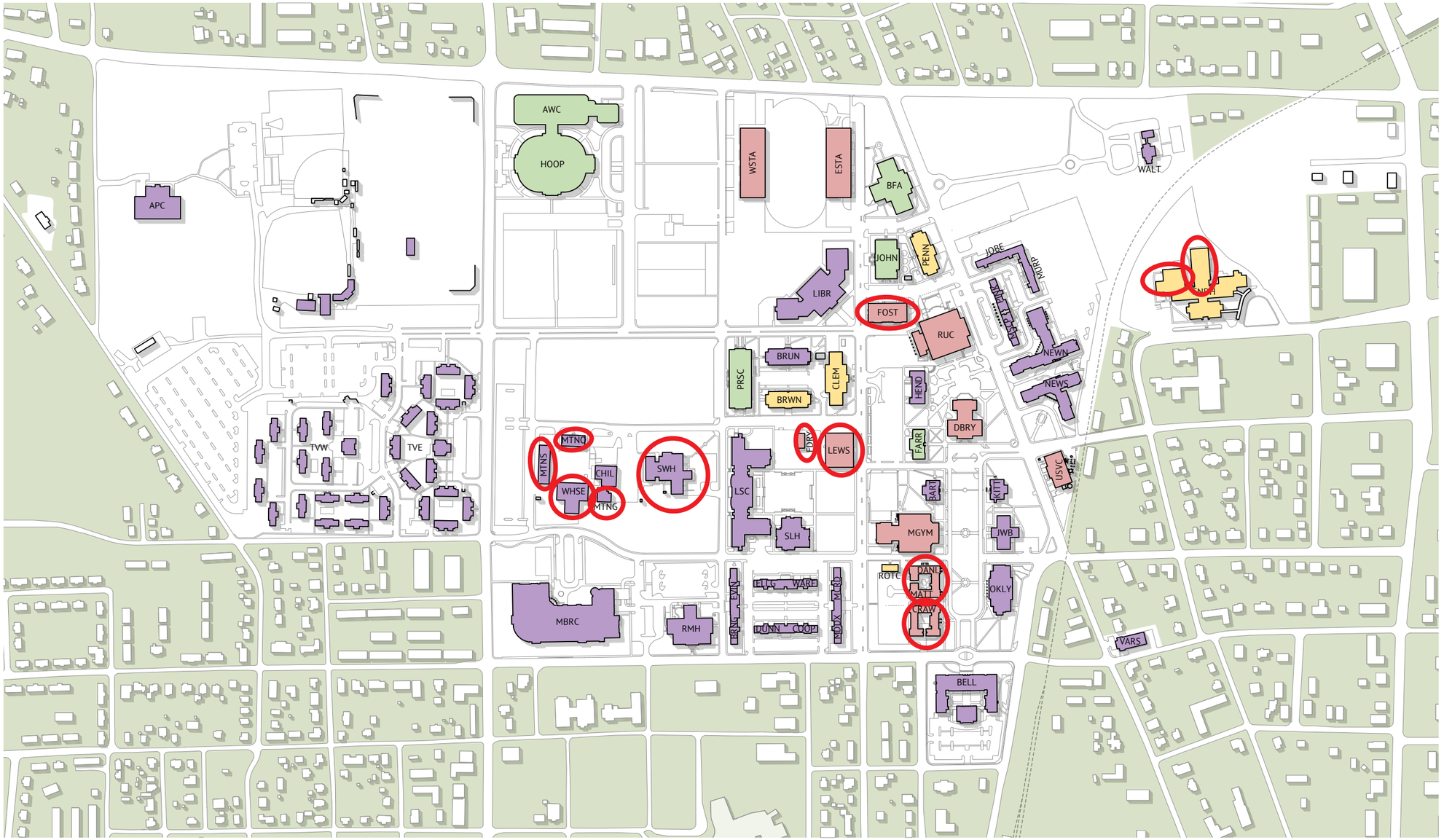


Figure 2.18 Physical Conditions

PHYSICAL CONDITIONS

Table 2.3 Physical Building Rating/Suitablity Matrix

PHYSICAL BUILDING RATING/SUITABILITY MATRIX

BUILDING FUNCTIONS

The function of each facility on Tennessee Tech's campus is defined by its predominant use. TTU's campus consists of seven types of building functions: academic, athletic, housing, student services/recreation, administration, campus support and president's residence.

Facilities used for academic purposes and offices are located at the campus core. The centralization of the academic buildings on campus, as shown in Figure 2.22, assists in consolidating resources, strengthen adjacencies, and enhance the TTU academic communities.

Tennessee Tech's Athletic facilities are located within the northwest corner of campus. These facilities house spaces for campus sports as well as intramurals. The location of the athletic buildings on the northern edge of the campus makes these facilities easily accessible for both students and visitors who wish to participate and view this aspect of campus life.

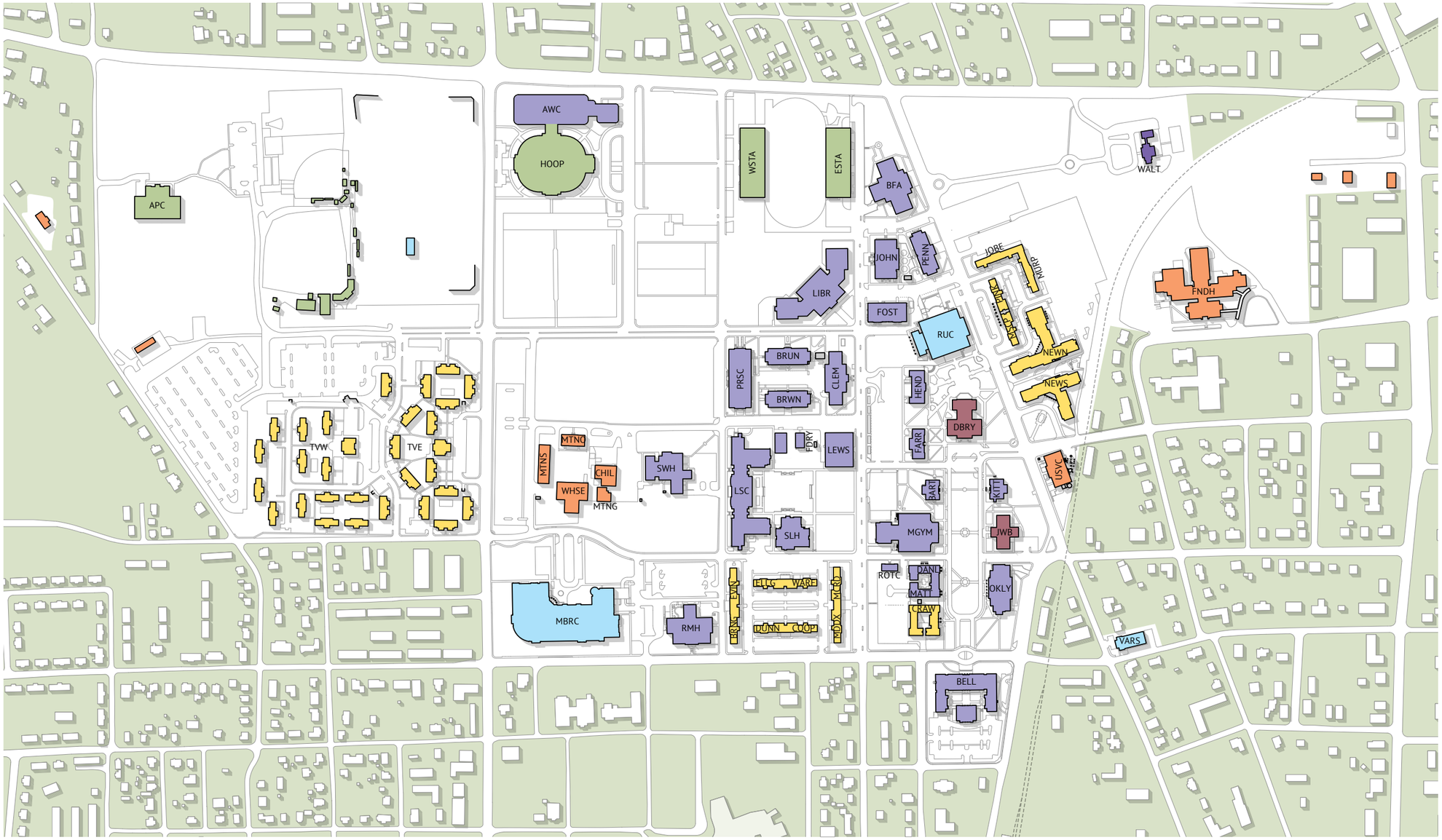
Student housing facilities are grouped in several locations around campus. These locations are generally at the perimeter of the academic core making it easily accessible to all students who live on campus. Tech has both traditional dormitories, suite-type units, and apartment type units. A variety of dormitory style housing is located on the eastern and southern edge of the campus with the apartment style housing on the western portion of the campus. All of TTU's student housing are within close proximity to student services and recreation facilities including the Marc L. Burnett Recreation and Fitness Center, Roaden University Center, and intramural fields.

The majority of Tennessee Tech's primary administrative offices are located within the campus's original building, Derryberry Hall. This building is a prominent symbol of campus located at the summit of the Historic Quad. Administrative functions are also located in other buildings such as Jere Whitson.

Campus support services, including facility services office, campus support, and warehouse and receiving docks are gathered west of the campus's central core. There are a few other campus support facilities that are located along the east and west edges of campus. Foundation Hall serves a significant function as a swing building providing academic and office space. This provides temporary relocation space to allow for the renovation of academic buildings as well as providing administration offices, campus police, and other support spaces.

The Walton House is the TTU president's home, located in the northeast corner of campus. Walton House hosts various holiday celebrations, faculty and staff receptions and alumni gatherings where visiting dignitaries, TTU students, alumni, and staff are welcomed.

Figure 2.19 Pergola at Centennial Plaza



LEGEND

- ACADEMIC
- ATHLETIC
- STUDENT HOUSING
- STUDENT SERVICES / RECREATION
- ADMINISTRATION
- CAMPUS SUPPORT
- PRESIDENT'S RESIDENCE

NORTH

0' 500' 1,000'

Figure 2.20 Building Functions

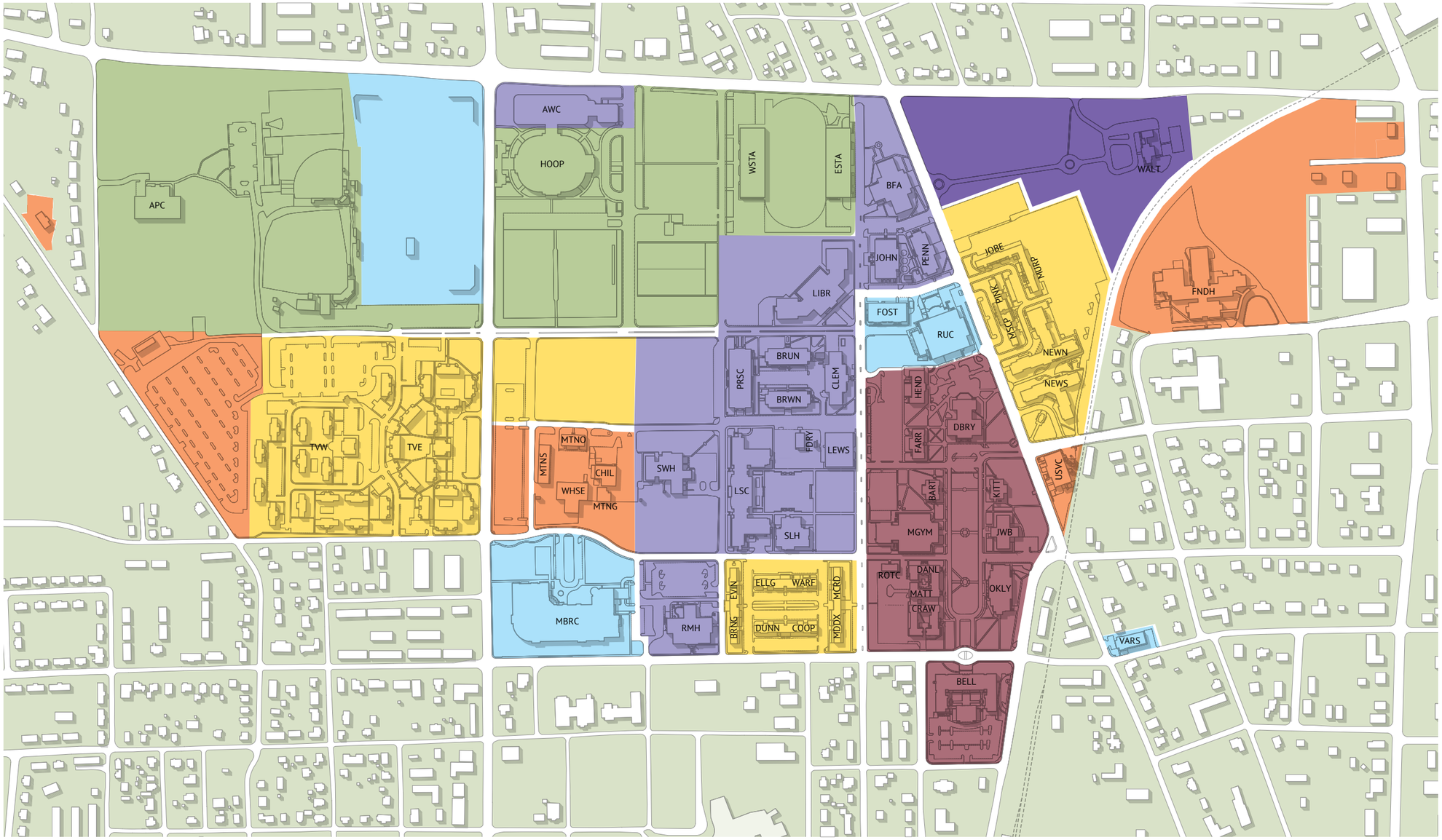
BUILDING FUNCTION

CAMPUS PRECINCTS

Since TTU opened its doors in 1915, its campus has steadily developed outward from the historic core. The grouping of similar building functions throughout Tennessee Tech's main campus divides the campus into seven precincts. These precincts are separated based on the specific functions that go on within them: historic core, academics, student activities, student housing, athletics, Walton House, and campus support.

The Historic Core houses both academic and administrative functions and contains the buildings that made up the initial campus. The Academic Precinct includes buildings focused on academic functions. It borders the Historic Core to the west and north and houses the remainder of the academic programs. The Student Activities Precinct is broken up into four areas on campus. These areas include the intramural sports fields, student recreation center, Roaden University Center, and the Varsity Building. The Student Housing Precinct is located in three groupings. These include to the mixture of housing to the east across Dixie Avenue, Capital Quad housing on the southern edge along Seventh Street and Tech Village with the upcoming Innovation Housing on the western side of the campus. Tech's Athletics Precinct makes up the majority of the northwestern quarter of campus. The Walton House Precinct is located within the northeast corner of TTU's campus and houses the President's Residence. The Campus Support Precinct is located primarily on the perimeter of the campus and includes perimeter parking and campus central plant operations.

Figure 2.21 Roaden University Center



LEGEND

- HISTORIC CORE
- ACADEMIC
- STUDENT ACTIVITIES
- STUDENT HOUSING
- ATHLETIC
- WALTON HOUSE
- CAMPUS SUPPORT

Figure 2.22 Campus Precincts

CAMPUS PRECINCTS

PARKING OVERVIEW

The analysis of parking on campus was generated within the 2014 Master Plan Vision for Greening the Campus. In general, the desire was to remove parking from the core areas of campus to allow for and provide a park-like walkable pedestrian-oriented campus environment. The key first step was accomplished in preparation for the new Laboratory Science Commons. The large 854-car parking lot between Peachtree, Stadium, Eighth, and Tenth Streets was removed and effectively relocated to the west side of campus with the development of new parking just west of Tech Village. This initiated the concept of providing remote perimeter parking with a shuttle system to serve the parking areas on the east and west perimeter areas of campus, at Tech Village and Foundation Hall.

The Parking Data Analysis was conducted by RPM Transportation Consultants, LLC as part of the 2014 Master Plan. Now operating as KCI Technologies, Inc., the firm's design recommendation for future parking is a .46 factor of space/student for the total parking capacity needed on campus. The parking capacities have been updated to allow for refinements to the parking inventory that have been accomplished in recent years. Due to the variations in on-campus enrollment during the pandemic, the 2020 Student Enrollment has been utilized.

2014 Parking Data Analysis Results

2013 Student Enrollment -	11,000
Number of Staff and Faculty -	1,200
Peak Parking Demand (Spaces) -	4,938
Total Parking Spaces (Capacity) -	5,457
Parking Demand Rate (Space/Student) -	0.45
Parking Capacity Rate (Space/Student) -	0.50

Future Parking Recommendation

Parking Capacity Rate (Space/Student) -	0.46
	(0.45 min.)

2020 Parking Status

2020 Student Enrollment -	10,177
Total Parking Spaces (Capacity) -	5,858

Recommended Parking Capacities

Students	Spaces	Student/Space
10,200	4,692	0.46
10,500	4,830	0.46
11,000	5,060	0.46
12,000	5,520	0.46
13,000	5,980	0.46
14,000	6,440	0.46
15,000	6,900	0.46

Figure 2.23 Campus Parking Lot

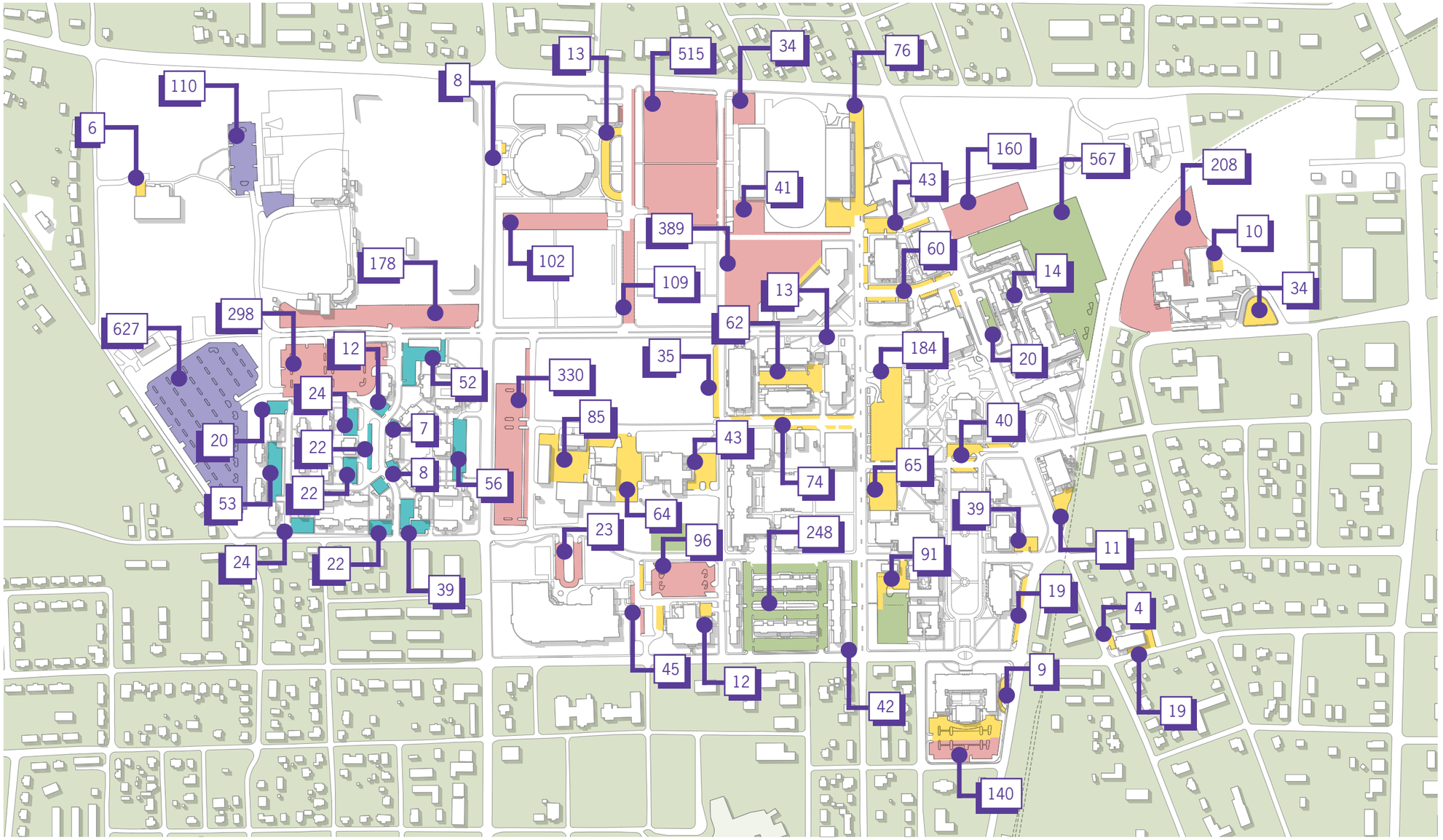


Figure 2.24 Current Parking Counts

CURRENT PARKING COUNT (2020)

NORTH

0' 500' 1,000'

LEGEND

- STUDENT PREMIUM PARKING
- RESIDENTIAL PARKING
- EMPLOYEE PREMIUM PARKING
- TECH VILLAGE PARKING
- PERIMETER PARKING

PARKING COUNT

- 2,572 SPACES
- 933 SPACES
- 1,246 SPACES
- 373 SPACES
- 747 SPACES

TOTAL: 5,871 SPACES

2014 RPM STUDY

5,457 CURRENT SPACES

ENROLLMENT	PROJECTED PARKING
10,000	4600
12,000	5520
13,000	5980
15,000	6900

HARDSCAPE AND GREENSPACE

In recent history, the greenspace on campus has been limited. The two primary green spaces have been the Historic Quad and Sherlock Park- one formal and one informal. The 2014 Master Plan Update outlined a concept for two additional formal campus quadrangle spaces to link the core of the campus. The concept of the interconnected quadrangles linking the core of the campus is illustrated on the following page. The Science Quad will be an east-west link to the Historic Quad. Likewise, the Peachtree Quad will be a north south quadrangle that will extend north to the library and li the northern half of the Academic Precinct. These two spaces are beginning to develop with the Science Quadrangle at the new Laboratory Science Commons and the University Center lawn area as the north end of the future Peachtree Quadrangle.

The development of green spaces should be carefully considered with each project on campus to create spaces for students and all others utilizing the campus to gather, play, study, meditate and walk in a natural setting. Therefore, the development of greenspace in lieu of parking provides a visual relief as well as a more sustainable built environment. While informal greenspace will inherently be limited as the campus develops, the buildings should be utilized to frame the setting for green space and preserve the outdoor environment.

The coverage of paved surfaces versus buildings and green space is illustrated on the Hardscape page. TTU's current campus has more than 1,484 parking spaces within its central core. This is equivalent to approximately twelve acres of generally treeless paved area. While still a heavily paved campus core, the image is significantly better than the same diagram prior to the development of the new Laboratory Science Commons which transplanted a 850+ car parking area.

The Tennessee Tech campus has also been known for narrow sidewalks. The master plan initiative and ongoing streetscape improvements have evolved the pedestrian walkway system to wider sidewalks with tree lining and separation from the streetscape where possible. As the perception of the campus as an environment dominated by parking lots is progressively transformed, the focus then transitions to the development of the Hardscape and Greenspace.

The best example for hardscape development on the campus is Centennial Plaza. This location represents the aspiration of the campus for improved and occupiable hardscape. The surface of the space is primarily brick pavers with perimeter areas of concrete. It is also integrated with landscaped areas and ample intimate and open spaces for students to gather.

While Centennial Plaza is a great example of hardscape development, it is not accessible from the primary path to the library at the north end of Henderson Hall. Likewise, numerous buildings on campus are not accessible at the front door and often require circuitous routes to the back or side doors for access. As the university should strive for an accessible campus to walk and roll without impediments, a recommendation of the master plan is to study the campus accessibility more thoroughly including accessible parking availability throughout the campus as it transforms to a more green environment.

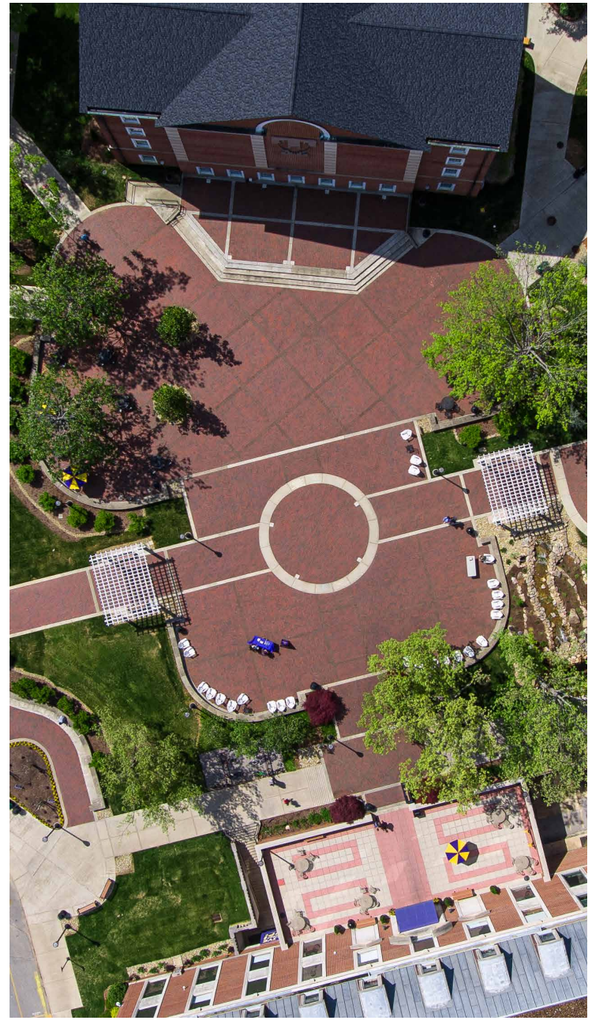


Figure 2.25 Centennial Plaza

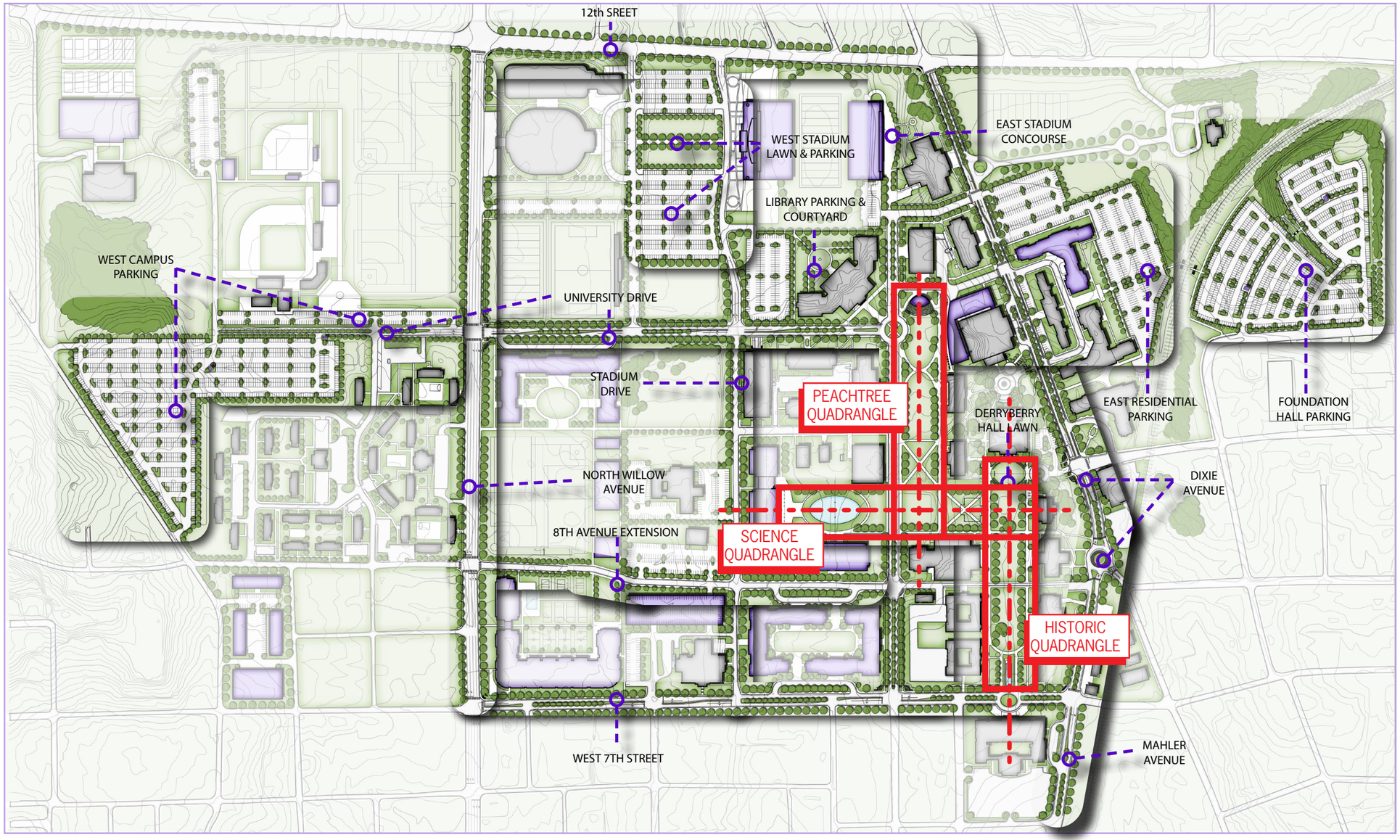


Figure 2.26 Greening the Campus 2014 Vision

HARDSCAPE & LANDSCAPE - 2014 MASTER PLAN VISION

GREENING OF THE CAMPUS

A major initiative of the 2014 Master Plan Update was the “Greening of the Campus” to provide a more pedestrian oriented, friendly campus. This entailed the development of two major greenspaces on campus in addition to the existing Historic Campus Quadrangle. The Science Quad began with the relocation of the Peachtree parking lot to the western edge of the campus. It was developed in association with the new Laboratory Science Commons and runs east-west from the new building. It will be further defined by future science buildings which will flank the north and south sides. The Peachtree Quadrangle has begun development with the greening of the parking lots west of the Roaden University Center. This north-south quadrangle will develop over coming years. The anticipated university tower and the expansion of the student center will define the north end of the quad. Peachtree Street, currently being redeveloped as a pedestrian walkway, will provide a major corridor through the campus and will lead to the university tower. The existing parking lots within the quadrangle area will be replaced over time with lawn space to provide a linking of greenspace that will connect the majority of the campus.

The greening effort also extended to the redevelopment of much of the street and hardscapes in and surrounding the campus. The adjacent image shows the vision provided in the 2014 Master Plan with the greening projects that have been accomplished or are underway highlighted in red.

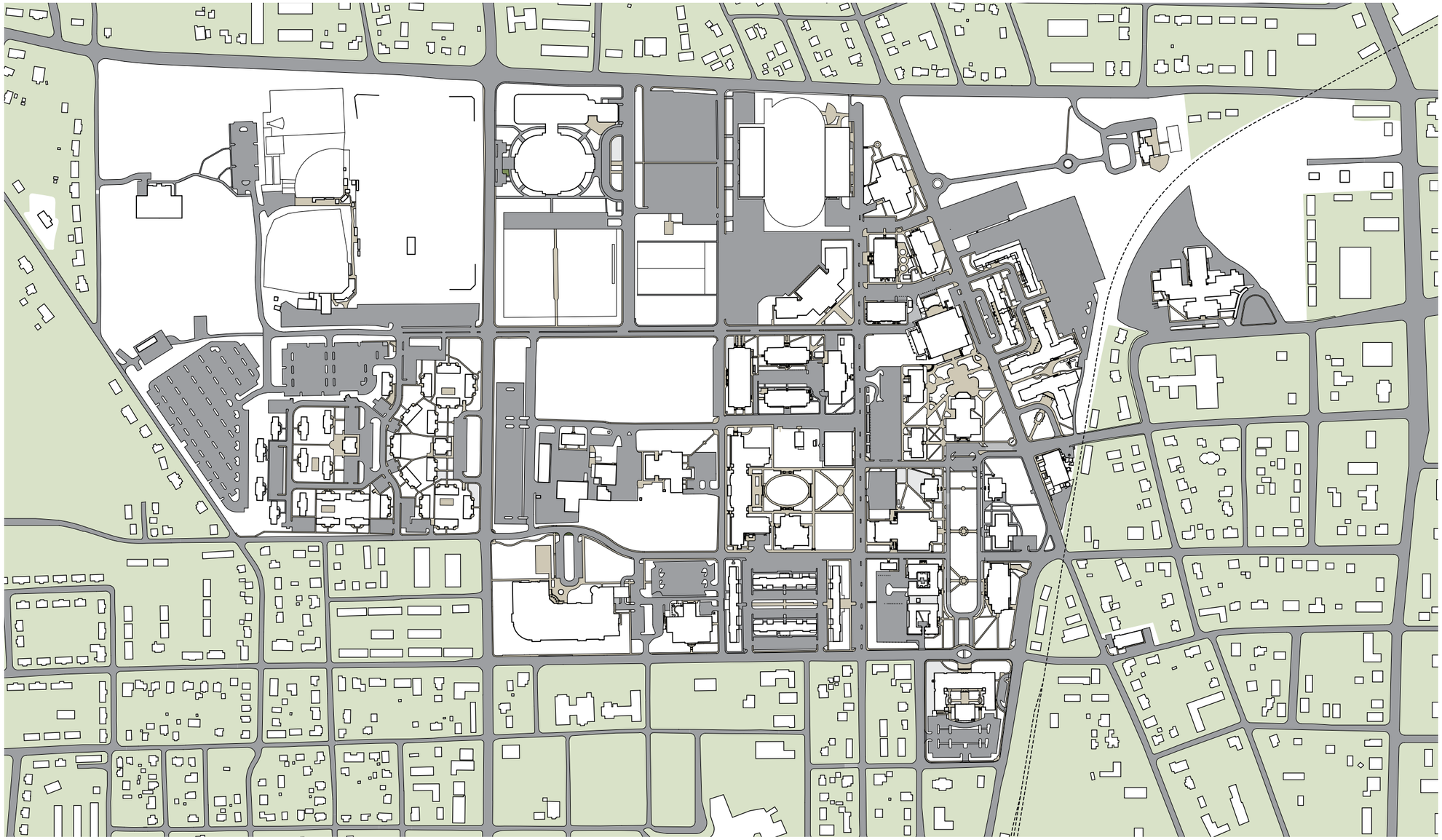


Figure 2.27 Hardscape Map

HARDSCAPE - EXISTING

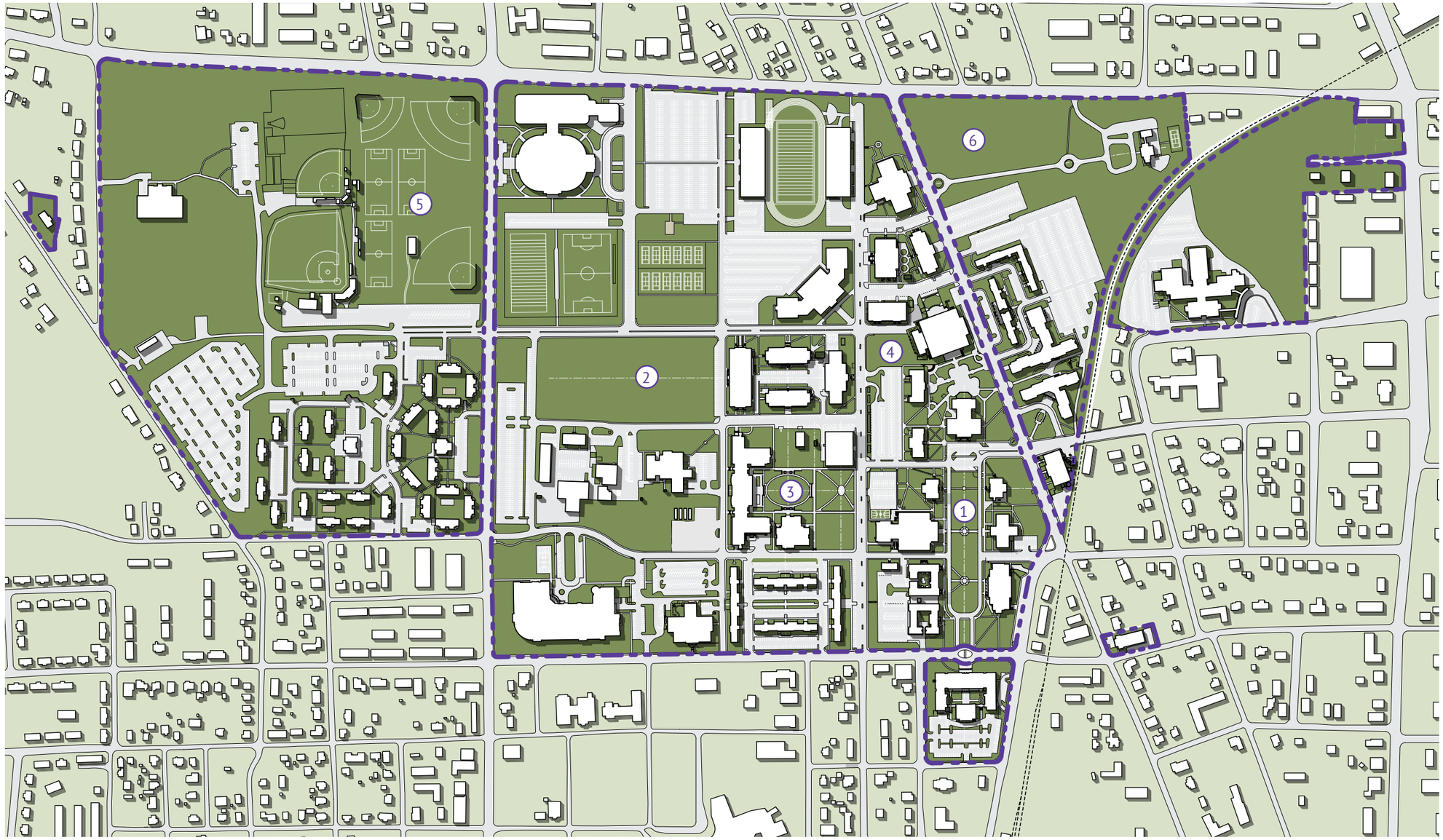


Figure 2.28 Open Space Map

LEGEND

#	OPEN GREEN SPACE	ACRES
1.	HISTORIC QUAD	1.80
2.	SHERLOCK PARK	7.35
3.	SCIENCE QUAD	2.08
4.	RUC LAWN	0.75
5.	INTRAMURAL FIELDS	13.50
6.	WALTON PARK	4.7

NORTH

0' 500' 1,000'

OPEN SPACE - EXISTING

VEHICULAR CIRCULATION

Tennessee Tech's campus boundaries are defined by Cookeville's city streets and a state highway. These boundary roads are high traffic circulation around the perimeter of the campus. Seventh Street is a two-lane road with a center turn lane. Willow Avenue (State Highway 135) and Twelfth Street are both four-lane roadways with center turn lanes added at their intersection. The section of Willow Avenue from West Broad Street (at the train trestle) to Twelfth Street is currently in the process of being upgraded by the Tennessee Department of Transportation (TDOT). The roadway will be expanded to provide a center turn lane for the length of the upgrade area. The section along the Tennessee Tech campus will expand to the east side toward the center of campus.

North Dixie Avenue is currently a four-lane road and provides a challenge to distracted students to cross to the residence halls on the east side of the campus. As part of the implementation of the 2014 Master Plan Update, Dixie Avenue and Mahler Avenue are currently part of a renovation plan to convert them to two lane roads with a center turn lane where applicable. As part of the renovation, the intersection of the two streets with Eighth Street and the railroad, will be converted to a roundabout. The roundabout will be offset to the north to align with the centerline of Jere Whitson and provide a more comfortable clearance from the railroad and assist in smooth traffic flow.

The renovation of Seventh Street to upgrade with sidewalks, street lighting and a center turn lane roughly paralleled the 2010 Master Plan and the development of Bell Hall. The University should work with the city for a similar renovation of Twelfth Street to provide pedestrian access, turn lanes, streetlighting and additional lanes at the eastern portion as it extends to Washington Avenue.

For the purposes of the master plan analysis, the internal vehicular circulation on the campus has been broken up into primary, secondary, and tertiary roads. While the scale varies, each road on campus is a two-lane road. The dominate vehicular circulation roadways on campus are University Drive, Peachtree Avenue, and Stadium Drive. These streets are primary entry points into campus, and therefore receive the most traffic.

Secondary roads are also used as entry points to the campus. These streets are used to navigate through the campus. As with the primary streets, the secondary streets also provide access to parking areas to a lesser degree. These roads include North Whitney Avenue, Wings Up Way, Tenth Street, A and B Streets, and William L. Jones Drive.

Tertiary roads are mainly service streets that have developed over time providing convenient connections to reach building front doors as well as loading docks. These paths occur at West Tenth Street, McGee Boulevard, northern Peachtree Avenue and East Eighth Street.

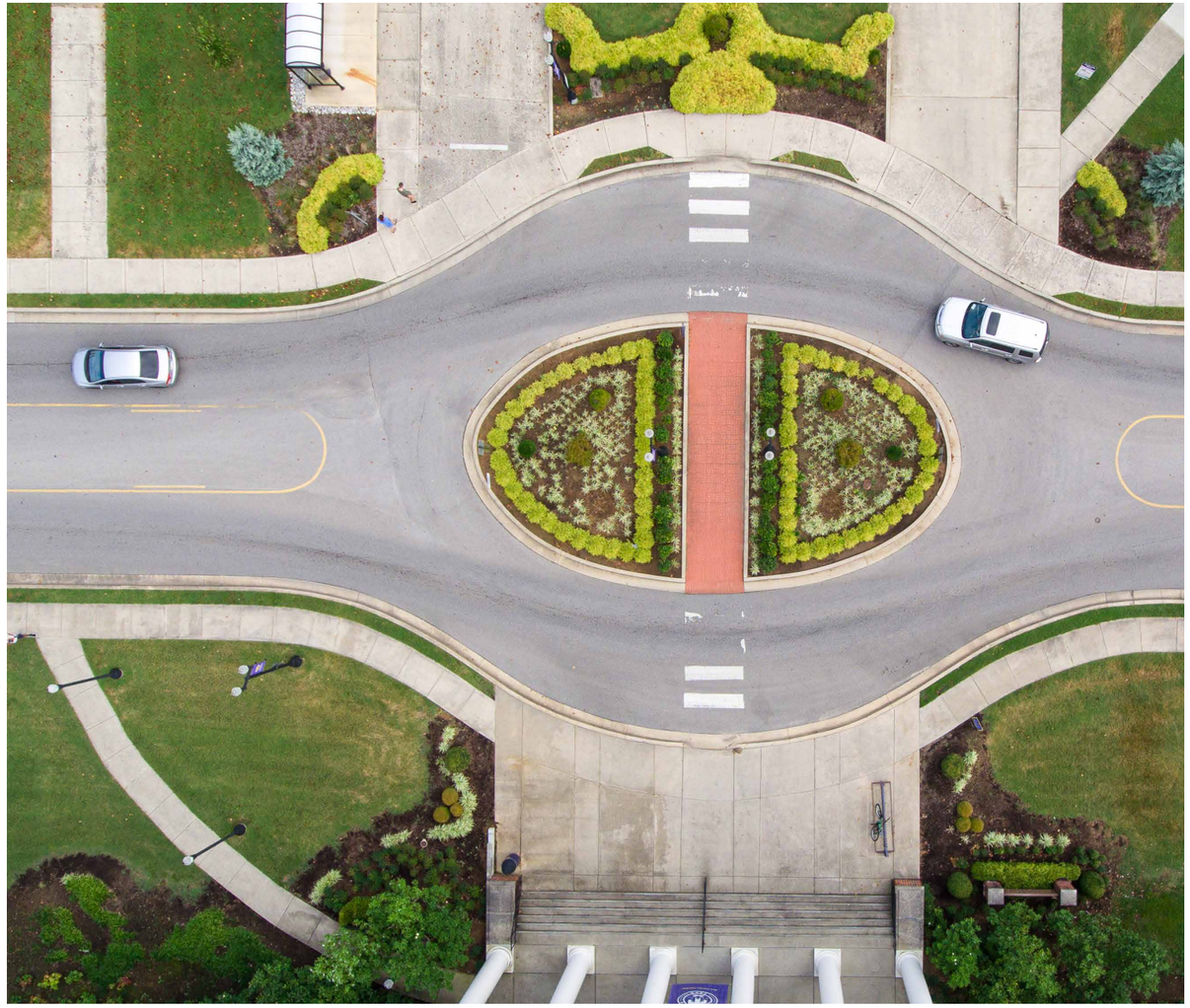


Figure 2.29 Campus Circulation

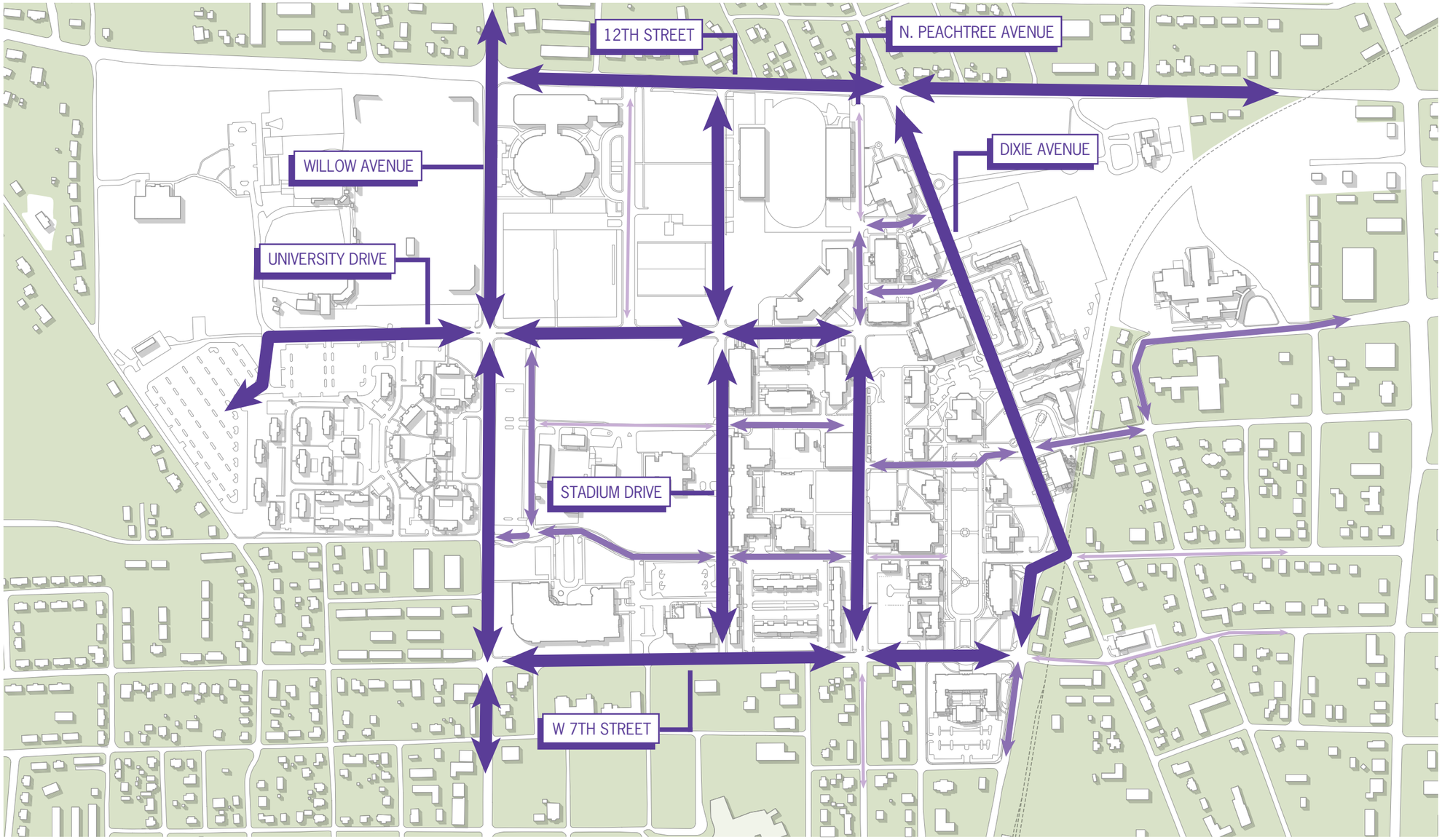


Figure 2.30 Vehicular Circulation

VEHICULAR CIRCULATION

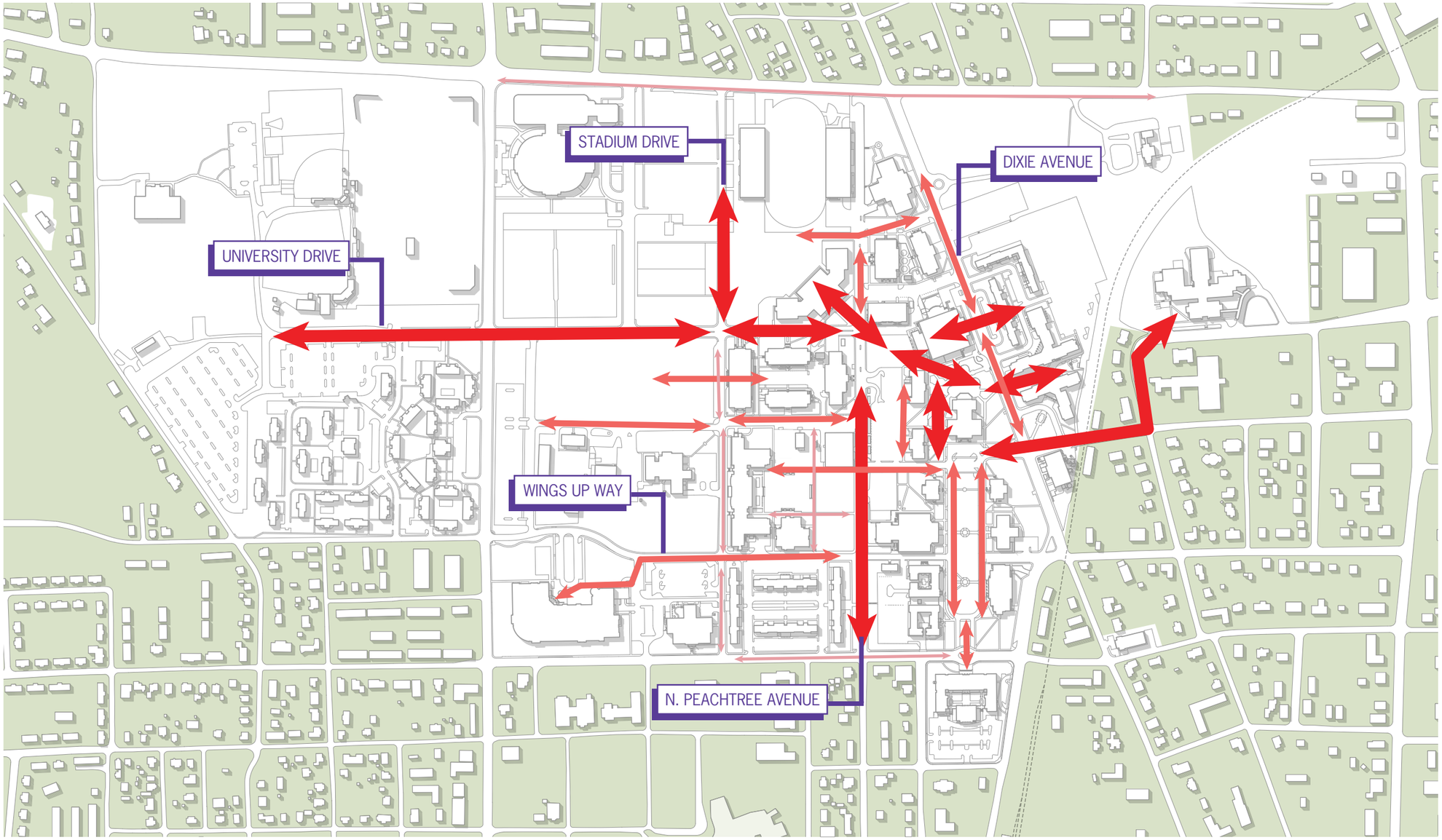
PEDESTRIAN CIRCULATION

Pedestrians on Tennessee Tech's campus currently circulate through campus using a hierarchy of pedestrian pathways. The pedestrian circulation analysis shows the primary, secondary, and tertiary pathways that students, faculty, staff, and visitors use on a daily basis. It is intuitively obvious that the heaviest pedestrian traffic flows would be at the core of campus. High traffic pedestrian pathways are from parking and housing areas: from the west along University Drive, from the south along Peachtree Drive and from the east across Dixie Avenue. Another high-traffic area for pedestrians occurs in north central campus between the Roaden University Center|Centennial Plaza area and Volpe Library.

Secondary pedestrian paths are located in multiple areas in and around campus. These generally represent student movement around campus between academic and student service destinations. These paths occur along Dixie Avenue, up and down the historic quad between Derryberry Hall and Nursing, from the new Lab Science Commons to the historic mall, and along Wings Up Way from the Student Recreation Center to central campus.

Tertiary pedestrian paths with lower foot traffic occur along paths that have less populated destinations. These paths are located along areas such as Stadium Drive to Ray Morris Hall or the perimeter of campus. A formal study could be commissioned to provide a definitive pedestrian traffic count and assist in the proportioning of the width of the sidewalks to the pedestrian flow.

Figure 2.31 Students Walking to Class



LEGEND

- PRIMARY PEDESTRIAN PATHS
- SECONDARY PEDESTRIAN PATHS
- TERTIARY PEDESTRIAN PATHS

NORTH

0' 500' 1,000'

Figure 2.32 Pedestrian Circulation

PEDESTRIAN CIRCULATION

VEHICULAR & PEDESTRIAN CIRCULATION

The diagram on the following page illustrates the pedestrian and vehicular circulation diagrams overlaid together. Not surprisingly, much of the highest traffic areas for both pedestrian and vehicular circulation are associated with parking. Logically, this entails vehicular traffic to parking and the associated pedestrian traffic from the parking to the core of campus. Several of the major overlaps are currently being addressed in the street improvements project.

The two major vehicular paths in the core of campus, Peachtree Avenue from Eighth Avenue to A Street and University Drive from Stadium Drive eastward, are being converted to pedestrian only with access for emergency and service vehicles. This work is supporting the Greening of the Campus effort to relocate parking to the perimeter of campus and thus reduce the need for vehicular traffic to the campus core. Likewise, within the initial phase of the ongoing street improvement project, William L. Jones Drive will be removed from the campus core reducing access to only serve the Derryberry Hall area, eliminating cross-campus access.

The most significant pedestrian issue to address is part of the ongoing street improvements project. The path from the Library to Centennial Plaza is the most congested on campus. As the streets at the intersection of University Drive and Peachtree Avenue are converted to pedestrian only, the intersection will become a large student plaza at the core of campus. To further improve the pedestrian use of this area, the pedestrian path that extends from the future plaza in front of the Library to Centennial Plaza should also be addressed to provide an ample and accessible connection between these two emerging keynote student spaces.

Figure 2.33 University & Peachtree Intersection

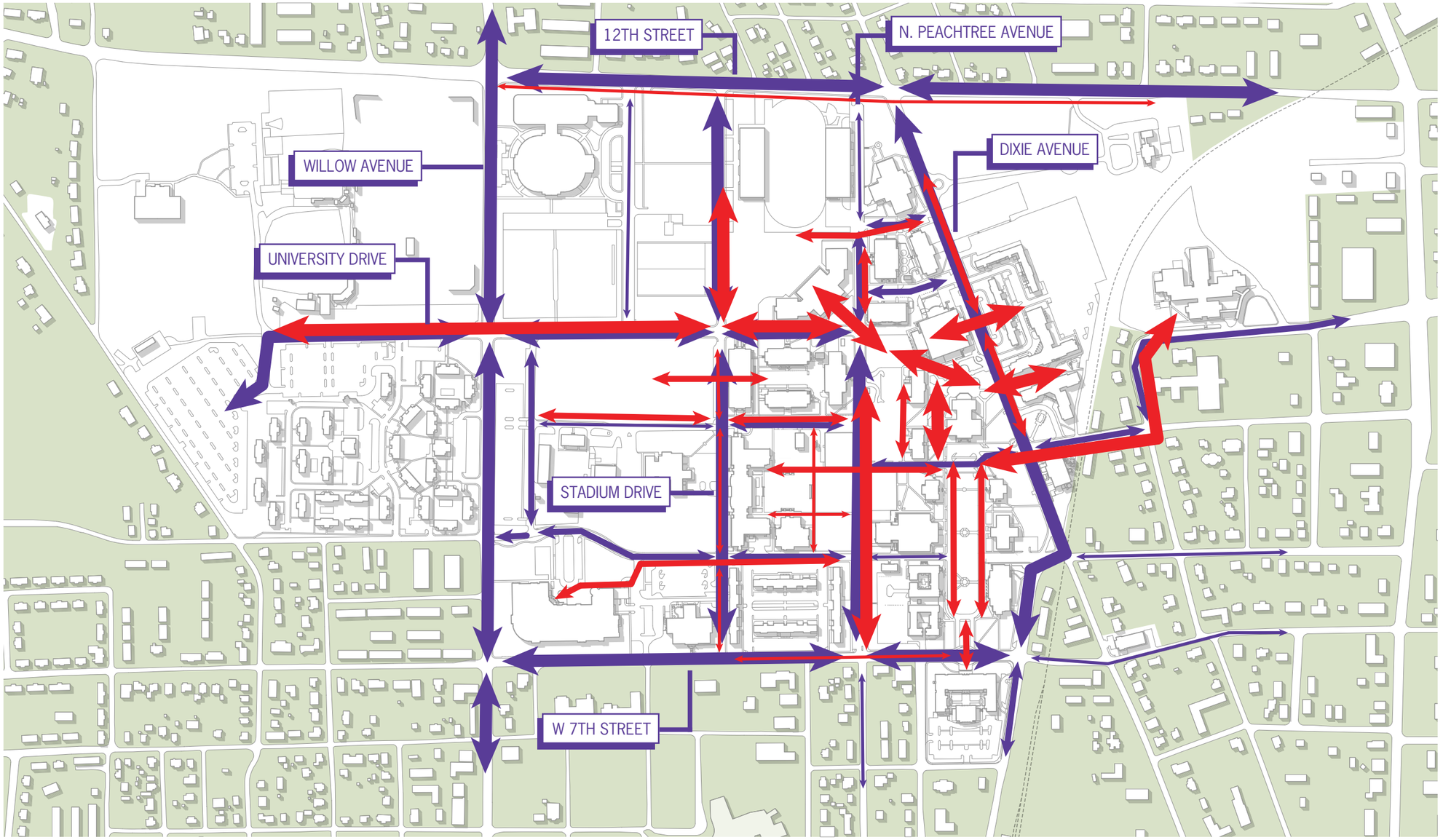


Figure 2.34 Vehicular & Pedestrain Circulation

VEHICULAR & PEDESTRIAN CIRCULATION

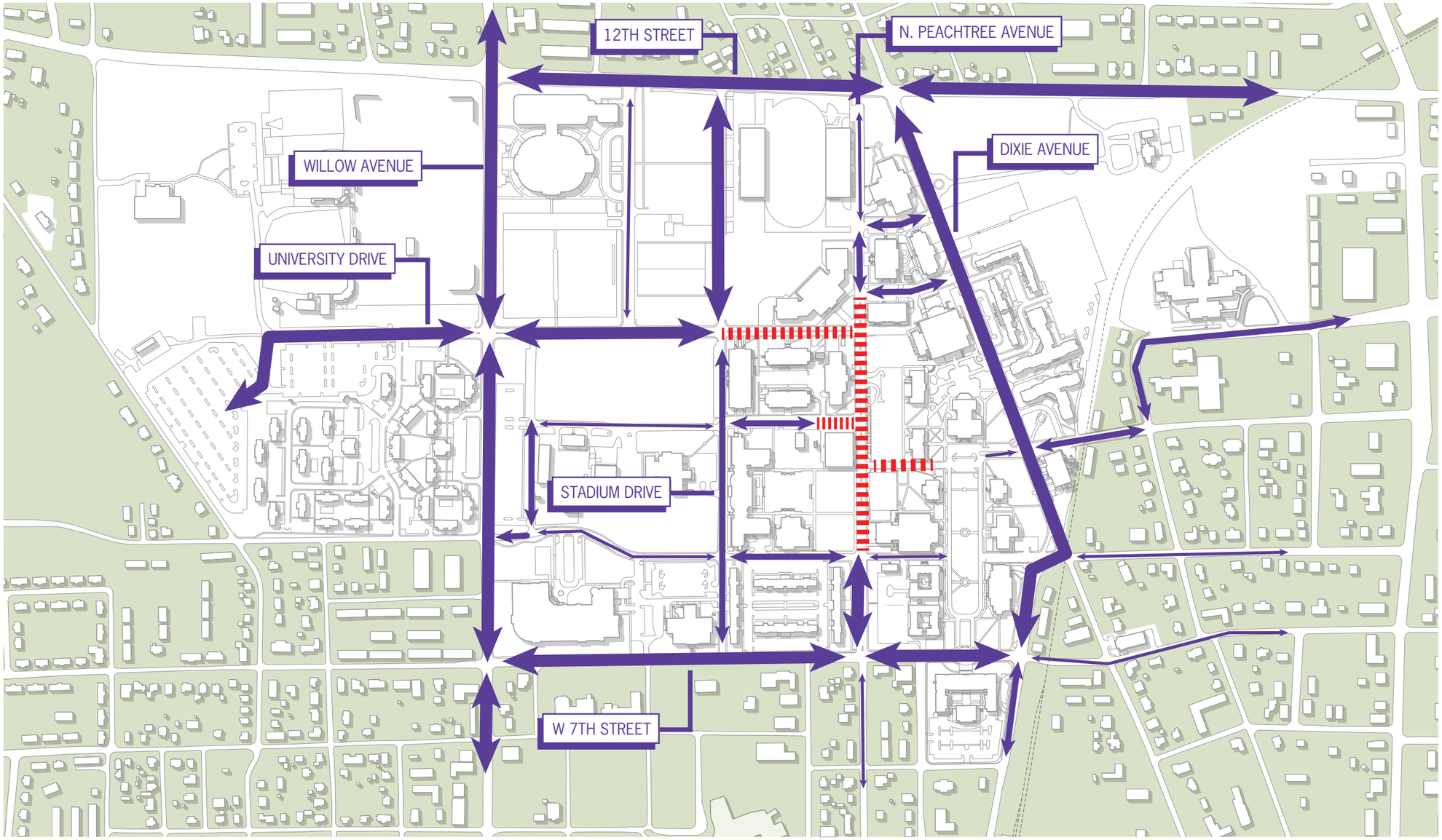


Figure 2.35 Proposed Vehicular Circulation

VEHICULAR AND PEDESTRIAN CIRCULATION IMPROVEMENTS (CURRENTLY UNDERWAY)

WALKING DISTANCE & SHUTTLE ROUTES

A general rule of thumb in planning is that a person can travel approximately ¼ of a mile in five minutes based upon average walking speed. This assumes that the walk is unimpeded by traffic or other obstructions. By applying a ¼ and ½ mile radii to Tennessee Tech's campus, the range of a five and ten-minute walk can be gauged. For the diagram on this page, the center of both the five and ten-minute radius circles were placed at the two most remote points of the campus with a high population. From these two points, central campus can be reached with an approximate ten-minute walk with a twenty-minute walk for traversing the campus. In practice, actual walking times are affected by a number of factors including street lights, traffic, path directness, etc. and therefore will vary from the theoretical.

To assist students and faculty crossing campus, there are currently two shuttle routes. The West Shuttle Route has four pick-up/drop-off points. The shuttle routes and stops can vary from semester to semester based upon usage patterns. The 2014 Master Plan Update envisioned a southern return route for the west shuttle which would provide service to the Marc L. Burnett Recreation and Fitness Center from the center of the campus. A light at the intersection of Willow Avenue and Wings Up Way is currently part of the Willow Avenue expansion plan and will provide a reliable option for a shuttle loop to cross Willow Avenue. Options for a third shuttle route or two overlapping shuttle routes have been illustrated and should be undergo further study as the campus evolves into a more pedestrian environment.

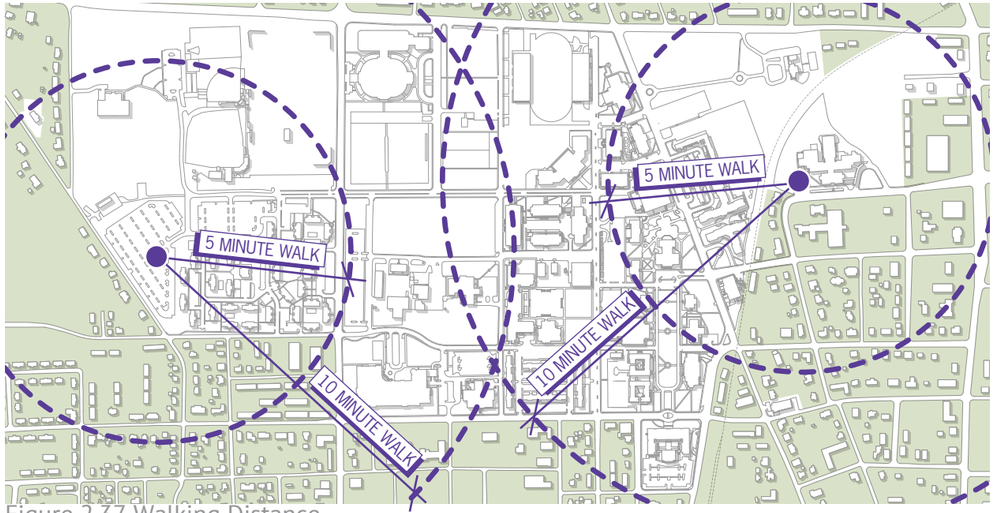
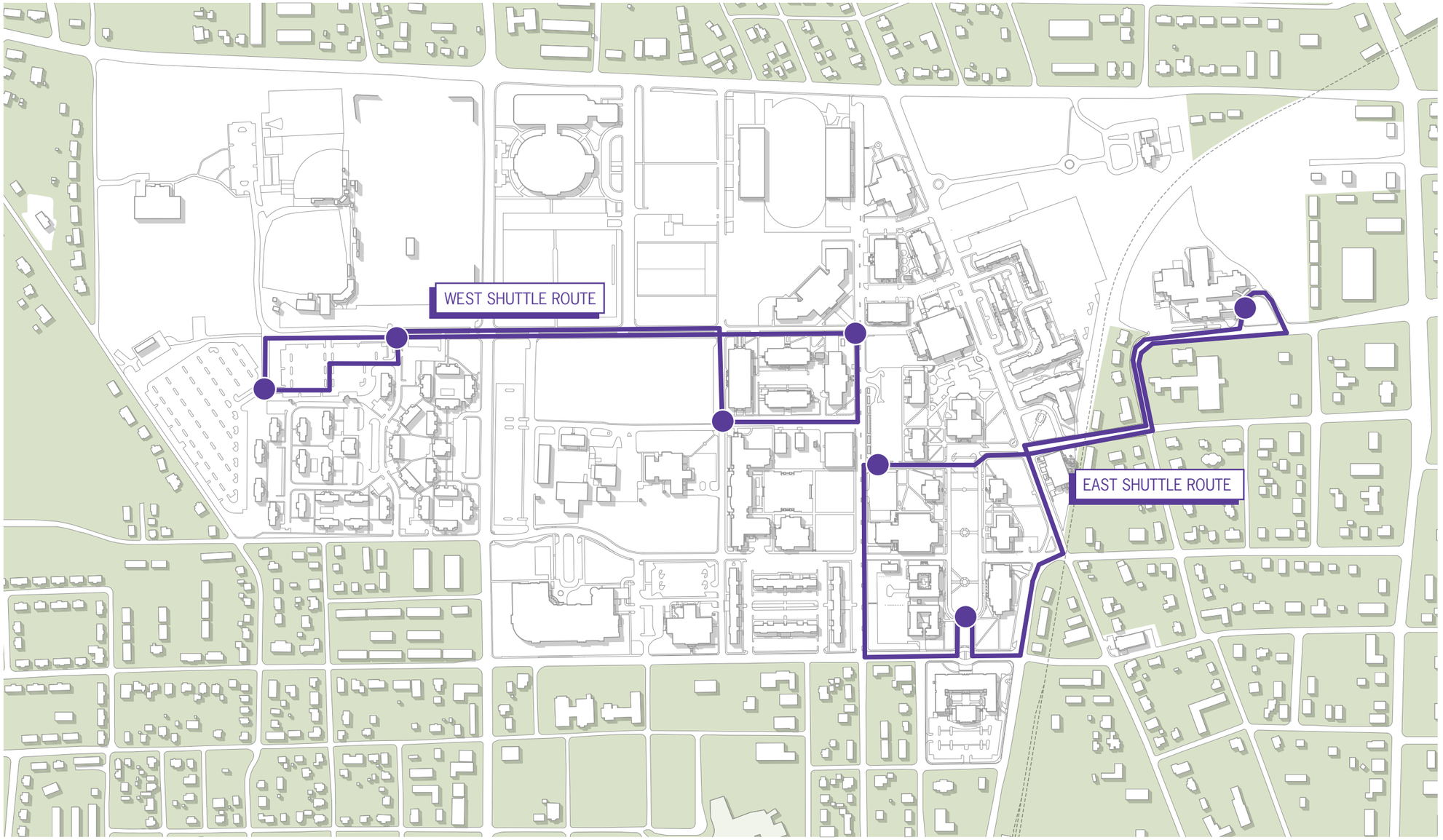


Figure 2.37 Walking Distance

Figure 2.36 Campus Shuttle



LEGEND

- SHUTTLE ROUTE
- SHUTTLE STOP

NORTH

0' 500' 1,000'

Figure 2.38 Existing Shuttle Routes

EXISTING SHUTTLE ROUTES

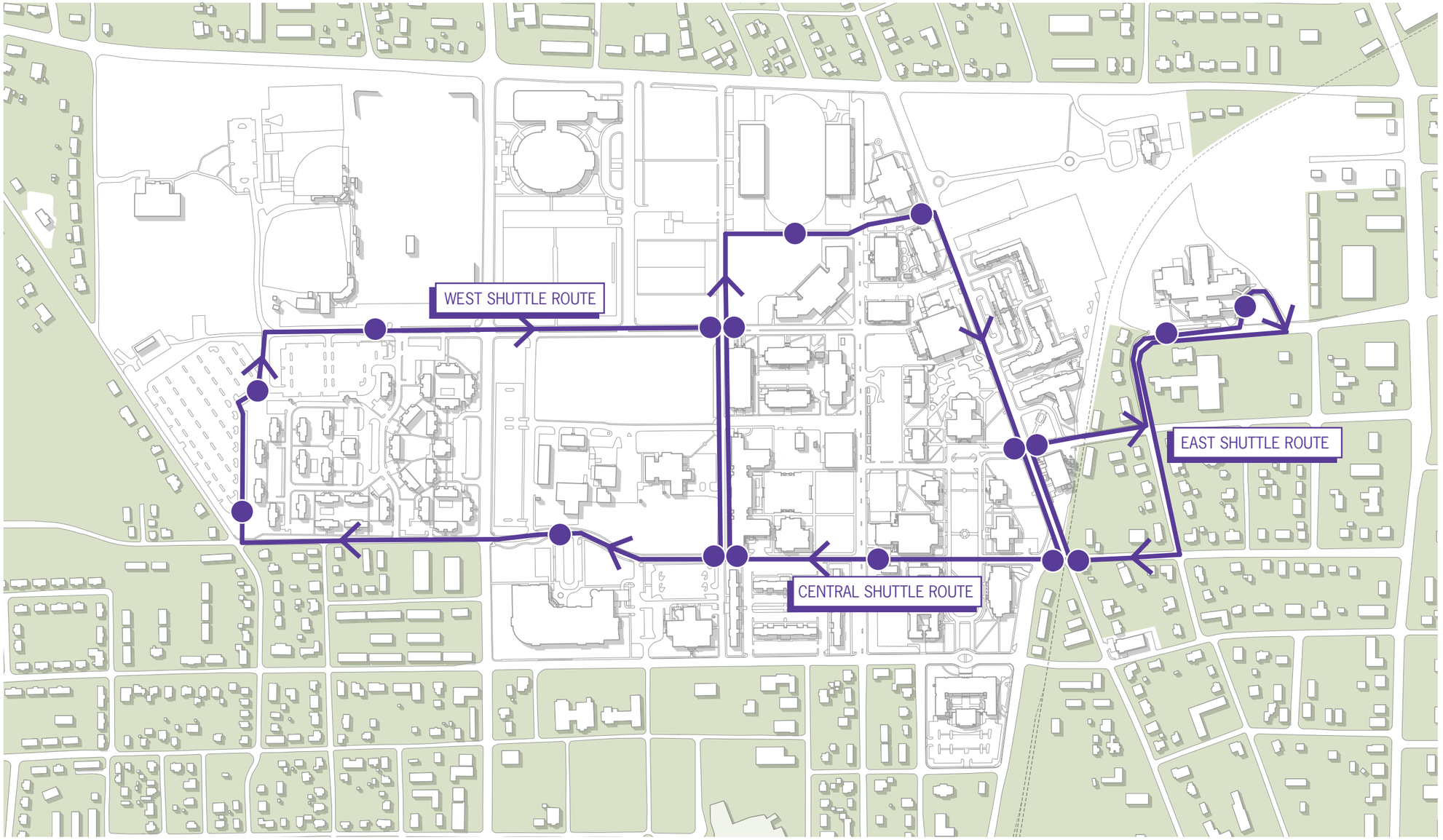


Figure 2.39 Potential Shuttle Route Option 1

POTENTIAL SHUTTLE ROUTE - OPTION 1

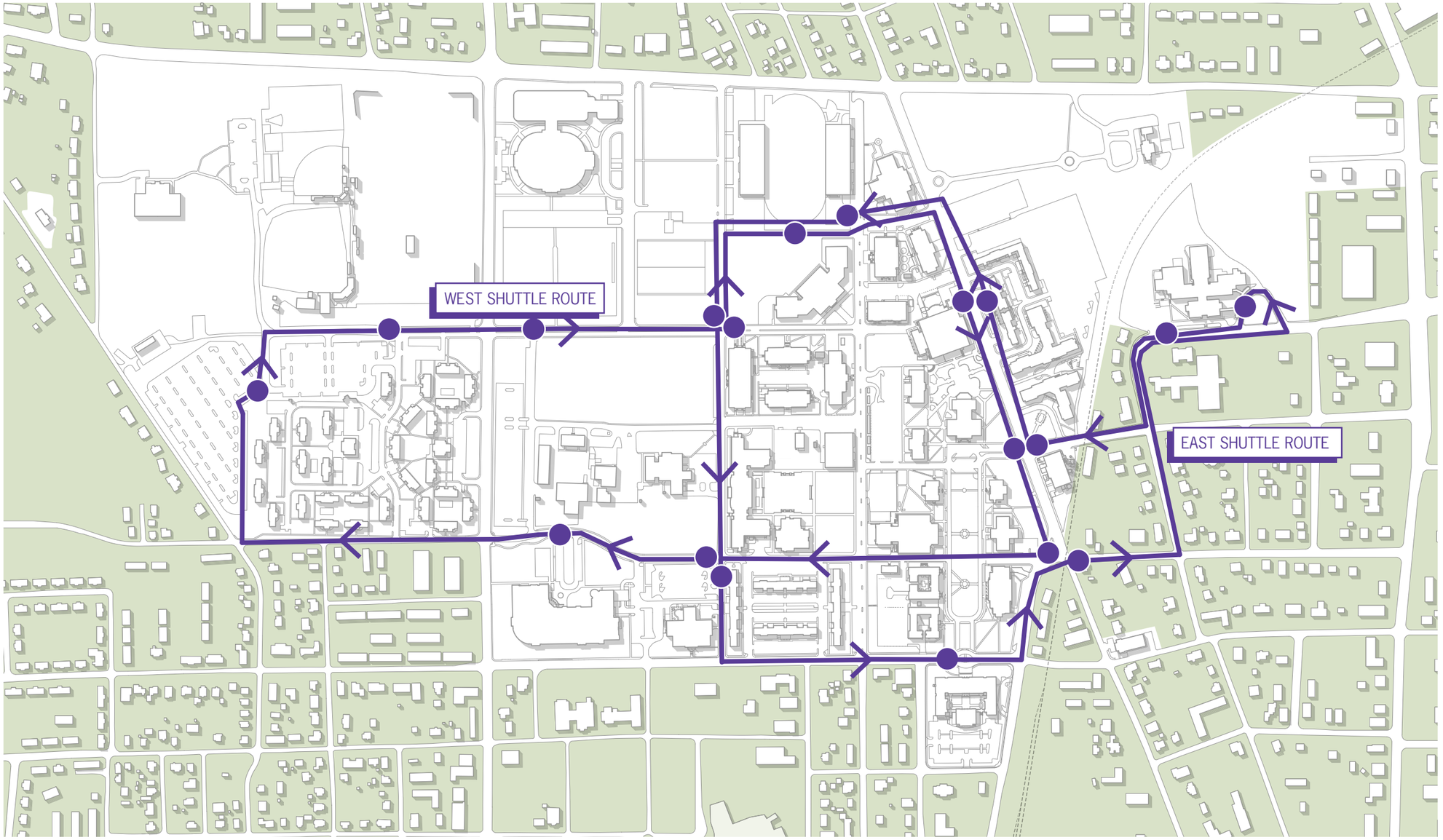


Figure 2.40 Potential Shuttle Route Option 2

POTENTIAL SHUTTLE ROUTE - OPTION 2

MASTER PLAN IMPLEMENTATION

As Master Plan Updates, the 2010 and 2014 Master Plans were limited in scope. A major focus of the 2010 plan was to incorporate the vision developed by the University with an outside consultant for a multi-building science complex. The complex was proposed to incorporate the two blocks that housed the Capital Quad residence halls and the large parking lot to the north across Eighth Street. Other priorities of the update included the integration of the Athletic Master Plan and the development of options for Tech Village. Items that were achieved from that update were the renovation of Tech Village and the addition of a Strength and Conditioning Center for athletics on the west side of campus.

The 2014 Master Plan vision coincided with the inauguration of the new university president, Dr. Philip Oldham. The primary objectives of the 2014 Master Plan update were significantly refining the scope of the science vision, greening the campus which coupled with the relocation of parking, enhancement of the vehicular circulation around the campus and development of the southwest quadrant for an Intramural Building. Much of the primary focus of the update has been accomplished or is in progress.

The vision for a science quad was reduced from a two-block mega structure to a single block with buildings that were scaled to be viable for funding through the State process. The initial building was developed as an interdisciplinary laboratory science building which included all of the chemistry department as well as portions of biology and other related laboratory-oriented sciences. The new buildings Lab Science Commons and Stonecipher Lecture Hall with Science Quadrangle realizing this vision were opened in 2021.

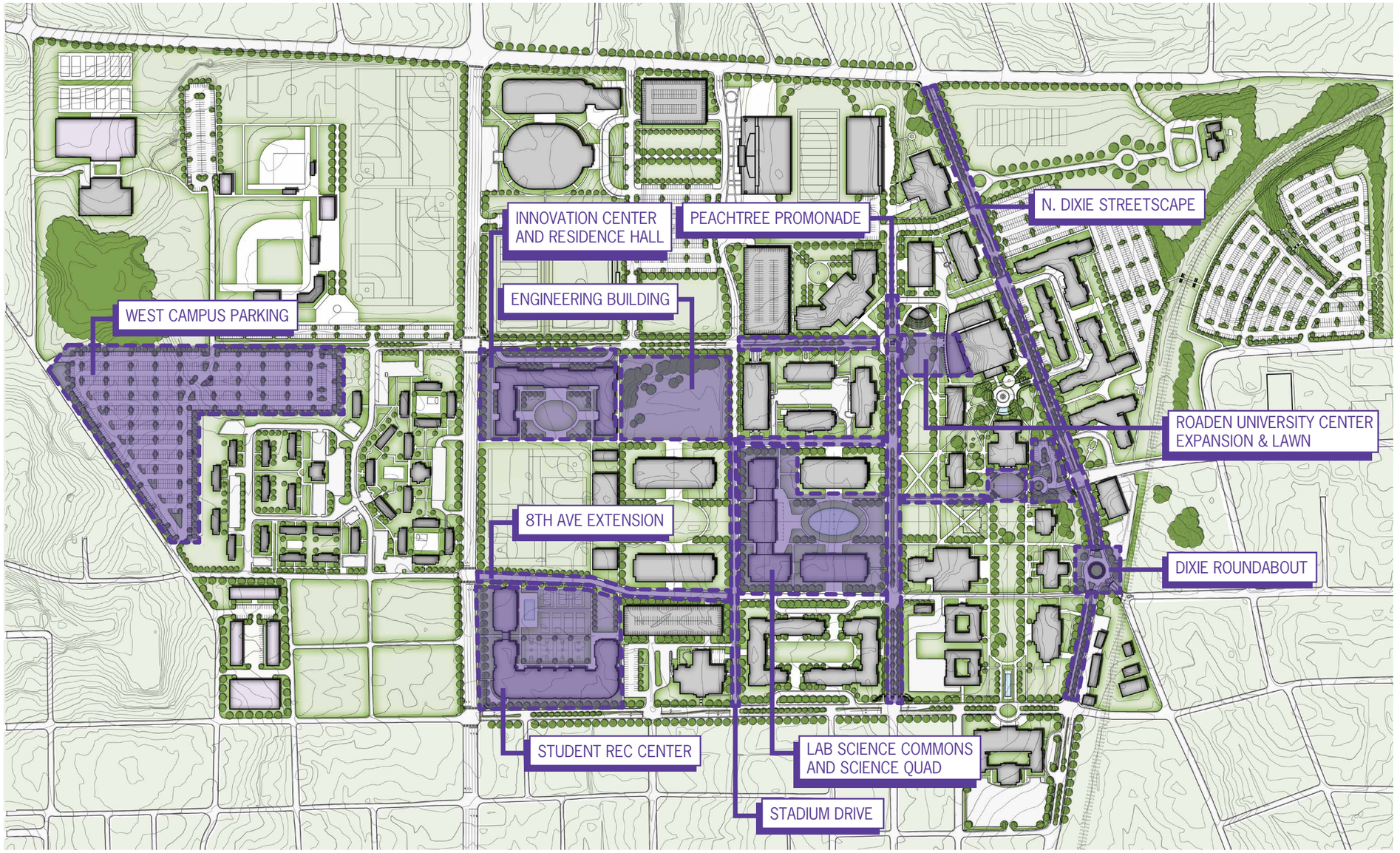
Creating the site for the Lab Science Commons provided a major opportunity to begin the second and third initiatives of the masterplan with the relocation of the 725+ car parking lot north of the Capital Quad Residence Halls to the west side of campus. This initiated the systematic relocation of parking to the perimeter of campus. This also included the development of a shuttle system to bring students to the core of the campus. The new west parking lot was in place prior to the construction of the Lab Science Commons.

A fourth major initiative of the 2014 Master Plan Update was the enhancement of the vehicular circulation at the perimeter of the campus. This effort focused on the development of aesthetically pleasing streetscape which safely accommodates pedestrians through and around the campus. This began with the city's improvements along Seventh Street. The on-campus work is in process with major renovations beginning at Peachtree Avenue, Stadium Drive, West Tenth Street, University Drive, William L. Jones Drive, North Dixie Avenue, and Mahler Avenue.

A fifth initiative of the Update was the development of a Recreation Center at the corner of Willow Avenue and Seventh Street. At that point, the property in the area had to be acquired and the project developed. These were both accomplished with the opening of the Marc L. Burnett Recreation and Fitness Center for students in 2020.

Other initiatives included a new academic building and new campus housing at the corner of N. Willow Avenue and University Drive opposite the new fitness center. At this writing, the new Ashraf Islam Engineering Building and JJ Oakley Innovation Center & Residence Hall are both beginning construction in 2022.

Figure 2.41 Laboratory Science Commons



PROJECTS (REALIZED & IN-PROGRESS)

LIMITS OF CAPITOL PROJECTS

Figure 2.42 30-Year Master Plan (2014) with Accomplished Projects

30-YEAR MASTER PLAN (2014)

SECTION 3

CAMPUS VISION

ENROLLMENT HISTORY

The enrollment history data presented on the following pages outlines university enrollment for the past decade. It should be noted that the 2011 student headcount was the peak and the highest in the last twenty years. The prior decade indicated gradual growth from a student count of 9,217 in 2004. This growth amounted to an additional 2,551 students in the seven years prior to 2011.

Since 2011, the flattening of the population curve in the college age demographic has been reflected in the majority of the state's LGI (Locally Governed Institutions- formerly under the Tennessee Board of Regents) Universities and Community Colleges. Additionally, the universities have experienced a significant reduction in the number of international students. Therefore, the TTU trend over the past ten years is very comparable to the trends of the state institutions as outlined in THEC (Tennessee Higher Education) Fact Book.

Other notable items based upon the Tennessee Higher Education Fact Book 2020-2021:

- Tennessee Tech has the highest percentage full-time enrollment of the LGI universities. At 78%, it is the same as UT Knoxville and just under UT Chattanooga and UT Health Science Center at 82%.
- TTU is second in the state, only to UT Knoxville, for highest average ACT score.
- TTU has the second lowest off-campus enrollment of the LGI institutions.
- Tennessee Tech has the highest freshman to sophomore retention rate of the LGI institutions and is only exceeded by UT Knoxville and UT Chattanooga in retention at all levels of Tennessee's higher education.
- TTU consistently has the highest four and six-year graduation rates of all the LGI institutions.
- TTU has the second highest rate of full-time faculty teaching lower division courses of any state higher education institution.
- TTU students have the lowest average debt of any state university graduates.
- TTU consistently has the second lowest default rate for students with financial assistance.
- TTU ranks the highest of the state universities for Quality Assurance points and funding.

Figure 3.1 "Wings Up"

TTU Ten Year Enrollment Trends - University

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	% Change 1 Yr.	% Change 3 Yr. Ave.
Total Headcount	11,768	11,469	11,118	11,339	10,900	10,492	10,504	10,186	10,140	10,177	0.4%	-1.0%
Undergraduate	9,920	9,957	10,052	10,314	9,801	9,437	9,365	9,006	8,957	8,778	-2.0%	-2.1%
Graduate	1,848	1,512	1,066	1,025	1,099	1,055	1,139	1,180	1,183	1,399	18.3%	7.4%
FTE	9,542	9,586	9,762	9,890	9,439	9,125	9,019	8,750	8,724	8,683	-0.5%	-1.3%
Undergraduate	8,861	8,955	9,156	9,311	8,837	8,564	8,428	8,153	8,117	7,964	-1.9%	-1.9%
Graduate	681	631	606	579	602	560	591	597	607	719	18.5%	7.0%
SCH*	141,086	141,894	144,612	146,619	139,779	135,189	133,508	129,466	129,037	128,085	-0.7%	-1.4%
Undergraduate	132,915	134,320	137,342	139,670	132,554	128,464	126,413	122,301	121,758	119,459	-1.9%	-1.9%
Graduate	8,171	7,574	7,270	6,949	7,225	6,725	7,095	7,165	7,279	8,626	18.5%	7.0%
College												
Agriculture & Human Ecology	528	594	589	593	576	576	550	546	522	508	-2.7%	-2.6%
Arts & Sciences	1,652	1,694	1,650	1,609	1,541	1,518	1,471	1,432	1,430	1,346	-5.9%	-2.9%
Business	1,360	1,393	1,367	1,474	1,470	1,482	1,413	1,333	1,310	1,360	3.8%	-1.2%
Education	2,636	2,408	2,292	2,087	1,918	1,766	1,723	1,733	1,772	1,934	9.1%	4.0%
Engineering	2,284	2,501	2,786	3,046	2,933	2,793	2,834	2,733	2,729	2,749	0.7%	-1.0%
Fine Arts	292	300	313	312	310	308	305	293	291	265	-8.9%	-4.5%
Interdisciplinary Studies	1,255	1,148	1,163	1,198	1,122	1,100	1,176	1,145	1,089	1,023	-6.1%	-4.5%
Nursing	627	723	766	766	733	706	759	767	775	774	-0.1%	0.7%
Non Degree Seeking	1,134	708	192	254	297	243	273	204	222	218	-1.8%	-6.1%

*SCH is based on level of student, not course.

Table 3.1 TTU Ten Year Enrollment Trends Chart

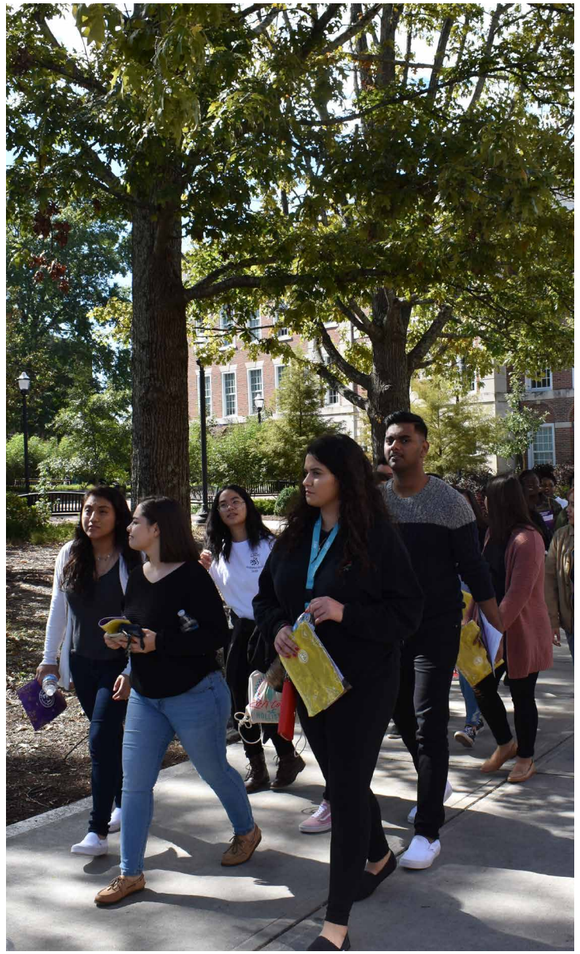


Figure 3.2 Students Touring Campus

TTU TEN YEAR ENROLLMENT TRENDS - UNIVERSITY

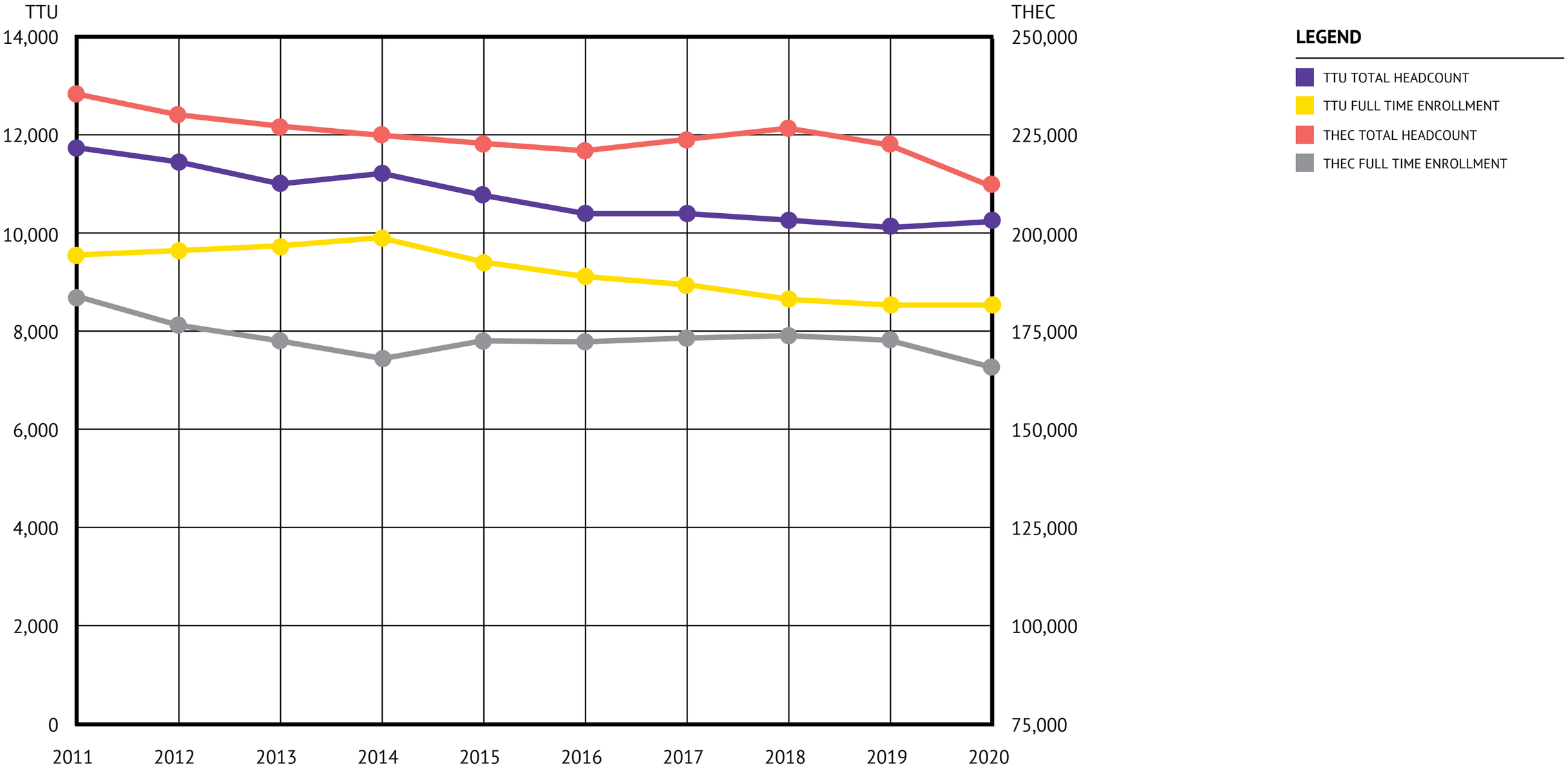
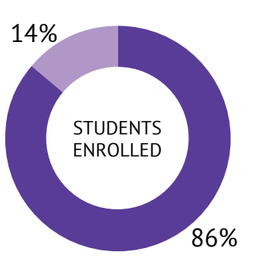


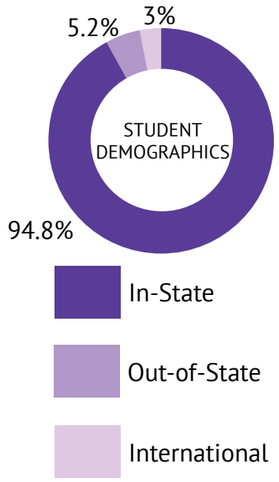
Table 3.2 Ten Year Enrollment Trends Chart

TEN YEAR ENROLLMENT TRENDS - UNIVERSITY VS. THEC

UNIVERSITY GOALS

The long-term goal of the Tennessee Tech University 2022 Master Plan is envisioning a campus of 15,000 students. As the first milestone, the initial focus of the Master Plan is to envision the campus at a 12,000-student threshold. This initial goal is reflected in the University's 2025 Goals. This set of goals also includes goals for improving Minority Enrollment, 1-2 Year Retention, 4 Year Graduation Rate and Sponsored Research. Worth noting is that the goals were established in 2018 with a baseline of 2018-2019. Like most institutions, with the effects of the current pandemic, the University enrollment is currently tracking under the projected goals.





Tennessee Tech 2025 Goals

	YEAR	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	GOAL
BASELINE (2018-2019)	Enrollment (headcount)	**10,186**	*10,427*	*10,674*	*10,927*	*11,186*	*11,451*	*11,722*	*12,000*	12,000
	Minority Enrollment	**16.00%**	*16.74%*	*17.52%*	*18.34%*	*19.19%*	*20.09%*	*21.02%*	*22.00%*	22.00%
	1-2 Year Retention	**75.00%**	*75.96%*	*76.94%*	*77.92%*	*78.92%*	*79.94%*	*80.96%*	*82.00%*	82.00%
	4-year Graduation Rate	**34.60%**	*36.47%*	*38.44%*	*40.51%*	*42.70%*	*45.01%*	*47.44%*	*50.00%*	50.00%
	Sponsored Research (millions)	**$20.23**	*$22.30*	*$24.58*	*$27.09*	*$29.87*	*$32.92*	*$36.29*	*$40.00*	$40.00

Table 3.3 TTU Goals

Note: All goals were set prior to pandemic

Figure 3.3 Students Representing TTU Pride

THEC GUIDELINES

The THEC Space Guidelines section lists each of the space standards in the THEC manual. The size of various categories of offices, the average hours per week that a classroom or lab should be scheduled, the percent of seats and workspaces that should be occupied when scheduled, the NASF/station for each department's instructional lab, and the amount of space per researcher by research category and by discipline.

The amount of space recommended for a department's instructional labs is based on the average lab course section size and the number of weekly student lab contact hours. It is also based on the number of hours per week that a lab is expected to be scheduled (THEC Guidelines) and the amount of space per student for that discipline, also from the THEC Guidelines section of the Assumptions worksheet.

The amount of research space required for applicable programs is based on the percent of faculty conducting research in their office and the percent of faculty requiring a lab – both percentages are on the Assumptions Worksheet provided by the Deans. For some departments, the current percentage and the future percentage remained the same. Usually, the projected column increased. The space allocation is calculated by multiplying the number of researchers by the square foot guideline for the specific discipline on the THEC Guidelines section of the Assumptions Worksheet.

The structure of the Space Needs Worksheet for each college is the same and provides the requirements for each type of space for each department or school within the college. While the detailed worksheet for each college is not published within the master plan document, the summary sheet outlining the Academic Space Model is included. The information on the summary sheet is linked back to the data in the Assumption Worksheet which was provided by the Dean.

The Academic Space Model spreadsheet indicates the current number of faculty in each department as well as the projected faculty at the 12,000 and 15,000 student headcount milestones as indicated in the green shading. The next series of columns, shaded blue, indicate the Existing Space for each department and the projected needs currently and at the 12,000 and 15,000 student headcount milestones. This provides the summary of space needed for each department based upon the THEC guidelines. The third series of columns, shaded purple, indicates the difference in each category versus the projected need. An excess is indicated by a positive number and a deficit indicated by a negative number.

Figure 3.4 New Sculpture in Lab Science Commons Atrium

SPACE NEEDS ANALYSIS

A space allocation model was designed and created specifically for Tennessee Tech and the campus planning process. It is based on the Tennessee Higher Education Commission (THEC) Space Guidelines. The model is imported in a MS Excel file so that the University can own and use it for its planning purposes once the campus plan is finalized.

The file is structured around 10 worksheets: an Assumption worksheet, a Summary worksheet, and eight worksheets – one for each of the colleges and school. The Summary worksheet is just that, it summarizes the results of the space allocation for the colleges and school and lists the existing college and department net assignable square feet, current needed space, and the projected amount of space need.

Each of the college and school worksheets are linked to the Assumption worksheet – the first worksheet in the MS Excel file and the key to all the data that drives the model. Changing a number in this worksheet has an impact on the net assignable square feet either for the entire University or just for one college or one department. Change the standard for the size of the faculty office and it is a universal change. Change the number of PhDs in a department and it changes just that department's space requirements.

The Assumptions Worksheet is structured around two areas: the top portion of the worksheet includes the data and projections from each college Dean for every academic department; the bottom portion of the worksheet outlines the THEC Space Guidelines.

Each Dean was asked to provide the current faculty, staff, and student counts as well as estimated projected numbers. The fields that the Deans were asked to respond to are listed below.

Students

- Number of PhD Students
- Number of Funded Masters Level Grad Assistants
- Number of GTAs and GRAs if not included above
- Number of Undergraduate Majors
- Number of Post Docs
- Number of MA and EdS Students not counted above

Faculty

- Number of Faculty, Full-time Tenure/Tenure Track
- Number of Instructors/Lecturers, Full-time
- Number of Adjunct Faculty
- Number of FTE Faculty
- Number of Faculty, Emeriti (Productive)
- Number of Visiting Faculty/Scholars
- Lab Assistants

Research and Technical Staff

- Number of Research Associates, Full-time
- Number of Research Associates, Part-time
- Number of Technicians/Lab-Based Research
- Number of Technicians/Lab-Based Instruction
- Average Grad Students per Faulty in Research Lab

Percent of FTE Faculty Doing Research

- % Laboratory Based Research
- % Office Based Research

Undergraduate Researchers

- Number of Undergrads involved in Research

Staff

- Number of Administrators, Full-time
- Number of Administrators, Part-time
- Number of Clerical, Full-time
- Number of Clerical, Part-time

Number of Undergraduate Student Workers

- Student Workers Office-related

Instructional Labs

- Average Section Size
- Contact Hours

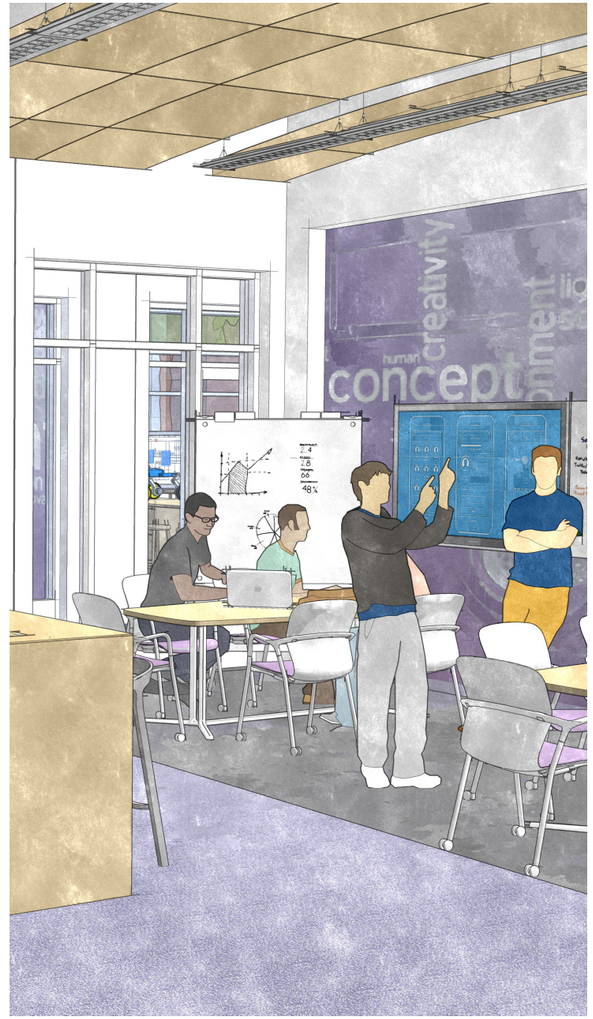


Figure 3.5 Innovation Center early Master Plan concept

SPACE NEEDS ANALYSIS

An overwhelming majority of colleges indicate a current deficit of space. The only exceptions are the College of Education which includes gyms at Memorial Gym as well as the Academic Wellness Center thus inflating their numbers. Likewise, the Military Science program is including space in the Military Science Building (former Infirmary) as well as the West Stadium. Since both buildings have Physical Conditions scores of less than 50, these spaces are inadequate.

The goal of the master plan is to address the needs of the campus at the 12,000 student count milestone providing a guide for capital improvements to address the needs. The master plan will also present a vision for accommodating the space needs at the 15,000 student horizon. The guide will directly reflect the space needs outlined in the Space Model.

While every college indicates a significant space shortage at the 12,000 and 15,000 student milestones, the first hurdle is to address the space deficiencies at the current time. The 119,493 net square foot overall shortfall in academic space is partially addressed with the new engineering building which is under construction as of this writing. While the new building will address 75% of the College of Engineering's current shortfall, the poor quality of the research space at East Stadium and the poor condition of Lewis Hall and the Foundry (all with Facility Conditions ratings in the 50's or below) indicate a current need for an additional engineering building of similar size. Therefore, with the current deficit, even with no growth, a significant space deficit will remain after the construction of the new Ashraf Islam Engineering Building.

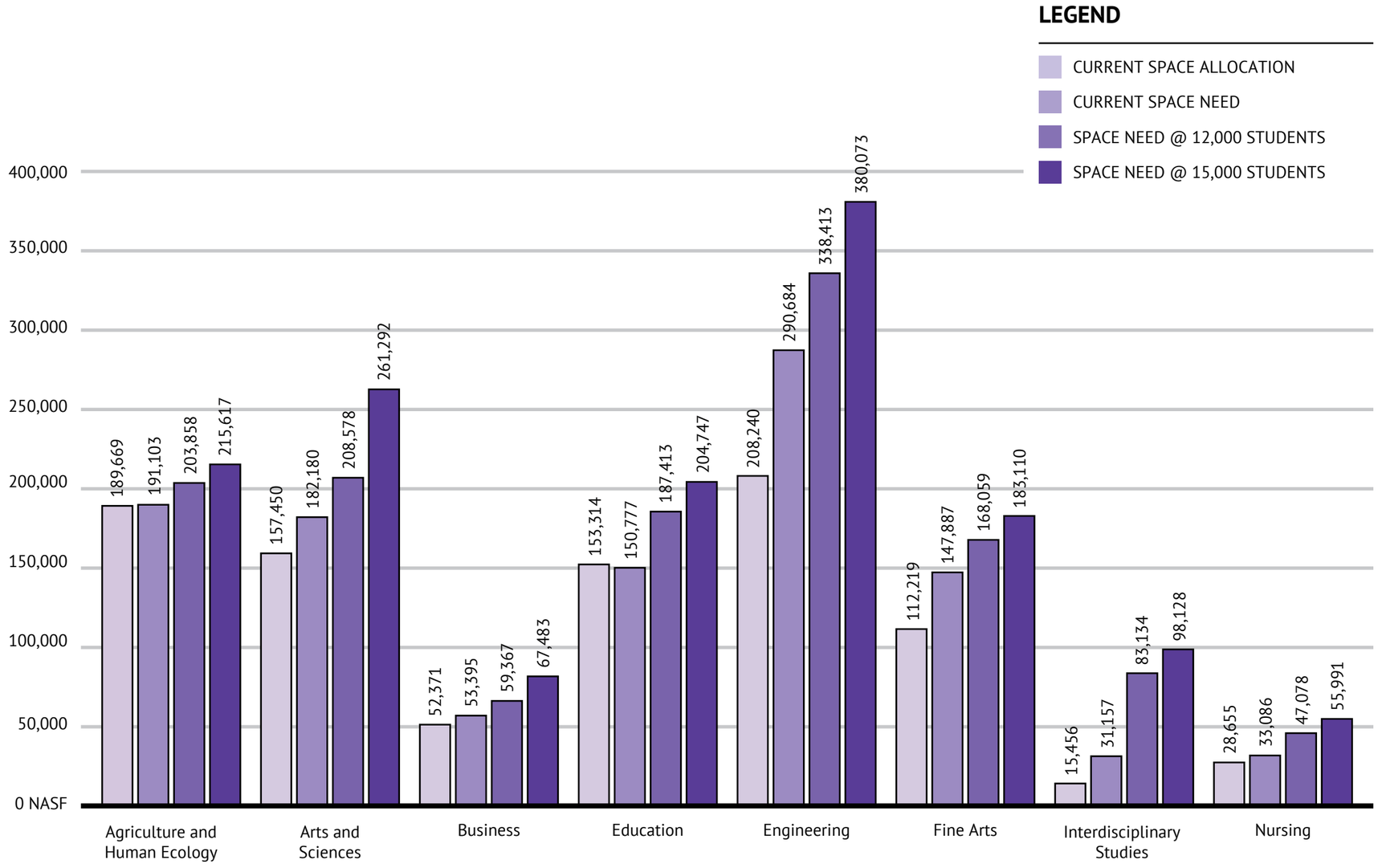


Table 3.4 Academic Space Model Graph

Academic Space Model	Faculty			NASF				NASF			Existing Conditions			
	2020 Current	12,000 Proj.	15,000 Proj.	Existing	Current Need	12,000 Need	15,000 Need	Current (Shortfall)	12,000 (Shortfall)	15,000 (Shortfall)	Building	Gross Area	Year Built	Campus Score PFIS
College of Agriculture and Human Ecology														
School of Agriculture	11.0	12.0	15.0	167,769	176,833	182,552	189,963	(9,064)	(14,783)	(22,194)	Oakley Hall	54,635	1931	89.5
School of Human Ecology	8.6	8.0	10.0	21,900	14,270	21,306	25,654	7,630	594	(3,754)	Oakley Hall			
College of Agriculture and Human Ecology Totals	19.6	20.0	25.0	189,669	191,103	203,858	215,617	(1,434)	(14,189)	(25,948)				
College of Arts and Sciences											Stonecipher Lecture Hall	17,652	2020	
Biology	19.4	19.5	24.4	59,779	50,499	59,532	79,174	9,280	247	(19,395)	Pennebaker Hall	59,679	1968	62
Chemistry	22.2	22.2	27.2	62,284	46,542	48,649	69,828	15,742	13,635	(7,544)	Lab Science Commons	148,188	2020	
Earth Sciences	7.8	8.8	8.8	13,744	10,039	11,035	11,060	3,705	2,709	2,684	Kittrell Hall	19,015	1916	88.4
English	34.8	40.8	51.0	19,649	18,649	21,694	25,791	1,000	(2,045)	(6,142)	Henderson Hall	35,831	1931	72
Foreign Languages	7.5	7.6	9.5	3,770	4,296	4,267	4,653	(526)	(497)	(883)	Oakley Hall	54,635	1931	89.5
History	12.0	13.8	17.3	5,601	7,163	8,202	9,153	(1,562)	(2,601)	(3,552)	Henderson Hall			
Mathematics	26.5	30.4	38.0	13,543	19,416	22,825	23,903	(5,873)	(9,282)	(10,360)	Bruner Hall	57,668	1966	70.6
Physics	9.0	10.0	10.0	11,129	16,912	21,963	25,585	(5,783)	(10,834)	(14,456)	Bruner Hall			
Sociology and Poli Science	16.2	21.4	26.8	7,019	8,664	10,411	12,145	(1,645)	(3,392)	(5,126)	Daniel Hall	18,356	1921	46.9
College of Arts and Sciences Totals	155.4	174.5	212.9	196,518	182,180	208,578	261,292	14,338	(12,060)	(64,774)				

represents new addition of Laboratory Science Commons with partial occupancy of Pennebaker

represents new renovation of Bruner Hall

College of Business														
Accounting and Law	16.2	21.4	26.8	5,479	8,876	10,623	12,357	(3,397)	(5,144)	(6,878)	Johnson Hall	68,171	1970	79.6
Business Management	8.0	8.0	10.0	5,247	7,098	7,026	7,827	(1,851)	(1,779)	(2,580)	Johnson Hall			
Business Information Technology	9.0	15.2	19.0	5,248	6,725	9,043	10,337	(1,477)	(3,795)	(5,089)	Johnson Hall			
Economics	7.0	7.2	9.0	1,925	3,491	3,501	4,063	(1,566)	(1,576)	(2,138)	Johnson Hall			
Finance	5.0	5.6	7.0	1,925	2,835	3,212	3,722	(910)	(1,287)	(1,797)	Johnson Hall			
Marketing	5.0	6.4	8.0	1,926	3,270	3,458	4,052	(1,344)	(1,532)	(2,126)	Johnson Hall			
International Bus & Cult	0.0	0.0	0.0	-	365	240	240	(365)	(240)	(240)	Johnson Hall			
Basic Business	0.0	0.0	0.0	-	765	365	365	(765)	(365)	(365)	Johnson Hall			
College of Business	0.0	0.0	0.0	30,621	19,970	21,899	24,520	10,651	8,722	6,101	Johnson Hall			
College of Business Totals	50.2	63.8	79.8	52,371	53,395	59,367	67,483	(1,024)	(6,996)	(15,112)				
College of Interdisciplinary Studies														
Communications	8.0	16.0	20.0	7,215	6,958	15,349	17,367	257	(8,134)	(10,152)	Henderson Hall			
School of Environmental Studies	3.0	7.2	9.0	1,537	8,530	32,474	38,547	(6,993)	(30,937)	(37,010)	Southwest Hall	23,500	1973	94.8
School of Interdisciplinary Studies	1.0	8.0	10.0	4,093	6,130	14,201	16,786	(2,037)	(10,108)	(12,693)	Southwest Hall			
School of Professional Studies	1.0	8.0	10.0	2,611	9,539	21,110	25,428	(6,928)	(18,499)	(22,817)	Southwest Hall			
College of Interdisciplinary Studies Totals	13.0	39.2	49.0	15,456	31,157	83,134	98,128	(15,701)	(67,678)	(82,672)				

Table 3.5 Academic Space Model

ACADEMIC SPACE MODEL

Academic Space Model	Faculty			NASF				NASF			Existing Conditions			
	2020 Current	12,000 Proj.	15,000 Proj.	Existing	Current Need	12,000 Need	15,000 Need	Current (Shortfall)	12,000 (Shortfall)	15,000 (Shortfall)	Building	Gross Area	Year Built	Campus Score PFIS
College of Education											Health & P.E. Building	87,181	1929	49.1
Curriculum & Instruction	48.0	61.6	77.0	21,529	33,129	43,235	50,777	(11,600)	(21,706)	(29,248)	Bartoo Hall	18,326	1916	80.9
Counseling & Psychology	16.0	16.8	21.0	11,298	11,947	15,315	17,130	(649)	(4,017)	(5,832)	T J Farr Bldg	26,299	1928	79.6
Exercise Science	14.0	16.0	20.0	87,102	73,499	92,788	97,871	13,603	(5,686)	(10,769)	Matthews Hall	25,199	1951	47.3
STEM Center	0.0	0.0	0.0	18,940	16,535	18,570	16,691	2,405	370	2,249	Ray Morris Hall	25,300	2008	95.7
College of Education	6.0	8.0	8.0	12,792	12,684	13,565	18,307	108	(773)	(5,515)	T J Farr Bldg			
COEd w/SSC				1,653	2,983	3,940	3,971	(1,330)	(2,287)	(2,318)	Academic Wellness Center	77,895	1991	72.3
Teacher Education			Included above											
Learning Resources Center			Included above								Bartoo Hall			
Child Development Lab			Included above								Southwest Hall			
CAT			Included above											
College of Education Totals	84.0	102.4	126.0	153,314	150,777	187,413	204,747	2,537	(34,099)	(51,433)				
College of Engineering														
General & Basic	6.0	10.6	13.0	6,500	16,714	24,278	29,888	(10,214)	(11,311)	(27,135)	Clement Hall	62,887	1965	62.5
Chemical	10.5	10.5	10.5	21,900	32,891	35,693	39,686	(10,991)	(9,104)	(13,097)	Prescott Hall	111,955	1971	72.6
Computer Science	23.0	24.3	28.5	13,408	22,063	26,674	32,682	(8,655)	(7,710)	(13,718)	Bruner Hall	57,668	1966	70.6
Electrical & Comp	16.0	17.6	21.0	25,300	35,281	40,468	47,525	(9,981)	(9,199)	(16,256)	Brown Hall	55,001	1967	68.7
Manufacturing	7.0	9.0	9.0	23,600	14,788	18,375	18,846	8,812	10,002	9,531	Lewis Hall	26,592	1921	50.9
Mechanical	22.0	26.6	28.0	44,000	43,291	51,525	52,681	709	(613)	(1,769)	Brown Hall			
Dean's Office/SSC	3.0	3.0	3.0	30,600	73,093	76,709	90,155	(42,493)	(25,134)	(38,580)	Clement Hall			
Center for Energy Systems Research				5,300	5,300	9,113	9,113	-	(3,813)	(3,813)	Prescott Hall			
Center for Manufacturing Research				10,000	10,000	17,194	17,194	-	(7,194)	(7,194)	Brown Hall			
Cybersecurity Ed., Research & Outreach Ctr.				2,300	2,300	2,300	2,300	-	2,761	2,761	Prescott Hall			
Water Resource Center														
College of Engineering Totals	104.5	119.2	134.0	212,108	290,684	338,413	380,073	**(78,576)**	**(126,305)**	**(167,965)**				
New Engineering Building- projected 2024								63,083	63,083	63,083				
Total after New Building								(15,493)						
Less antiquated current Engineering space @ East Stadium (campus worst 45.2 rating)- Primarily Mech. + Civil/Environ.								(24,593)	(24,593)	(24,593)	East Stadium	91,851	1967	45.2
Less Demolished space @ Lewis Hall | Foundry								(23,600)	(23,600)	(23,600)	Foundry	3,604	1943	59.9
Less vacated Foundation Hall Space								(8,853)	(8,853)	(8,853)	Foundation Hall	134,228	1932	65.4
College of Engineering Projected Totals								**(72,539)**	**(120,268)**	**(161,928)**				

represents new renovation of Bruner Hall

Table 3.5 Academic Space Model

ACADEMIC SPACE MODEL

Academic Space Model	Faculty			NASF				NASF		
	2020 Current	12,000 Proj.	15,000 Proj.	Existing	Current Need	12,000 Need	15,000 Need	Current (Shortfall)	12,000 (Shortfall)	15,000 (Shortfall)
College of Fine Arts										
School of Art, Craft, and Design	7.0	7.2	9.0	10,942	28,034	31,350	38,517	(17,092)	(20,408)	(27,575)
School of Music	23.0	26.0	26.0	30,971	46,874	63,730	71,614	(15,903)	(32,759)	(40,643)
								(32,995)	(53,167)	(68,218)
Appalachian Craft Center (off campus)	5.0	5.0	5.0	70,306	72,979	72,979	72,979	(2,673)	(2,673)	(2,673)
College of Fine Arts Totals	35.0	38.2	40.0	112,219	147,887	168,059	183,110	(35,668)	(55,840)	(70,891)
School of Nursing										
School of Nursing	15.0	22.4	28.0	28,655	33,086	47,078	55,991	(4,431)	(18,423)	(27,336)
School of Nursing Totals	15.0	22.4	28.0	28,655	33,086	47,078	55,991	(4,431)	(18,423)	(27,336)
Honors College										
Honors College				1,335	1,657	2,111	2,804	(322)	(776)	(1,469)
Honors College Totals	0.0	0.0	0.0	1,335	1,657	2,111	2,804	(322)	(776)	(1,469)
Military Science										
Military Science	5.0	6.4	8.0	9,854	9,066	10,256	11,065	788	(402)	(1,211)
Military Science Totals	5.0	6.4	8.0	9,854	9,066	10,256	11,065	788	(402)	(1,211)
University Totals	482	586	703	971,499	1,090,992	1,308,267	1,480,310	**(119,493)**	**(336,768)**	**(508,811)**
New Engineering Building								63,083	63,083	63,083
Less antiquated current Engineering space @ East Stadium (campus worst 45.2 rating)								(24,593)	(24,593)	(24,593)
Total Projected Space Shortfall (NSF)								**(81,003)**	**(298,278)**	**(470,321)**

Existing Conditions			
Building	Gross Area	Year Built	Campus Score PFIS
Foundation Hall	134,228	1932	65.4
Bryan Fine Arts Building	55,110	1981	75.5
Robert and Gloria Bell Hall	66,302	2006	100

Table 3.5 Academic Space Model

ACADEMIC SPACE MODEL

CLASSROOM OVERVIEW

As part of the overall space needs analysis, every academic space on campus was accounted for with a focus on classrooms. Tennessee Tech currently has 150 classrooms. In the fall of 2019, on average the classrooms were scheduled 19 hours per week during the day. The THEC utilization target for classrooms is 30 hours per week during the day. Therefore, the classroom count was held at its current level for the Academic Space Model.

There are several ways to increase classroom utilization calculations. One option is to remove classrooms from the inventory. With fewer spaces to schedule courses, each existing space will need to accommodate more sections and the utilization will automatically increase. Those classrooms that were removed from the inventory can be renovated for other uses. This is not recommended as a general strategy since the University is planning for increased enrollment.

Another option includes increasing the number of course sections. This is accomplished by increasing student enrollment. Theoretically, the current TTU classroom inventory can support an enrollment of 14,000 students if utilized at 30 hours per week.

Another consideration is that most of TTU's existing classrooms were designed for a style of teaching that may not be as effective today as the more contemporary approach of experiential, active learning. The use of tablet arm chairs in rows, cramped into a classroom to maximize capacity is outdated. The pedagogy of today, in many cases, trends away from strictly lecture formats in many curriculums with emphasis on collaborative and active teaching styles. Therefore, new classrooms are most often equipped with movable tables and chairs. The more collaborative and active classrooms are equipped with elements such as group tables, movable seating arrangements, flexible seating configurations, and movable markerboards for presenting work. The concept of a "flipped" classroom utilizes online pre-class lectures to allow for groups to work collaboratively in class with the instructor.

The statistics for many of the Tennessee Tech classrooms are based upon a dense seating arrangement. While beyond the scope of this Master Plan, a classroom study is recommended for the University to analyze the style of classroom and its relationship to the style of teaching for the students in the future. Spaces required for classrooms with tablet armchairs, with tables and chairs, and with active learning arrangements require progressively more square feet per student. Therefore, the expectations for classroom capacity will change as the pedagogy changes.

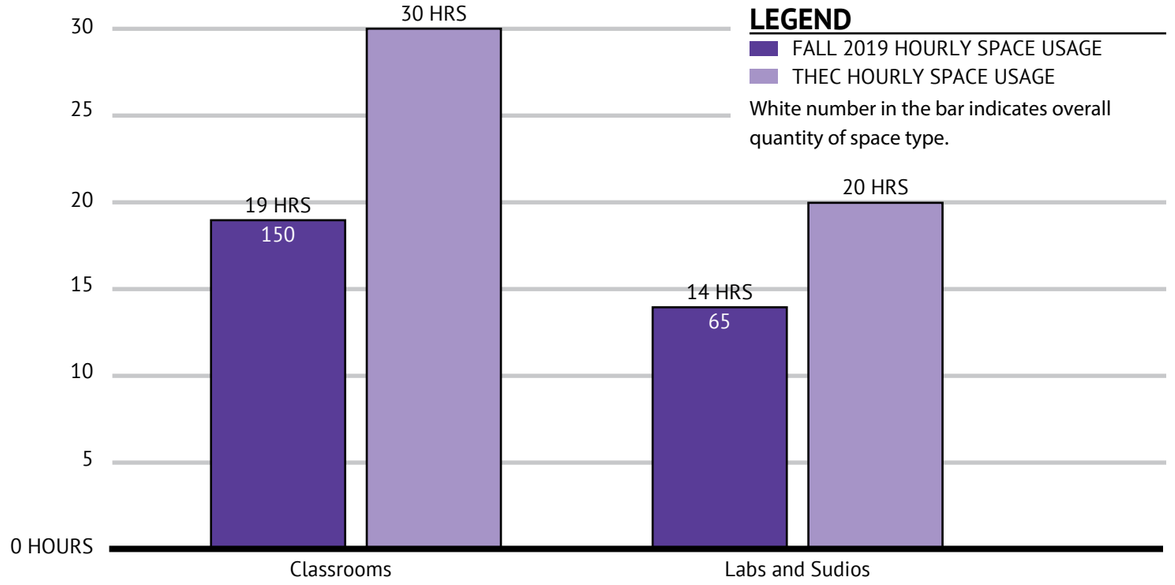


Table 3.6 Classroom and Lab & Studio Utilization

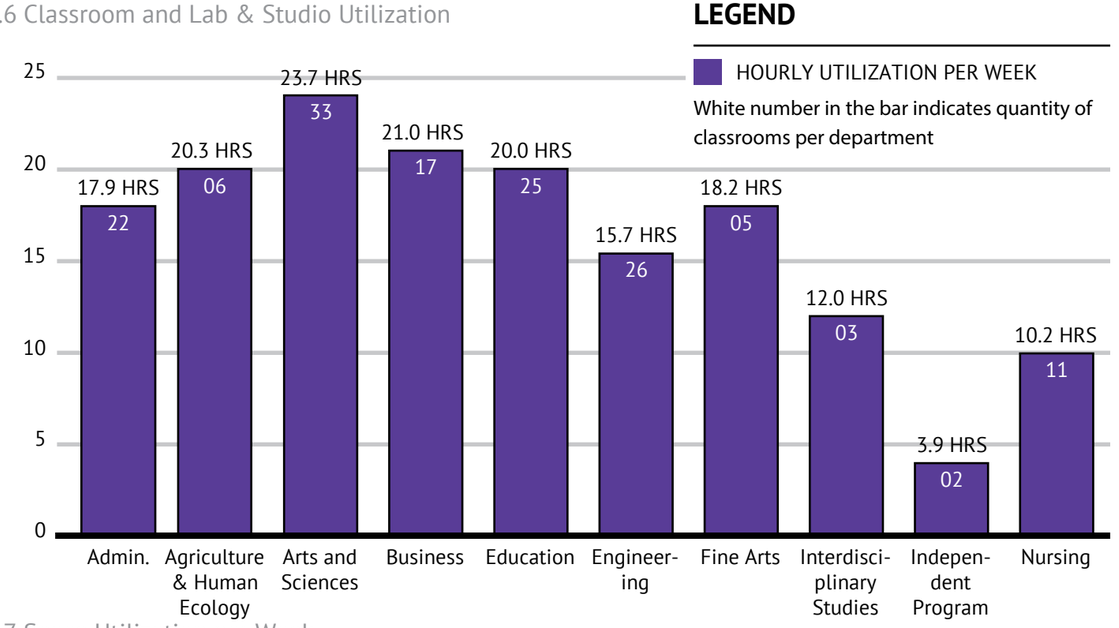


Table 3.7 Space Utilization per Week

CLASSROOM SCHEDULING

The classrooms at Tennessee Tech were part of a utilization study that showed that these spaces were scheduled, on average, 19 hours per week. The utilization of classrooms is affected by the manner in which they are scheduled. The TTU system over the years has evolved to departmental control of the classrooms. Among other factors, this often leads to the inability of other departments to gain timely access to the classroom during the scheduling process. At most institutions, all classrooms are considered "University" classrooms. That is, scheduling is controlled by the University to optimize the utilization of the space rather than fall under departmental control. A detailed review of the TTU utilization reveals that there are many classrooms that are significantly underutilized while there are several that tend to be the workhorses.

All classrooms should be considered an institutional resource. TTU should create utilization policies that cover all classrooms. Therefore, it is recommended that the University transition to a central scheduling system. While the system should provide initial preference to the proximity of the programs near the classroom, it should also make the spaces available for scheduling by others with need in a timely manner to allow for the scheduling process to be accomplished.

To facilitate the transition, a study of the classroom inventory should be conducted. As part of the recommended study, the utilization, technology, seating capacity and arrangement of classrooms should be considered. Likewise, the overall mix of the classroom inventory should be evaluated.

Currently 80% of the classrooms on campus accommodate under 50 occupants. The average utilization is approximately 19 hours a week versus the 30 hours expected by the THEC Guidelines. The 20% of classrooms above this mark have the highest average weekly usage. Therefore, there is generally the request from the departments for larger classrooms.

The new Laboratory Science Commons building is adding six larger capacity classrooms (serving over 50 students) to the classroom inventory. Each are lecture style classrooms and are available as University classrooms initially for departmental scheduling then for university scheduling. Likewise, the new Ashraf Islam Engineering Building will add five larger capacity classrooms. Each will be "adaptive learning labs" with flexible table and chair arrangements for collaborative work with the students.

Figure 3.6 Stonecipher Hall Classroom

TEACHING SPACES - TIME UTILIZATION ANALYSIS

FICM CATEGORY: 100 (Classrooms)

150 Spaces

Percent of Spaces Utilized

Classes in Session at:	M%	T%	W%	R%	F%
7:00:00 AM	1	0	1	1	1
8:00:00 AM	31	41	32	41	24
9:00:00 AM	7	35	7	35	3
10:00:00 AM	11	67	11	66	3
11:00:00 AM	52	3	55	3	43
12:00:00 PM	49	63	50	67	43
1:00:00 PM	43	49	41	52	32
2:00:00 PM	61	59	63	56	25
3:00:00 PM	48	49	50	42	13
4:00:00 PM	41	44	40	36	5
5:00:00 PM	29	29	21	23	1
6:00:00 PM	21	21	16	15	1
7:00:00 PM	15	15	8	10	0
8:00:00 PM	9	8	5	6	0
9:00:00 PM	0	1	0	1	0

Key:	
	80% - 100%
	60% - 80%
	40% - 60%
	20% - 40%
	0% - 20%

6972 Stations

Percent of Stations Utilized

M%	T%	W%	R%	F%
2	0	2	0	2
25	28	25	28	20
4	22	3	23	2
5	47	5	48	1
39	1	39	2	33
34	44	34	47	31
30	37	28	38	24
38	35	38	35	16
30	34	30	29	10
24	28	22	25	3
15	15	10	13	1
11	10	7	7	1
7	8	3	5	0
5	6	2	3	0
0	1	0	1	0

Key:	
	48% - 100%
	36% - 48%
	24% - 36%
	12% - 24%
	0% - 12%

FICM CATEGORY: 200 (Laboratories and Studios)

66 Spaces

Percent of Spaces Utilized

Classes in Session at:	M%	T%	W%	R%	F%
7:00:00 AM	0	0	2	2	0
8:00:00 AM	26	27	27	24	18
9:00:00 AM	8	36	15	30	6
10:00:00 AM	6	41	12	39	6
11:00:00 AM	32	0	33	3	23
12:00:00 PM	30	39	36	30	21
1:00:00 PM	26	44	30	35	14
2:00:00 PM	41	48	44	42	17
3:00:00 PM	38	39	38	38	12
4:00:00 PM	41	41	45	27	11
5:00:00 PM	33	33	33	18	2
6:00:00 PM	20	17	26	20	0
7:00:00 PM	17	17	24	20	0
8:00:00 PM	8	5	9	3	0

Key:	
	80% - 100%
	60% - 80%
	40% - 60%
	20% - 40%
	0% - 20%

1527 Stations

Percent of Stations Utilized

M%	T%	W%	R%	F%
0	0	0	0	0
21	19	18	18	15
6	31	7	27	4
4	33	6	31	3
24	0	23	1	16
20	27	21	22	15
20	33	20	29	13
32	36	33	35	18
31	26	32	28	13
39	29	43	18	16
38	25	38	14	9
13	9	18	9	0
12	10	18	13	0
7	4	7	5	0

Key:	
	48% - 100%
	36% - 48%
	24% - 36%
	12% - 24%
	0% - 12%

Table 3.8 Time Utilization Analysis

FICM CATEGORY: 100 (Classrooms)

Station Capacity Group	Spaces	Mean Capacity	Total Stations	NASF / Station	DLM NASF per Station		Mean Section Size	Mean Station Occupancy	Mean Hours per Week
					Tab-Arm	Tab+Chr			
B (10-19)	5	14	71	26.0	22	30	10.6	53%	10.7
C (20-29)	28	25	706	26.7	20	30	17.5	62%	17.9
D (30-39)	58	35	2,018	20.6	18	25	22.7	64%	18.1
E (40-49)	29	45	1,305	22.5	16	22	29.0	67%	18.2
F (50-59)	4	55	219	20.2	16	22	32.9	61%	27.3
G (60-99)	15	70	1,053	20.5	15	22	42.8	61%	21.5
H (100-149)	1	126	126	20.2	14	20	79.3	63%	34.0
I (150-299)	5	225	1,124	13.9	14	20	112.3	52%	29.2
J (300+)	1	350	350	7.1	12	18	66.4	19%	35.0
Unclassified	4						10.4		7.8
FICM 100 Totals:	**150**	**48**	**6,972**	**22.0**			**30.9**	**63%**	**18.7**

FICM CATEGORY: 200 (Laboratories and Studios)

Station Capacity Group	Spaces	Mean Capacity	Total Stations	NASF / Station	DLM NASF per Station		Mean Section Size	Mean Station Occupancy	Mean Hours per Week
					Tab-Arm	Tab+Chr			
B (10-19)	8	15	118	66.9			12.9	93%	7.5
C (20-29)	17	23	390	45.2			18.3	68%	12.0
D (30-39)	8	35	280	29.7			20.4	61%	17.6
E (40-49)	9	44	396	28.2			28.2	61%	19.4
F (50-59)	1	54	54	19.9			24.0	44%	7.5
G (60-99)	2	68	136	24.5			49.4	73%	30.0
H (100-149)	1	100	100	31.3			34.2	34%	24.5
Unclassified	19						18.1		12.4
FICM 200 Totals:	**65**	**32**	**1,474**	**41.2**			**22.7**	**69%**	**14.0**

Table 3.9 Classroom and Lab Summary by Capacity

TEACHING SPACES - TIME UTILIZATION ANALYSIS

DESIGN GUIDELINES

INTENTIONS

The intention of the TTU Construction Guidelines is to provide a framework of expectations for professional designers and consultants on contract for SBC projects, thereby establishing consistency across projects. The guidelines provide answers to common questions encountered on typical projects. Where an item is not completely defined, these guidelines are intended to clarify campus goals which should assist the designer in shaping a design response.

These guidelines are not intended to be comprehensive specifications nor are they intended to limit discussion on any given topic. New technologies, materials, and techniques are encouraged to be examined and discussed with TTU representatives on all projects within their individual context.

Construction Guidelines are also meant to inform local, in-house projects and serve as a reference guide for TTU employees in an effort to maintain consistency in all campus construction efforts.

ARCHITECTURAL CHARACTER

Tennessee Tech University seeks to maintain the architectural integrity and character of all its buildings, both existing and new. The predominant architectural style is modified Georgian. It is requisite that designers take this into consideration in all new construction and renovation projects. Particularly with new construction, this effort will help to maintain the architectural character of our campus. The modified Georgian style shall not strictly apply within the Athletic Precinct.

A typical palette of materials for TTU includes red brick exterior, stone or pre-cast concrete trim and detailing, and white columns, either painted wood, fiberglass wrap, or stone as well as dark shingles. Fenestration is typically single or double hung operable windows with divided lights, although storefront glazing has been used successfully when considered in appropriate architectural context.

For renovations, great care should be taken to match original architectural details in design and scale. Long-term maintenance of new finishes should be considered.

Care should be taken to locate, size, and screen mechanical and electrical equipment to minimize distraction from the architecture of a building and/or diminish unsightly conditions.

TTU is working to develop a more pedestrian friendly campus and increase green space as much as possible. The Campus Master Plan should be consulted for details.

ACCESSIBILITY

All projects shall accommodate required accessibility upgrades within the Design and Budget of the project.

Accessibility accommodations shall include, but not limited to, path of travel (starting at the parking lot, entering a building, and access through the building to point of renovation), restrooms, signage, and telephones or other technology along the path of travel are required to be accessible.

All programs, not necessarily all spaces, must be made accessible. Renovations shall consider whether or not a program can be provided in another, already accessible or more easily converted to accessible space.

Figure 3.7 Volpe Library

CAPITAL IMPROVEMENTS

The proposed Capital Improvements are based upon the needs of the University to serve the academic functions. The projects include new construction to address current shortfalls in space per the THEC Guidelines as well as the projected shortfalls as the University grows. The proposed projects also include renovations to upgrade existing facilities as well as the elimination and replacement of antiquated space. The projects are listed in order of priority at the time of this writing. The established priorities are likely to shift over time as needs evolve and funding is available. The list, however, does provide a chronological path for the sequencing of projects for an efficient implementation that minimizes temporary measures to accommodate the refurbishment and growth of the campus.

1. Johnson Hall Renovation

The Johnson Hall renovation will continue the effort to methodically renovate the older buildings on campus updating program spaces as needed while upgrading and replacing building systems that are well past their expected operational life. Since upstream campus infrastructure systems run through and immediately adjacent to Foster Hall, located next door to Johnson Hall, it is recommended that the Foster Hall Demolition be incorporated as part of this project. Combining these initiatives will provide the most efficient and cost-effective process while limiting the intermediate accommodations required to maintain the downstream buildings (Johnson and Pennebaker) in operation while the Foster Hall demolition process is underway.

2. Advanced Construction and Manufacturing Bldg

Due to the overwhelming need for engineering space and the condition of the existing spaces, a new engineering building is proposed. The building is proposed to accommodate Advanced Construction and Manufacturing program providing the consolidation of the shops and materials testing for the college. It will also provide for the relocation of the Advanced Manufacturing department and the Foundry. This will allow for the demolition of Lewis Hall and the Foundry to clear their location for future development. Likewise, with the consolidation of the shops, the new building will open space within Prescott, Brown and Clement Halls for renovation.

3. Academic Classroom Building

The Academic Classroom Building will replace the Matthews and the Daniel Buildings, as well as Crawford Hall, which are among the lowest ranked buildings according to the PFI scores. Each has a PFI score of less than 60. This initiative will allow the academic building program to utilize the whole site on the southwest corner of the Historic Quadrangle without the compromises that renovation of any of the three structures would demand. The building will, however, comply with the scale and historical vernacular of the Historic Quad. The building will serve needs of the College of Arts and Sciences and the College of Education as well as the Office of Research and the Office of Communications & Marketing.

Figure 3.8 Bell Hall courtyard

CAPITAL IMPROVEMENTS

4. Brown Hall Renovation
The Brown Hall renovation is envisioned to be the first in a series of Engineering Quad Renovations. It is recommended that the Engineering Quad buildings (other than Bruner Hall which completed its renovation in 2021) be combined as a multi-phased project. This will continue the effort to methodically renovate the older buildings and provide for programmatic refinements as well as systems upgrades. Even with the current new Ashraf Islam Engineering Building, the engineering program will still represent the greatest space need on campus. Refer to the Appendix for a comprehensive master plan for the engineering program.

5. Prescott Hall Renovation
The Prescott Renovation is proposed as the second of the multi-phased engineering quad upgrades. As the largest of the Derryberry Era buildings in need of programmatic and systems upgrades, the Prescott renovation will require considerable temporary space to accomplish these improvements. This will likely involve utilizing most of the Foundation Hall Building as swing space, as other building renovations have done, as well as utilizing portions of the Laboratory Science Commons building to accommodate the fume hood needs of specific programs. However, the optimal phasing allows the Chemical Engineering department to move into a renovated Brown Hall as envisioned by the Engineering Master Plan.

6. Memorial Gym Renovation
While still functional, the ninety-two year old gym building is in need of renovation to improve the programmatic utilization of the space as well as update the building systems. The renovations will include the development of the adjacent parking lot as a campus quadrangle outdoor space.

7. New Engineering Building
To address more of the outstanding current space need, a second new engineering building is proposed. The building will combine certain aspects of the engineering and interdisciplinary studies programs to develop an emphasis on Environmental Engineering. The location in the southwest quadrant of the Engineering and Laboratory Science district will provide a synergy with civil engineering, biology, chemistry and earth science for the environmental programs. The project will include the demolition of the existing Southwest Hall on the building site as well as the relocation of the university's Child Development Lab to the Foundation Hall area of the campus.

8. Biology Building
The remainder of the Biology Department is proposed to be relocated from Pennebaker Hall to the north side of the Laboratory Science Quadrangle. This will allow these programs to be located in the vicinity of the Micro and Molecular Biology programs at the Laboratory Science Commons and further define the Science Quadrangle. As part of the project, it is proposed that the Art Program be relocated from the north end of Foundation Hall to a renovated Pennebaker Hall. This will accomplish the needed Pennebaker systems replacement as well as provide a permanent space for Art. Therefore, the Art program will be adjacent to Bryan Fine Arts and the remaining programs within the School of Fine Arts. The initiative is also proposed to include the demolition of the north end of Foundation Hall which is separated from the remainder of the building where the Art program has been housed. This will allow the development of parking at the area of the demolition.

9. Physics Building
To provide space within Bruner Hall for the Computer Science program to expand, a new Physics building is proposed to the east of the new Stonecipher Lecture Hall. This will provide a third building to complete the definition of the proposed Science Quadrangle. The project will allow for all three of the programs currently in Bruner Hall to address their growing space needs.

10. Clement Hall Renovation
The Clement Hall renovation will be the last of the phased engineering quad renovations. It will continue the effort to methodically renovate the older buildings on campus, updating program spaces as needed while upgrading and replacing building systems that are well past their expected operational life. As described in the Engineering Master Plan (see Appendix), Clement Hall is envisioned to progressively evolve to become a Math Building as well as maintain its current function as the campus Data Center, and home of Information Technology Services.

11. Academic Wellness Center Renovation
This renovation is proposed to convert the former student recreation building into an academic building. The renovation will include programmatic as well as building systems upgrades. The existing pool is proposed to be infilled. The building will be renovated to provide program space for the growing Exercise Science, Physical Education and Wellness program.

12. Bell Hall Expansion
The Bell Hall Expansion will provide additional academic space for the expansion of the Nursing program with the addition of post graduate programs.

13. Volpe Library Renovation
The Library renovation will provide programmatic as well as building systems upgrades.

14. Bryan Fine Arts Renovation and Addition
The renovation and addition will provide programmatic as well as building systems upgrades.

15. Oakley Hall Expansion
The addition will provide added space for the anticipated growth in the School of Agriculture and Human Ecology.

16. New Engineering Building #2
Another new engineering building will complete the engineering master plan and provide space to fulfill the needs of the college. The building is envisioned to connect the engineering buildings within the new southwest Engineering Quadrangle. (see the Engineering Master Plan in the Appendix).

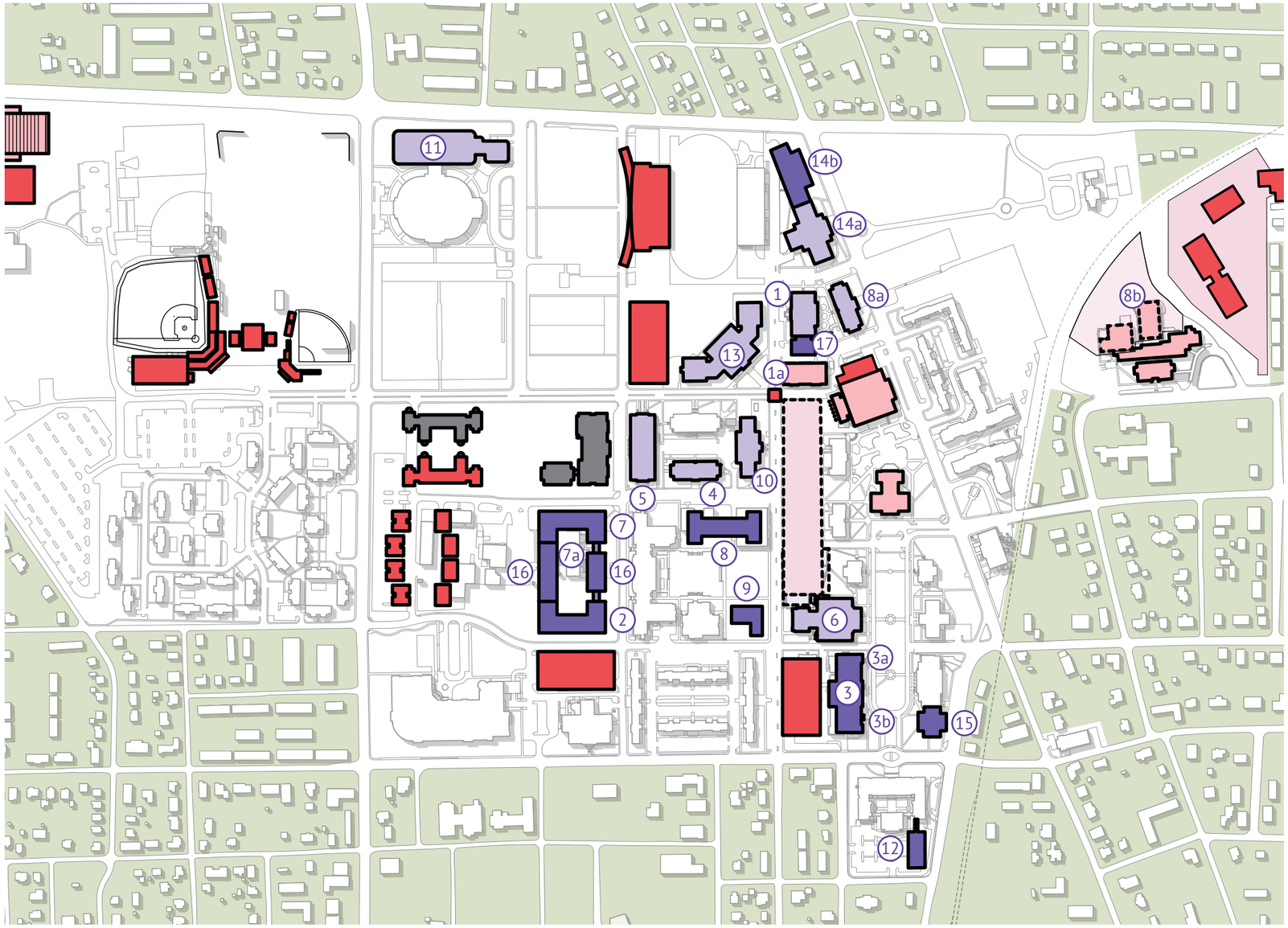


Figure 3.9 Capital Improvement Projects

CAPITAL IMPROVEMENT PROJECTS

CAPITAL IMPROVEMENT PROJECTS

#	PROJECT	NEW	RENOVATION	STORIES	AREA (SF)
1	JOHNSON HALL RENOVATION	X	X	4	68,171
1a	FOSTER DEMOLITION				60,743
2	ADVANCED CONSTRUCTION AND MANUFACTURING BUILDING	X		3	80,000
3	ACADEMIC CLASSROOM BLDG	X		2-3	91,000
3a	MATTHEWS/DANIEL DEMOLITION				43,555
3b	CRAWFORD DEMOLITION				42,042
4	BROWN HALL RENOVATION		X	4	55,001
5	PRESCOTT HALL RENOVATION		X	5	111,955
6	MEMORIAL GYM RENOVATION		X		87,181
7	NEW ENGINEERING BUILDING	X		3	100,000
7a	SOUTHWEST HALL DEMOLITION				23,500
8	BIOLOGY BUILDING	X		3	93,785
8a	PENNEBAKER HALL RENOVATION		X	4	59,679
8b	PARTIAL FOUNDATION HALL DEMOLITION				
9	PHYSICS BUILDING	X		3	38,378
10	CLEMENT HALL RENOVATION		X	4	62,887
11	ACADEMIC WELLNESS CENTER RENOVATION		X	2	77,895
12	BELL HALL EXPANSION	X		3	27,635
13	VOLPE LIBRARY RENOVATION		X	3	132,645
14a	BRYAN FINE ARTS RENOVATION		X	3	55,110
14b	BRYAN FINE ARTS ADDITION	X		2	60,965
15	OAKLEY HALL EXPANSION	X		2	38,922
16	NEW ENGINEERING BUILDING #2	X		3	90,000
17	JOHNSON HALL EXPANSION	X		4	25,000

LEGEND

- CAPITAL IMPROVEMENT NEW CONST.
- CAPITAL IMPROVEMENT RENO.
- ON-GOING PROJECT

NON-ACADEMIC SPACES

Due to the funding methods for state university facilities, the primary focus of the master plan is on Education and General (E&G) space. Therefore, the previous discussion referred specifically to the academic functions of the University which are, for the most part, funded through state appropriations. The non-E&G spaces are funded through the University. Whether through fees, donations, revenue generation or other methods, the University must accommodate all non-academic activities. For example, a tennis court for students physical education or general recreation would be state funded. A tennis court for varsity competition would be university funded. Therefore, items such as football stadiums, student housing, dining halls, university centers, parking, etc. are generally financed by the University and paid for over time through a revenue stream.

A Space Model was developed for the administrative and student services areas of the University. Separate independent analysis and master plans have been developed for Athletics and for Residential facility needs and projections.

Non- Academic Space Model		NASF				NASF		
Assuming Future Enrollment of 12,000 and 15,000 Students		Existing	Current Need	12,000 Need	15,000 Need	Current Shortfall	12,000 Shortfall	15,000 Shortfall
Academic Affairs		3,967	3,518	3,583	3,648	449	384	319
Accessible Education Center		1,959	1,924	2,037	2,151	36	(78)	(192)
Admissions		4,755	5,131	5,570	6,009	(376)	(815)	(1,254)
Auxiliary Services (including Dining)		53,707	53,457	63,134	72,812	250	(9,427)	(19,105)
Business Office		6,104	6,754	7,423	8,093	(650)	(1,319)	(1,989)
Capital Projects		2,816	3,725	3,920	4,115	(909)	(1,104)	(1,299)
Center for Career Development		2,963	2,831	3,234	3,636	132	(271)	(673)
Center for Teaching and Learning		3,072	1,814	2,041	2,269	1,259	1,031	804
Communication and Marketing		4,820	4,836	5,600	6,364	(16)	(780)	(1,544)
Counseling Center		2,610	3,000	3,549	4,098	(390)	(939)	(1,488)
Dean of Students		1,423	1,970	2,262	2,555	(547)	(839)	(1,132)
Enrollment Management, Career Services & Student Success		3,225	3,634	3,975	4,316	(409)	(750)	(1,091)
Facilities and Business Services		42,163	43,097	46,440	49,782	(934)	(4,277)	(7,619)
Financial Aid		2,358	2,626	3,146	3,666	(268)	(788)	(1,308)
Health Services		4,972	5,141	5,696	6,251	(169)	(724)	(1,279)
Institutional Assessment, Research, and Effectiveness		1,081	1,320	1,417	1,515	(239)	(336)	(434)
International Education		1,097	871	1,164	1,456	226	(67)	(359)
Information Technology		14,279	14,704	15,559	16,414	(425)	(1,280)	(2,135)
Library		90,641	82,814	89,162	95,510	7,827	1,479	(4,869)
New Student and Family Programs		357	546	741	936	(189)	(384)	(579)
Planning and Finance. Compliance, HR, Purchasing		5,711	5,889	6,230	6,572	(178)	(519)	(861)
Planning and Finance (VP Suite)		776	1,144	1,144	1,144	(368)	(368)	(368)
President's Office		3,215	3,430	3,430	3,430	(215)	(215)	(215)
Research & Economic Development		2,786	3,036	3,474	3,913	(250)	(688)	(1,127)
Student Affairs		1,993	1,918	1,918	1,918	76	76	76
Telecommunications		2,598	2,725	2,725	2,725	(127)	(127)	(127)
University Advancement		6,030	6,940	6,940	6,940	(910)	(910)	(910)
University Counsel		569	819	819	819	(250)	(250)	(250)
University Center		39,454	47,934	47,934	47,934	(8,480)	(8,480)	(8,480)
University Police		3,422	3,531	3,824	4,116	(109)	(402)	(694)
Women's Center		1,399	1,448	1,513	1,578	(49)	(114)	(179)
Totals		**316,322**	**322,521**	**349,601**	**376,680**	**(6,199)**	**(33,279)**	**(60,358)**

Table 3.10 Non-Academic Space Model

Spaces that were not included in the model
Residential Life
Advisement & Retention
Environmental Health and Safety
Fishery Unit
Graduate Studies
Internal Audit
Military and Veteran Affairs
Multicultural Affairs
Outside Agency
Printing Services
Registrar's Office
Scholarship Office
Student Affairs
Surge Space
Water Resources Center

RECURRING FUNDS PROJECTS

A. CROSSVILLE CAMPUS

The new Tennessee Tech Crossville Campus is envisioned at the former Trade-A-Plane facility at 174 Fourth Avenue in downtown Crossville. The property includes three interconnected buildings and three properties. The facilities include a three story 61,500 sf office building and two single story warehouse buildings. The larger 49,500 sf warehouse was the former printing shop and is concrete masonry unit construction. The smaller 10,000 sf warehouse is a metal building. The buildings are located on a 2.51 acres property. The .50 and .11 acre lots across the street are part of the overall property acquisition and have 52 and 15 parking spaces respectively. The state has provided $3,500,000 in recurring funding to own and operate the facility.

The facility is envisioned to become a satellite campus for the university to serve Cumberland County and the nearby Upper Cumberland region. The primary focus of the new campus will begin as research. The university, through the TTU Foundation, has purchased a large-scale wind tunnel which will be housed in the warehouse portion of the facility. The wind tunnel will offer research opportunities for the School of Engineering which will utilize graduate and primarily undergraduate students to support the research activities. The wind tunnel is also expected to be utilized by related private industry for research activities as well. In particular, a local business is expected to lease a portion of the facility and wind tunnel time once the facility is operational. Likewise, federal agencies located in Oak Ridge also offer potential collaborations such as the placement of a supercomputer at the new campus. Other opportunities include association with the anticipated test track facility in eastern Cumberland County.

Per the request of the local city and county government, the facility is also envisioned to provide bachelor level academic opportunities. The new campus is located between the Roane State Community College Cumberland Center and the TCAT Crossville campuses (within 3.4 miles and 6 blocks respectively). Likewise, the new campus is located between the two Cumberland County high schools, Stone Memorial and Cumberland County (within 3.6 miles and 5 blocks respectively). Therefore, the synergy of the various levels of higher education and opportunities for dual enrollment for high school students will provide a diverse level of options for students in the region.

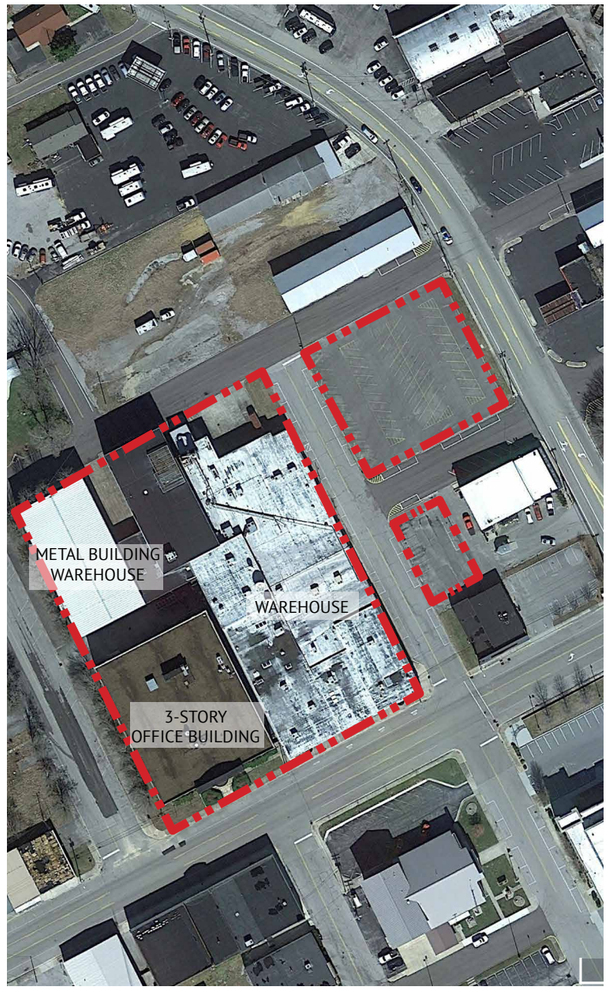


Figure 3.9A Crossville Campus Property

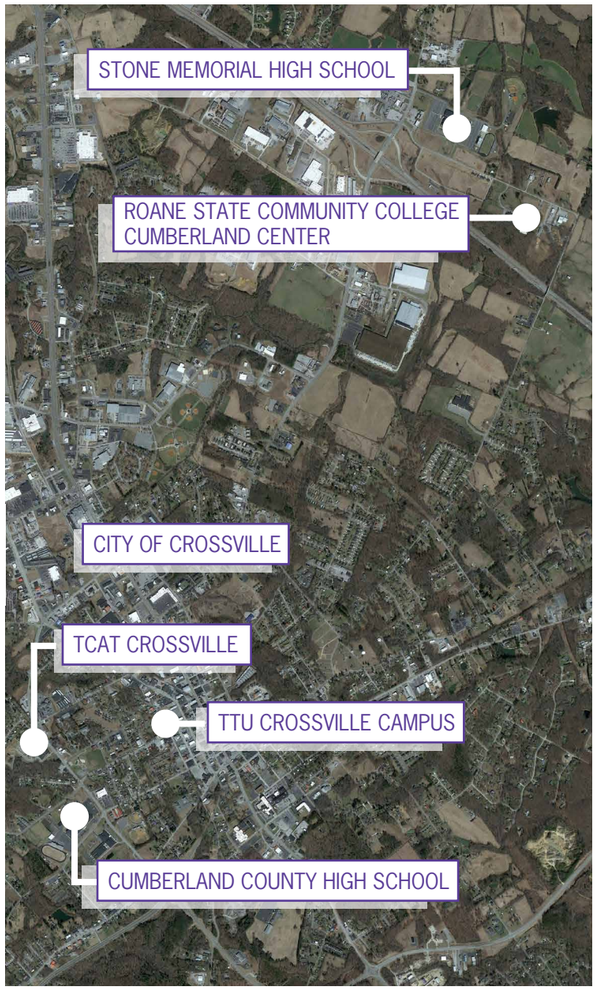


Figure 3.9B Crossville Proximity Map

DISCLOSURE PROJECTS

The Disclosure Projects represent projects that will be funded through the University rather than through capital outlay by the State. The projects will generally be financed by debt service through loans provided through the school bond authority or by general university funds. University funding sources may include general operating funds, fees, revenue generation or donations. The projects are listed without a particular order or priority.

The major upcoming Athletics projects are listed for information. Refer to the Athletic Master Plan for a complete listing of the Athletic vision. Likewise, a second phase of Innovation Housing is envisioned adjacent to the initial phase. Refer to the Housing Master Plan for the future plans for student housing.

A. Facilities Services Complex

The existing Facilities complex is proposed to be relocated to the northeast corner of the campus. This area includes access from Washington Avenue to the east as well as E. Tenth Street to the south. The proposed location is the lower elevation area at the northeast corner of the Foundation Hall site, the former middle school football field. The relocation will include placing the administrative functions of Facilities in the south (front) section of Foundation Hall with new buildings for the support functions (warehouse, tool shop and garage) in the northeast area. The buildings are proposed to be arranged in a defined complex area at the northern portion of the site with approximately 80 parking spaces for staff and motor pool parking.

Figure 3.10 Marc L.. Burnett Student Recreation and Fitness Center

The remainder of the lower area (southern portion) is proposed to be supplemental student parking with shuttle service. The chiller plant is the only building that is proposed to remain at the existing Facilities Complex.

B. Athletics Projects

The Athletics Department's projects and priorities are outlined in the Athletics Master Plan. The major imminent projects include:

B1. Football Operations Building
B2. West Stadium Replacement
B3. Baseball | Softball Complex

C. Parking Garages

Parking garages are proposed to add on-campus parking density for those who would like to park closer to the campus activities. The order of implementing the garages is subject to change.

C1. Wings Up Way Garage - The first garage is proposed to be located just north of Ray Morris Hall on Wings Up Way. The garage will serve the southern portion of the campus including the Marc L. Burnett Student Recreation and Fitness Center and the Capital Quad residence halls. Due to its location, the garage should be considered for housing the future chiller plant expansion to minimize the upgrades needed in the campus chilled water piping system. NOTE: This Garage is part of the currently ongoing Disclosed Parking and Transportation Improvements Project

C2. Peachtree Garage - A second garage is proposed just west of the proposed Academic Classroom Building. The garage will be two levels and will be integrated into the hillside with the first level at the Peachtree Avenue level and the upper level at existing parking level. The garage will provide parking for students as well as faculty and staff. The Peachtree Garage will also provide a replacement for the parking eliminated to create the Peachtree Mall green space in the core of the campus.

C3. Library Garage - A third parking garage is proposed at the west side of the Library site. The garage will serve faculty and commuting students as well as athletic events. This garage is also proposed to serve visitors to the new Event Center which is proposed to include a Welcome Center for prospective students and their families to begin their visit to the campus. The garage is a potential site for a remote chiller plant.

D. Food Service Improvements

The food services project(s) represent ongoing projects related to providing continually improving food service for the University.

E. Innovation Housing- Phase II

The Innovation Housing is proposed to be a two-building residential complex with a separate Innovation Center. The buildings are proposed to be organized about the centerline from the engineering quad through the center of the new engineering building. Phase II will include the southern residential hall.

F. Sorority Row

The sorority row is envisioned as an eight-building grouping of houses. The row is envisioned to be designed as a cohesive neighborhood grouping to provide a central outdoor commons space. While serving as the combining element of the community, the commons will provide space for group functions such as sorority rush events. Each house is envisioned to serve 30-32 women. Currently, there are five sororities on campus as well as other women's organizations.

G. Roaden University Center Expansion

The University Center Expansion is envisioned as a renovation of the existing facility with a detached Event Center located at the south end of Tucker Stadium. The multi-phased project will include the renovation of the Volpe Library to provide facade improvements, an interior connection to the Peachtree Quadrangle, and the conversion of the library parking area to an exterior open air courtyard. The renovation of the University Center may entail a temporary facility to serve food service and other needs during construction. Further expansion of the University Center to the north could be considered in the future.

H. Parking & Transportation Improvements - Phase II

Road Improvement projects are envisioned to extend the current work throughout the campus. The initial work could include the roads surrounding the new Ashraf Islam Engineering Building and the J.J. Oakley Innovation Center and Residence Hall.

I. University Tower

The university tower is envisioned as an iconic element within the Peachtree Quadrangle. The classic Georgian features of the tower should reflect the campus architecture and provide a vertical element on the axial center of University Drive and the Peachtree Promenade. The tower could incorporate a clock, a bell or carillon, or simply exist as a vertical feature.

J. Art Trail

The art trail is envisioned as a series of art elements throughout the campus. Several concepts are presented later in the master plan which form a walking "trail" through the campus. The integration of art throughout the campus, however, should not be limited to the proposed locations.

K. Peachtree Quadrangle

The Peachtree Quadrangle is envisioned as the third major quadrangle on the campus. The Quadrangle will interconnect with the other Quads to provide linked greenspace throughout the core of the campus.

L. Foundation Hall Demolition(s)

Foundation Hall provides a valuable resource for the University as a swing building for campus renovations as well as for permanent campus support space. The building, however, does have portions that are under utilized, in need of renovation, or detached from the remainder of the building. Therefore, portions could be considered for demolition.

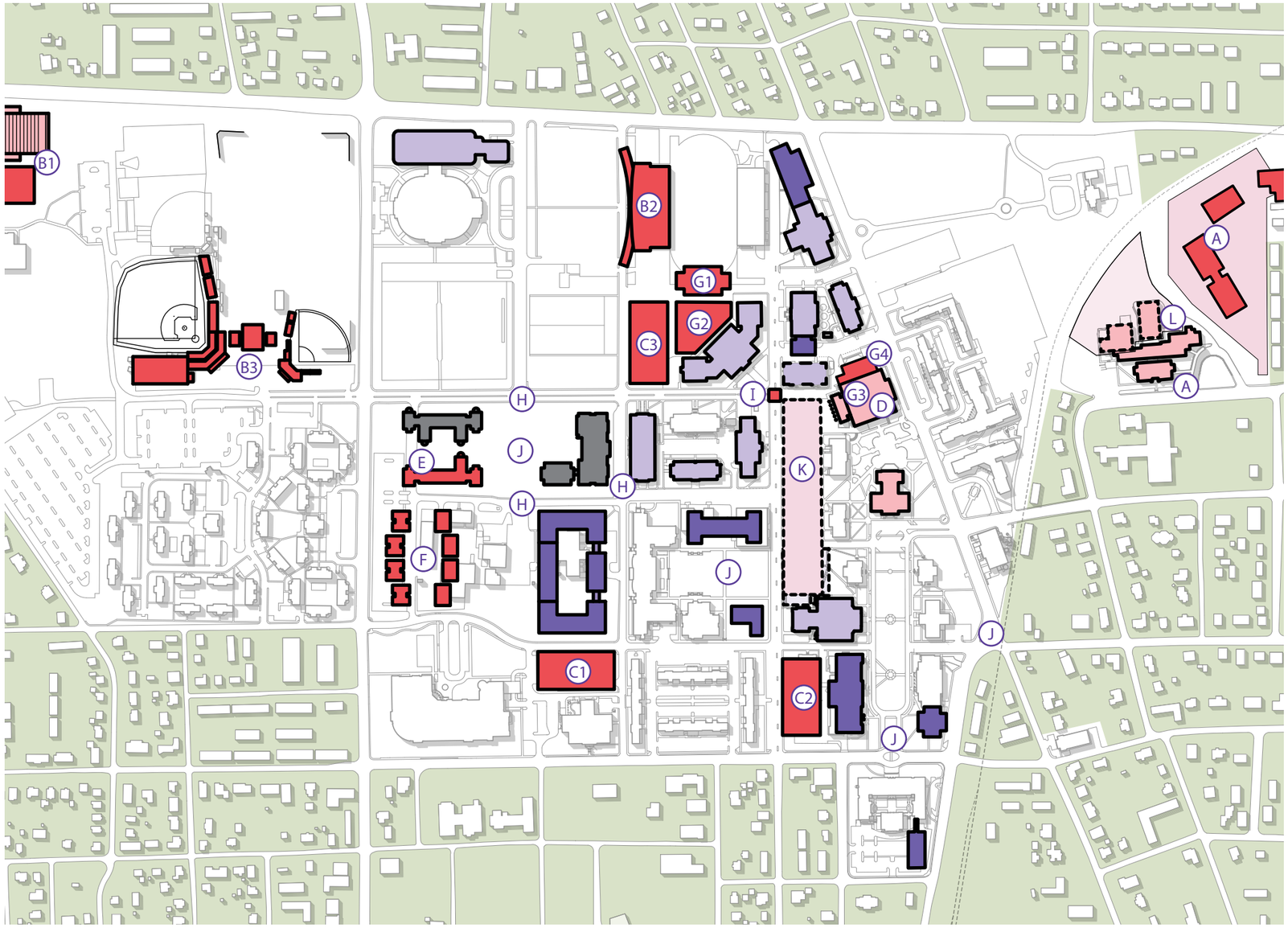


Figure 3.11 Disclosure Projects

DISCLOSURE PROJECTS

#	PROJECT	NEW	RENOVATION	STORIES	AREA (SF)
A	FACILITIES SERVICES COMPLEX	X			
B	MAJOR ATHLETICS PROJECTS	X			
	B1 - FOOTBALL OPERATIONS BLDG	X			
	B2 - WEST STADIUM REPLACEMENT	X			
	B3 - BASEBALL/SOFTBALL COMPLEX	X			
C	PARKING GARAGE(S)	X			
	C1 - WINGS UP WAY GARAGE	X			
	C2 - PEACHTREE GARAGE	X			
	C3 - LIBRARY GARAGE	X			
D	FOOD SERVICE IMPROVEMENTS		X		
E	INNOVATION HOUSING - PHASE II	X			
F	SORORITY ROW	X			
G	ROADEN UNIVERSITY CENTER RENOVATION		X		
	G1 - EVENT CENTER	X			
	G2 - LIBRARY COURTYARD	X			
	G3 - ROADEN RENOVATION		X		
	G4 - ROADEN UNIVERSITY CENTER EXPANSION	X			
H	PARKING & TRANSPORTATION IMPROVEMENTS - PHASE II		X		
I	UNIVERSITY TOWER	X			
J	ART TRAIL	X			
K	PEACHTREE QUADRANGLE		X		
L	FOUNDATION HALL DEMOLITIONS		X		

LEGEND

- DISCLOSED PROJECT NEW CONST.
- DISCLOSED PROJECT RENO.
- ON-GOING PROJECT

LANDSCAPE VISION

LANDSCAPE VISION:
To restore the beauty of the campus landscape by reconnecting it to the local and regional context of the Upper Cumberland area. Finding inspiration in the region's planting, geography, and rivers, the TTU campus is envisioned as an extension of the native landscape.

LANDSCAPE Goals

Campus Arboretum
The vision of the master plan is to extend the character of the arboretum throughout the campus.

Green Space by Precinct
Increase the percentage of Green Space in each campus precinct. Along with an increase in Green Spaces, the goal is to increase the canopy coverage within each campus precinct.

Landscape Sustainability (Landscape Strategic Plan)
Establish guidelines for a long-term maintenance plan to ensure the quality of planting material throughout all seasons. Within these guidelines, TTU can determine the methods to carry out Landscape Maintenance and Implementing Sustainable Best Practices including stormwater management and low impact development strategies.

Paving Reduction
(and reduction of impervious surfaces)
Reduce hardscape area (roadway/parking and pedestrian walkways) by reducing hardscape, particularly non-essential roadways and parking areas. In addition, paving areas that can be transformed into impervious hardscape areas should be identified.

Heat Island Reduction
Provide ground surfaces with shade or SRI compliant pavements, and the building roof with green roof or SRI compliant roof materials where possible.

Parking Island Standards
Establish requirements for planting type and quantity of landscape coverage within and around parking areas. In many cases, existing parking areas have no landscaping whatsoever. These parking island guidelines will help reinforce the efforts in Heat Island Reduction as well as an increase in tree canopy coverage across campus.

Invasive Species
All invasive species found on campus should be removed in a timely manner.

Figure 3.12 TTU Greenspace Projects

ARBORETUM

The characteristics of the Tennessee Tech Arboretum are to collect and study trees, shrubs, and other plants from around the Upper Cumberland region, to display them across campus for students, staff, and visitors to study and enjoy while also learning how to grow them in ways that enhance our environment. The formal arboretum on campus is the Gerald Duane Coorts Memorial Arboretum. It is a Level II Arboretum (certified in August 2003 by Tennessee Urban Forestry Council and Tennessee Federation of Garden Clubs, Inc.). The extents of the Arboretum are Oakley Hall to Derryberry Hall along Dixie Avenue. The vision of the master plan is to extend the character of the arboretum throughout the campus. The goal is to encourage the planting and conservation of trees and other plants for a greener, healthier, and more beautiful world.

ARBORETUM ZONES

Trees

The Tennessee Tech University campus is comprised of a series of precincts. Each precinct should showcase a different mix of tree species to support its unique character. The current and proposed tree canopy is illustrated on the following pages. Likewise, the current tree species on campus are also listed.

Heritage Zone (Historic Core)

The Heritage Zone is comprised of a wide variety of species that contribute to the campus wide arboretum distinction. The heritage zone occurs in areas designated as the Historic Core and Academic Precincts, which currently fall within the boundaries of the Gerald D. Coorts Memorial Arboretum. This zone may be comprised of a mix of evergreen and deciduous trees and should include both native and non-native specimen trees to maintain a diverse collection as part of the larger campus arboretum. To achieve the visually open ground plan of the shaded lawn, low branching should typically be avoided.

Urban Zone (Perimeter city streets and State Highway)

The urban zone planting palette should be comprised of deciduous trees to allow for a mix of shade in the summer and warmth from sun exposure in the winter. Native tree species should be considered to promote a sense of identity while reinforcing a regionally appropriate sense of place within the Housing, Student Services/ Recreation and Campus Support Precincts hardscape and sitting areas. Planting trees within the Urban Zone shall meet a minimum requirement of a 4 ft. planting strip and 3 ft. soil depth along all street conditions. This zone should be closely coordinated with the city and state at their right of ways.

Understory Zone

The use of understory trees should be limited to small gathering spaces, gardens and courtyards, and perimeter conditions where they can be used to define edges. Existing understory trees should be removed, to the extent possible, from areas designated as open shaded lawns, to promote unobstructed views and pedestrian circulation across those areas.

Figure 3.13 The Quad with Fall Colors

ARBORETUM

General Zone

Areas with this designation will use a general planting palette defined with input from TTU. This zone should be planted to meet a minimum level of planting requirements, while still reinforcing the notion of the campus as an arboretum. Tree planting in this zone should focus on the entrances of buildings.

Lawns

Event Lawns

These lawns require a little more thorough maintenance and need recovery times throughout the year. These lawns should be 419 hybrid Bermuda grass that is overseeded with perennial rye grass in the fall. Fertilization, mowing, watering, and cultural practices should be monitored more closely and performed more frequently in these areas.

Athletic Fields

These areas should be sand-based fields with 419 hybrid Bermuda grass. All have irrigation systems. Normal cultural practices (aerification, vertical mowing, topdressing, etc.) occur on an annual basis, or more frequently as needed. Soil tests should be used to determine nutrient needs and fertilizer frequency.

General Lawn

General grass areas should be certified 3-way turf type fescue blend. The grass should be fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Sod should be improved turf type tall fescue. Sod should be weed and insect free with a root zone thickness of 3/4”.

Figure 3.14 Lavender Garden

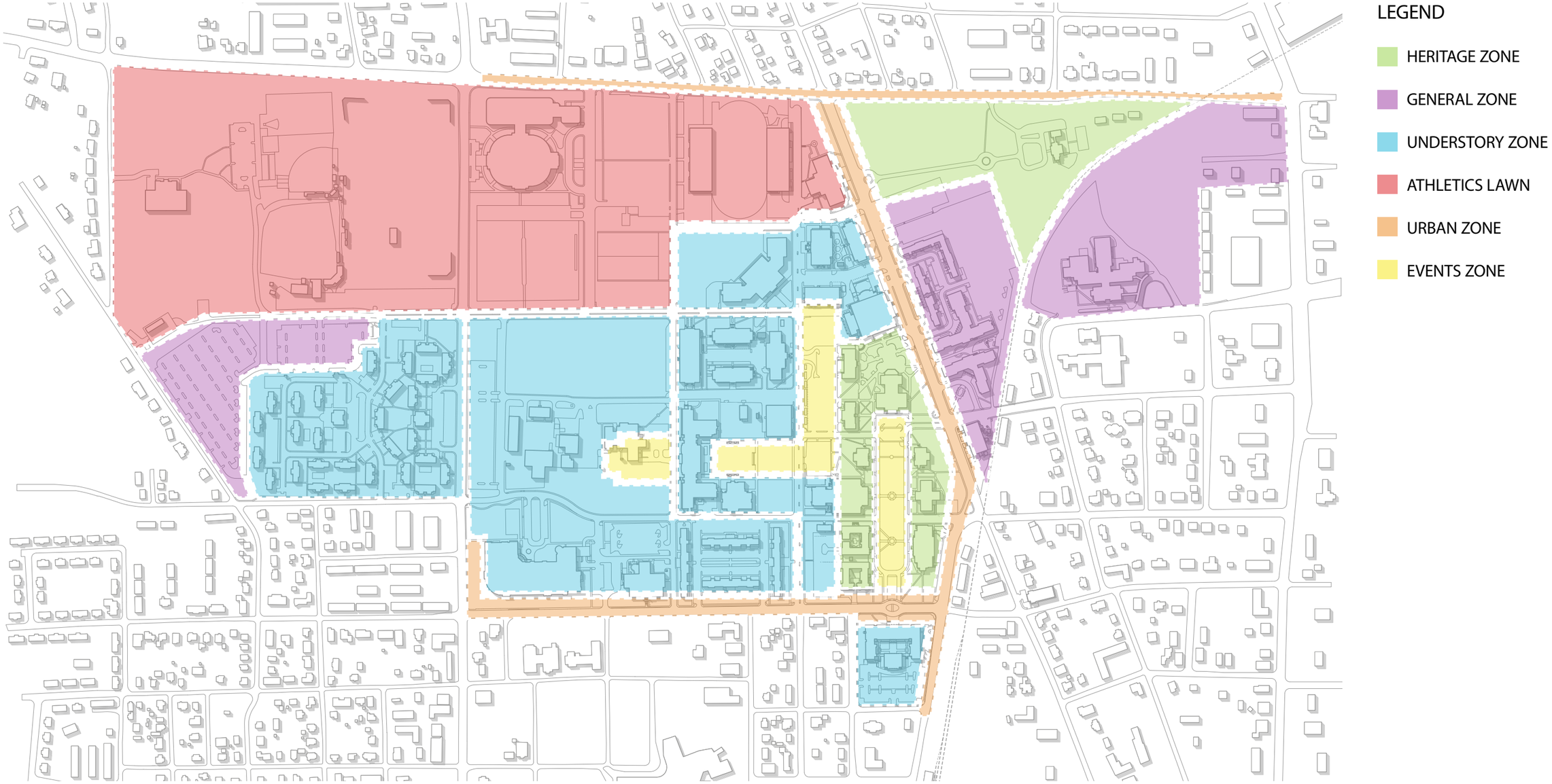


Figure 3.15 Arboretum Zones

ARBORETUM ZONES

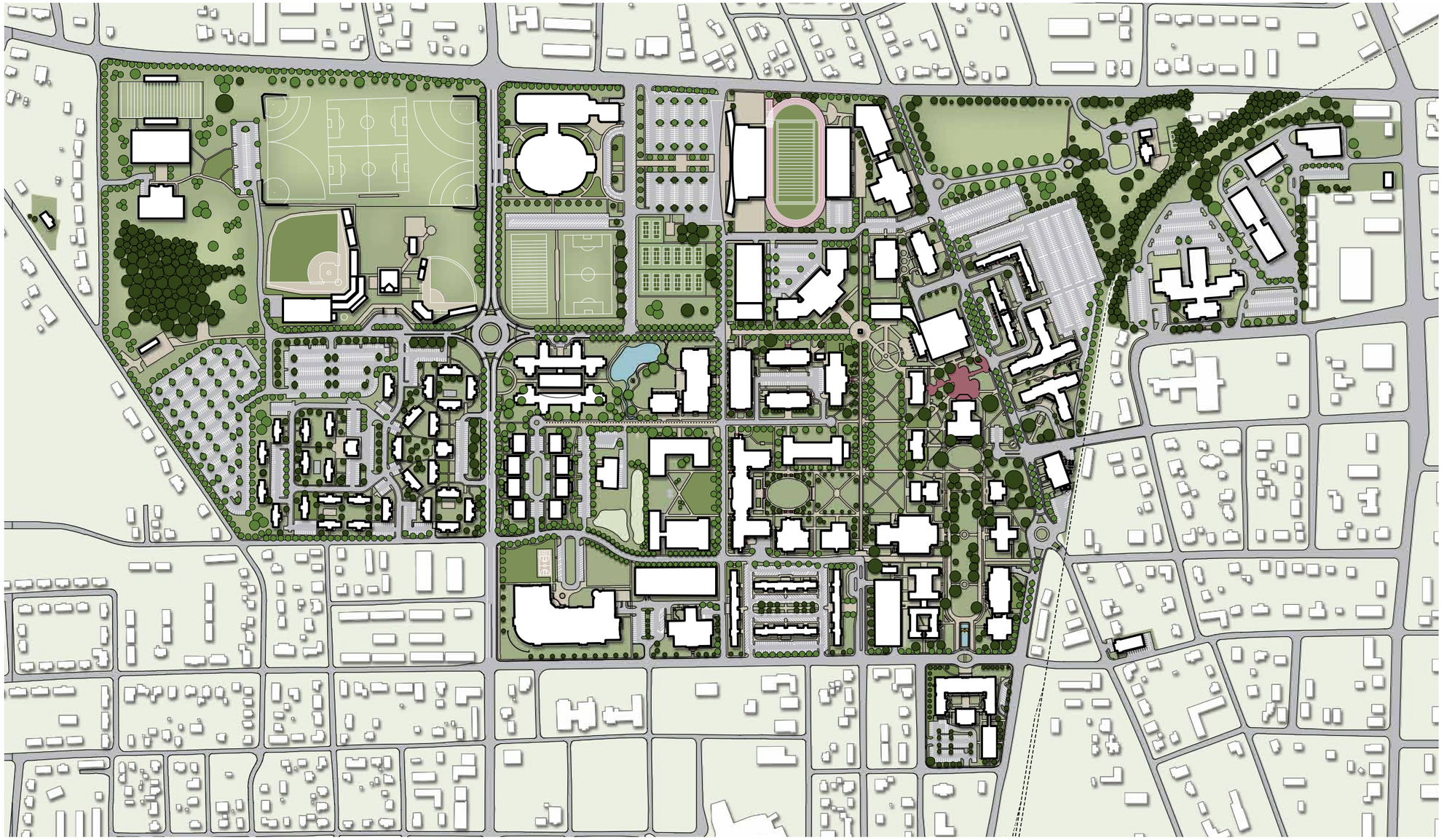


Figure 3.16 Tree Canopy

TREE CANOPY

General Campus Tree Information	
Common Name	**Scientific Name**
American Arborvitae	Thuja occidentalis
American Beech	Fagus grandifolia
American Elm	Ulmus americana
American Holly	Ilex opaca
American Hornbeam	Carpinus caroliniana
American Linden (American Basswood)	Tilia americana
Arizona Cypress	Cupressus arizonica
Bald Cypress	Taxodium distichum
Black Tupelo (Black gum)	Nyssa sylvatica
Black Cherry	Prunus serotina
Black Oak	Quercus velutina
Bunges Pine	Pinus Bungeana
Bur Oak	Quercus macrocarpa
Callery Pear (Bradford Pear)	Pyrus calleryana
Chaste Tree	Vitex agnus-castus
Cherry Plum	Prunus cerasifera
Chinese Pistache	Pistacia chinensis
Crepe Myrtle	Lagerstroemia indica
Dwarf Alberta Spruce	Picea glauca var. albertiana 'Conica'
Eastern Hemlock	Tsuga candensis
Eastern Sycamore	Platanus occidentalis
Eastern Redbud	Cercis canadensis
Eastern Red-Cedar	Juniperus virginiana
Eastern White Pine	Pinus strobus
European White Poplar	Populas alba
Flowering Dogwood	Cornus florida
Gingko	Ginkgo biloba

General Campus Tree Information	
Grey Alder	Alnus incana
Green Ash	Fraxinus pennsylvanica
Harry Lauder's Walking Stick	Corylus avellana
Japenese Black Pine	Pinus thundergii
Japenese Maple	Acer palmatum
Kentucky Coffeetree	Gymnocladus dioicus
Loblolly Pine	Pinus taeda
Mockernut Hickory	Carya tomentosa
Mountain Maple	Acer spicatum
Northern Red Oak	Quercus rubra
Norway Spruce	Picea abies
Nuttall Oak	Quercus nuttalli
Ohio Buckeye	Aesculus glabra
Overcup Oak	Quercus lyrata
Pawpaw	Asimina triloba
Pin Oak	Quercus palustris
Possumhaw Holly	Ilex decidua
Post Oak	Quercus stellata
Princess Tree	Paulownia tomentosa
Red Maple	Acer rubrum
River Birch	Betula nigra
Royal Star Magnolia	Magnolia stellata
Sawtooth Oak	Quercus acutissima
Shingle Oak	Quercus imbricaria
Shumard Oak	Quercus shumardii
Silver Linden	Tilia tomentosa
Silver Maple	Acer saccharinum
Southern Magnolia	Magnolia grandiflora

General Campus Tree Information	
Southern Red Oak	Quercus falcata
Sugar Maple	Acer saccharum
Swamp Chestnut Oak	Quercus michauxii
Swamp White Oak	Quercus bicolor
Sweetbay Magnolia	Magnolia virginiana
Sweetgum	Liquidambar styraciflua
Sweet Cherry	Prunus avium
Trident Maple	Acer buergerianum
Tulip Poplar	Liriodendron tulipifera
Water Oak	Quercus nigra
White Ash	Fraxinus americana
White Oak	Quercus alba
Willow Oak	Quercus phellos
Witch Hazel	Hamamelis virginica
Yellow Buckeye	Aesculus spp

Total Discovered: 70

Tennessee Invasive Tree List	
Common Names	**Scientific Name**
Tree of Heaven	*Ailanthus altissima* (Mill.) Swingle
Mimosa Silktree Silky Acacia	*Albizia julibrissin* Durazz.
Empress Tree Princess Tree Royal Paulownia	*Paulownia tomentosa* (Thunb.) Sieb. & Zucc. ex Steud.
Bradford Pear Callery Pear	*Pyrus calleryana* Dcne.
Chinese Parasol Tree Phoenix Tree Varnish Tree	*Firmiana simplex (L.) W. Wight*

Table 3.11 Campus Tree Species Listing

CAMPUS TREE SPECIES LISTING

PROPOSED PARKING REFINEMENTS

The projected refinements to the parking inventory detailed and illustrated on the following pages should parallel the anticipated development of the 12,000-student campus. The refinements represent a reduction of 1,173 existing parking spaces. The refinements also include the addition of 489 surface parking spaces in the Foundation Hall area. Along with this added surface parking, the addition of ~455 spaces in parking garages on the south side of the campus will support the 12,000-student goal. A third parking garage has also been proposed to provide options at each end of the campus and effectively extend the parking capacity to serve a campus of ~ 12,750 students.

For growth to the long-range goal of 15,000 students, subsequent parking in the range of 1000 spaces will need to be provided. Surface parking options will be limited. Potential structured parking options might include a garage at the Tech Village area, a garage at the athletic parking lot along Twelfth Street or a garage north of the Jobe|Murphy Residence Halls across from Pennebaker and Bryan Fine Arts. A garage at the Tech Village area could support expanded student housing on both sides of Willow Avenue. In most every case, the likely location for a parking garage is at a site which already contains surface parking. Therefore, generally only the added above grade parking within the garage area represents the actual net gain in parking.

Figure 3.17 Parking in Front of Derryberry Hall to be removed

PROPOSED PARKING REFINEMENTS

The Master Plan Vision for Greening the Campus continues to be a priority for the University for the development of the campus in the years to come. The focus will still be to reduce the core campus parking areas to the degree possible, develop perimeter parking as available, and to then introduce dense parking in the form of parking garage(s) at the edges of the academic core of the campus. Based upon the findings and recommendations of the parking study, the capacity requirements will need to be maintained to accommodate the population of the campus as the student count fluctuates over time.

The following outlines the projected phasing for the refinements to the campus parking capacity in the future. While the phasing is presented in the anticipated sequence, variations are certainly very likely as priorities are refined over time.

Phase 1
As part of the campus street improvements project, eliminate the parking along W. Tenth Street.

Minus 74 spaces

Phase 2
Eliminate the parking along Stadium Drive as part of the New Engineering building project.

Minus 35 spaces

Phase 3
Eliminate ~2/3 of the existing temporary parking along the east side of Willow Avenue to allow for the construction of the New Innovation Housing. Maintain approximately 100 spaces to support the new Marc L. Burnett Student Recreation & Fitness Center. It is envisioned that these spaces could be relocated and developed as permanent parking as part of the potential Sorority Row.

Minus 230 of 330 spaces

Phase 4
Eliminate the parking in front of Derryberry Hall to establish as front lawn area. Provide parking to the east of Derryberry to allow for Administration visitors to the campus.

Minus 21 of 39 spaces

Phase 5
As part of the Facilities Complex relocation to the Foundation Hall area, eliminate the parking area associated with the Facilities Operations. Retain parking for the Chiller Plant.

Minus 67 of 85 spaces

Phase 6
As part of the Facilities Complex relocation to the Foundation Hall area, add parking at the lower former football field area to be developed as the Warehouse and associated buildings site. Provide replacement parking for Facilities operations with the remainder of the parking for Student Remote Parking.

Add 104 spaces

Phase 7
To provide a site for New Engineering Building #1 to replace Lewis Hall, the Foundry, and provide expanded engineering programs, eliminate the parking along the north side of Wings Up Way, just south of Southwest Hall.

Minus 68 spaces

Phase 8
Provide a new Parking Garage at the area behind Ray Morris Hall. The added parking capacity is a net gain due to the elimination of existing parking already on site.

Net add of 404 spaces (at 4 Levels)

Phase 9
Provide a new Parking Garage at the area behind the New Academic Classroom Building. The added parking capacity is a net gain due to the elimination of existing parking already on site.

Net add of 114 spaces (at 2 Levels)

Phase 10
As part of the Memorial Gym Renovation project, eliminate the adjacent parking area.

Minus 65 spaces

Phase 11
In preparation for New Engineering Building #2, eliminate the parking associated with Southwest Hall.

Minus 107 spaces

Phase 12
Provide a new Parking Garage at the area west of the Volpe Library courtyard site. The new parking garage will provide approximately 545 parking spaces on five levels. The garage may be developed to include the remote chiller plant at the north end of the garage.

Net add 156 spaces (at 5 levels)

Phase 13
Eliminate the parking along Peachtree behind Henderson and TJ Farr to create the Peachtree Quadrangle.

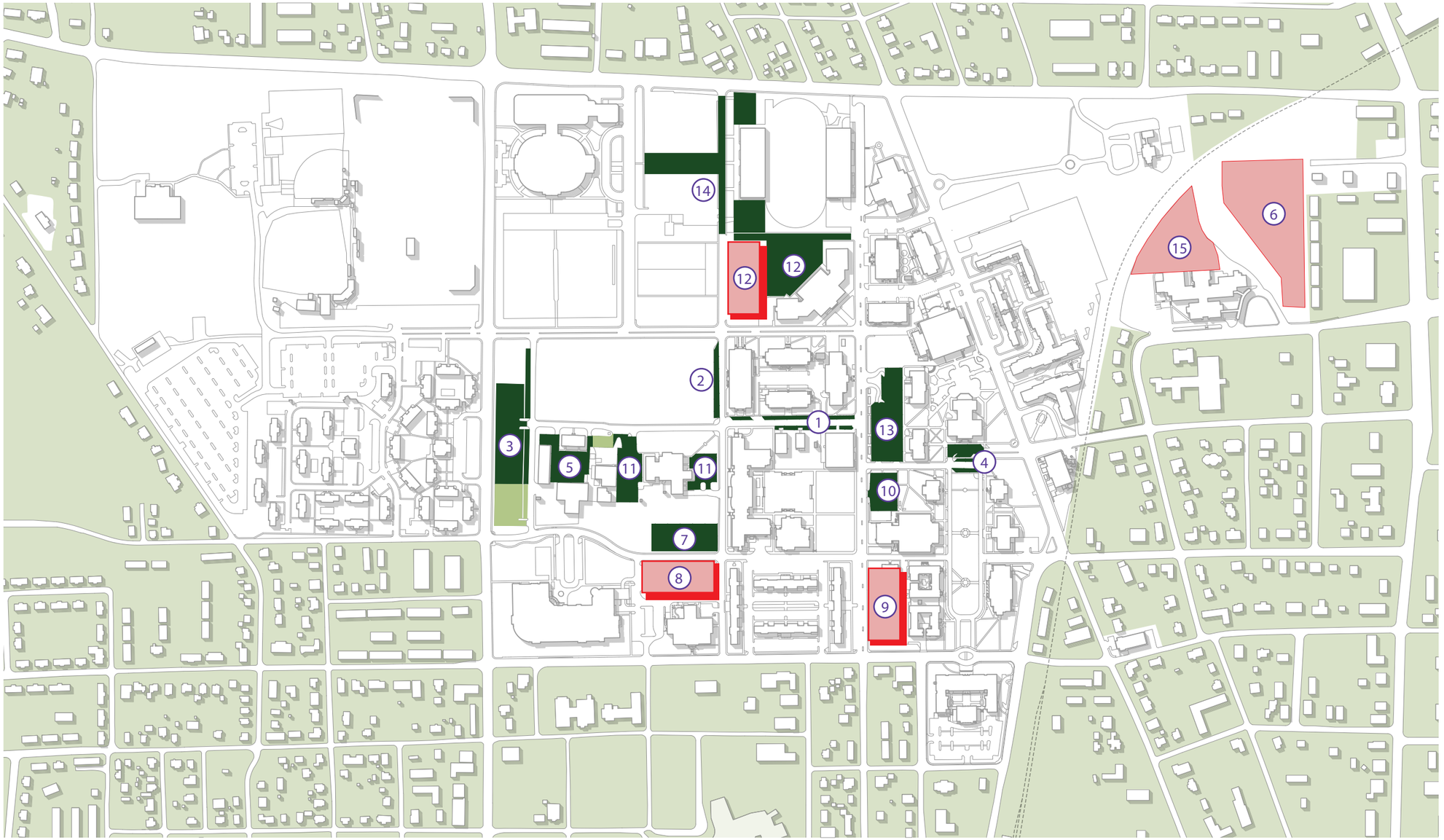
Minus 184 spaces

Phase 14
As part of the West Stadium expansion, eliminate parking at the Athletics areas to accommodate the vision of the project. This would include the lots at the north and south of the current stands, the parallel spaces along Stadium Drive and the center section of spaces in the main parking lot to create a landscape plaza connection to the Hooper Eblen Center.

Minus 322 spaces

Phase 15
In association with the paring down of the Foundation Hall footprint, provide a reconfigured parking area with added parking to the north and west of the building.

Add 4 spaces



LEGEND

- PARKING TO BE REMOVED
- NEW PARKING

#	PROJECT - SPOTS REMOVED/ADDED	
1.	W. 10TH STREET PARKING - 74	
2.	STADIUM DRIVE PARKING -35	
3.	WILLOW AVE. LOT	-230
4.	DERRYBERRY HALL PARKING	- 21
5.	FACILITIES PARKING	- 67
6.	FACILITIES RELOCATION	+ 104
7.	WINGS UP WAY LOT	- 68
8.	PARKING GARAGE	+ 341
9.	PARKING GARAGE	+ 114
10.	MEMORIAL GYM PARKING	- 65
11.	SOUTHWEST HALL PARKING	- 107
12.	PARKING GARAGE	+ 120
13.	PEACHTREE LOT	- 184
14.	ATHLETICS PARKING	- 322
15.	FOUNDATION HALL PARKING	+ 4
	TOTAL REMOVED	- 1,280
	TOTAL ADDED	+ 810

Figure 3.18 Parking Projects

NORTH

0′ 500′ 1,000′

PARKING PROJECTS

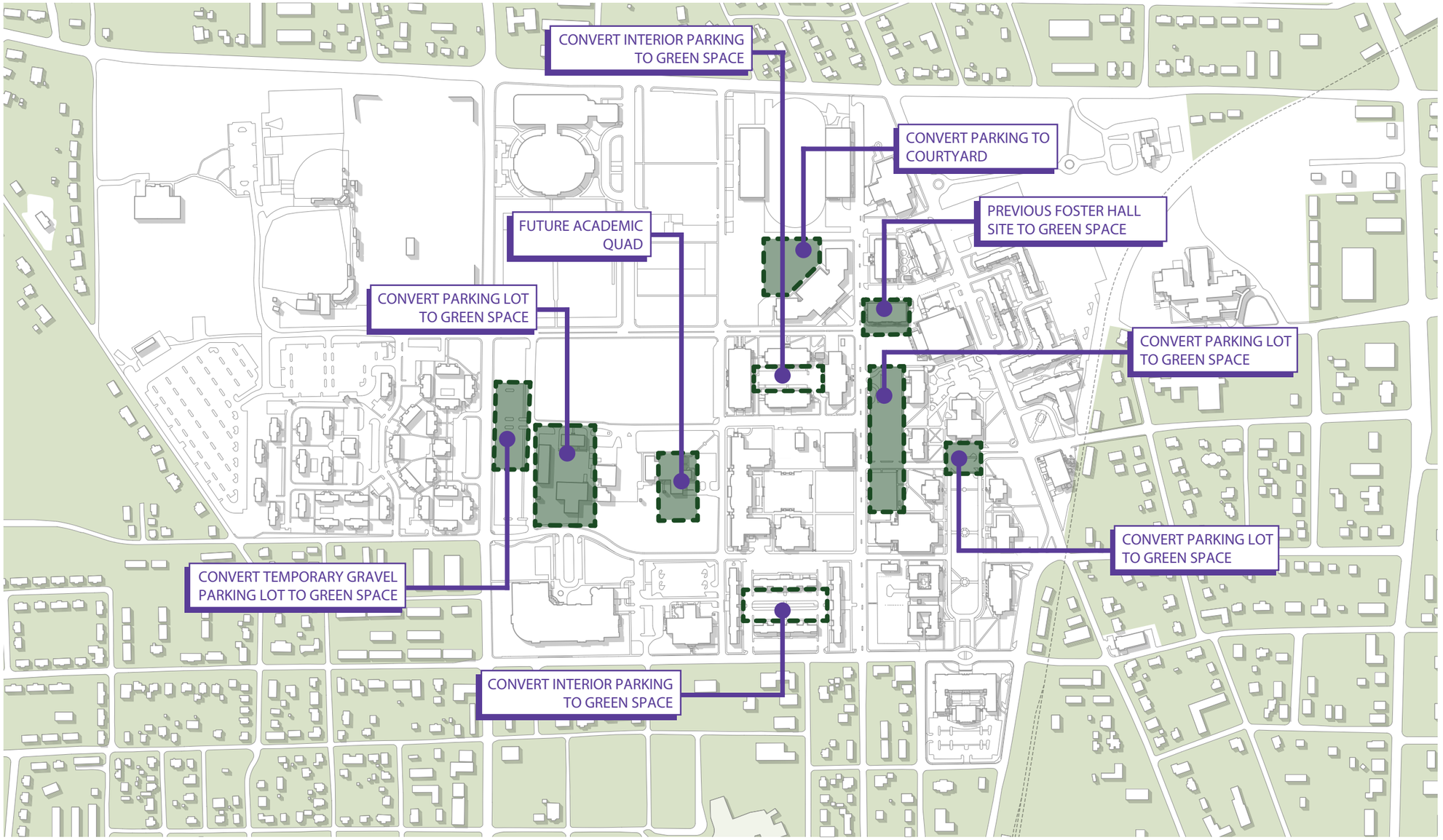


Figure 3.19 Hardscape & Landscape 2021 Vision

MAJOR GREENSPACE VISION

ART TRAIL

The Tennessee Tech Art Trail is envisioned as an opportunity to enhance the daily experience of students, faculty and staff as well as visitors to the campus. The “trail”, as conceived, would be a prescribed route through the campus to visit a number of sculptural and iconic elements. For the visitor, the experience might begin at the southeast corner of the campus. As the Tennessee Central Heritage Rail Trail passes by the eastern side of the campus, a visitor may take a short detour off the Rail Trail at Seventh Street. Walking west along Seventh, the visitor would encounter the first installation of the TTU Art Trail.

Several installations along the trail have been envisioned with concepts presented within this master plan. These include: a fountain at the historic mall with a bronze eagle sculpture, a science and math themed sculpture at the Science Quadrangle, an innovation themed constructivist sculpture at Sherlock Park, an interactive sculpture and lawn at the Peachtree Quadrangle, a University Tower at the center of campus and a striking representation of the birth of the University symbol at the new Dixie Roundabout.

The six elements described will complement existing sculptural exhibits on campus at Centennial Plaza and the Bryan Fine Arts Building. Other excellent locations for exterior artwork include the Pennebaker front lawn as an Art Garden should the building be renovated for the Art Department, the potential Roundabout at the intersection of Willow Avenue and University Drive, the Bell Hall Courtyard and the upcoming Derryberry Lawn. Several entry plazas would also provide appropriate locations for artwork including at the entry court at the new Marc L. Burnett Recreation and Fitness Center, as well as the entry plazas at the Hooper Eblen Center and the future West Stadium expansion.

Figure 3.20 Ascension Sculpture at Centennial Plaza

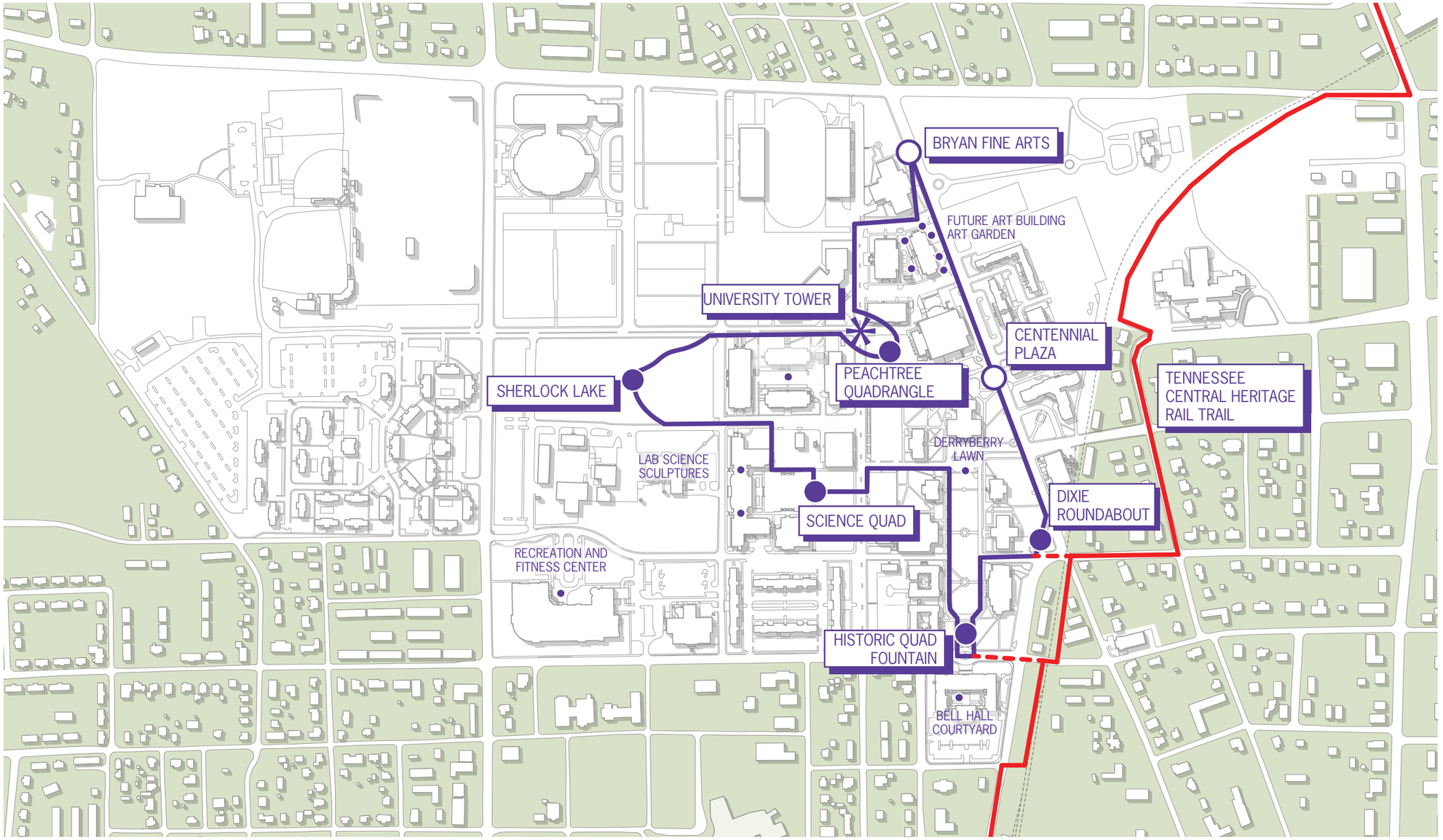


Figure 3.21 Art Trail

ART TRAIL & ICONIC MOMENTS

Figure 3.22 Historic Quad Fountain

HISTORIC QUADRANGLE FOUNTAIN

The Historic Quad Fountain is envisioned as a shallow reflecting pool with seating at the full perimeter of the pool. A large bronze sculpture of a golden eagle is envisioned to be placed within the pool. The sculpture will be of the eagle in flight descending upon the pool with its talons poised to snatch its prey from the water. A spray of water at the base will represent the moment of the catch. This iconic setting with the university symbol will provide an enduring image, complete with Derryberry Hall in the background.

Like many of the art trail elements, the eagle fountain is envisioned to provide a multitude of “selfie moments”, such as the first day on campus, with cap and gown upon graduation, or as returning alums visit the campus.

Figure 3.23 Science Quadrangle Sculpture

SCIENCE QUADRANGLE SCULPTURE

The new Laboratory Science Building is envisioned to be joined in the future by new Biology and new Physics buildings to form a science quadrangle. The Science Quad will open to the main portion of the campus to the east. A sculpture is envisioned at the center of the quad with a vertical presence that allows the sculpture to be experienced from a distance, yet unobtrusive in massing to allow views through the sculpture. The initial concept for the sculpture is based upon an infinity symbol as an expression from science and math, but also representing the unlimited possibilities for the students on campus.

SCULPTURE CONCEPTS

Figure 3.24 Sherlock Lake Sculpture

SHERLOCK LAKE SCULPTURE

The sculpture at Sherlock Lake will be poised between the new Engineering Building and the new Innovation Housing complex. The sculpture will be positioned on axis to the main atrium of the Engineering building. It will also be framed by the Innovation Housing complex to the west. The sculpture will overlook the new lake at the end of the courtyard lawn. As the University Drive entrance will be established as the primary entry to the campus, this positioning allows it to be in the foreground of the view to the building as one enters the campus. The intent is to provide a keynote view to enhance the first impression of the campus as well as enliven the experience upon subsequent visits.

The illustrated concept is of a sculpture by internationally recognized sculptor John Henry. The intent is to create an abstracted “Wings Up Eagle”, the logo of the university whose mascot is the Golden Eagle. The yellow color was chosen for its relationship to the golden color of the university and its striking quality against the building backdrop.

Figure 3.25 University Tower

UNIVERSITY TOWER

The University Tower is located to be at the visual center of the campus. It is sited on center to the University Drive entry to campus, the center line of the Peachtree Promenade and the center of the walkway from the Library. Each vista will provide a view to the tower, will be intentionally iconic, and will offer a lasting image of the University. The tower is envisioned to be approximately five stories tall, becoming the tallest element on the academic portion of the campus. It’s design is envisioned to incorporate the classic Georgian qualities of the campus architecture.

SCULPTURE CONCEPTS

Figure 3.26 Peachtree Quad Aerie

PEACHTREE QUADRANGLE AERIE

As an element in the center of campus, the Peachtree Quad Sculpture is envisioned as an interactive element within a sculpted landscape environment. Just west of the university center and south of the library, this central campus green space will be flooded with students as they traverse in every direction across campus. The sculpture is envisioned at the crossroads of several paths to invite interaction.

The sculpture could revolve in water, invite interaction with reflections or simply provide an engaging form. The oval|spherical form could allude to an egg within the aerie, which is a large nest of an eagle, created by the undulations with the surrounding lawn. The proposed undulating lawn area is envisioned as an area of respite and relaxation. The undulations will provide areas for individuals or groups to sit for a study break, a conversation or perhaps just lay out and enjoy the sun.

Figure 3.27 Dixie Roundabout

DIXIE ROUNDABOUT

The New Dixie Roundabout, that resolves the awkward intersection to the east of the Jere Whitson building, provides a unique location for a large-scale sculpture. Especially appropriate due to its location adjacent to the origin of the campus, the concept for the roundabout sculpture is drawn from the four eagles that circled above this same location at the founding of the university. The sculpture will tell the story of the campus symbol by featuring the four eagles soaring overhead providing a dynamic large scale feature which still allows for views across the intersection.

SCULPTURE CONCEPTS

IMPLEMENTATION PLAN

The Implementation Plan incorporates the anticipated projects envisioned to facilitate the vision of the University in the coming years. The Master Plan outlines a series of projects within the Capital Improvements section which address current space deficits and building maintenance deficiencies. The plan also includes initiatives which will address the projected growth of the University in the future.

The Implementation Plan supports the Ongoing Capital Improvement Plan for the campus. This Improvement Plan includes Capital Outlay, Capital Maintenance, and major Disclosure Projects. The University is required to maintain a five-year capital improvement plan that can be developed from the Improvement Plan listing of initiatives and based upon the emerging priorities of the University reviewed annually. An itemization of the Capital Outlay, Capital Maintenance and major Disclosure Projects is provided on the following page. Also included is a listing of other items which may be considered at the capital appropriation level or incorporated as part of the three major categories.

Note: The projected budgets can change significantly in inflationary times. Therefore, the overall budget request for any given project should be evaluated carefully and adjusted for items such as scope refinement and current inflationary environment. These adjustments should account for the anticipated "bid" date of the actual expenditure of the funding.

2022 Capital Outlay Cost Projections

Priority	Building Name	Projected Budget
2	Advanced Construction and Manufacturing Building	$62,400,000
3	Academic Classroom Building	$45,000,000
9	Physics Building	$23,000,000
8	Biology Building	$72,000,000
7	Engineering Building	$68,600,000
11a	Academic Wellness Center	$4,000,000
13	Bell Hall Expansion	$16,500,000
15b	Bryan Fine Arts Expansion	$36,100,000
16	Oakley Hall Expansion	$23,200,000
17	Engineering Building #2	$54,000,000
18	Johnson Hall Expansion	$14,000,000
		$418,800,000

2022 Disclosed Projects Cost Projections

Item	Building Name	Project Budget
A	Facilities Services Complex	$21,500,000
B1	Football Operations Building	$22,000,000
B2	West Stadium Replacement	$29,900,000
B3	Baseball Softball Complex-Turf	$2,260,000
C1	Wings Up Way Garage- Phase II	$13,925,000
C2	Peachtree Garage	$6,500,000
C3	Library Garage/ Remote Chiller Plant	$18,250,000
D	Food Service Improvements	$3,000,000
E	Innovation Housing- Phase II	$53,650,000
F	Sorority Row	$41,500,000
G	University Center Expansion	$17,000,000
H	Parking /Trans. Imp.- Phase III	
I	University Tower	$1,500,000
J	Art Trail	$3,250,000
K	Peachtree Quadrangle	$1,750,000
L	Foundation Hall Demolition(s)	$1,000,000
		$236,985,000

Table 3.12 Implementation Table

2022 Capital Renovation Cost Projections

Priority	Building Name	Projected Budget
1	Johnson Hall	$14,200,000
4	Brown Hall	$16,978,078
5	Prescott Hall	$37,992,178
6	Memorial Gym	$20,500,000
8a	Pennebaker Hall	$13,750,000
10	Clement Hall	$17,750,000
11	Academic Wellness Center	$17,800,000
12	Derryberry Hall	$13,250,000
14	Volpe Library	$23,500,000
15a	Bryan Fine Arts	$12,600,000
		$188,320,256

2022 Campus Maintenance Cost Projections

Item	Project	Project Budget
A	Electrical- Campus Service	$2,480,000
B	Steam Upgrades/Replacement (6 Phases)	$16,000,000
C	Steam West Campus Loop	$3,800,000
D	Satellite Chiller Plant	$25,500,000
E	Data Telecom Ductbank	$800,000
F	Sewer System Survey and Inspection	$160,000
G	Sewer upgrades near TJ Farr	$320,000
H	Foundation Hall Manhole Replacement	$32,000
I	STEM Center Manhole Replacement	$32,000
J	University Services Stormwater Upgrades	$650,000
K	Storm System Survey and Inspection	$200,000
L	Establish GIS for campus infrastucture	$40,000
M	Annual GIS update and verification	$20,000
N	New Steam/Condensate Johnson to Jobe	$650,000
O	CH-1/CT-1 Replacement - 2027	$3,795,000
P	CH-3/CT-3 Replacement - 2031	$6,325,000
Q	CH-2/CT-2 Replacement - 2033	$7,590,000
		$68,394,000

LEGEND

1	JOHNSON HALL RENOVATION
2	ADVANCED CONSTRUCTION AND MANUFACTURING ENGINEERING BLDG
3	ACADEMIC CLASSROOM BLDG
4	BROWN HALL RENOVATION
5	PRESCOTT HALL RENOVATION
6	MEMORIAL GYM RENOVATION
7	NEW ENGINEERING BUILDING
8	BIOLOGY BUILDING
9	PENNEBAKER HALL RENOVATION
10	PHYSICS BUILDING
11	CLEMENT HALL RENOVATION
12	ACADEMIC WELLNESS CENTER RENOVATION
13	BELL HALL EXPANSION
14	VOLPE LIBRARY RENOVATION
15	BRYAN FINE ARTS RENOVATION
16	BRYAN FINE ARTS ADDITION
17	OAKLEY HALL EXPANSION
18	JOHNSON HALL EXPANSION
19	FOUNDATION HALL RENOVATION
20	ROADEN UNIVERSITY CENTER RENOVATION
20a	EVENT CENTER AND COURTYARD
21	FACILITIES SERVICES COMPLEX
22	FOOTBALL OPERATIONS BLDG
23	WEST STADIUM REPLACEMENT
24	BASEBALL/SOFTBALL COMPLEX
25	WINGS UP WAY GARAGE
26	PEACHTREE GARAGE
27	LIBRARY GARAGE
28	INNOVATION HOUSING - PHASE II
29	SORORITY ROW

LEGEND

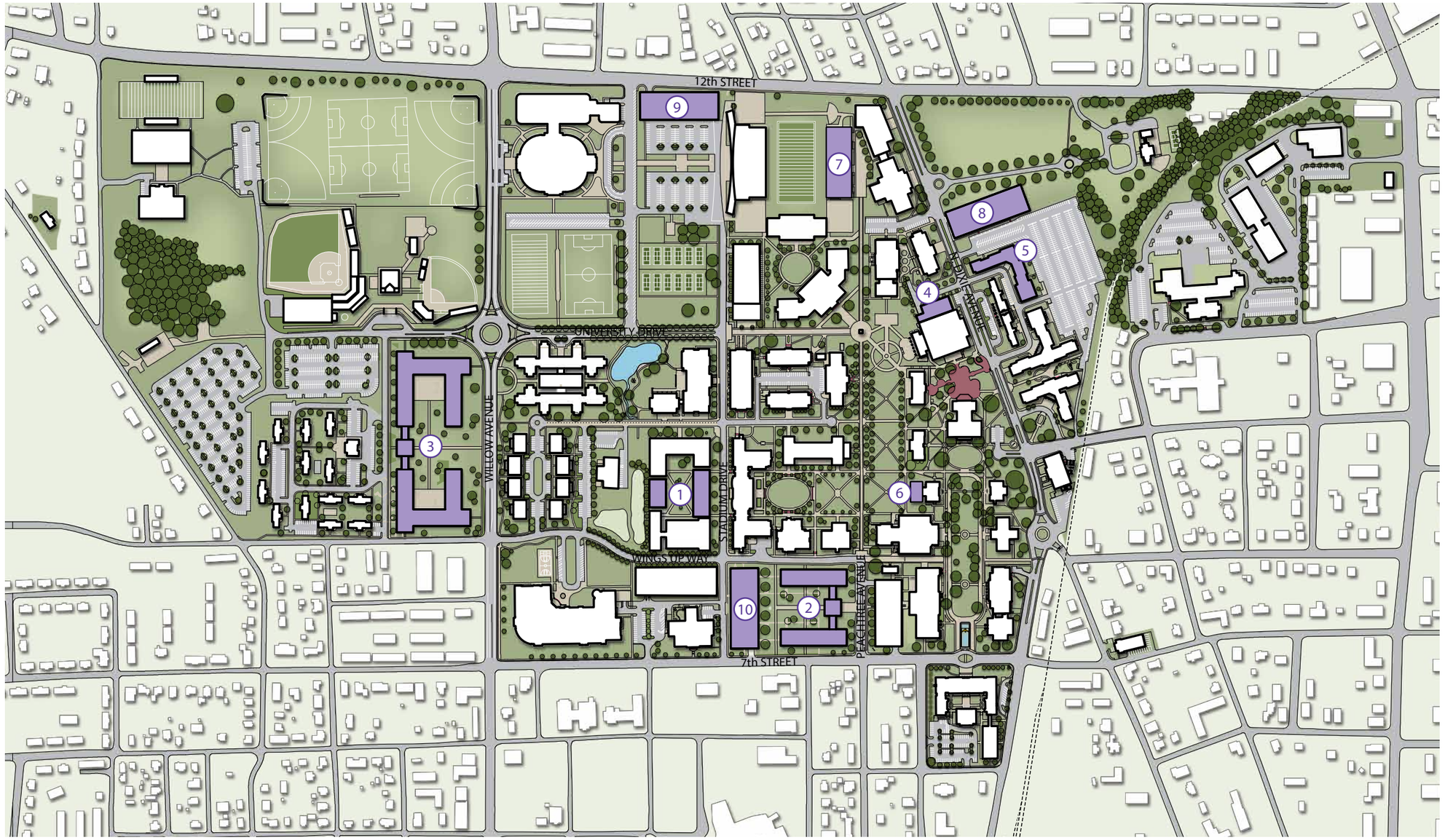
- NEW BUILDING
- RENOVATED BUILDING

NORTH

0′ 500′ 1,000′

Figure 3.28 12,000 Student Campus Master Plan

12,000 STUDENT CAMPUS MASTER PLAN



LEGEND

1 NEW ENGINEERING BUILDING #2
2 NEW ACADEMIC BUILDING AT CAPITAL QUAD
3 CAPITAL QUAD HOUSING REPLACEMENT
4 ROADEN UNIVERSITY CENTER EXPANSION
5 JOBE | MURPHY HOUSING REPLACEMENT
6 BARTOO EXPANSION
7 EAST STADIUM REPLACEMENT
8 DIXIE GARAGE
9 STADIUM GARAGE
10 CAPITAL QUAD GARAGE

LEGEND

NEW BUILDING
RENOVATED BUILDING

NORTH
0' 500' 1,000'

Figure 3.29 15,000 Student Campus Master Plan

15,000 STUDENT CAMPUS MASTER PLAN

AMENDMENTS

1. ACADEMIC CLASSROOM BUILDING

Page 07	Clarify renovation goal
Page 11	Revised list to show Crawford to be demolished
Page 13	Updated footprint for new Academic Classroom Building
Page 14	Updated footprint for new Academic Classroom Building
Page 35	Crawford rating revised to be <60 and to be demolished
Page 75	Updated narrative for Academic Classroom Building
Page 77	Updated Capital Improvement list and footprint of Academic Classroom Building
Page 81	Updated footprint for new Academic Classroom Building
Page 97	Updated Implementation table
Page 98	Updated footprint for new Academic Classroom Building
Page 99	Updated footprint for new Academic Classroom Building

2. CROSSVILLE CAMPUS

Page 26	Updated narrative and University Property chart
Page 28	Added the Crossville Campus to the map
Page 29	Updated narrative
Page 78A	Added page to show Crossville Campus property and proximity map

3. UNIVERSITY CENTER

Page 80	Revised University Center Expansion to include a detached Event Center at the south end of Tucker Stadium in association with the Volpe Library in lieu of a western addition to the existing University Center. The existing University Center will still be renovated.
Page 81	Added footprint of Event Center, reduced footprint of expansion of Roaden University Center
Page 89	Refined Parking to eliminate parking lot behind Volpe Library
Page 90	Refined Parking to eliminate parking lot behind Volpe Library
Page 91	Added greenspace at parking area behind Library as part of University Event Center
Page 98	Updated plan to include University Center related projects
Page 99	Updated plan to include University Center related projects

APPENDIX A

UTILITIES & INFRASTRUCTURE

CHILLED WATER

Existing Conditions

Chilled water for the campus is currently provided from a single chiller plant located on West 10th Street on the west side of the campus. Most of the buildings on campus receive chilled water from the chiller plant, including the new Student Recreation Center and Laboratory Science Commons buildings.

The chiller plant presently has a total connected capacity of 5,600 tons, provided by four (4) centrifugal water-cooled chillers:

- Chiller 1: 1,300 tons (installed in 2000)
- Chiller 2: 1,500 tons (installed in 2006)
- Chiller 3: 1,300 tons (installed in 2004)
- Chiller 4: 1,500 tons (installed in 2018)

Chilled water is distributed to the campus by five (5) base-mounted centrifugal pumps, configured in a variable primary arrangement. The pumps are controlled to maintain a fixed differential pressure at the chiller plant between the supply and return as required to reach the most hydraulically remote building on campus. The chillers and chilled water pumps are separated into two loops:

- Loop 1:
  - Chillers 1, 2 and 3
  - Chilled Water Pump #1: 6,000 gallons per minute (gpm)
  - Chilled Water Pump #2: 6,000 gpm
  - Chilled Water Pump #3: 6,000 gpm
- Loop 2:
  - Chiller 4
  - Chilled Water Pump #4: 3,600 gpm
  - Chilled Water Pump #5: 3,600 gpm

In 2018, as part of the Lab Science building and infrastructure project, Chiller 4 was installed in an expansion to the existing chiller plant. Also included in the chiller plant expansion was space for a future 1,500-ton chiller (Chiller 5).

The underground chilled water piping was modified and expanded in 2018 as part of the Lab Science building and infrastructure project. Included were new 20" chiller water mains exiting the east side of the plant and connecting to the 20" mains on the north side of the plant. New underground chilled water piping was also provided on the west and south sides of the campus to primarily serve the new Student Recreation Center and Laboratory Science Commons buildings.

Condenser water for the chillers is provided by dedicated cooling towers and condenser water pumps:

- Chiller 1:
  - Cooling Tower 1: Single cell, induced-draft, field-assembled
  - Installed: 1971
  - Refurbished: 2021
  - Condenser Water Pump #1: 3,900 gpm
- Chiller 2:
  - Cooling Tower 2: Two-cell, induced-draft, factory-assembled
  - Installed: 2004
  - Refurbished: 2019
  - Condenser Water Pump #2: 3,900 gpm
- Chiller 3:
  - Cooling Tower 3: Single cell, induced-draft, field-assembled
  - Installed: 1985
  - Refurbished: 2021
  - Condenser Water Pump #3: 3,900 gpm
- Chiller 4:
  - Cooling Tower 4: Two-cell, induced-draft, factory-assembled
  - Installed: 2018
  - Condenser Water Pump #4: 4,500 gpm

Chilled Water Demand

The peak chilled water demand for 2021 was reported to be 12,000 gpm at 5,400 tons.

The total connected load for the campus in 2021 was approximately 8,249 tons. At the reported peak demand of 5,400 tons, the diversified campus demand is 65% of the connected load.

Existing Chiller Plant Analysis:

- Present:
  - Peak Demand for 2021: 5,400 tons
  - Total Connected Plant Capacity: 5,600 tons (104% of the demand)
  - Surplus Plant Capacity at Peak Demand: 200 tons
  - Plant Capacity with Largest Chiller Offline: 4,100 tons (76% of the demand)

- Future (Present + Ongoing Projects): [with present plant capacity]
  - Estimated Peak Demand: 5,831 tons
  - Total Connected Plant Capacity: 5,600 tons (96% of the demand)
  - Surplus Plant Capacity at Peak Demand: -231 tons
  - Plant Capacity with Largest Chiller Offline: 4,100 tons (70% of the demand)

- Future (Present + Ongoing Projects): [with new Chiller 5 at 1,500 tons]
  - Estimated Total Peak Demand: 5,831 tons
  - Total Connected Plant Capacity: 7,100 tons (122% of the demand)
  - Surplus Plant Capacity at Peak Demand: 1,269 tons
  - Plant Capacity with Largest Chiller Offline: 5,600 tons (96% of the demand)

CHILLED WATER

- Future (Present + Ongoing + Capital Improvement Projects): [with new Chiller 5 at 1,500 tons]
  - Estimated Peak Demand: 7,361 tons
  - Total Connected Plant Capacity: 7,100 tons (96% of the demand)
  - Surplus Plant Capacity at Peak Demand: -262 tons
  - Plant Capacity with Largest Chiller Offline: 5,600 tons (76% of the demand)

- Future (Present + Ongoing + Capital Improvement + Disclosure Projects): [with new Chiller 5 at 1,500 tons]:
  - Estimated Peak Demand: 7,968 tons
  - Total Connected Plant Capacity: 7,100 tons (89% of the demand)
  - Surplus Plant Capacity at Peak Demand: -868 tons
  - Plant Capacity with Largest Chiller Offline: 5,600 tons (70% of the demand)

Summary

The addition of Chiller 5 at 1,500 tons will nearly provide a redundant chiller during peak design conditions when the Ongoing Projects (Ashraf Islam Engineering Building and Innovation Center Residence Hall - Phase 1) are brought online.

With the addition of Chiller 5 at 1,500 tons, the current chiller plant's capacity will not meet the cooling demand for the entirety of the Capital Improvement and Disclosure Projects. Since the current chiller plant has no future expansion capability, either a replacement chiller plant or a satellite chiller plant to supplement the existing plant should be considered. A satellite chiller plant is recommended due to high cost of a replacement chiller plant.

The current campus chilled water distribution system would appear to support a clean north-south division of the campus for two chiller plants. The current plant would serve the south half of the campus, while the north half would be served by the new satellite plant conceivably located in or adjacent to the Library Parking Garage Disclosure Project. A detailed analysis is required to confirm this arrangement, but a preliminary review indicates doing so would require the current plant to provide approximately 70% of the future demand (including all Capital Improvement and Disclosure Projects) and the satellite plant to provide the remaining 30%. With the addition of Chiller 5 at 1,500 tons in the existing plant, at 70% of the future peak campus demand, the plant would have one (1) redundant chiller. Refer to page 104 and 105 for conceptual diagrams of the north and south zonings.

For the satellite chiller plant to provide the future 30% of the campus chilled water demand, a redundant chiller and surplus capacity for future projects beyond the currently planned projects, many chiller quantity and capacity options are possible. One such option would be three (3) 1,500 ton chillers, which would provide approximately 500 tons of future capacity (beyond the Disclosure Projects) and still maintain a redundant chiller.

The chilled water distribution system for the campus will be significantly impacted with the addition of a satellite plant. A hydraulic analysis of the entire campus will be required to determine critical pressure paths for both the existing and satellite plants.

The condenser water system configuration for the chiller plant represents the "weak link" regarding redundancy. Although the chilled water system is arranged in a headered manner and can provide backup upon the loss of a chiller or chilled water pump, the condenser water system for each chiller is independent of the others. As such, the loss of a condenser water pump (only one per system) will take its respective chiller offline. Single cell cooling towers (1 and 3) present a similar condition if their respective single fan motors fail. Providing redundancy for the condenser water systems does not appear to be achievable in the existing chiller plant.

The average service life for water-cooled centrifugal chillers is 23 years according to ASHRAE. Chiller manufacturers have reported 30+ years for well-maintained chillers, which applies to the chillers in the existing plant. With the oldest chiller being 22 years old, its replacement will likely not be required for a minimum of five years. Budget estimates are provided for the replacement of Chillers 1, 2 and 3 and their associated cooling towers.

The average service life for cooling towers is 20 to 34 years according to ASHRAE. As indicated above, the cooling towers range in age from 4 to 51 years but have all been recently refurbished. Cooling tower replacement or supplemental refurbishment will also likely not be required for a minimum of five years.

Figure 4.1 Chilled Water Lines Map

CHILLED WATER LINES

UTILITY & INFRASTRUCTURE

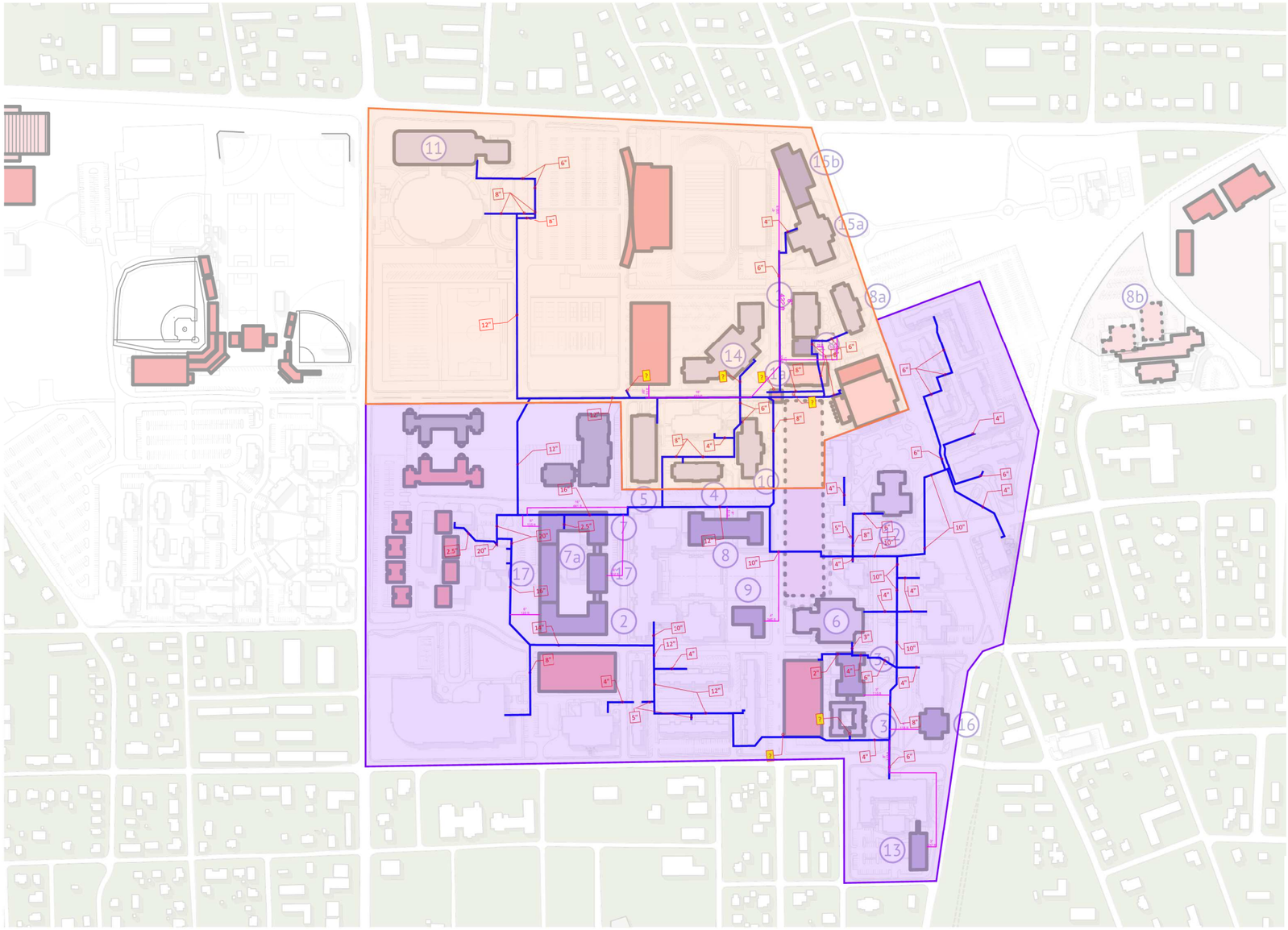


Figure 4.2 Chilled Water Zoning Map

CHILLED WATER - PROPOSED NORTH & SOUTH ZONING

NORTH

0' 500' 1,000'

CAPITAL IMPROVEMENT PROJECTS

#	PROJECT	NEW	RENOVATION	STORIES	AREA (SF)
1	JOHNSON HALL RENOVATION	X	X	4	68,171
1a	FOSTER DEMOLITION				60,743
2	NEW ENGINEERING BUILDING #1	X		3	80,000
3	ACADEMIC CLASSROOM/ CRAWFORD RENOVATION	X	X	2-3	63,755
3a	MATTHEWS/DANIEL DEMOLITION				43,555
4	BROWN HALL RENOVATION		X	4	55,001
5	PRESCOTT HALL RENOVATION		X	5	111,955
6	MEMORIAL GYM RENOVATION		X		87,181
7	NEW ENGINEERING BUILDING #2	X		3	100,000
7a	SOUTHWEST HALL DEMOLITION				23,500
8	BIOLOGY BUILDING	X		3	93,785
8a	PENNEBAKER HALL RENOVATION		X	4	59,679
8b	PARTIAL FOUNDATION HALL DEMOLITION				
9	PHYSICS BUILDING	X		3	38,378
10	CLEMENT HALL RENOVATION		X	4	62,887
11	ACADEMIC WELLNESS CENTER RENOVATION		X		77,895
12	DERRYBERRY HALL RENOVATION		X		57,877
13	BELL HALL EXPANSION	X		3	27,635
14	VOLPE LIBRARY RENOVATION		X	3	132,645
15a	BRYAN FINE ARTS RENOVATION		X	3	55,110
15b	BRYAN FINE ARTS ADDITION	X		2	60,965
16	OAKLEY HALL EXPANSION	X		2	38,922
17	NEW ENGINEERING BUILDING #3	X		3	90,000
18	JOHNSON HALL EXPANSION	X		4	25,000

LEGEND

NEW CHILLED WATER PIPING

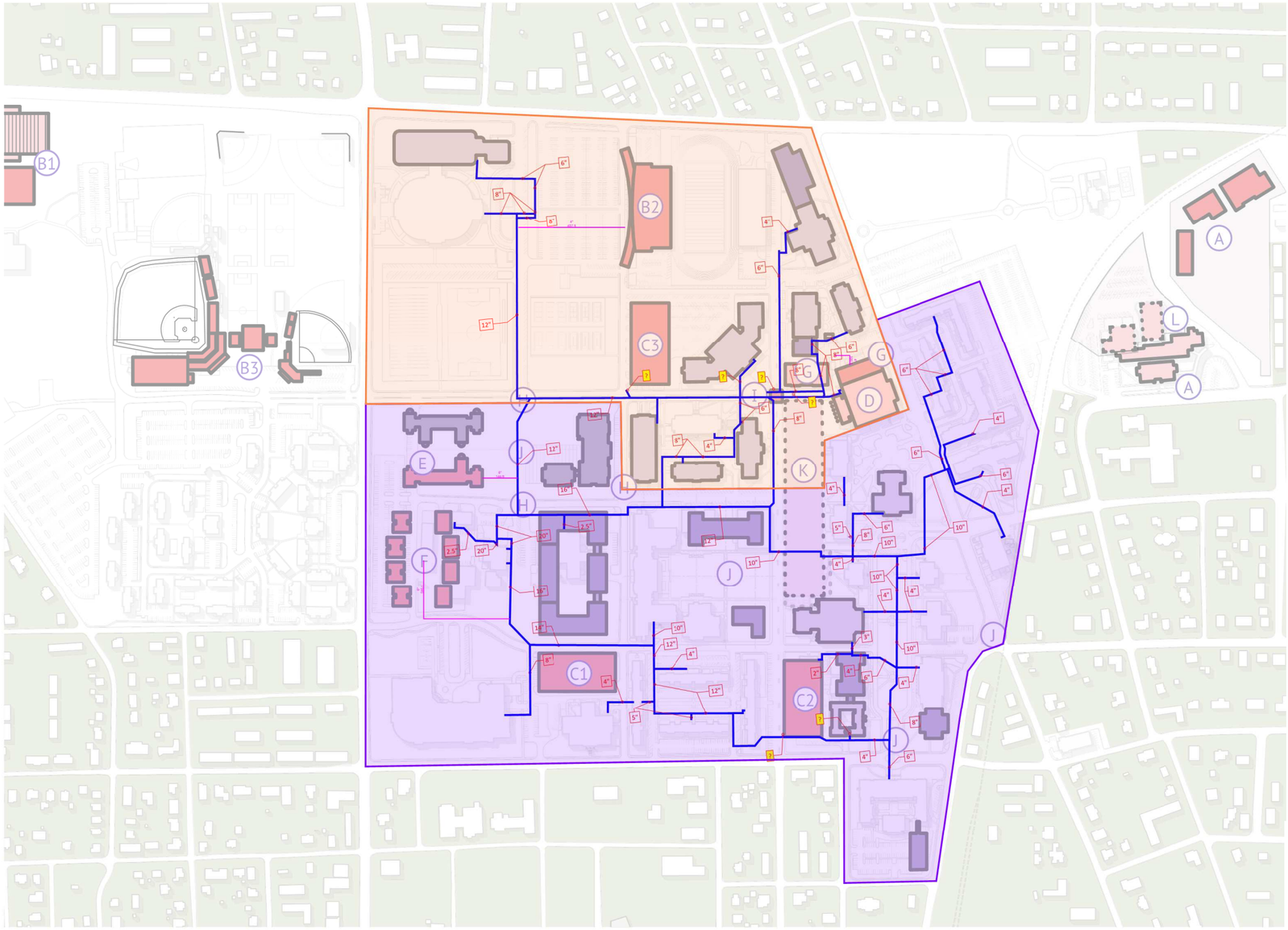


Figure 4.3 Chilled Water Zoning Map

CHILLED WATER - PROPOSED NORTH & SOUTH ZONING

NORTH

0' 500' 1,000'

DISCLOSURE PROJECTS

#	PROJECT	NEW	RENOVATION	STORIES	AREA (SF)
A	FACILITIES SERVICES COMPLEX	X			
B1	FOOTBALL OPERATIONS BLDG	X			
B2	WEST STADIUM REPLACEMENT	X			
B3	BASEBALL/SOFTBALL COMPLEX	X			
C	PARKING GARAGE(S)	X			
C1	WINGS UP WAY GARAGE	X			
C2	PEACHTREE GARAGE	X			
C3	LIBRARY GARAGE	X			
D	FOOD SERVICE IMPROVEMENTS		X		
E	INNOVATION HOUSING - PHASE II	X			
F	SORORITY ROW	X			
G	UNIVERSITY CENTER EXPANSION	X	X		
H	PARKING & TRANSPORTATION IMPROVEMENTS - PHASE II		X		
I	UNIVERSITY TOWER	X			
J	ART TRAIL	X			
K	PEACHTREE QUADRANGLE		X		
L	FOUNDATION HALL DEMOLITIONS		X		

LEGEND

NEW CHILLED WATER PIPING

STEAM

Existing Conditions

Steam for the campus is currently provided from a single boiler plant located on the corner of North Dixie Avenue and East 9th Street on the east side of the campus. Most of the buildings on campus receive steam from the boiler plant, including the new Student Recreation Center and Laboratory Science Commons buildings.

The boiler plant presently has a total connected capacity of 179,000 pounds per hour (pph) of steam, provided by two (2) dual fuel (natural gas and No. 2 fuel oil) steam boilers and one natural gas only steam boiler:

- Boiler 2: 69,000 pph (Dual fuel - installed in 2015)
- Boiler 3: 68,000 pph (Dual fuel - installed in 1965)
- Boiler 4: 42,000 pph (Natural gas - installed in 1948)

The steam distribution system is split into a loop circling the campus. Both the north and south loops have 8" steam mains leaving the boiler plant with 6" distribution system.

The underground steam and steam condensate piping was modified and expanded in 2018 on the south side of the campus as part of the Lab Science building and infrastructure project. Included were new steam and pumped steam condensate mains to primarily serve the new Student Recreation Center and Laboratory Science Commons buildings. Underground steam and steam condensate piping was replaced in 2020 by the Capital Quad Steam Line Replacement Project.

Steam Demand

A utility study issued in 2015 indicated connected and diversified peak steam demands of 70,601 pph and 52,000 pph respectively, which included Hooper Eblen Center and the Academic Wellness Center. Hooper Eblen Center and the Academic Wellness Center have since been provided with independent heating systems and have been removed from the boiler plant. Therefore, based on the 2015 utility study, the peak steam demand as of 2019 was approximately 46,000 pph.

Present:

- Estimated Peak Demand:
  - 2019 Demand: 46,000 pph
  - University Center Expansion: 2,400 pph
  - Student Recreation Center: 6,300 pph
  - Laboratory Science Commons: 22,600 pph
  - Total Present Demand: 77,300 pph
- Total Connected Plant Capacity: 179,000 pph (232% of the present demand)
- Surplus Plant Capacity at Peak Demand: 101,700 pph
- Plant Capacity with Largest Boiler Offline: 110,000 pph (142% of the present demand)

Future (Present + Ongoing Projects):

- Estimated Peak Demand: 83,021 pph
- Total Connected Plant Capacity: 179,000 pph (216% of the present demand)
- Surplus Plant Capacity at Peak Demand: 95,979 pph
- Plant Capacity with Largest Boiler Offline: 110,000 pph (132% of the present demand)

Future (Present + Ongoing + Capital Improvement Projects):

- Estimated Peak Demand: 96,553 pph
- Total Connected Plant Capacity: 179,000 pph (185% of the present demand)
- Surplus Plant Capacity at Peak Demand: 82,447 pph
- Plant Capacity with Largest Boiler Offline: 110,000 pph (114% of the present demand)

Future (Present + Ongoing + Capital Improvement + Disclosure Projects):

- Estimated Peak Demand: 104,373 pph
- Total Connected Plant Capacity: 179,000 pph (171% of the present demand)
- Surplus Plant Capacity at Peak Demand: 74,627 pph
- Plant Capacity with Largest Boiler Offline: 110,000 pph (105% of the present demand)

Summary

The present capacity of the boiler plant will support all Ongoing, Capital Improvement and Disclosure Projects, provide a minimum of approximately 5,600 pph of future capacity (beyond the Disclosure Projects) and maintain a redundant boiler.

The average service life for fire-tube boilers is 25 years according to ASHRAE. As noted above, Boiler 2 is only seven years old and as such is expected to provide many more years of service. The life expectancy of Boilers 3 and 4 cannot reliably be predicted since they were converted from coal-fired.

Ancillary equipment associated with the steam boilers such as deaerators, surge tanks, condensate polishers and water softeners typically have an average service life of 15 to 20 years. Such equipment in the boiler plant varies in age and condition. Replacement of the existing deaerator tank is in design with construction scheduled for completion in 2023.

The underground steam and steam condensate piping systems throughout the campus vary in age and condition and are scheduled for phased replacement. The diagram on page 110 outlines the phases of steam piping by age of installation. While the assumed replacement installation would begin with the oldest, each section should be further evaluated to determine the most desirable sequence for implementation. The budgeted total includes all phases.

To serve Capital Improvement and Disclosure projects located on the west side of the campus, new underground high pressure steam and steam condensate lines with associated manholes will connect the north and south zones on the west side of the campus.

West 12th Street
East 12th Street
West 10th Street
East 10th Street
West 9th Street
East 9th Street
West 7th Street
W. 9TH STREET
W. 8th St
11th Street
AWC
HOOP
WSTA
Tucker Stadium Overall Field
ESTA
BFA
WALT
Women's Softball Field
Intramural Fields
Toilets
APC
Wet lands
Bush Stadium Quillen Field
Wetlands
Soccer Field
Tennis Courts
Sherlock Park
BBCG
BBCH
TVEJ
TVEX
TVEK
TVEH
TVEL
TVEM
TVEW
TVWJ
TVWK
TVWM
TVWH
TVW
TVWL
TVEV
TVE
TVWG
TVEU
TVEO
TVWF
TVWI
TVWC
TVEP
TVWB
TVWA
TVET
TVEQ
TVES
TVER
Lovell Rd
Bell Tower Dr
Wetlands Drive
University Drive
Dixon Ave
North Willow Avenue
Prescott Ave
Dixon Ave
Bellum Drive
Dixon Ave
Prescott Ave
Dixon Ave
N. Dixie Ave
Dixie Ave
Dixie Ave

Figure 4.5 Steam Capital Improvements

STEAM - CAPITAL IMPROVEMENTS

CAPITAL IMPROVEMENT PROJECTS

#	PROJECT	NEW	RENOVATION	STORIES	AREA (SF)
1	JOHNSON HALL RENOVATION	X	X	4	68,171
1a	FOSTER DEMOLITION				60,743
2	NEW ENGINEERING BUILDING #1	X		3	80,000
3	ACADEMIC CLASSROOM/ CRAWFORD RENOVATION	X	X	2-3	63,755
3a	MATTHEWS/DANIEL DEMOLITION				43,555
4	BROWN HALL RENOVATION		X	4	55,001
5	PRESCOTT HALL RENOVATION		X	5	111,955
6	MEMORIAL GYM RENOVATION		X		87,181
7	NEW ENGINEERING BUILDING #2	X		3	100,000
7a	SOUTHWEST HALL DEMOLITION				23,500
8	BIOLOGY BUILDING	X		3	93,785
8a	PENNEBAKER HALL RENOVATION		X	4	59,679
8b	PARTIAL FOUNDATION HALL DEMOLITION				
9	PHYSICS BUILDING	X		3	38,378
10	CLEMENT HALL RENOVATION		X	4	62,887
11	ACADEMIC WELLNESS CENTER RENOVATION		X		77,895
12	DERRYBERRY HALL RENOVATION		X		57,877
13	BELL HALL EXPANSION	X		3	27,635
14	VOLPE LIBRARY RENOVATION		X	3	132,645
15a	BRYAN FINE ARTS RENOVATION		X	3	55,110
15b	BRYAN FINE ARTS ADDITION	X		2	60,965
16	OAKLEY HALL EXPANSION	X		2	38,922
17	NEW ENGINEERING BUILDING #3	X		3	90,000
18	JOHNSON HALL EXPANSION	X		4	25,000

LEGEND

NEW STEAM PIPING

Figure 4.6 Steam Disclosure

DISCLOSURE PROJECTS

#	PROJECT	NEW	RENOVATION	STORIES	AREA (SF)
A	FACILITIES SERVICES COMPLEX	X			
B1	FOOTBALL OPERATIONS BLDG	X			
B2	WEST STADIUM REPLACEMENT	X			
B3	BASEBALL/SOFTBALL COMPLEX	X			
C	PARKING GARAGE(S)	X			
C1	WINGS UP WAY GARAGE	X			
C2	PEACHTREE GARAGE	X			
C3	LIBRARY GARAGE	X			
D	FOOD SERVICE IMPROVEMENTS		X		
E	INNOVATION HOUSING - PHASE II	X			
F	SORORITY ROW	X			
G	UNIVERSITY CENTER EXPANSION	X	X		
H	PARKING & TRANSPORTATION IMPROVEMENTS - PHASE II		X		
I	UNIVERSITY TOWER	X			
J	ART TRAIL	X			
K	PEACHTREE QUADRANGLE		X		
L	FOUNDATION HALL DEMOLITIONS		X		

LEGEND

NEW STEAM PIPING

NORTH

0' 500' 1,000'

STEAM - DISCLOSURE

	Phase 1			Phase 2			Phase 3			Phase 3A			Phase 4			Phase 4A		
HPS Pipe Size (in)	Pipe Length (HPS) (ft)	New Manhole?	Total Cost	Pipe Length (HPS) (ft)	New Manhole?	Total Cost	Pipe Length (HPS) (ft)	New Manhole?	Total Cost	Pipe Length (HPS) (ft)	New Manhole?	Total Cost	Pipe Length (HPS) (ft)	New Manhole?	Total Cost	Pipe Length (HPS) (ft)	New Manhole?	Total Cost
2	173		$130,000							115		$90,000						
3				617		$650,000	95		$100,000							168		$180,000
4													352		$430,000	678		$820,000
6	1,929		$2,900,000	686		$1,030,000	1,236		$1,860,000	172		$260,000	1,196		$1,800,000	1,269		$1,910,000
			$3,030,000			**$1,680,000**			**$1,960,000**			**$350,000**			**$2,230,000**			**$2,910,000**

$12,160,000

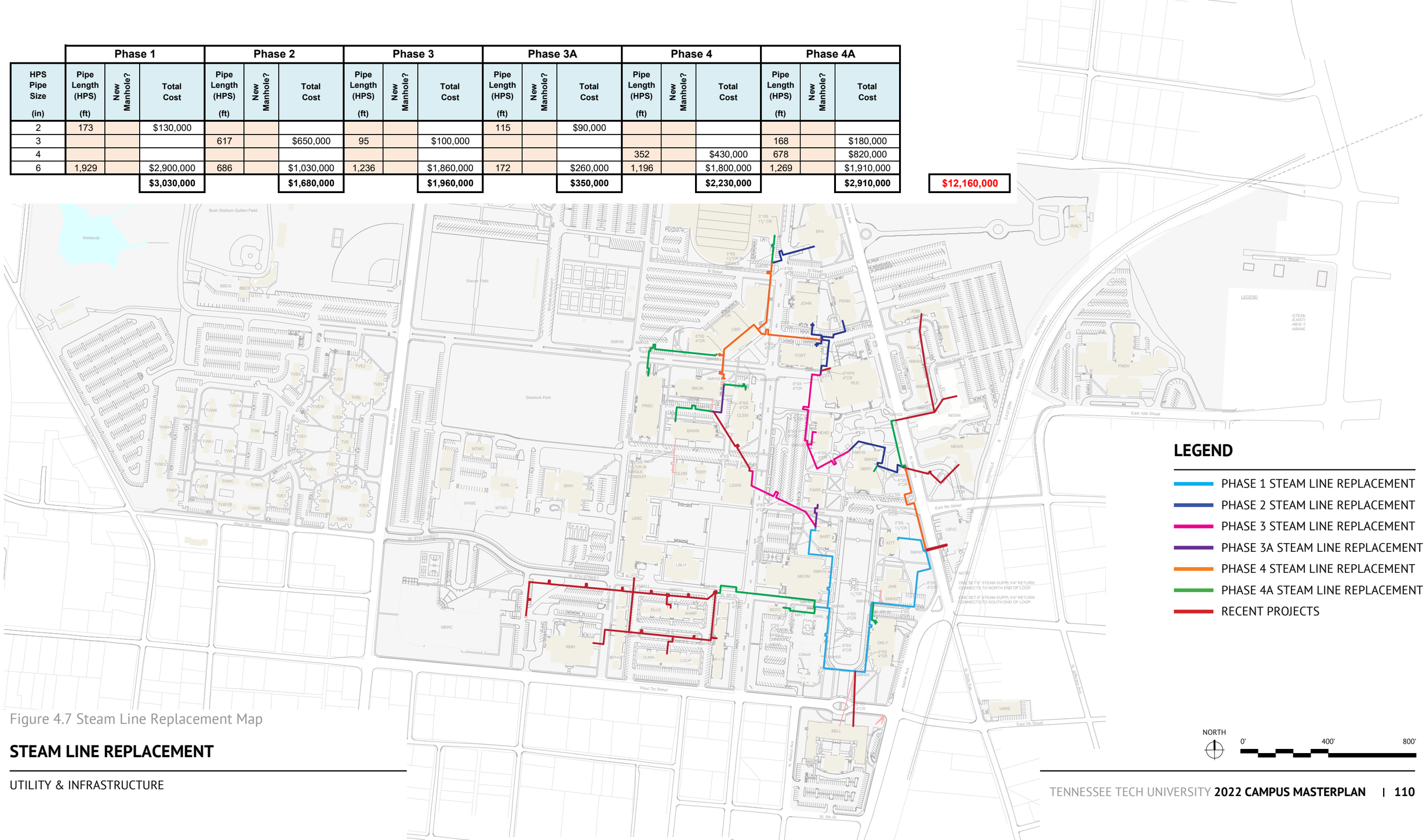


Figure 4.7 Steam Line Replacement Map

STEAM LINE REPLACEMENT

UTILITY & INFRASTRUCTURE

ELECTRICAL

Electrical Utility Distribution - Existing Conditions

The university purchases its electricity from Cookeville Electric Department (CED). Tennessee Tech owns its own electrical distribution which is serviced by CED. Tennessee Tech is under an IP5 off-grid agreement with TVA that requires the campus to shift power from the Utility to the Generator farm when dispatched by TVA. Primary distribution is 12,470 volts into a single point behind Southwest Hall. A single meter for facility power is located on a dip pole near Willow Avenue. Primary service for the campus from Cookeville Electric Department (CED) serves a 600 Amp, 12,470 Volt pad mount switchgear. The primary is routed underground from a single meter past the Marc L. Burnett Student Recreation and Fitness Center to the 600 Amp medium voltage main campus switchgear. Primary service is distributed through-out the campus via underground ductbank as 12,470 Volt from the main service entrance switchgear using 200 Amp and 600 Amp pad mounted fusible switches. It is understood based on conversations that the existing CED overhead primary service running along North Willow Avenue is to be replaced with a new underground service in the same area.

Street lighting around the campus is generally served and metered separately from the primary distribution and maintained by Cookeville Electric Department.

Electrical Generated Power Distribution - Existing Conditions

Generator power is provided by four (4) paralleled 2 MW, 480 Volt, diesel generators located adjacent to Southwest Hall. These generators serve the entire campus via the 15KV switchgear thru step-up transformers and underground ductbank. Current combined capacity is approximately 7300 KW with all generators operating.

The existing generator and switchgear area adjacent to the existing Southwest Hall area is of adequate size for the (4) existing generators and main campus switchgear. The current generators are running at approximately 90% capacity at full campus load under current conditions. The existing campus main generators are serviced twice a year and each small generator serving individual buildings are serviced every six (6) months.

The new Laboratory Science Commons and Marc L. Burnett Student Recreation and Fitness Center have their own standby generator for life safety and emergency circuits only. There are several other buildings on the campus that have standalone generators for life safety and emergency circuits only. Clement Hall has a standby generator installed around 2013 which serves the IT campus network and it is in good condition. There are several other buildings that have small independent generators providing life safety functions.

Existing Conditions

During a site review, it was indicated the existing switches and feed-thru cabinets throughout the campus were in fairly good condition. All the existing building transformers appeared to be in good condition. A few new switches and feed-thru cabinets were recently added for the new buildings to include the Laboratory Science Commons, Marc L. Burnett Student Recreation and Fitness Center and Chiller Plant addition.

Current Capacity and Future Requirements

Current peak demands provided by the campus indicate approximately 6800 KW, 316 Amps at 12,470 Volts during July and August 2020. The generator system is approximately 90% load based on current demands with a maximum available 7300KW with the existing (4) 2-megawatt generators. As new future buildings are brought online on campus, this will exceed the current ratings of the four (4) generators currently installed. Future requirements include new disclosed projects indicated below and demolition of portions or existing buildings. Estimated square footage and electrical demands are based on average electrical loads for these types of facilities and buildings.

adjacent to Southwest Hall. These generators serve the entire campus via the 15KV switchgear thru step-up transformers and underground ductbank. Current combined capacity is approximately 7300 KW with all generators operating.

The existing generator and switchgear area adjacent to the existing Health Facility Building area is of adequate size for the (4) existing generators and main campus switchgear. The current generators are running at approximately 90% capacity at full campus load under current conditions. The existing campus main generators are serviced twice a year and each small generator serving individual buildings are serviced every six (6) months.

The new Lab Science building and recreational center have their own standby generator for Life Safety and emergency circuits only. There are several other buildings on the campus that have standalone generators for Life Safety and emergency circuits only. Clement Hall has a standby generator installed around 2013 which serves the IT campus network and is in good condition. There are several other buildings that have small independent generators providing life safety functions.

ELECTRICAL

The current campus service from CED is a 600-Amp, 12,470-Volt service feeding a 600-Amp switchgear with (4) 2 megawatt generators at 480 Volt serving the switchgear through step-up transformers. In the table above the existing demand loads and estimated loads indicate that the existing 600 Amp, CED service entrance and switchgear will be overloaded by 303.6 connected loads of the capacity of the existing service. The existing (4) generators will be insufficient to accommodate the additional estimated demand loads of new construction.

Based on the existing peak demand provided by TTU and addition of estimated future connected loads at 12,470-volt is equal to 903.6 Amps. Using an estimate of 60% demand of the connected load for future buildings and construction and 100% of the existing peak demand of the campus in the above table total campus load would be 542.1 Amps at 12,470 Volts. This includes current peak demand, future expansion, additions, and renovations of campus buildings in the near future. The existing service entrance of the 600 Amp 12,470-volt switchgear would be 90.3% of full capacity.

Recommendations

SSR recommends that the service entrance and switchgear should be increased in size to a new dual-fed, 800-Amp 15KV medium voltage switchgear and new dual-feed 800-Amp service entrance from CED. The primary service entrance is proposed at North Willow Avenue and Wings Up Way to accommodate the new estimated loads indicated above and provide for future expansion. The increase in service size primary and switchgear to 800 Amp would provide for an estimated 60% demand load of approximately 67.8% on the new service entrance switchgear allowing for future expansion capabilities on the campus service. A new service underground primary from CED primary at the corner of North Willow Ave and Wings Up Way to a new dual-fed 800 Amp, 12,470-volt Main Switchgear located at West 9th Street and Armstrong Avenue should be provided (however, other locations could be considered to conceal the service entrance complex from public view).

This will also require extensive changes to the three and four-way switches, Vista switches and 15KV feeders. The change to 800 Amp, 12,470-volt equipment from the existing switchgear area will be required: to the existing Chiller distribution area and from West 9th Street and Stadium Drive, up Stadium Drive, across West 10th Street to switches between Brown and Bruner buildings, and across University Drive to an existing switch at the Volpe Library. The existing feed through switches and switchgear along this route will need to be replaced with new 800 Amp, 12,470-volt feed through switches and 800 Amp switchgear. The existing 600-Amp campus distribution system will need to connect at the new 800 Amp, 12,470-volt feed through switch at the Volpe Library. These 15KV underground feeders will be replaced for 800 Amp, 15KV rated feeders in the existing raceways. The ductbank up Stadium Drive to the Volpe Library switch will require extensive changes to increase to accommodate three (3) new Auxiliary Chillers, cooling towers, and pumps at the new C3 Library Parking Garage.

Description	Estimated Square Footage	Estimated Loads Wattage @ 480 Volt	Estimated Loads KW @ 480 volt via transformers	Estimated Amps @ 480 Volt FLA	Estimated Loads VA @ 12,470 Volt	Estimated Amps @ 12,470 Volts - FLA	Estimated Demand Amps @ 12,470 Volts
Existing Campus Peak Demand Load per August 2020 Utility Billing					**6,839,000**	**316.6**	**316.6**
Proposed Additional Loads							Est. Future 60% Demand Ea.
#3 Academic Classroom/Crawford Hall Renovation	21,173	306,000	306	368.1	306,000	14.2	8.5
#2 New Engineering Building #1	102,959	1,310,670	1,311	1,576.5	1,310,670	60.7	36.4
#9 Physics Bldg	38,378	509,000	509	612.2	509,000	23.6	14.1
#8 Biology Building	93,785	1,225,000	1,225	1,473.5	1,225,000	56.7	34.0
#7 Engineering Building #2	100,000	1,304,926	1,305	1,569.6	1,304,926	60.1	36.1
#1 Johnson Hall Renovation	15,112	229,100	229	275.6	229,100	10.6	6.4
#13 Bell Hall Expansion	27,635	392,000	392	471.5	392,000	18.1	10.9
#15b Bryan Fine Arts Addition	60,965	782,000	782	940.6	782,000	36.2	21.7
#16 Oakley Hall Expansion	38,922	515,000	515	619.5	515,000	23.8	14.3
#17 New Engineering Bldg 3	90,000	1,146,000	1,146	1,378.5	1,146,000	53.1	31.8
#18 Johnson Hall Expansion	25,000	315,000	315.0	378.9	315,000	14.6	8.75
C1 Wings Up Way Parking Garage 1	162,000	404,200	404	486.2	404,200	18.7	11.2
Auxiliary Chillers (3) CTs, and Pumps		3,547,000	3,547	4,266	3,547,000	164.2	98.5
Innovation Housing Phase II	120,000	1,600,000	1,600	1,924.6	1,600,000	74.1	44.4
F Sorority Row	92,000	1,226,000	1,226	1,474.7	1,226,000	56.8	34.1
C2 Peachtree Parking Garage 2	162,000	404,200	404	486.2	404,200	18.7	11.2
C3 Library Parking Garage 3	162,000	404,200	404	486.2	404,200	18.7	11.2
Total of Proposed Additions	**1,286,929**	**15,270,370**	**15,270**	**18,367.9**	**22,109,370**	**1,023.7**	**614.2**
Renovations of Existing Buildings:							
#4 Brown Hall Renovation	15,000	Exist	0	0	0	0.0	0.0
#5 Prescott Hall Renovation	111,955	Exist	0	0	0	0.0	0.0
#6 Memorial Gym Renovation	87,181	Exist	0	0	0	0.0	0.0
#8a Pennebaker Hall Renovation	59,679	Exist	0	0	0	0.0	0.0
#10 Clement Hall Renovation	62,887	Exist	0	0	0	0.0	0.0
#11 Academic Wellness Center Renov	77,895	Exist	0	0	0	0.0	0.0
#12 Derryberry Hall Renovation	57,877	Exist	0	0	0	0.0	0.0
#14 Volpe Library Renovation	132,645	Exist	0	0	0	0.0	0.0
#15a Bryan Fine Arts Renovation	55,110	Exist	0	0	0	0.0	0.0
Demolition of Portion of Buildings (Multiple - Matthews, Daniel, Foster, Lewis, Foundry, Maint Ware., Carr, Maintenance Office, Southwest, Partial Foundation Hall)	(198,300)	(2,595,000)	(2,595)	(3,121)	(2,595,000)	(120.1)	(72.1)
Total Campus Loads including existing, future and disclosed projects proposed.	**1,748,878**				**19,515,309**	**903.6**	**542.1**

Table 4.1 Electrical Table

The existing generator farm will be insufficient in handling these additional loads. The additions would require (3) additional 2-megawatt, 480-volt generators, 12,470-480 Volt transformers, and associated controls. The addition of the new generators, liquid filled, medium voltage, step-up transformers and new medium voltage switchgear on the existing site is possible but will require encroaching on valuable future planned development for that area and would require relocation in the very near future. This would allow for expansions/renovations to the campus for any disclosed projects not included in the table above such as Baseball/Softball complex, Sorority Row, Football Operations Complex, etc. It is assumed that the future location for the Facilities Services Complex will not be on the Campus service loop.

SSR recommends that the generator farm be removed completely from the campus due to the cost of installation, relocation of generators and future maintenance. It no longer would be a cost advantage to operate the generators for the campus power during an outage or requested transfer by TVA during an IP5 request. Existing Feed Through switches and Switchgear in the area of the generator farm feeding the Southwest Hall building and existing chiller area with be removed along with feeders along that route as new buildings come online in that area. Feeders should be rerouted to a new 800 Amp Switchgear along Stadium Drive at the new Laboratory Science Commons. Chiller feeders should be rerouted from the new 800 Amp switchgear service entrance at West 9th across the retention pond near the existing steam lines in a new concrete encased ductbank to the existing feed through switch in the Chiller Plant parking area.

We recommend that each new individual building indicated above for future projects be fed from the nearest 3-way or 4-way fed thru switch. Each building should be served from a 12470-480/277-volt, liquid filled, medium transformer at each building sized for the appropriate estimated load. See table above for minimum KW required. If no switch exists in the immediate facility of the new building, a 3-way switch in the medium voltage distribution should be installed and tap the existing underground campus service ductbank. New 15kv feeders should be provided from the switch to each transformer.

We also recommend the existing transformer #1202 (167 KVA, 4160-480V) and control cabinet located at the south side of the Tennis Courts should be replaced with a new transformer and control cabinet. It is in very poor condition and parts are becoming more difficult to find. A new 15KV feeder from new 3-way switch in the existing conduit should be provided.

We further recommend that campus establish an Electrical Preventive Maintenance (EPM) program. This would apply to existing medium voltage main switchgear, all distribution transformers, and distribution switches throughout the campus. We recommend that the campus utilize the ANSI/NETA Standard for Maintenance Testing Specifications (current edition) to establish recommended testing and preventive maintenance intervals for each piece of equipment. These test and maintenance procedures include Infrared scans, tightening of mechanical connections, fluid levels, inspections of all parts in each switch, transformer, grounding connections, medium voltage cabling continuity, insulators, contacts and enclosures on the campus wide distribution system. Testing and maintenance recommended procedures vary in time for each item and can be from 6 months to 3 years depending on the equipment being service.

Future Relocation of Campus Service Entrance and Removal of Generator Farm:

The relocation of the main campus service entrance, campus underground service upgrades, and new switches above should be a priority based on the future loads of 584 Amps at 12,470-volt for the new future Engineering Building #1, proposed building construction, and the extended required downtime for the changes. We recommend replacing the existing the Campus Service entrance switchgear and associated controls to the corner of the W. 9th Street and drive entrance to Marc L. Burnett Student Recreation and Fitness Center prior to construction of Engineering Building #1. Likewise, the existing transformers, generators, and associated equipment from the existing generator farm area should be removed. By installing the new service entrance and switchgear and campus ductbank to a new feed through switch at the east corner of West 9th and Stadium Drive first, this will minimize the downtime for the Campus for the changeover to the new service when complete and removal of the old campus service entrance and generator farm are removed. It will provide a securable location, ease of maintenance and some protection from the elements. New dual fed 800-Amp, 15KV CED service feeders from the existing CED 12,470-volt service on North Willow Avenue at the corner of Wings Up Way to the new 800-Amp, 15 KV switchgear should be provided. This will also allow for extended future growth of new construction on the Campus distribution system with minimal changes required. This includes new underground 15KV 800 Amp feeder from the new service entrance switchgear on West 9th Street up Stadium Drive to University Drive with new feed through and switchgear in existing locations. Existing 600 Amp switches should be replaced with new 800 Amp switches along Stadium Drive up to University Drive at the Volpe Library. The estimated cost to remove Generator farm and provide new dual-fed service entrance 800 Amp Switchgear, 15KV underground ductbanks and new 800 Amp Feed through switches and 800 Amp switchgear along this path indicated is approximately $2,750,000.

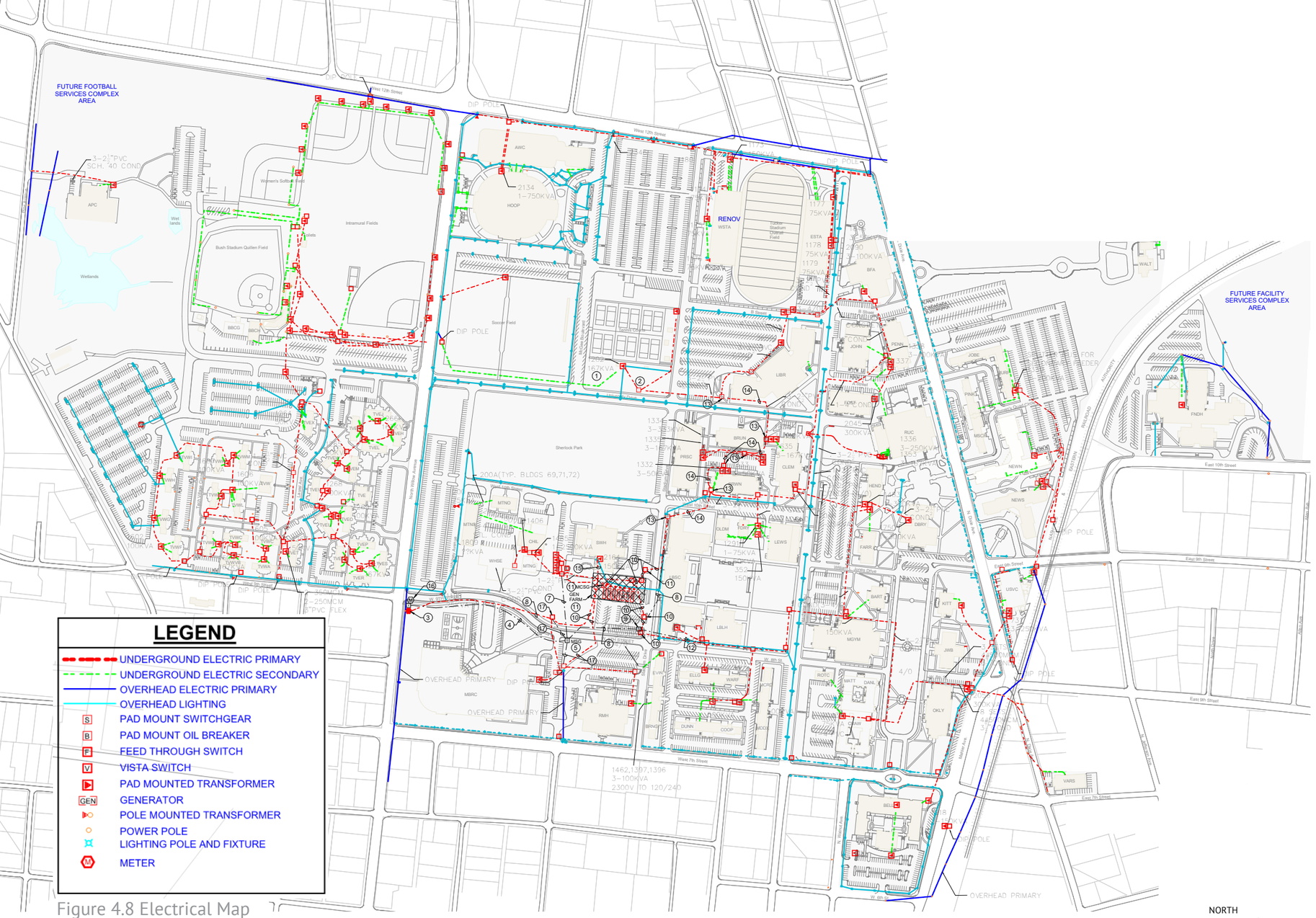


Figure 4.8 Electrical Map

LEGEND

1. Replace existing 'STA 1202' at tennis courts with new 167KVA, 4160-480V transformer and control cabinet to match existing. Provide new digital timers and switches as required.
2. Existing 15KV Underground feeders in ductbank to next 3-way switch.
3. Existing 15KV service entrance pole to be removed and CED service installed by CED/TDOT underground along north Willow Avenue. Coordinate with CED and TDOT.
4. Provide new vista switch at CED service. Install 800 AMP, 12,470 volt service ductbank from switch to new 800 amp fused switchgear 'MSG' at corner of W. 9th and drive entrance to MBRC per CED guidelines. Refer to narrative for additional information.
5. Provide new 1200 AMP, 12,470 volt service entrance switchgear fused at 800 AMP and owner metering and distribution section. Refer to narrative for complete description.
6. Provide new 15KV, 600 AMP, feeder in ductbank from main service entrance 'MSG' to existing vista switch as indicated. Coordinate with removal of ductbank from existing 'MSCG' to existing vista switch to remain.
7. Provide new 15KV, 600 AMP, feeder in ductbank across the holding pond adjacent to the campus steam lines to the existing chiller padmount switchgear. Coordinate connect to existing switchgear with transition from the generator yard switch to be removed.
8. Provide new 15KV, 800 AMP, feeder in ductbank and new 800 AMP, 12,470 volt switchgear. Coordinate connect to new campus service entrance switchgear 'MSG'. Coordinate with the replacement of the existing 600 AMP switchgear with the new 800 AMP switchgear.
9. Provide new 800 AMP, 12,470 volt switchgear adjacent to the existing 600 AMP switchgear to be removed. Remove existing 600 AMP switch when the generator farm is removed.
10. Remove existing 600 AMP switch when the generator farm is removed after new service is up and operational.
11. Remove existing generators, transformers, switches, and underground ductbank after new service entrance is up and operational.
12. Provide new 600 AMP, 15KV feeder in ductbank from new 800 AMP switch to existing vista switch. Make connections to existing vista switch after the new service entrance is up and operational. Remove existing ductbank between the existing vista switch and existing switchgear after transition.
13. Replace existing 600 AMP, 12,470 volt switch or feed-through switch with new 800 AMP, 12,470 volt switchgear or feed-through switch as indicated. Coordinate instalation and transition with new service entrance. Match existing configuration of each switch.
14. Replace existing 600 AMP, 15KV feeder in existing ductbank with new 800 AMP, 15KV feeders between switches as noted after the new service entrance is operational.
15. Intercept existing feeder to transformer serving building SWH and extend to chiller switchgear. SWH building will be removed during constructon of Engineering Building #2
16. New CED 12.47KV underground primary, meter and padmount 4-way switch.
17. Provide new 600 AMP, 15KV underground feeder in ductbank from new switchgear 'MSG' to existing switch. Remove existing ductbank after new service is operational.

ELECTRICAL

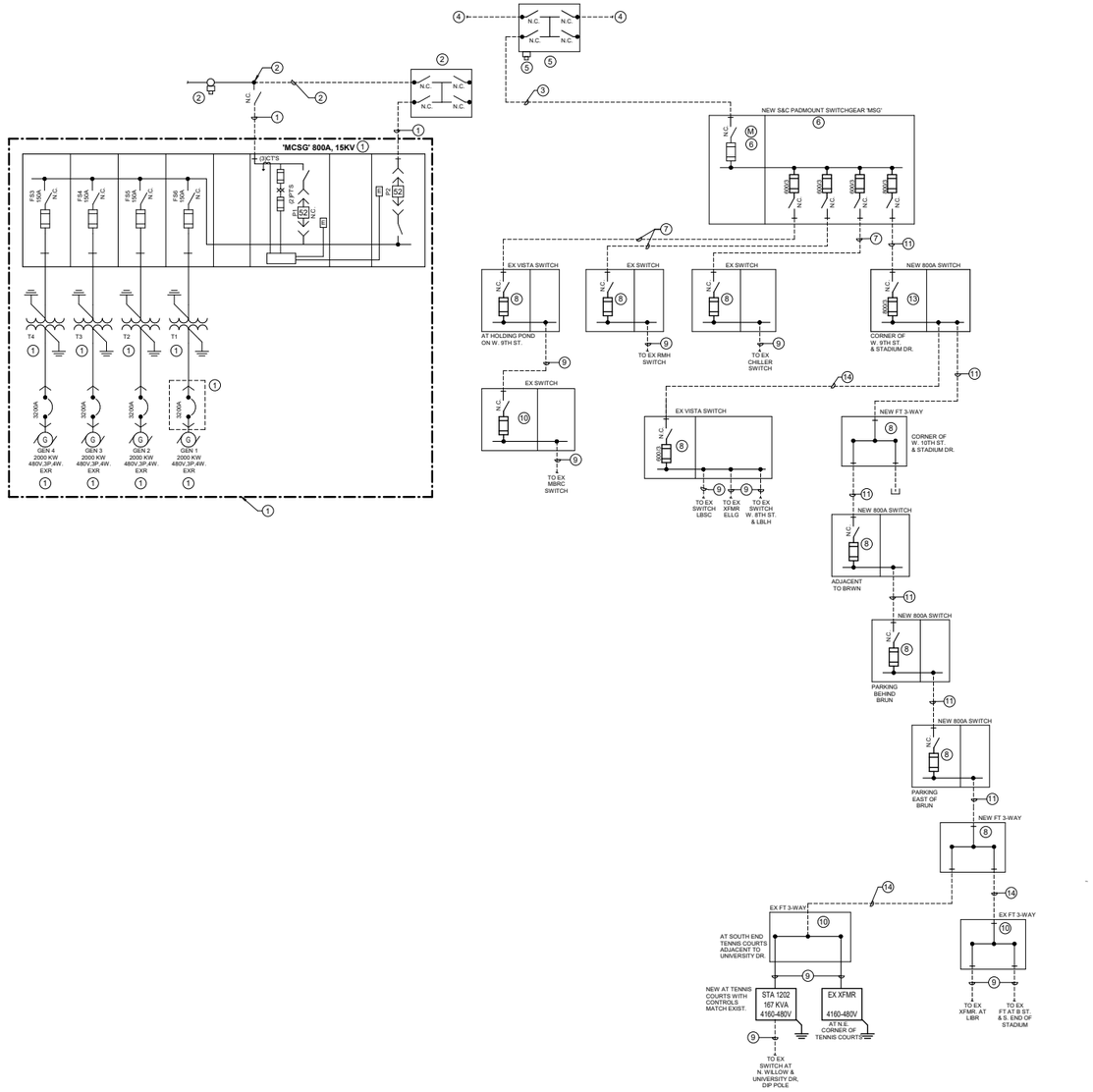


Figure 4.9 Electrical One-Line Diagram

LEGEND

1. Existing generator farm including transformers, switches, feed throughs and service entrance from CED to be removed after new service entrance is installed and operational.
2. Existing 12.47KV OH service, pole and meter to be removed by CED/TDOT and replaced with new underground primary from CED routed up north Willow Avenue. New CED 800 AMP, 15KV padmount 4-way switch installed by CED. Contractor to provide concrete pad.
3. Provide new 800 AMP, 12.47KV underground primary from CED 4-way switch to new campus main service entrance switchgear 'MSG' in ductbank per CED guidelines.
4. New 12.47KV underground primary by CED routed along north Willow Avenue
5. New 12.47KV 4-way padmount switch and meter by CED
6. New 800 AMP, 15KV padmount switchgear 'MSG' SE rated, with owner metering and (1) 800 AMP distribution breaker and (3) 600 AMP distribution breakers in distribution section.
7. New 600 AMP, 15KV underground feeder in new ductbank. Coordinate removal of existing feeder and ductbank after new construction is complete.
8. Existing switch to remain. Connect new 600 AMP feeder after new service entrance switchgear is operational.
9. Existing 15KV underground feeder to remain.
10. Existing switch to remain
11. Provide new 800 AMP, 15KV feeder in existing ductbank. Coordinate installation after the new service entrance is fully operational.
12. Replace existing switch with new 800 AMP, 15KV switch in same location. Coordinate removal of existing switch after the new service entrance is fully operational.
13. Provide new 800 AMP, 15KV switch adjacent to existing ductbank to new switch. Coordinate installation after the new service entrance is fully operational.
14. Connect existing 15KV feeder in existing ductbank to new switch. Coordinate installation after the new service entrance is fully operational.
15. Replace existing 'STA 1202' at tennis courts with new 167KVA, 4160-480V transformer and control cabinet to match existing. Provide new digital timers and switches as required.
16. Provide new 15KV underground feeders in ductbank to next 3-way switch.

PARTIAL CAMPUS ELECTRICAL ONE-LINE DIAGRAM

TELECOMMUNICATIONS

Overview

The TTU campus copper and coaxial CATV cable system has been developed and maintained for several decades for the purpose of distributing conventional telephone and television service. There are approximately 3250 phone and 1350 cable TV locations served. The TTU campus is served by a fiber optic distribution backbone that was significantly upgraded by virtue of a Federal economic stimulus project approximately 10 years ago. The intra-building structured cable system typically utilized by TTU ITS consists of predominantly Category 6 UTP cable and termination components from a variety of manufacturers.

With respect to security, a comprehensive Security and Safety Assessment was completed in March 2018. Included in this report were recommendations for upgrades and improvements to campus video surveillance and access control systems. Since that time, significant progress has been made by the University in response to the report's recommendations regarding these two systems.

Outside Plant Technology Pathways and Spaces

Existing Conditions

A system of underground manholes, handholes, and conduits exists on campus for the purpose of technology distribution throughout the campus. MaxCell fabric sub duct material is being installed in new underground ducts. There is limited overhead aerial distribution east of the railroad tracks in the Foundation Hall and Varsity / Alumni vicinities. In general, the underground duct is in reasonable shape. There is limited vacant duct (varies dependent upon specific duct routes) for installation of future cable.

At the time of the campus technology site visit, with the exception of the large above ground technology enclosure outside Foster Hall, the internal contents and condition of handholes and manholes were not observed. There have been past instances of damage to technology ducts and cables due to close proximity to leaking steam lines. There are two campus technology infrastructure locations which have been identified as subject to major disruptions due to future construction, namely the new Engineering Building site and the Foster Hall site.

A major underground technology pathway exists on the north side of West 10th Street on the Sherlock Park Engineering Building site. Without proper consideration by the project design team, the possibility exists that this project could adversely affect this pathway and cause a significant pathway and cable reconfiguration requirement, affecting almost the entire W/SW sections of campus, including the new Laboratory Science Commons.

The second major area of potential impact to technology pathways and cable exists at the NW corner of Foster Hall, which may be targeted for demolition. A very large above ground technology enclosure exists in close proximity to Foster, as well as several smaller technology pedestals. A large number of fiber optic cables, copper telephone cables, and CATV television cables connect and route through these points in multiple directions. University ITS and telecommunications have coordinated on a preliminary plan for re-location of impacted existing pathways and cables; however, further coordination will be required with any design team selected for projects in this vicinity.

Recommendations

The Engineering Building / 10th Avenue project offers several opportunities. Regarding the straightening of 10th Ave and its impact on the underground technology pathway, significant consideration should be given by the design team to the preservation of this underground duct route. The existing duct route may be able to be protected by the addition of concrete and rebar, and the steel manhole covers adjusted in elevation in such a manner as to allow preservation of the ducts, holes, and cables, thereby eliminating a significant project cost and campus network disruption.

A second recommendation regarding this vicinity would create redundancy and contingency opportunities. First, there is no East West pathway redundancy on campus. Almost all network services are supported by the pathway and cables on the north side of 10th. A redundant pathway is recommended to be incorporated into the Engineering Building project on the North side of the site, to connect any approved ITS / Telecommunication approved existing pathways in an East West fashion between the campus core immediately east of the site and extending west across North Willow Avenue. This pathway could be implemented by any combination of buried duct, directional boring, or conduit internal to the building. The benefits would be twofold. First, the pathway would support future growth opportunities on the NW quadrant of campus while providing immediate network redundancy potential afforded by crossing Willow and connecting to a suitable network point. Secondly, and more defensively strategic, the pathway, constructed prior to any heavy construction which might threaten the existing 10th Avenue pathway, would afford a rapid recovery option should the duct and cable along 10th be damaged during construction or any future activity.

Regarding Foster Hall, which is slated for demolition, there is widespread assumption that the telecommunications pedestals, underground ducts, and enclosed cables are necessarily impacted by Foster demolition and must be relocated / reconfigured prior to demolition. The technology intersection in this vicinity affects approximately 7 buildings. While these conditions exist very close to Foster, they are not actually in the building. It is recommended that the design team selected for the project consider the existing site technology location(s) when planning future building footprints. The potential may exist to carefully excavate existing technology and enclose splice and connection points in either pre-manufactured or cast in place grade level enclosures, thereby avoiding the cost and network disruptions of a major technology reconfiguration.

As a general recommendation, any future projects requiring significant underground utility excavation should be coordinated with ITS / Telecommunications

and considered for inclusion of vacant technology ducts, especially where opportunities for creating future network redundancy exists. Consideration should be given to the type, depth, size, etc. of adjacent utilities, and adequate separation from technology ducts provided in the trench design whenever possible.

Copper Outside Plant Feeder Cable

Existing Conditions

For the most part, the TTU outside plant copper and coax cable plant is in reasonable quality and provides adequate service in the support of technologies for which it was designed, namely conventional telephone and television service. This cable plant originates at the University Services Building.

Voice requirements for new campus buildings are typically served by fiber and VoIP network technology from this point forward. No new copper feeder cable of significance is designed for new buildings. Existing copper feeder cable is utilized to the fullest extent possible where building renovation projects allow.

There are areas of end-of-life cycle air core feeder cable requiring air pressurization with lead splice enclosures that are well beyond current technology for telecom cables. The necessary skill sets for maintenance and repair of lead splice enclosures are extremely difficult to find.

Recommendations

Continue to utilize existing copper feeder, when possible, in renovations unless building program changes or user demands require voice technologies that cannot be delivered by existing media or existing cable capacity is exceeded.

Fiber Optic Cable Outside Plant Feeder Cable

Existing Conditions

The majority of the buildings on the TTU campus network are served by relatively new singlemode fiber optic cable. This is current generation technology and should serve the University into the foreseeable future.

Some buildings remain on multimode fiber. Services provided are data, security, fire alarm, and BMS.

Recommendations

While ITS staff has an excellent working knowledge of both the new as well as older legacy fiber cable plant, most of this knowledge resides with staff. There is little “as built” type documentation as to cable routes within underground pathways, cable counts, etc. This condition creates the potential for significant loss of cable plant knowledge should there be a loss of key staff members for any reason. It is recommended that the University develop a set of fiber plant documentation records.

In Building Structured Cable Systems

Existing Conditions

The majority of the intra-building data requirements for campus buildings are served by Category 6 unshielded twisted pair (UTP) data cable. This performance level cable serves both hardwired data outlets and data connections supporting wireless access points.

Technology spaces, while not necessarily meeting minimum industry best practice size requirements, are functional and meet the current needs of the University. Technology grounding is recognized by ITS as a necessary element in technology spaces. Industry standard technology ground bus bars were observed in new and existing spaces; however, their installation is not necessarily consistent in all representative spaces observed.

In the last 2 years, ITS has been engaged in an effort to improve the conditions of its existing technology spaces in terms of cable management, patching, and general overall organization. Technology spaces observed as among the least functional of those on campus were reasonably functional, though limited in expansion capacity. Non-technology related storage in technology spaces was observed as relatively common.

Recommendations

It is recommended that ITS consider specification / utilization of Category 6A UTP for all future wireless access (WiFi) point cables. Cat 6A has become an industry best practice performance level for access point cables and will enhance the University’s ability to deliver high speed 802.11ac WiFi network service to staff and students. Such speeds would be useful in research and technology support, imaging, video delivery, and student life gaming enhancement.

Continued consideration / attention on the part of ITS with respect to grounding is encouraged. Incorporation of industry standard EIA 607 best practice grounding standards into new construction and renovation expectations for technology spaces is encouraged. Particular attention is called to the origins of ground conductors (ie EIA 607 compliant) serving telecommunications ground busbars in technology spaces.

It is recommended that efforts be made to limit non-ITS staff access to technology spaces and eliminate non-ITS related storage in these spaces.

TTU ITS and Telecommunications staff have a good knowledge of needs and expectations for new building and project construction. Most universities have developed written guidelines and specifications for their minimum structured cable system requirements for new construction. TTU has not developed such a document. Development and delivery of such specifications to project design teams serves to facilitate incorporation into project designs the necessary

elements of communications infrastructure required for instruction, research, and operations. A University technology cabling standard document would include:

- Technology space minimum size and location criteria
- Power and cooling requirements for technology spaces
- Equipment rack requirements
- Grounding requirements
- UTP cable counts at typical technology outlets
- UTP cable transmission performance level requirements
- UTP cable testing requirements
- Manufacturer preferences and manufacturer extended warranty requirements

Video Surveillance Systems

Existing Conditions

The 2018 SRMC Security and Safety Assessment Report presented a very favorable assessment of the existing industry top tier Avigilon video surveillance and management system. Excellent video quality and best practice generally deemed adequate 30-day video retention were noted.

Recommendations

Verify implementation status of referenced $3M 150 exterior / 500 interior camera upgrade project.

Continue camera implementation strategy

Servers were noted as reaching end of life – verify replacement strategy

Access Control Systems

Existing Conditions

The 2018 SRMC Security and Safety Assessment Report noted significant issues with University door access control equipment and management software. Since that time, there has been an approximately 95% conversion of legacy access control systems to state of the art technology. This Lenel/S2 based security management system utilizes Mercury door controllers and Blackboard Transaction System contactless proximity card readers. Door control equipment is sometimes wall mounted in technology spaces without protective locking cabinetry.

Recommendations

Continue replacement and upgrade of existing legacy systems and implementation of current generation equipment in new construction.

Consider installation of door control equipment in locking cabinets, especially in technology spaces accessible to non- ITS and Security staff. Such locking cabinetry will add an additional level of protection versus intentional tampering, as well as accidental damage.

Emergency Call Phones

Existing Conditions

TTU maintains a network of 27 exterior and 32 classroom based Ramtel single button auto dial telephones. These phones dial the TTU Police department. These devices are checked monthly and preventative maintenance is performed. The phones are not electronically supervised for trouble and do not report a loss of power.

Recommendations

Monitoring / Reliance 12 Software

Code Considerations and Additional Recommendations

First Responder Radio Systems

There is increased enforcement on the part of codes officials and local AHJ's of longstanding provisions of the International Fire Code, Section 510, with regard to requirements for first responder radio distributed antenna systems (DAS systems). Specifically:

> 510.1 Emergency responder radio coverage in new buildings. All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.
>
> Exceptions:
> 1. Where approved by the building official and the fire code official, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained in lieu of an approved radio coverage system.

It is recommended that this code requirement be considered as an element of all new projects and coordinated with local AHJ's prior to construction.

Elevator Landing 2 Way Communication

There is increased enforcement on the part of codes officials and local AHJ's of longstanding provisions of the International Building Code, Section 1009, with regard to requirements for 2-way communication at elevator landings. Specifically:

> 1009.8 Two-way communication. A two-way communication system complying with Sections 1009.8.1 and 1009.8.2 shall be provided at the landing serving each elevator or bank of elevators on each accessible floor that is one or more stories above or below the level of exit discharge.
> Exceptions:
> 1. Two-way communication systems are not required at the landing serving each elevator or bank of elevators where the two-way communication system is provided within areas of refuge in accordance with Section 1009.6.5.

It is recommended that this code requirement be considered as an element of all new project designs.

West 12th Street
East 12th Street
University Drive
Women's Softball Field
Intramural Fields
Bush Stadium Quillen Field
Wetlands
Soccer Field
Tennis Courts
Sherlock Park
Women's Quad Circle
West 10th Street
East 10th Street
West 9th Street
W. 9TH STREET
West 7th Street
East 7th Street
W. 8th St.
W. 6th St.
N. Dixie Ave
N. Walnut Ave
N. Jefferson Ave
Peachtree Ave
Master Ave
Stadium Drive
North Willow Avenue
Laurel Ave
North Evergreen
Ken Yeager Circle
McGee Boulevard
A Street
B Street
Wilson Jones Drive
TPC Avenue
EASTERN & NASHVILLE RAILROAD AUTHORITY
AWC
HOOP
WSTA
Tucker Stadium Overall Field
ESTA
BFA
APC
Wet lands
Toilets
EMERGENCY PHONE
SIDEWALK PULLBOX
UNDERGROUND PVC-BOX FEED TO FINE ARTS
BRUN
PRSC
RUC
FOST
LIBR
JOHN
PENN
JOBE
MURP
PINK
MSCP1
NEWN
NEWS
HEND
FARR
BART
KITT
JWB
MGYM
ROTC
MATT
DANL
OKLY
CRAW
USVC
VARS
FNDH
WALT
SWH
CHIL
MTNG
MTNS
MTNO
WHSE
OLDM
FDRY
LEWS
EVIN
ELLG
WARF
MCRD
MBRC
BRNG
DUNN
COOP
MDDX
RMH
SWH
TVEJ
TVEK
TVEH
TVEL
TVEX
TVEW
TVEM
TVEV
TVEO
TVEP
TVEQ
TVER
TVES
TVWI
TVWK
TVWM
TVWH
TVW
TVWJ
TVWL
TVWG
TVWF
TVWE
TVWC
TVWB
TVWA
TVWV
BBCG
BBCH
(1) 3"C-100'
(1) 2"C-175'
(1) 3"C (BORE)
(1) 3"C-320'
(1) 4"C (BORE)
(1) 4"C-370'
(2) 4"C-100'
(2) 4"C-455
(1) 2"C-70'
(1) 1½"C-45'
(1) 2"C-190'
(1) 2"C-165'
(1) 2"C-250'
(1) 2"C-100'
(1) 4"C-290'
(1) 2"C-205'
(1) 2"C-60'
(1) 2"C-112'
(1) 1½"C-177'
(1) 4"C-570'
(2) 2"C-91'
(1) 2"C-17'
(1) 2"C-50'
(2) 2"C-200'
(2) 2"C-139'
(2) 2"C-51'
(2) 2"C-133'
(2) 2"C-68'
(2) 2"C-85'
(2) 4"C-375'
(2) 2"C-146'
(2) 4"C-155'
(1) 2"C-88'
(2) 4"C-329'
(1) 2"C-122'
(1) 2"C-110'
(2) 4"C-250'
(1) 2"C-45'
(1) 2"C-245'
(1) 2"C-75'
(1) 4"C-227'
(1) 2"C-75'
(2) 4"C-418'
(2) 4"C-316'
(1) 1-1/2"STEEL-70'
(4) 2"STEEL-70'
(1) 1 1/2"STEEL-110'
(1) 2"C-75'
(1) 4"C-350'
(2) 3"C-304'
(1) 3"C-134'
(1) 2"C-195'
(1) 2"C-15'
(1) 3"C-70'
(1) 2"C-55'
(1) 4"C-175'
(1) 4"C-103'
(1) 4"C
(3) 4"C-84' METAL
(1) 2"C-50'
(1) 2"C-72'
(1) 4"C-230'
(1) 2"C-55'
(1) 4"C-215'
(1) 2"C-222'
(1) 2"C-85'
(1) 2"C-181'
(1) 2"C-240'
(1) 4"C, (1) 4" INTERDUCT-98' (abandoned)
(2) 4"C-336' (abandoned)
(2) 2"C-125'
(1) 4"C, (1) 4" INTERDUCT-142' (abandoned)
(2) 4"C-240' (abandoned)
(2) 4"C-316' (abandoned)
(1) 4"C, (1) 4" INTERDUCT-443' (abandoned)
(3) 4"C-UNDER DRIVE CAPPED OFF 30" DEEP AND 10' FROM EDGE OF DRIVE (S. SIDE)
(1) 4"C, (1) 4" INTERDUCT-135'
(1) 4"C, (1) 4" INTERDUCT-158'
(1) 4"C, (1) 4" INTERDUCT-45'
(1) 4"C, (1) 4" INTERDUCT-37'
(1) 4"C, (1) 4" INTERDUCT-183'
(1) 4"C, (1) 4" INTERDUCT-47'
(1) 3"C, (1) 2"C-255'
(1) 4"C-92'
(1) 4"C-290'
(1) 4"C-227'
(2) 2"STL-200'
(1) 1½"STL-200'
(1) 2"STL-35'
(1) 1½"STL-35'
(1) 2"STL-109'
(3) 3"C-175'
(2) 4"C-382'
(1) 4"C-200'
(1) 4"C-42'
(2) 4"C-62'
(4) 4"C-485'
(1) 2"STEEL-445' CLEM
(1) 4"C-183'
(1) 4"C-363' (abandoned)
(1) 4"C-203'
(1) 4"C-241'
(2) 4"C-212'
(1) 4"C-38'
(2) 4"C-170'
(1) 4"C-169'
(2) 4"C-140'
(1) 2"STEEL-50' BRWN
(3) 2"STEEL-50'
(2) 4"C-125'
(6) 3"C-280' CONC. DUCT
(4) 4"C-195'
(2) 3"C-102'
(6) 3"C-165' CONC. DUCT
(1) 4"C-249'
(1) 4"C-228'
(2) 4"C-170'
(2) 4"C-175'
(1) 4"C-220'
(6) 3"C-Steel-25'
(3) 4"C, (2) 4" INTERDUCT-180'
(1) 4"C, (1) 4" INTERDUCT-36'
(1) 4"C, (1) 4" INTERDUCT-140'
(2) 3"C-270'
(2) 3"C-278'
(2) 4"C, (2) 4" INTERDUCT-388'
(1) 4"C, (2) 4" INTERDUCT-135'
(2) 4"C-540'
(2) 4", (2) 4" INTERDUCT-641'
(2) 4"C-130'
(1) 4"C-316'
(1) 4"C-70'
(2) 4"C-55'
(1) 2"C-490'
(1) 2"C-206'
(1) 4"C-180'
(1) 2"C-110'
(1) 2"C-226'
(1) 4"C-281'
(1) 4"C-450'
(1) 2"C-15'
(1) 2"C-228'
(1) 2"C-223'
(9) 3"C-191' CONC. DUCT
(1) 2"C-156'
(1) 4"C-99'
(1) 4"C-125' CONC DUCT
(1) 2"C-15'
(1) 2"C-226'
(1) 2"C-404'
(1) 4"C-450'
(1) 2"C-156'
(1) 2"C-15'
(1) 2"C-223'
(1) 2"C-220

DOMESTIC WATER

Overview

The TTU domestic water system is supplied and primarily managed by the City of Cookeville Water Department. Although not explicitly defined throughout campus, the water meter, owned and operated by the City, generally delineates the public system (City) from the private system (TTU). As such, the City is generally responsible for repair and maintenance of the main lines up to and including the service meter while TTU is responsible for all infrastructure past the meter. The University currently has at least one water meter set at every building on campus. Figure 4.11 shows all water infrastructure on campus, including that of both TTU and the City.

Current Capacity and Conditions

The current capacity of the water system does not appear to be an issue for TTU. There are multiple moderate to large diameter water mains in and around campus including the following:

- 16” Line – Peachtree Ave.
- 8” Line – University Drive
- 8” Line – Willow Ave.
- 8” Line – 12th St.
- 8” Line – 9th St.

The current condition of the water system is relatively unknown as most of the campus was constructed between 1960 and 1990 with limited record keeping of as-builts. This leaves the University with many questions about the pipe’s current condition, piping materials used, especially on water service lines, and prior maintenance procedures. To date, the University has made progress at replacing potentially outdated services by including new water services in every building renovation in recent years. These renovations, which target older buildings on campus, have replaced a mix of many different service materials and conditions.

Overall, it is estimated that the water system on campus is in fair to good condition and is currently more than capable of providing water to the University given its current demand and buildout.

Recommendations

Due to the fact TTU does not own or operate a majority of the water infrastructure on campus it is recommended that the University stay in constant contact with the City about upkeep and maintenance on the current system. Close coordination with the City regarding upcoming construction projects and renovations may lead to replacement of various piping, fire hydrants, or meters in the proximity of future projects. Based on the current system layout, it does not appear that new water main expansions will be necessary to serve future buildings on campus as most future buildings can be serviced by the installation of a new service on an existing line. It should be noted that line upgrades may be needed to maintain current water pressure and water quality standards once the demand of future buildings are put online. Water infrastructure updates should be considered on a project by project basis.

It is recommended that TTU continue to investigate the age and condition of the service piping to all campus buildings. Areas of particular concern include buildings built prior to 1985 that have not been updated since originally built. All water service lines should continue to be replaced during campus building renovations.

It is also recommended that the University use their existing utility mapping information and work with the City to create a Geographic Information System (GIS) map of all utilities on campus, including domestic water. This GIS system will allow the University to create a one-to-one spatial relationship of the campus infrastructure that is easy to update and use for record keeping. The goal of creating a GIS database for the water system is to accurately locate, map, and record the condition of all valves, meters, fire hydrants, and pipelines on campus. Once the initial map is established, it is recommended that TTU work to verify the location and accuracy of the existing infrastructure in the GIS system. Routine updates and maintenance of the GIS system are necessary to ensure the database remains accurate despite a constantly changing campus. Verification and updates to the GIS system can be completed by TTU staff or by a qualified engineering firm.

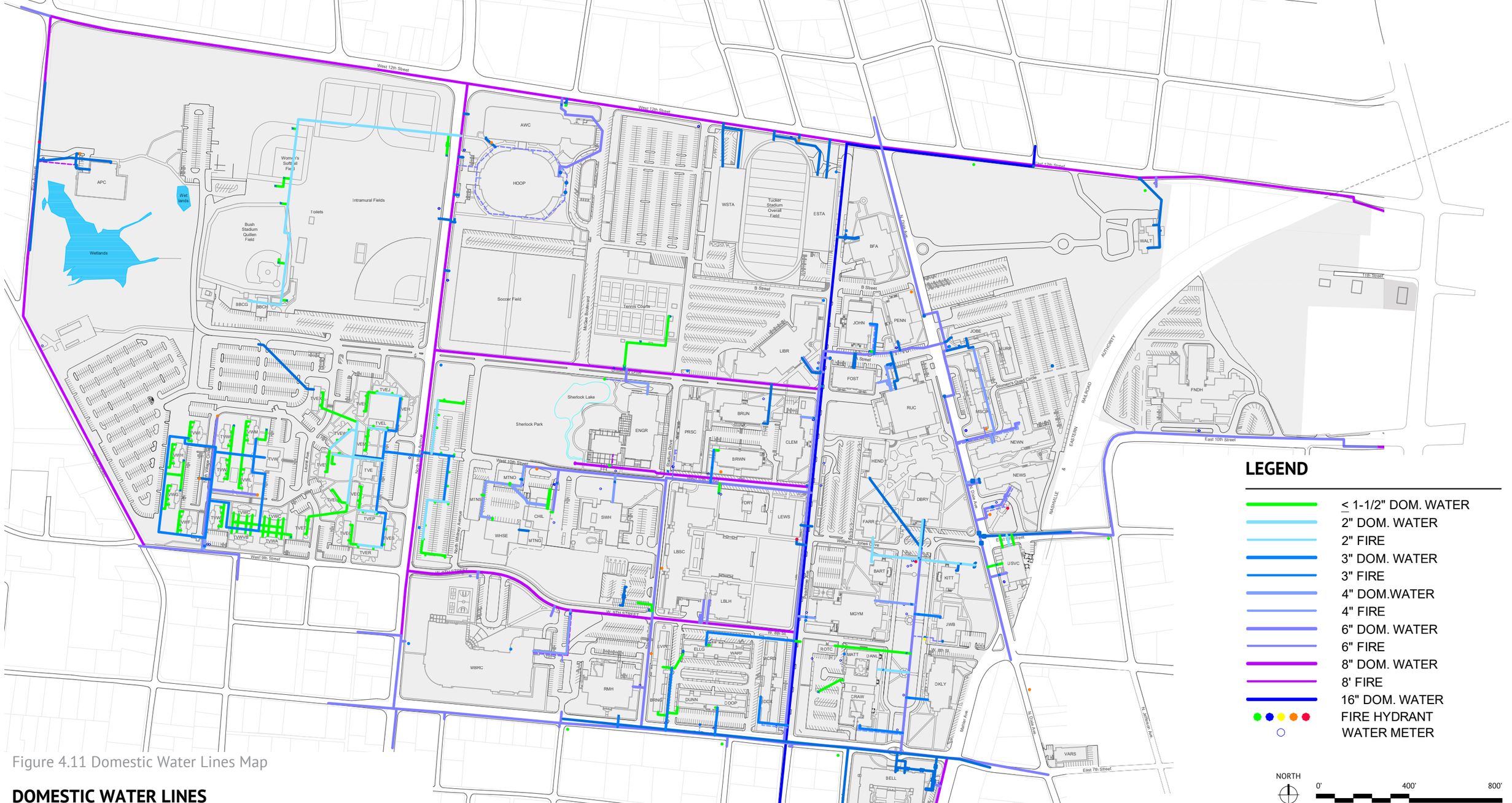


Figure 4.11 Domestic Water Lines Map

DOMESTIC WATER LINES

UTILITY & INFRASTRUCTURE

NATURAL GAS

Overview

Tennessee Tech purchases its natural gas from the City of Cookeville Gas Department and is currently their largest customer. The natural gas system on campus is operated by City which owns and manages the system up to the meter. The University is responsible for all infrastructure past the meter. The current configuration of the natural gas system on campus is shown in Figure 4.12.

Current Capacity and Condition

The campus is fed primarily by 6" lines running along Walnut Ave., 9th St. and 12th St. Current loads on the system include the boilers at the Hooper Eblen Center and the generators spread throughout campus. It should be noted that the boilers are the only natural gas demands on campus that maintain and uninterruptable rate structure. The campus also uses natural gas to condition all facilities west of Willow Ave. including the student housing in Tech Village and the baseball and softball stadium facilities. Currently, the gas is also used for hot water in both the West Stadium and East Stadium. Based on conversations with the Cookeville Gas Dept., the capacity of the natural gas system on campus is sufficient in meeting all current demands and its condition can be characterized as good.

Recommendations

Given that the campus plans to remain primarily conditioned by a centralized steam plant, it is expected the natural gas system will have no issues serving the campus demands in the future. Extensions to the current system may be necessary to provide service to new facilities west of Willow Ave. or to new boilers and generators on campus. It is recommended that TTU continue to monitor all usage at metered connections to identify potential leaks in the system.

It is also recommended that the University use existing utility mapping information and work with the City to create a Geographic Information System (GIS) map of all utilities on campus, including natural gas. This GIS system will allow the University to create a one-to-one spatial relationship of the campus infrastructure that is easy to update and use for record keeping. The goal of creating a GIS database for the natural gas system is to accurately locate, map, and record the condition of all valves, meters, generators, pipelines, and other natural gas facilities. Once the initial map is established, it is recommended that TTU work to verify the location and accuracy of the existing infrastructure in the GIS system. Routine updates and maintenance of the GIS system are necessary to ensure the database remains accurate despite a constantly changing campus. Verification and updates to the GIS system can be completed by TTU staff or by a qualified engineering firm.

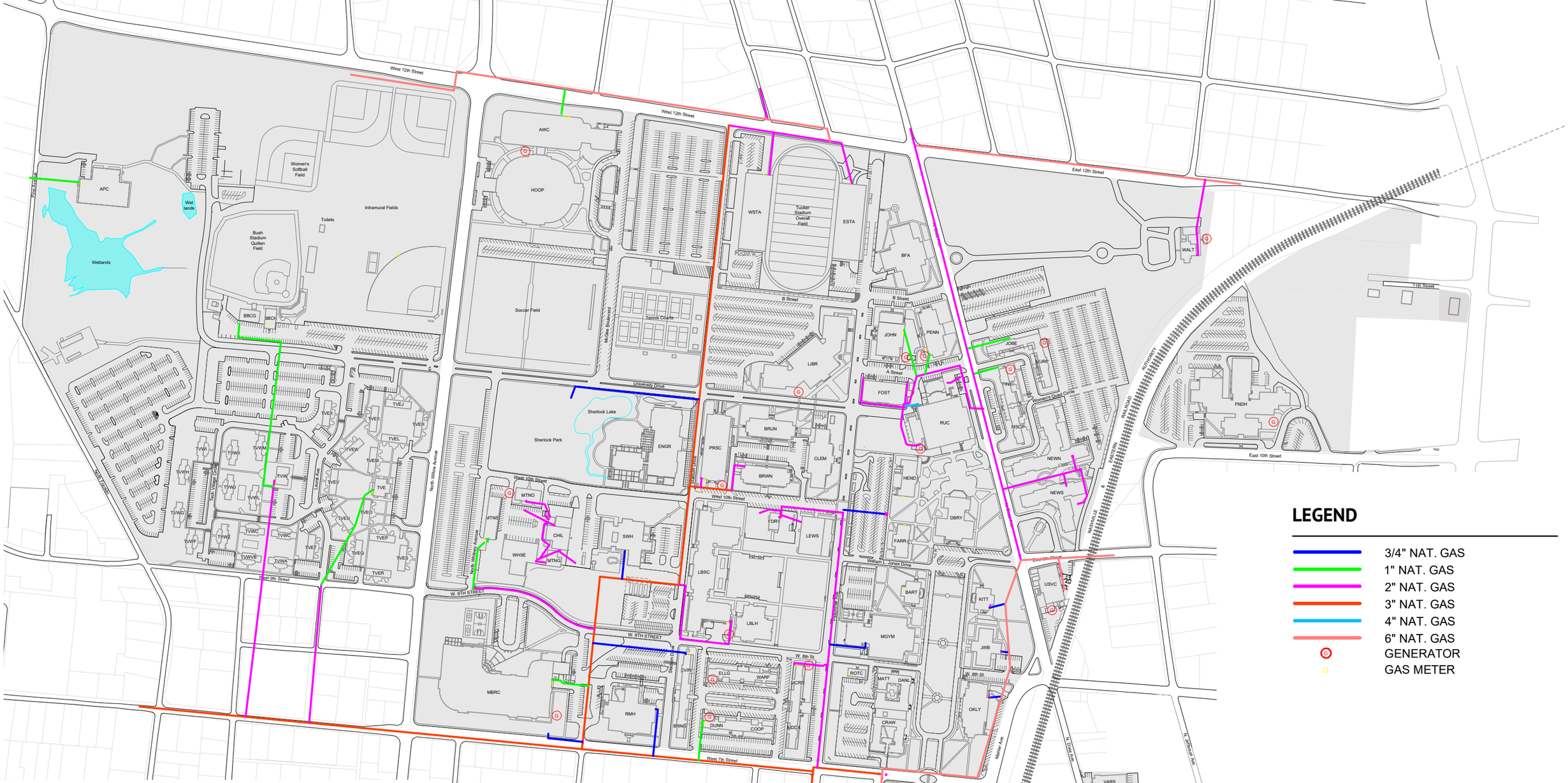


Figure 4.12 Natural Gas Map

NATURAL GAS

UTILITY & INFRASTRUCTURE

SANITARY SEWER

Overview

The TTU sanitary sewer system is owned and operated by the University and consists primarily of gravity pipelines. The City of Cookeville Water Department does most maintenance on the system on an on-call basis. The University's sewer system connects to the City's system in multiple locations on campus as shown in Figure 4.13. There are currently no flow meters on campus to monitor discharges to the City, thus, the City bills the University for 120% of the water usage rates for campus.

Based upon the topography at specific areas and capacity of the city system, several locations on campus require or will require the use of a forced main to provide service. The new Ashraf Islam Engineering Building and the Innovation Center and Residence Hall- Phase I will both utilize a new forced main which extends to Peachtree Avenue to discharge across campus to N. Dixie. Likewise, the Chiller plant has a small section of forced main.

Current Capacity and Conditions

Currently, there is very little information known about the condition of the sanitary sewer system on campus. The University noted that most of the gravity sewer was installed at the same time nearby buildings were built which dates some parts of the system back to nearly 100 years in age. To date, there have been no significant replacements of the sewer system on campus outside of miscellaneous upgrades during building renovations and new construction. Similarly, there has been no preventative maintenance performed on the system as the only repairs documented have taken place after main breaks have occurred causing ground settlement visible from the surface.

The University noted they have a wide range of pipe materials found in their current sanitary sewer system including vitrified clay pipe, cast iron pipe, cement pipe, orangeburg pipe, ductile iron pipe, and PVC. Many of the pipe materials listed are commonly known for their breakdown over time changing flow characteristics, allowing groundwater infiltration, and ultimately leading to failure of the pipeline. Similarly, it can be assumed that there are also many brick manholes in the system which can also create inflow and infiltration (I/I) issues. The University noted that I/I is a major issue for them, though no known sanitary sewer overflows (SSOs) have occurred.

To date, no video surveys or condition assessments have been performed on the sewer system leaving the University with many unknowns. Given the age and assumed condition of the sanitary sewer infrastructure on campus, the condition of the system can be generally characterized as poor to fair.

The University noted there are multiple areas of immediate concern on campus. They include the following:

- Replacement of a potentially collapsed clay pipe near Bartoo Hall (BART) and TJ Farr (FARR).
- Upgrade of line leaving TJ Farr (FARR) to a larger capacity
- Replacement of problematic manhole near Foundation Hall (FNDH)
- Potential replacement of manhole behind STEM Center (RMH) and surrounding infrastructure where surcharging occurs.

Recommendations

It is recommended that TTU work toward correction of the existing problematic areas on campus, especially those that could lead to sanitary sewer overflows such as the areas noted previously around TJ Farr (FARR), Foundation Hall (FNDH) and the STEM Center (RMH). For each of these areas noted, it is recommended that the University conduct a full engineering study and design to correct the issue. Due to lack of information currently known, construction costs were assumed and may not represent accurate depictions of the work necessary to correct the issues.

It is also recommended that the University use existing utility mapping information and work with the City to create a Geographic Information System (GIS) map of all utilities on campus, including sanitary sewer. This GIS system will allow the University to create a one-to-one spatial relationship of the campus infrastructure that is easy to update and use for record keeping. The goal of creating a GIS database for the sewer system is to accurately locate, map, and record the condition of all manholes, including lid elevations and inverts, as well as pipe characteristics such as diameter, material, and slope. Once the initial map is established, it is recommended that TTU work to verify the location and accuracy of the existing infrastructure in the GIS system. Routine updates and maintenance of the GIS system are necessary to ensure the database remains accurate despite a constantly changing campus. Verification and updates to the GIS system can be completed by TTU staff or by a qualified engineering firm.

In conjunction with the creation of a GIS system, it is recommended that the University conduct a full Sanitary Sewer Evaluation Survey (SSES) of the current system using the GIS map created. The goal of an SSES survey is to asses the condition of every aspect of the system by inspecting manholes, inspecting all pipelines using CCTV cameras, and smoke testing the pipelines for leaks. This survey will allow the University to determine the condition of all sanitary sewer assets in the system helping to identify and prioritize future sewer system projects. Correcting the existing system is paramount in setting the University up for future success as a conscious repair plan will save the University both money and headaches in the long run. It is highly recommended that the University begin this process as soon as possible.

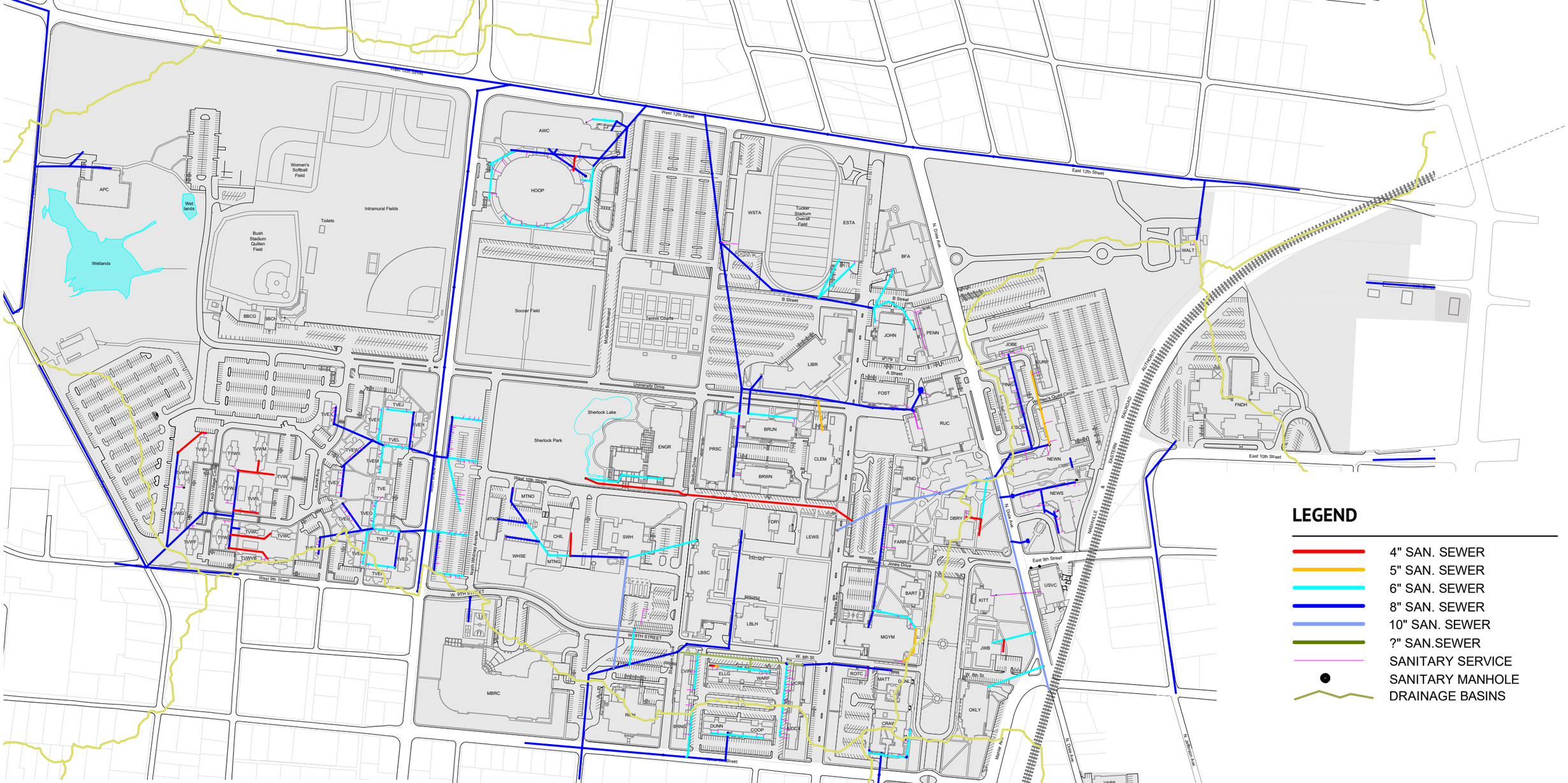


Figure 4.13 Sanitary Sewer Map

SANITARY SEWER

UTILITY & INFRASTRUCTURE

STORM SEWER

Overview

The TTU storm sewer system is owned and managed by the University. The University's stormwater system is currently overseen by the Stormwater Council made up of University staff and a City of Cookeville engineer. The University currently holds an active MS4 permit for stormwater discharge to multiple locations around campus. It is estimated that approximately 80% of the stormwater flow is discharged to the north in the Trog Sink area while the remaining 20% of flow is discharged to the south and eventual makes it way to the Ensor Sink area after passing through some of the City's stormwater infrastructure. A complete map of the campus stormwater system is shown in Figure 4.14.

Current Capacity and Conditions

Overall, the system has improved in recent years due to various upgrades including those installed as part of the new Laboratory Science Commons and Marc L. Burnett Student Recreation and Fitness Center as well as the replacement and upsize of the primary trunk line on campus. While replacing the existing 42" line under the stadium parking lot, it was discovered that the existing line was collapsed in multiple areas causing a major restriction to flow. Installation of the new 72" line relieved that restriction and has led to noticeable improvements in the overall system. It is expected that the trend will continue with improvements brought on by the construction of the new Ashraf Islam Engineering Building in Sherlock Park as well as other future capital projects around campus.

Despite these recent improvements, there are still many unknown factors in the storm sewer system on campus. Like the sanitary sewer system, most of the stormwater infrastructure and piping found on campus were installed when nearby buildings were built. Therefore, a large amount of storm infrastructure is well over 50 years old. The material, size, and condition of most pipelines around campus are unknown at this time. Additionally, there are likely multiple drainage structures that are undersized, misplaced, and/or broken that need repair. Based on this, the campus storm sewer system is characterized as poor to fair.

It should be noted that the University identified multiple areas that are currently causing issues on campus. These areas are noted below:

- Ponding behind University Services that leads to flooding of the steam plant's lower level.
- Ponding in Dixie Ave in front of University Services
- Flooding in Sherlock Park
- Flooding in the yard of the President's House along 12th St.
- Ponding in front of the loading dock at Southwest Hall
- Ponding around the baseball and softball fields
- Potentially undersized infrastructure near Bartoo that leads to constant clogging and slow draining

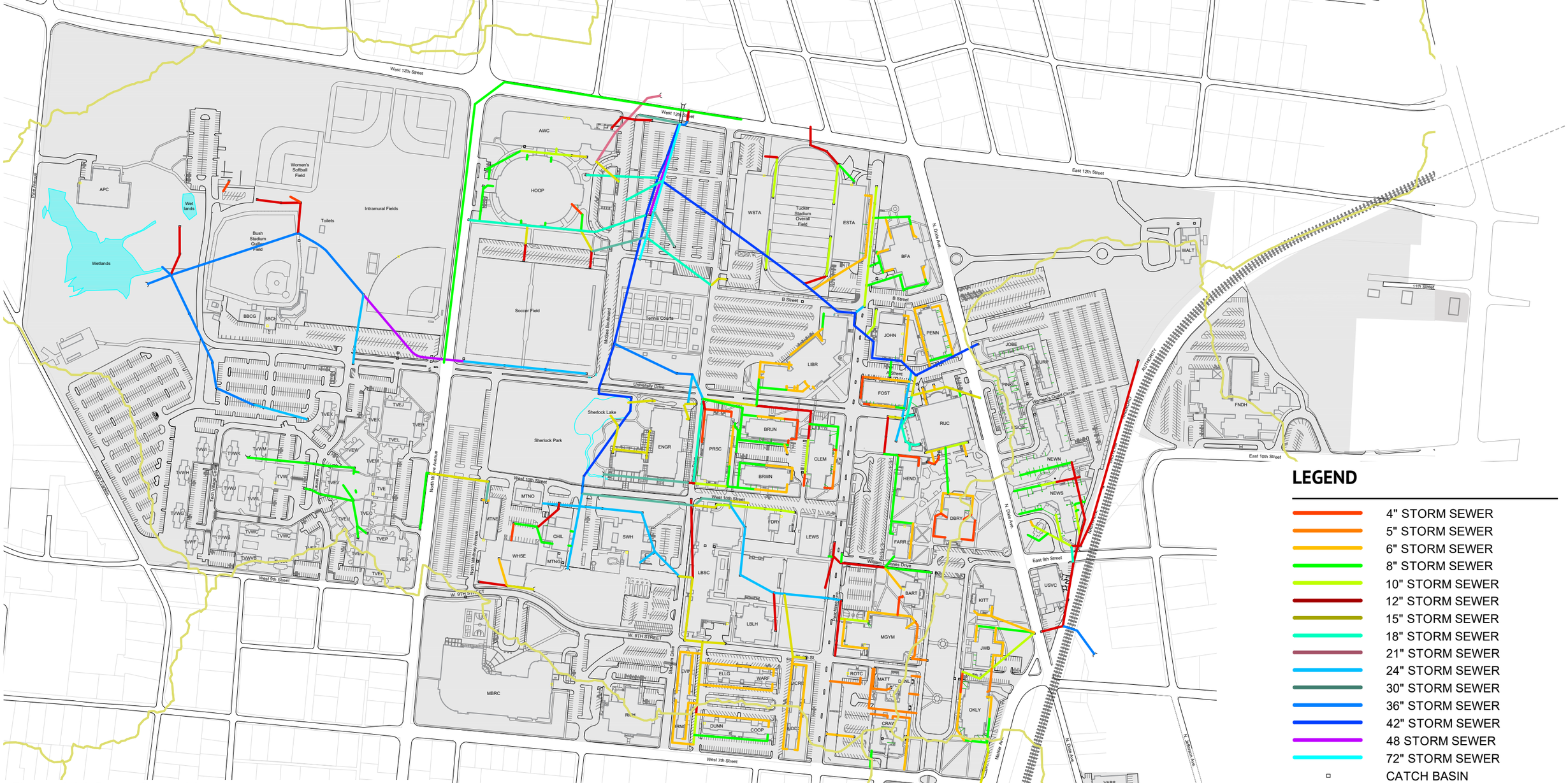
Recommendations

It is recommended that the University work toward correction of the existing problematic areas on campus, especially those around University Services. Examination of the site shows severe erosion along the railroad tracks and deterioration of infrastructure in close proximity to the main building. It is also expected that the underground drainage tiles in this area are also undersized and severely damaged. These concerns coupled with existing topography, campus growth, and the nearby infrastructure at risk create a major problem for the University. It is recommended the University move forward with an engineering design project to eliminate this problem in the immediate future. Due to lack of information currently known, construction costs were assumed and may not represent accurate depictions of the work necessary to correct the issues.

Similarly, the University should look to improve drainage conditions in Sherlock Park since multiple buildings, including the new Ashraf Islam Engineering Building, are slated for construction in that general area in the future. It is expected that conditions will improve with the construction of the nearby infrastructure, however, this area should continue to be monitored by campus personnel.

It is also recommended that the University use existing utility mapping information and work with the City to create a Geographic Information System (GIS) map of all utilities on campus, including storm sewer. This GIS system will allow the University to create a one-to-one spatial relationship of the campus infrastructure that is easy to update and use for record keeping. The goal of creating a GIS database for the storm sewer system is to accurately locate, map, and record the condition of all drainage structures, including catch basins and junction boxes, and pipe characteristics such as diameter, material, and slope. Once the initial map is established, it is recommended that TTU work to verify the location and accuracy of the existing infrastructure in the GIS system. Routine updates and maintenance of the GIS system are necessary to ensure the database remains accurate despite a constantly changing campus. Verification and updates to the GIS system can be completed by TTU staff or by a qualified engineering firm.

In conjunction with the creation of a GIS system, it is recommended that a full system survey, similar to the Sanitary Sewer Evaluation Survey (SSES) recommended for the sanitary sewer system, be conducted using the GIS map and database created. The goal of this survey is to inventory and assess the condition of every aspect of the system by inspecting drainage structures, inspecting all pipelines using CCTV cameras, and smoke testing the pipelines for leaks. This survey will help the University determine the condition of all storm sewer assets in the system so that future projects can be identified and prioritized. As noted in the sanitary sewer section, finding and correcting issues in the existing storm system should be a high priority of the University as it will save money in the long run.



LEGEND

- 4" STORM SEWER
- 5" STORM SEWER
- 6" STORM SEWER
- 8" STORM SEWER
- 10" STORM SEWER
- 12" STORM SEWER
- 15" STORM SEWER
- 18" STORM SEWER
- 21" STORM SEWER
- 24" STORM SEWER
- 30" STORM SEWER
- 36" STORM SEWER
- 42" STORM SEWER
- 48 STORM SEWER
- 72" STORM SEWER
- CATCH BASIN
- DRAINAGE BASINS

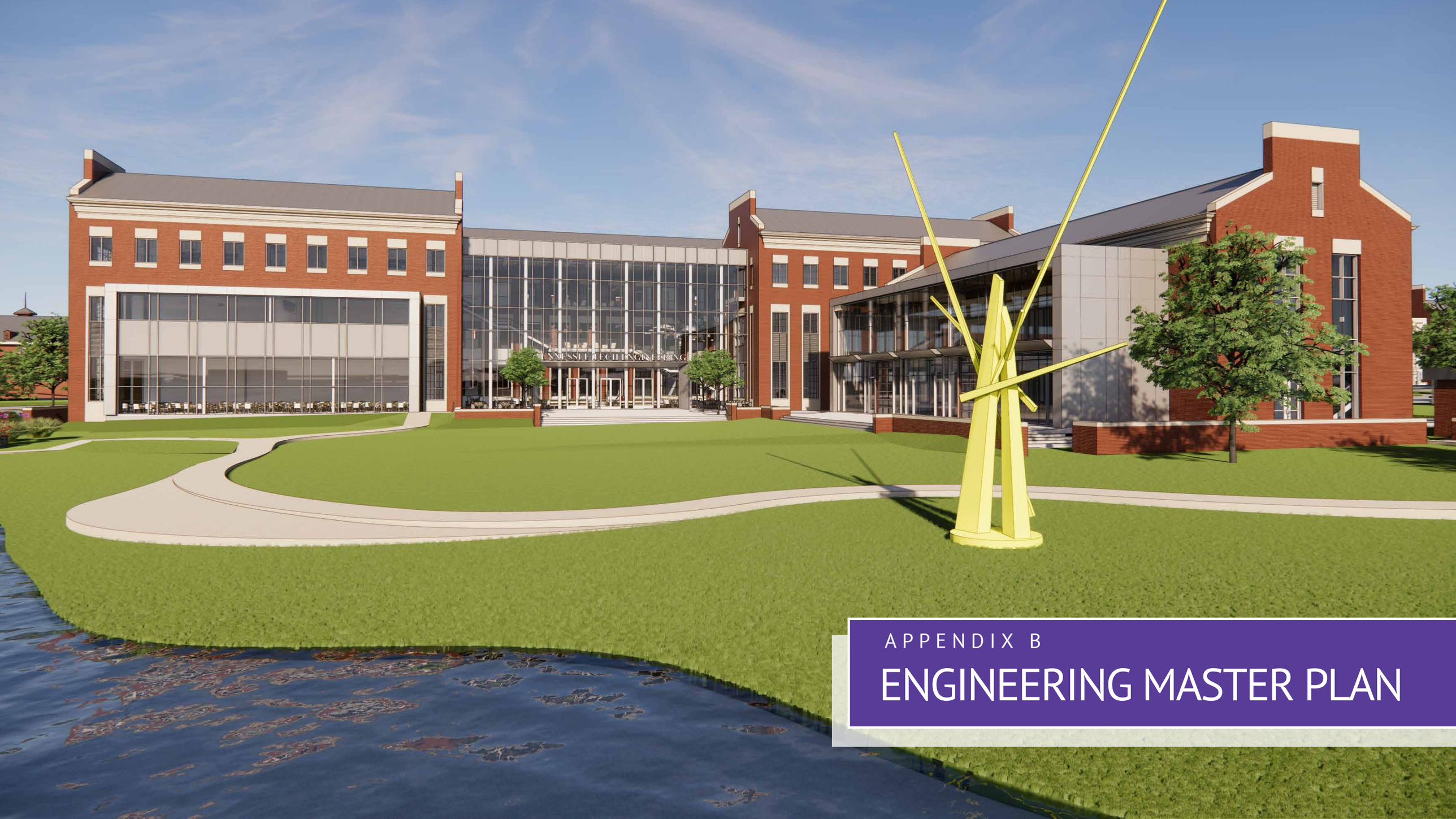
NORTH

0' 400' 800'

Figure 4.14 Storm Sewer Map

STORM SEWER

UTILITY & INFRASTRUCTURE



APPENDIX B

ENGINEERING MASTER PLAN

ENGINEERING MASTER PLAN

The proposed engineering master plan describes a series of phases to address the growth of the School of Engineering though the master plan horizon of a 15,000 student campus. The initial intent of the master plan is to address the current space deficiency for the current enrollment. Even with the use of antiquated space, the College is currently at a 78,576 net sf space deficit as determined by the THEC space Allocation Model. This represents over half of the current overall university deficit. At the 12,000 and 15,000 student horizons, the deficit for Engineering grows to 126,305 nsf and 167,965 nsf respectively.

On the following page is an excerpt from the overall university space model indicating the projected needs for each department and center. Note that the Foundry is not included in this space model calculation.

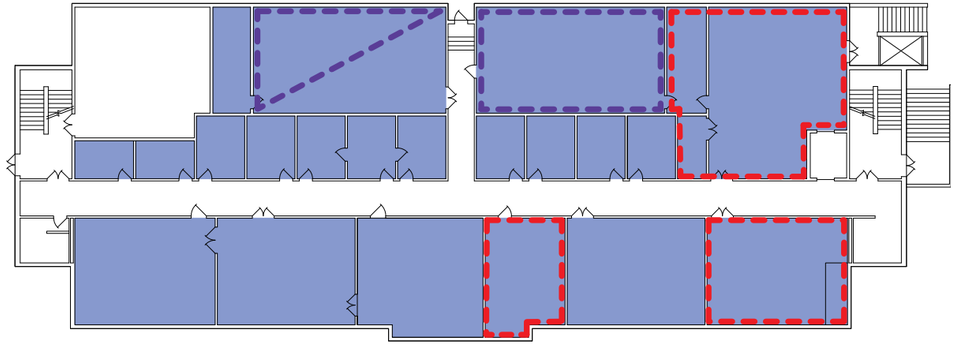
While addressing the space needs of the college, the Engineering Master Plan intent is to also include the renovation of the existing buildings as well as the reduction and then elimination of the use of severely antiquated space.

Academic Space Model	Faculty			NASF				NASF			Existing Conditions			
	2020 Current	12,000 Proj.	15,000 Proj.	Existing	Current Need	12,000 Need	15,000 Need	Current (Shortfall)	12,000 (Shortfall)	15,000 (Shortfall)	Building	Gross Area	Year Built	Campus Score PFIS
College of Engineering														
General & Basic	6.0	10.6	13.0	6,500	16,714	24,278	29,888	(10,214)	(11,311)	(27,135)	Clement Hall	62,887	1965	62.5
Chemical	10.5	10.5	10.5	21,900	32,891	35,693	39,686	(10,991)	(9,104)	(13,097)	Prescott Hall	111,955	1971	72.6
Computer Science	23.0	24.3	28.5	13,408	22,063	26,674	32,682	(8,655)	(7,710)	(13,718)	Bruner Hall	57,668	1966	70.6
Electrical & Comp	16.0	17.6	21.0	25,300	35,281	40,468	47,525	(9,981)	(9,199)	(16,256)	Brown Hall	55,001	1967	68.7
Manufacturing	7.0	9.0	9.0	23,600	14,788	18,375	18,846	8,812	10,002	9,531	Lewis Hall	26,592	1921	50.9
Mechanical	22.0	26.6	28.0	44,000	43,291	51,525	52,681	709	(613)	(1,769)	Brown Hall			
Dean's Office/SSC	3.0	3.0	3.0	30,600	73,093	76,709	90,155	(42,493)	(25,134)	(38,580)	Clement Hall			
Center for Energy Systems Research				5,300	5,300	9,113	9,113	-	(3,813)	(3,813)	Prescott Hall			
Center for Manufacturing Research				10,000	10,000	17,194	17,194	-	(7,194)	(7,194)	Brown Hall			
Cybersecurity Ed., Research & Outreach Ctr.				2,300	2,300	2,300	2,300	-	2,761	2,761	Prescott Hall			
Water Resource Center														
College of Engineering Totals	104.5	119.2	134.0	212,108	290,684	338,413	380,073	**(78,576)**	**(126,305)**	**(167,965)**				
New Engineering Building- projected 2024								63,083	63,083	63,083				
Total after New Building								(15,493)						
Less antiquated current Engineering space @ East Stadium (campus worst 45.2 rating)- Primarily Mech. + Civil/Environ.								(24,593)	(24,593)	(24,593)	East Stadium	91,851	1967	45.2
Less Demolished space @ Lewis Hall | Foundry								(23,600)	(23,600)	(23,600)	Foundry	3,604	1943	59.9
Less vacated Foundation Hall Space								(8,853)	(8,853)	(8,853)	Foundation Hall	134,228	1932	65.4
College of Engineering Projected Totals								**(72,539)**	**(120,268)**	**(161,928)**				
represents new renovation of Bruner Hall														
University Totals	482	586	703	971,499	1,090,992	1,308,267	1,480,310	**(119,493)**	**(336,768)**	**(508,811)**				
New Engineering Building								63,083	63,083	63,083				
Less antiquated current Engineering space @ East Stadium (campus worst 45.2 rating)								(24,593)	(24,593)	(24,593)				
Total Projected Space Shortfall (NSF)								**(81,003)**	**(298,278)**	**(470,321)**				

Table 5.1 Engineering Academic Space Model

COLLEGE OF ENGINEERING SPACE UTILIZATION SUMMARY

The following pages illustrate the current College of Engineering departments and their respective use of space in each building. Included are the summary pages for each building.



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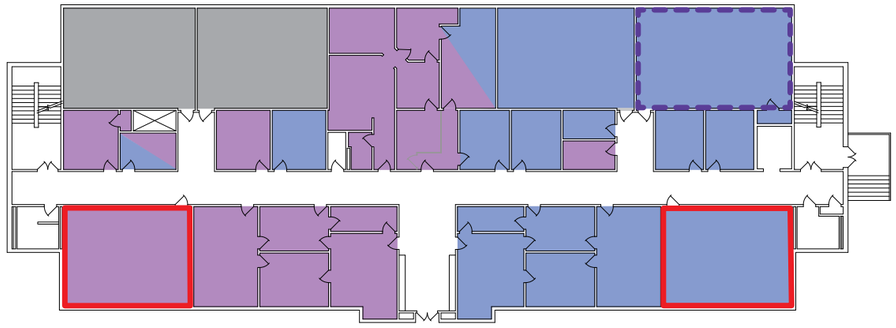

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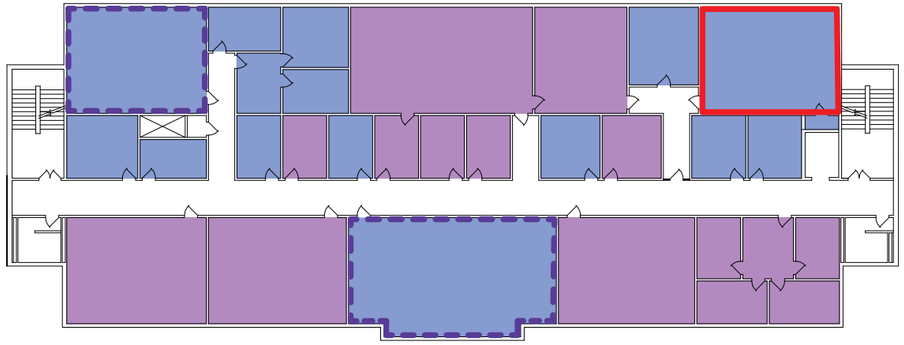

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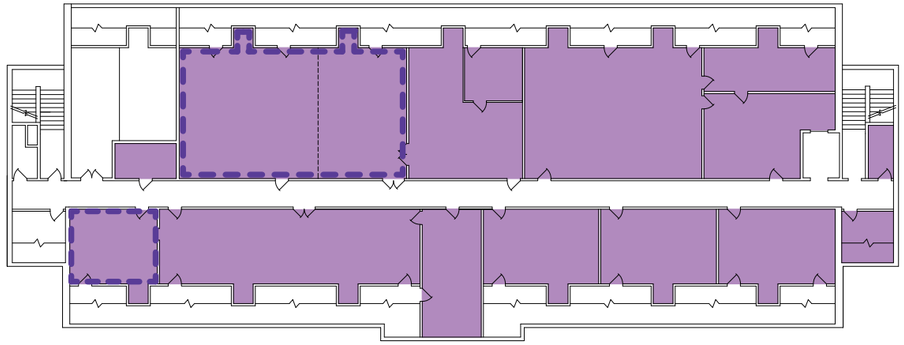


FOURTH FLOOR

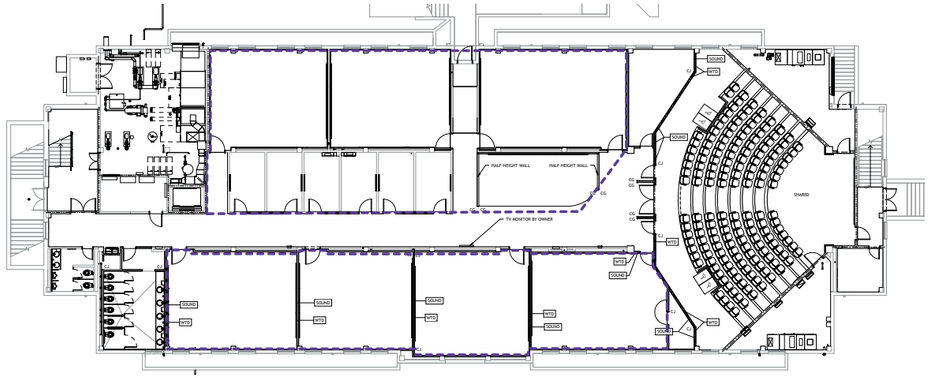
Figure 5.1 Brown Hall Overall Plans

ENGINEERING DEPARTMENTS

BROWN HALL

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

- SPACES TO BE MOVED TO ISLAM BUILDING
- SPACES TO BE MOVED TO ACME BUILDING
- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2



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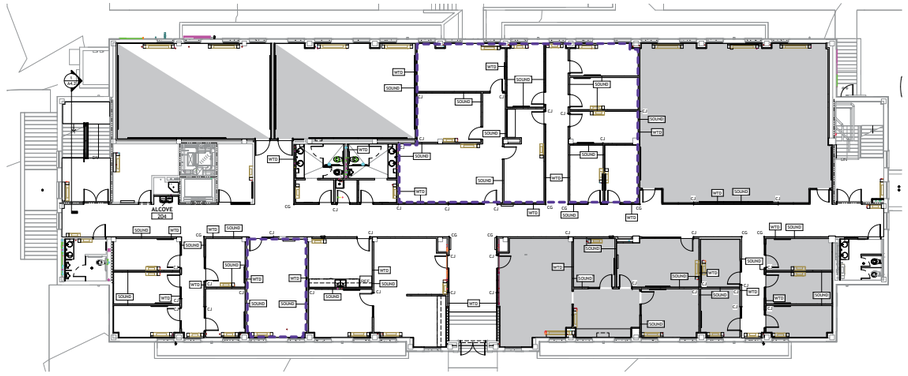
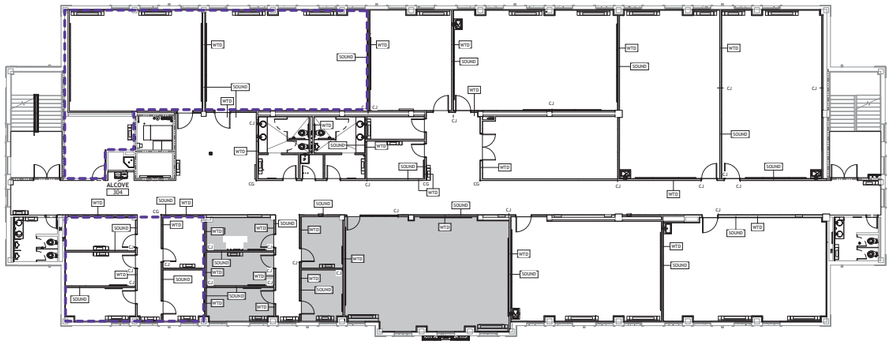
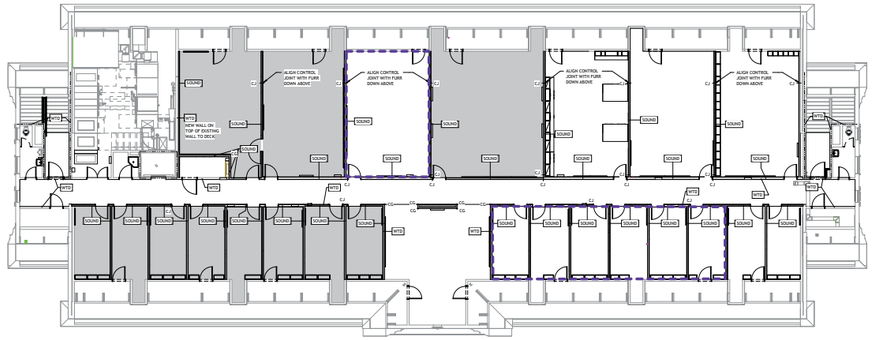


SECOND FLOOR



THIRD FLOOR



FOURTH FLOOR

Figure 5.2 Bruner Hall Overall Plans

ENGINEERING DEPARTMENTS

BRUNER HALL

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
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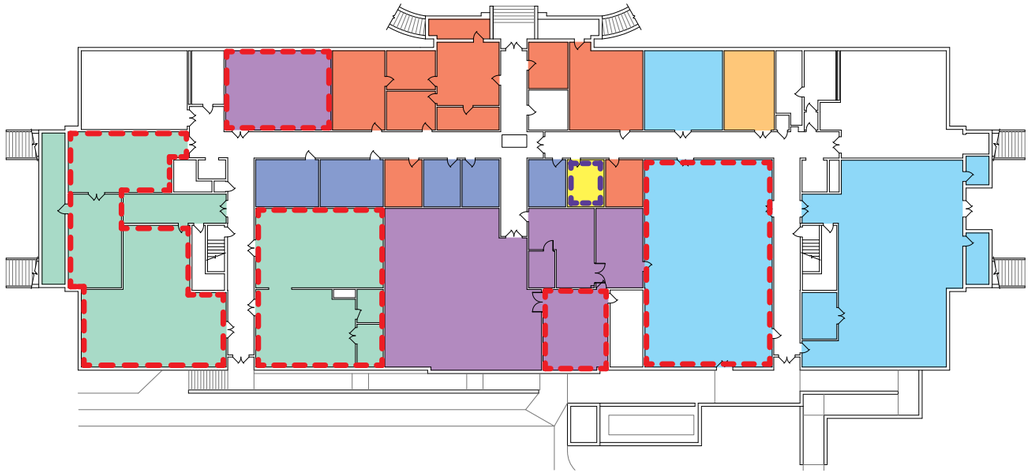

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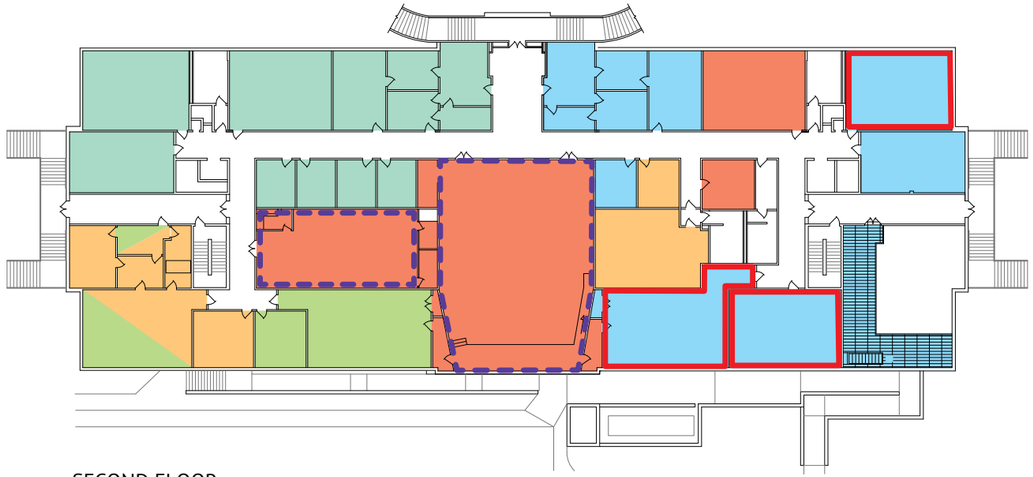
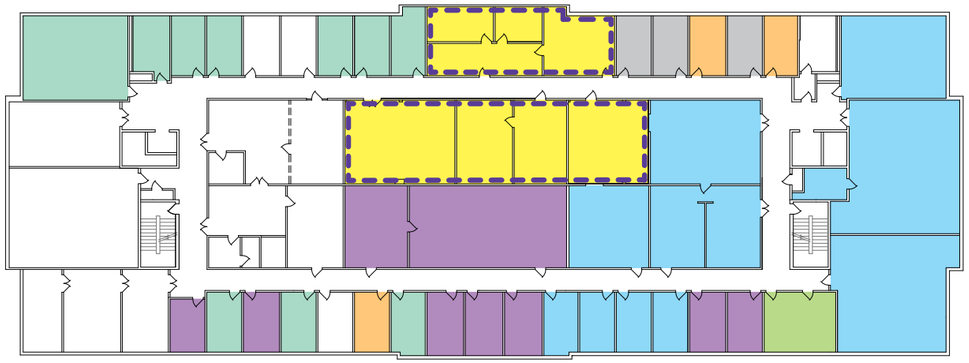


SECOND FLOOR

THIRD FLOOR



FOURTH FLOOR

Figure 5.3 Prescott Hall Overall Plans

ENGINEERING DEPARTMENTS

PRESCOTT HALL

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
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- MECHANICAL ENGINEERING
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- CENTER FOR MANUFACTURING RESEARCH (CMR)
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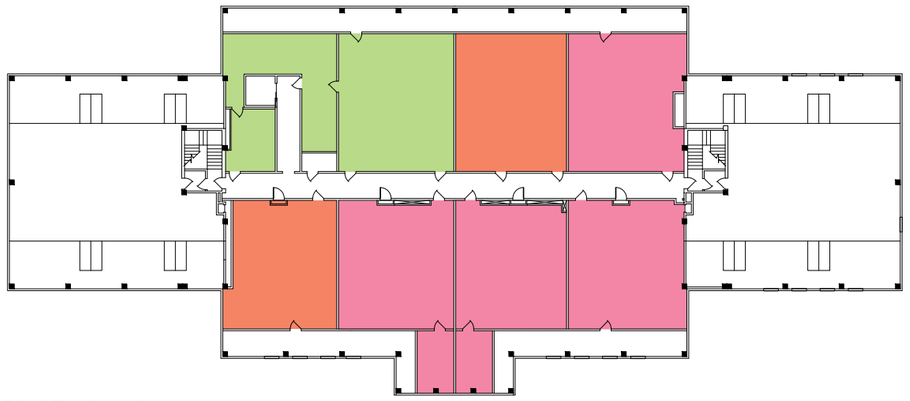
- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

FIRST FLOOR

SECOND FLOOR

THIRD FLOOR



FOURTH FLOOR

Figure 5.4 Clement Hall Overall Plans

ENGINEERING DEPARTMENTS

CLEMENT HALL

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
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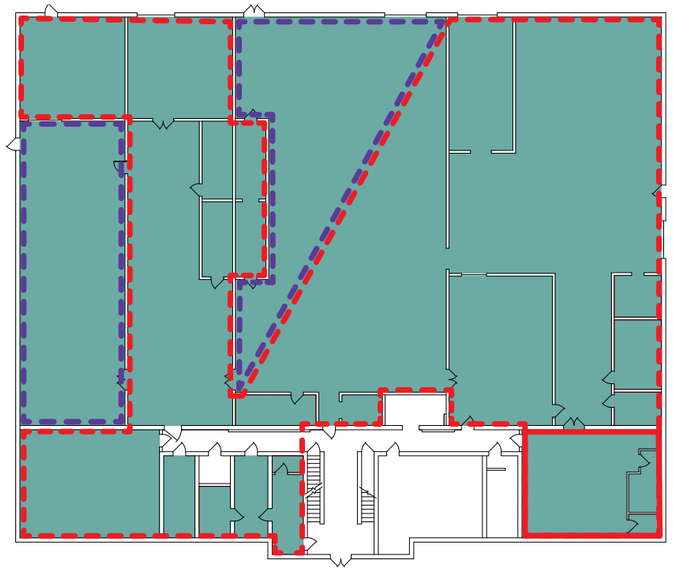

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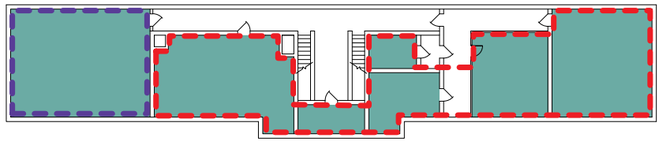

SECOND FLOOR

Figure 5.5 Lewis Hall Overall Plans

ENGINEERING DEPARTMENTS

LEWIS HALL

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
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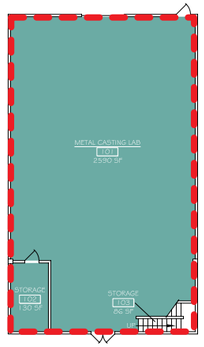

FIRST FLOOR

SECOND FLOOR

Figure 5.6 Foundry Overall Plans

ENGINEERING DEPARTMENTS

FOUNDRY

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
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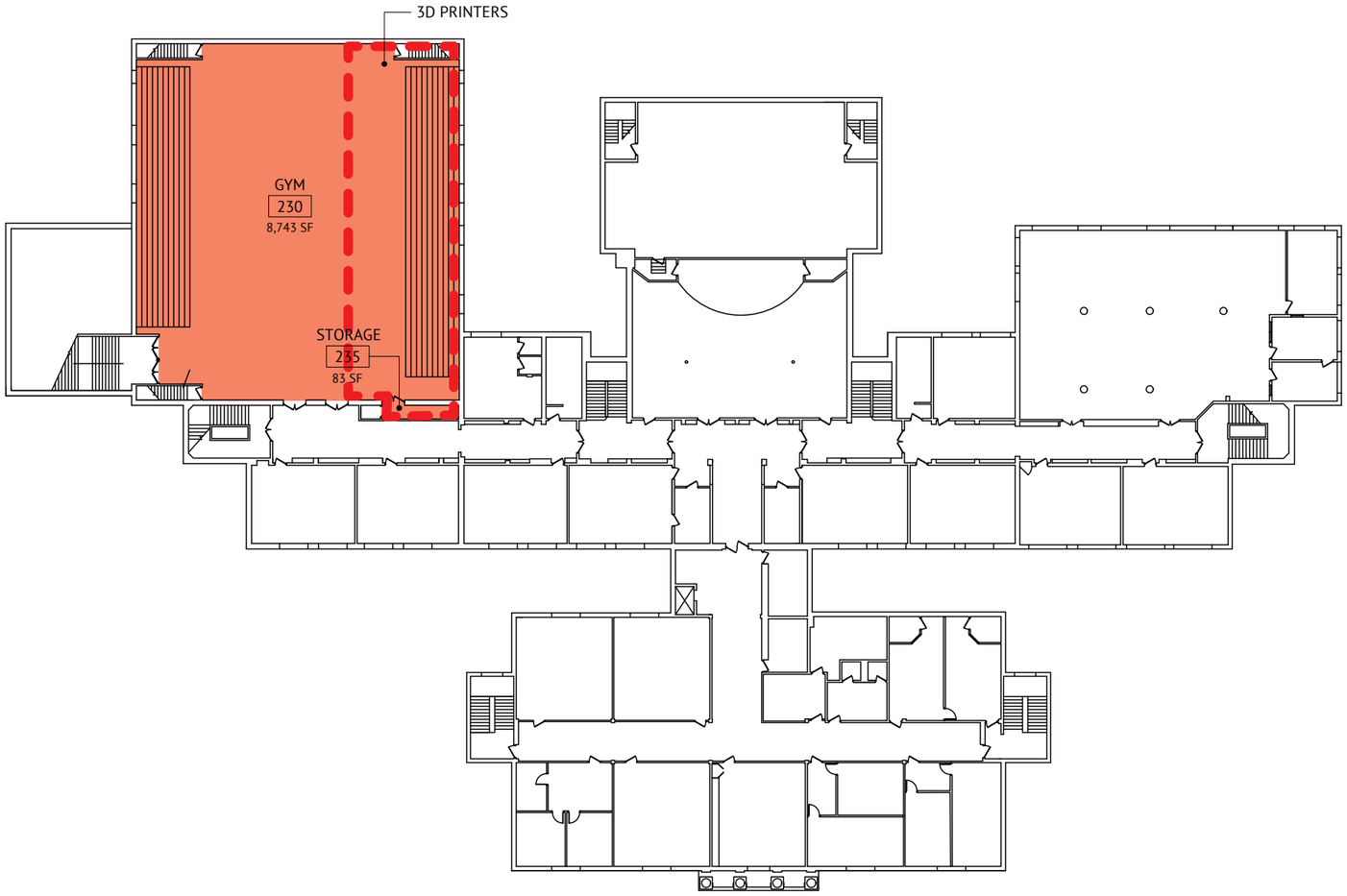

Figure 5.7 Foundation Hall second floor

ENGINEERING DEPARTMENTS

FOUNDATION HALL - SECOND FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
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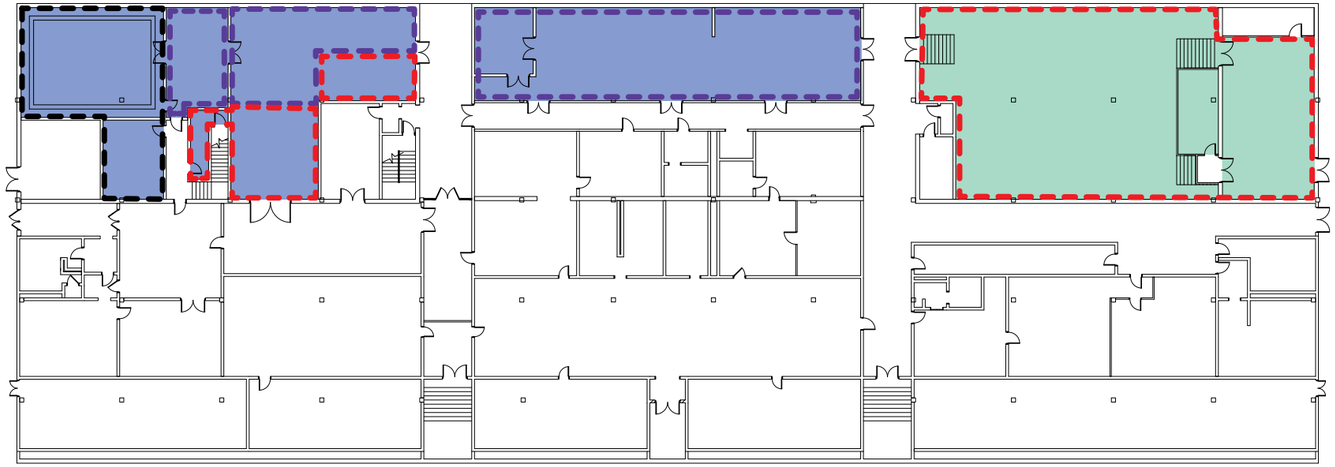
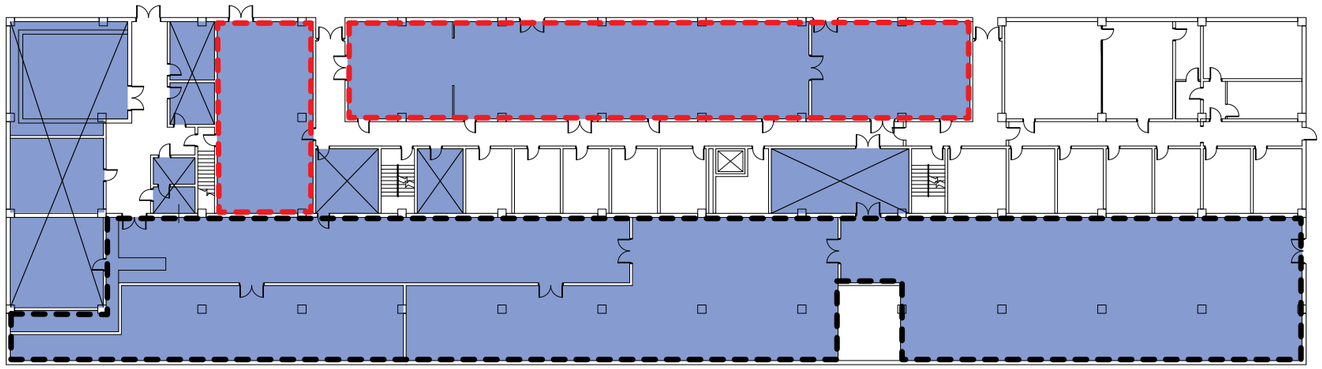


GROUND FLOOR



SECOND FLOOR

Figure 5.8 East Stadium Overall Plans

ENGINEERING DEPARTMENTS

EAST STADIUM

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
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- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

ENGINEERING MIGRATION PLAN

The Engineering Migration Plan is the description of the series of moves that are proposed for the implementation of the Master Plan. The exhibits that follow this narrative illustrate these moves in two forms: a spreadsheet with square footage allocations at each location at each phase and a series of site plans with the use of space in each building at each phase.

The goals of the Engineering Migration Plan include:

1. Develop new keynote building representing all programs
2. Program New Advanced Construction and Manufacturing Engineering Building
3. Allow Computer Science space to grow more rapidly with program
4. Integrate a new Industrial Engineering Program
5. Transition away from Clement Hall (for Arts and Sciences and Data Center)
6. Decentralize General and Basic Engineering
7. Swap Brown and Prescott programming
8. Vacate East Stadium and, ultimately, Foundation Hall
9. Transition Chemical Engineering to broader purview

The Master Plan Phases and, therefore, Migration steps are:

Existing Buildings

While the core of the college is the Engineering Quad (Clement, Brown, Prescott, and Bruner) plus Lewis Hall, the existing college programming is actually spread over ten buildings. With the exception of the newly renovated Bruner Hall, each building has a low rating on the PFIS rating scale. The PFIS provides an assessment score for each building's existing physical condition. Five of the ten facilities utilized are designated for abandonment or demolition. These include Lewis Hall, the Foundry, the MIT Welding building, East Stadium and portions of Foundation Hall.

Phase 1- Ashraf Islam Engineering Building

The building's strategic location provides the opportunity for it to be the keynote building in the foreground of the emerging Engineering neighborhood on campus. Likewise, it will also be a signature academic building at the front door entry to the university as the overall master plan envisions from Willow Avenue.

The new engineering building was designed to:

a. Provide collaborative environment for students
b. Include the freshmen to senior year experience
c. Be utilized as recruiting and marketing tool
d. Integrate Technology

The 103,172 gross sf building incorporates 62,673 net sf of program space. The building provides space for each of the departments within the college. The priority of the building is to be student focused. It provides spaces for collaboration highlighted by a student atrium space which is surrounded by the remainder of the building. It also provides large adaptive learning classrooms, labs for each department and a dedicated wing of the building for student projects.

The migration of space for the new building is envisioned to be a modest transition to foreshadow the anticipated migrations through the master plan. All departments will receive a net gain from the space provided in the new building. Departments within Prescott and Brown will simply reassign spaces that were vacated when the specific function moves to the new building. This should also include the reassignment of classroom spaces that are currently underutilized. The primary additional gain of space will occur for Computer Science as areas in Clement Hall are renovated for Mathematics progressive transition to Clement. This will also allow the anticipated but unprogrammed new program, Industrial Engineering, to utilize space in Bruner as well.

The relocation of several labs from East Stadium allows the progression toward discontinuing all use of its antiquated spaces.

ENGINEERING MIGRATION PLAN

Phase 2- ACME Building

The Phase 2 of the master plan incorporates:

a. Consolidation of shops throughout the college into a single Machine Shop
b. Relocation of Advanced Manufacturing and Foundry Programs
c. Clearing the Lewis / Foundry site (for Science Quad- Biology Building)
d. Relocation of the Materials Labs
e. Relocation of Mechanical Labs (HVAC, Engine)
f. Relocation of the Advanced Manufacturing Lab from the new Ashraf Islam Engineering Building

The relocation of spaces creates opportunities within the buildings being vacated. Programs moving from Clement allows Mathematics space to fully relocate and grow which will allow Computer Science (CS) space to expand within Bruner. The relocations also allow expansion space for Physics. The relocation of Advanced Manufacturing (MET) and the Foundry allows space to build a new Biology building on their vacated site at the emerging Science Quad. The relocation of the remaining labs at East Stadium allows for the discontinuation of all use of its antiquated spaces.

Phase 3- Brown Prescott Renovations

Phase 3 combines the renovation of two of the larger Derryberry era buildings on campus. This continues the universities comprehensive plan to methodically renovate buildings that are in need of systems upgrades and general overhaul due to their age. It is envisioned that the building renovations will be paired as a phased capital project. The basic concept is to relocate the larger departments, Mechanical (ME) and Electrical (ECE), to the larger building, Prescott. This will allow Chemical Engineering (CE), the Water Center, and portions of Civil and Environmental (CEE) to move to Brown. All buildings throughout each phase will incorporate a proportional amount of space for General & Basic Engineering (G&B) to allow it to be taught at a departmental level rather than as a central common first year experience.

Phase 4- 12,000 Student Horizon

A new engineering building will be needed to accommodate the Engineering program as the university enlarges to the 12,000-student horizon. The new building is anticipated to include space for a significant portion of the Civil and Environmental (CEE) department as well as space for the College, General & Basic (G&B) and Mechanical (ME) departments.

The new building will allow the College of Engineering and Center for Energy Systems Research to vacate Clement Hall which will afford expansion space for Mathematics and Physics. The new building will allow for Civil (CEE) to move out of Brown and Chemical (CE) to expand if needed. Likewise, it will allow Civil (CEE) to vacate its remaining space in Prescott to allow Electrical (ECE) and Computer Science (CS) as well as the Center of Energy Systems Research to expand.

Phase 5- 15,000 Student Horizon

A new engineering building will also be needed to accommodate the Engineering program as the university enlarges to the 15,000-student horizon. This building is envisioned to complete the new Engineering Quad. The program functions will complement the programs within the Phase 2 and Phase 4 buildings. The space provided for Mechanical (ME) will allow for the department to vacate space within Prescott to allow Electrical (ECE) and Computer Science (CS) to expand.

Ancillary to engineering, it is envisioned that a new Physics building will be developed on the southeast corner of the Academic Quad which will allow Computer Science (CS) and Mathematics to grow to their projected size within Bruner and Clement respectively.

Conclusion

The migration plan is intended to provide a vision for growth of the college. The goal was to provide for the anticipated needs of each department based upon their projected growth and space needs at each horizon. The parameters and priorities will inevitably change and refine over time. Therefore, detailed programming will be required at each step to determine the needs of each department to respond to their current and anticipated needs at that time.

Engineering Migration Plan					Proposed Concept										
Program SF by Building				Current		Phase 1		Phase 2		Phase 3		Phase 4		Phase 5
#	Building and Department			Existing Buildings		Islam Building		ACME Building		Brown |Prescott Renovations		12,000 Student Horizon		15,000 Student Horizon
145	**Lewis**													
		Manufacturing & Engineering Technology		**20,285**		**20,285**		demolish						
146	**Foundry**													
		Manufacturing & Engineering Technology		**3,166**		**3,166**		demolish						
148	**Clement**													
		Center for Energy Systems Research		1,567		1,567		1,567		1567	-1567	Move to Prescott		
		Center for Manufacturing Research		8,787		8,787	-3563	5,224		5,224		5,224		5,224
		Civil and Environmental Engineering		1,210		1,210	-1210	Move to ACME						
		College of Engineering		10,713	-4,326	6,387	-1046	5,341		5,341	-5,341	Move to PH-4		
		Electrical and Computer Engineering		236		236		236	-236	Move to Prescott				
		General & Basic Engineering		6,489		6,489	-6489	Move to Prescott						
		Mechanical Engineering		3,940		3,940		3,940		3,940		3,940		3,940
		Engineering Total		**32,942**		**28,616**		**16,308**		**16,072**		**9,164**		**9,164**
		Mathematics		1,460		5,786	9922	15,708		15,708	2,955	18,663		25,238
		Physics						2,386	236	2,622	3,953	6,575		Move to Sc. Quad
				34,402		34,402		34,402		34,402		34,402		34,402
149	**Brown**													
		College of Engineering		1,538		1,538		1,538		1538		1,538		1,538
		Electrical and Computer Engineering		17,460		17,460		17,460		Move to Prescott				
		Mechanical Engineering		19,295		19,295		19,295		Move to Prescott				
		Civil and Environmental Engineering								7,110		Move to PH-4		
		Chemical Engineering								19,939		27,049		27,049
		General & Basic Engineering								3,285		3,285		3,285
		Engineering Total		**38,293**		**38,293**		**38,293**		**31,872**		**31,872**		**31,872**
		Water Center								6,421		6,421		6,421
										38,293		38,293		38,293
150	**Prescott**													
		Center for Energy Systems Research		3,768		3,768		3,768		3,768		9,113		9,113
		Center for Manufacturing Research		1,206		1,206		1,206		1,206		1,206		Move to PH-5
		Chemical Engineering		21,932		21,932	-2002	19,930		Move to Brown				
		Civil and Environmental Engineering		24,191		24,191	-4317	19,874	-7110	12,764		Move to PH-4		
		College of Engineering		9,503	-1,169	8,334		8,334		8,334		8,334		9,503
		Computer Science		172		172		172	-172	Move to Bruner				
		Cybersecurity Educ., Research & Outreach Ctr.		2,267	-2,267	Move to Islam								
		Electrical and Computer Engineering		7,555		7,555		7,555		24,694		32,113		40,673
		Mechanical Engineering					6319	6,319		22,813		22,813		14,290
		General & Basic Engineering			3436	3,436		3,436		3,436		3,436		3,436
		Engineering Total		**70,594**		**70,594**		**70,594**		**77,015**		**77,015**		**77,015**
		Water Center		6,421		6,421		6,421						
				77,015		77,015		77,015						

Table 5.2 Engineering Migration Plan

ENGINEERING MIGRATION PLAN

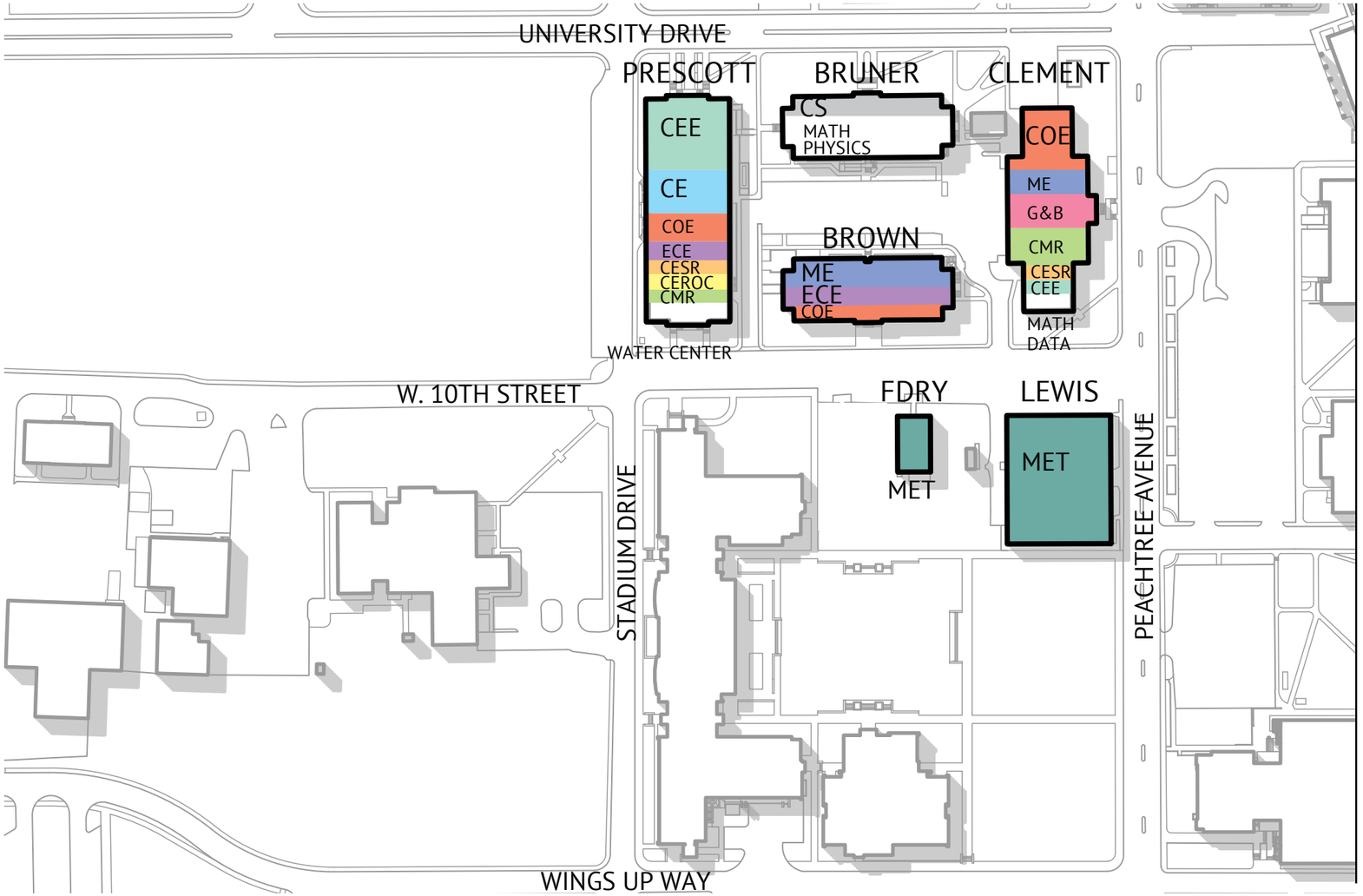
As described on the previous pages, the five phase migration plan incorporates a complex series of moves at each step. This often includes a combination of new construction and renovations as well as the vacation and demolition of space in each phase. The goal is to increase the space for each department to meet the projected space need requirements at each horizon as the university grows. Therefore, the goal of phases 1 through 3 is to meet the current need of the overall College of Engineering. Phases 4 and 5 respond to projected needs at the 12,000 and 15,000 student horizons respectively. Likewise, while accommodating the needs of Engineering, the migration plan also accommodated the progression of Mathematics and Physics over the same periods of time.

Program SF by Building				Current		Phase 1		Phase 2		Phase 3		Phase 4		Phase 5
#	Building and Department			Existing Buildings		Islam Building		ACME Building		Brown |Prescott Renovations		12,000 Student Horizon		15,000 Student Horizon
151	**Bruner**													
		Computer Science		9,420	3,652	13,072	6838	19,910		19,910		19,910		27,126
		General & Basic Engineering												1,368
		Engineering Total		**9,420**		**13,072**		**19,910**		**19,910**		**19,910**		**28,494**
		Mathematics		10,490	-3,652	6,838	-6838	Move to Clement						
		Physics		8,584		8,584		8,584		8,584		8,584		Move to Sc. Quad
				28,494		28,494		28,494		28,494		28,494		28,494
152	**Volpe Library**													
		Computer Science		**1,282**		**1,282**		**1,282**		**1,282**		**1,282**		Vacate
154	**East Stadium**													
		Civil and Environmental Engineering		3,844		3,844		Move to ACME						
		Mechanical Engineering		20,749	-5,630	15,119	-15119	To ACME/Presc.						
		Engineering Total		**24,593**		**18,963**		**0**						
191	**MIT Welding**													
		Manufacturing & Engineering Technology		**180**		**180**		demolish						
192	**Foundation**													
		College of Engineering		8,853		8,853	-2914	5,939		5,939		Vacate		
		Mechanical Engineering						2914		2914				
				8,853		**8,853**		**8,853**		**8,853**		**0**		**0**
		Currently Available NSF		**209,608**		**203,304**		**155,240**		**155,004**		**139,243**		**146,545**
PH-1	**New Ashraf Islam Building**													
		College of Engineering				20,975		22,310		22,310		22,310		22,310
		General & Basic Engineering				6,467		6,467		6,467		6,467		6,467
		Chemical Engineering				4,689		4,689		4,689		4,689		4,689
		Civil and Environmental Engineering				4,982		4,982		4,982		4,982		4,982
		Computer Science				5,556		5,556		5,556		5,556		5,556
		Electrical and Computer Engineering				5,969		5,524		5,524		5,524		5,524
		Manufacturing & Engineering Technology				4,777		4,332		4,332		4,332		4,332
		Mechanical Engineering				6,912		6,468		6,468		6,468		6,468
		Cybersecurity Ed., Res. and Outreach Ctr				2,761		2,761		2,761		2,761		2,761
		New Building NSF				**63,088**		**63,088**		**63,088**		**63,088**		**63,088**

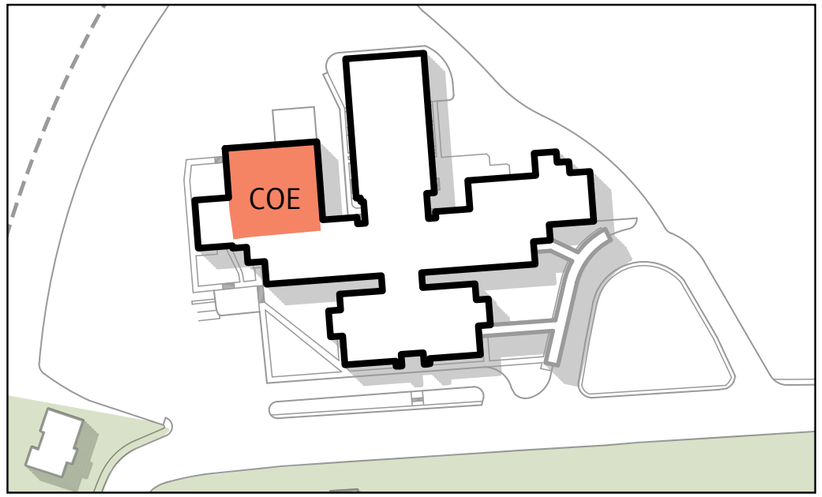
Table 5.2 Engineering Migration Plan

Program SF by Building			Current	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
#		Building and Department	Existing Buildings	Islam Building	ACME Building	Brown |Prescott Renovations	12,000 Student Horizon	15,000 Student Horizon
PH-2	**Advanced Construction and Manufacturing Engineering**							
		College of Engineering			8,800	8,800	8,800	8,800
		Chemical Engineering			1,320	1,320	1,320	1,320
		Civil and Environmental Engineering			8,640	8,640	8,640	8,640
		Electrical and Computer Engineering			600	600	600	600
		Manufacturing & Engineering Technology			23,400	23,400	23,400	23,400
		Mechanical Engineering			6,870	6,870	6,870	6,870
		Center for Manufacturing Research			3,300	3,300	3,300	3,300
		New Building NSF			**52,930**	**52,930**	**52,930**	**52,930**
PH-4	**12,000 Student Horizon Building**							
		College of Engineering					20,159	20,159
		Civil and Environmental Engineering					26,381	26,381
		General & Basic Engineering					7,666	7,666
		Mechanical Engineering					11,839	11,839
		New Building NSF					**66,045**	**66,045**
PH-5	**15,000 Student Horizon Building**							
		College of Engineering						22,302
		General & Basic Engineering						7,666
		Chemical Engineering						3,993
		Mechanical Engineering						9,274
		Center for Manufacturing Research						8,230
		New Building NSF						**51,465**
		Future Available NSF	**209,608**	**266,392**	**271,258**	**271,022**	**321,306**	**380,073**
		Current Space Need	290,684	290,684	290,684	290,684		
		12,000 Student Horizon Need					338,413	
		15,000 Student Horizon Need						380,073
		NSF Surplus/(Deficit)	**(81,076)**	**(24,292)**	**(19,426)**	**(19,662)**	**(17,107)**	**0**
	KEY							
		represents an increase in space or new space						
		represents a decrease in space, vacated space or demolished space						
	#####	**Bold** indicates number used in calculations						

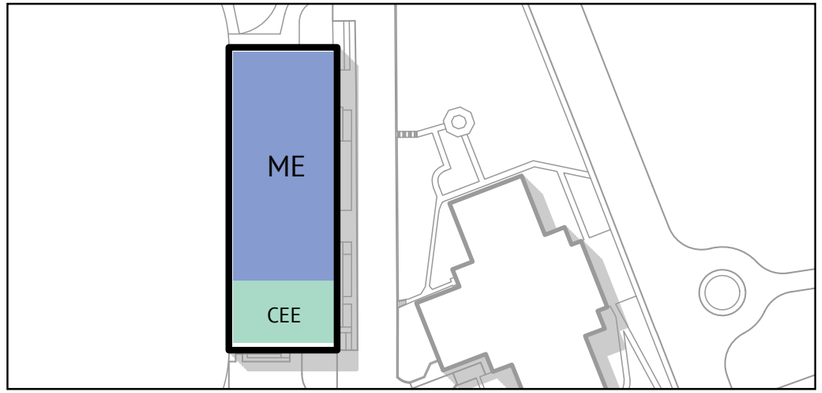
Table 5.2 Engineering Migration Plan



ENGINEERING DEPARTMENTS - PRIMARY DEPARTMENTAL LOCATIONS



FOUNDATION HALL



EAST STADIUM

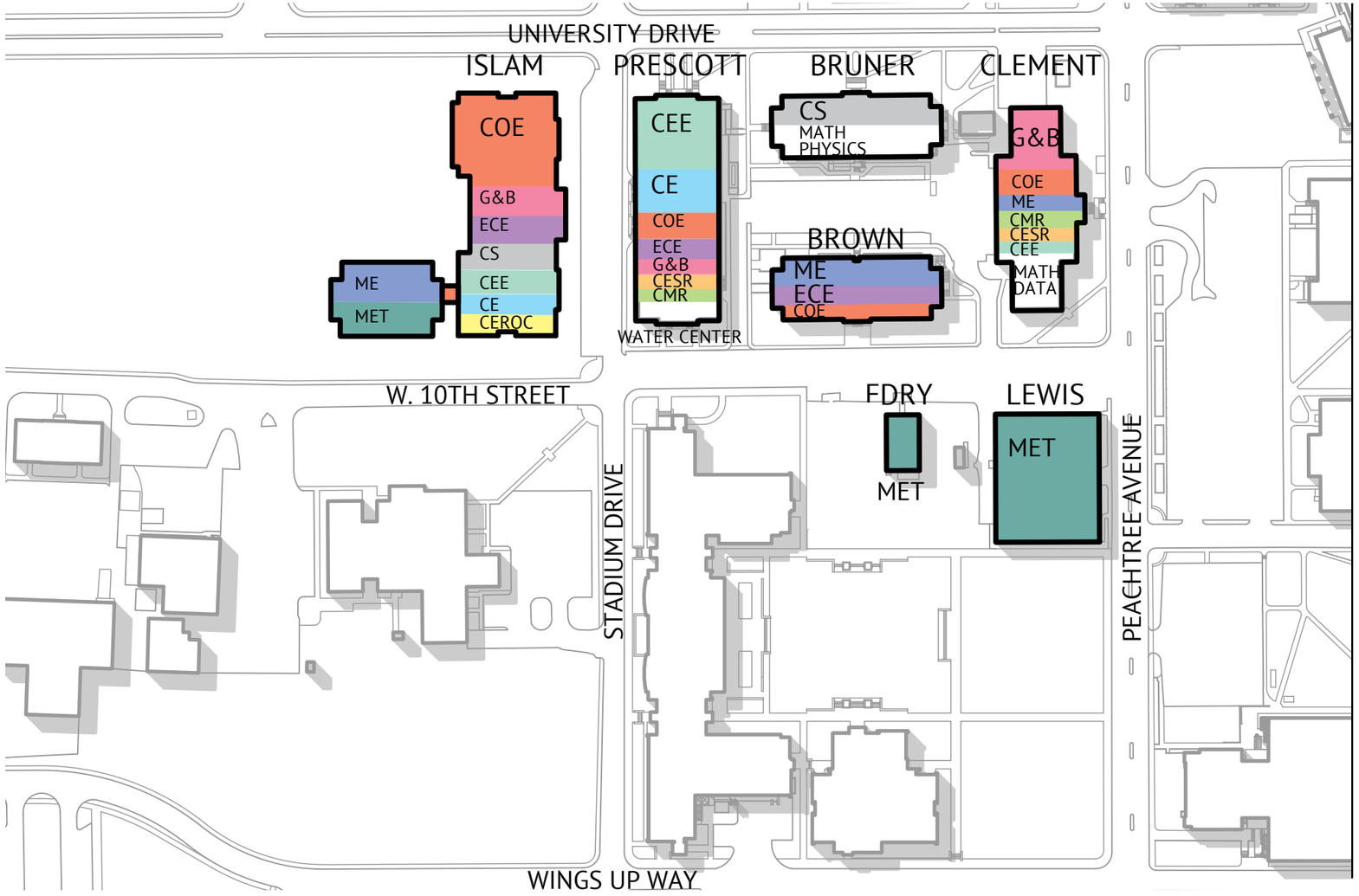
CURRENT

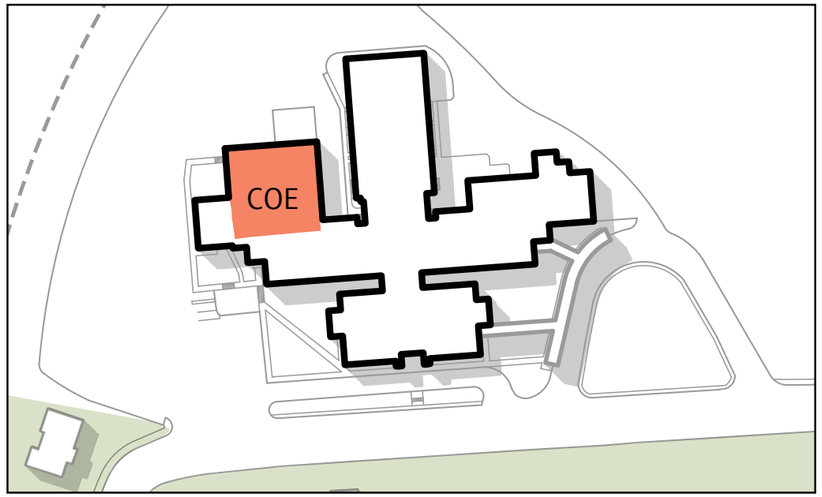
EXISTING BUILDINGS

Figure 5.9 Engineering Migration Plan - Current

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

0' NTS





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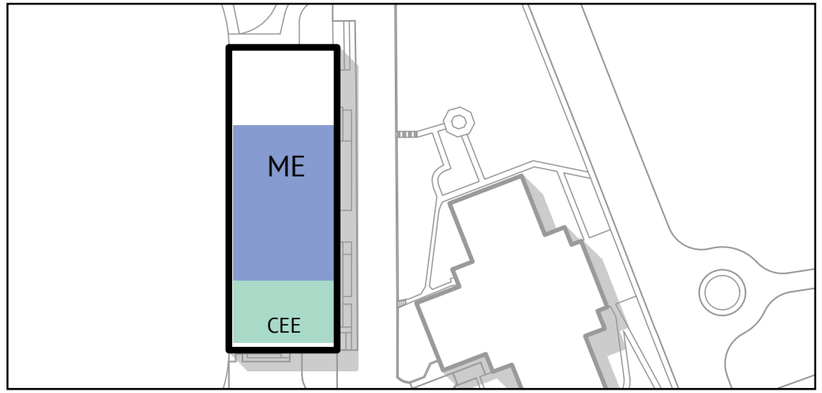


EAST STADIUM

ENGINEERING DEPARTMENTS - PRIMARY DEPARTMENTAL LOCATIONS

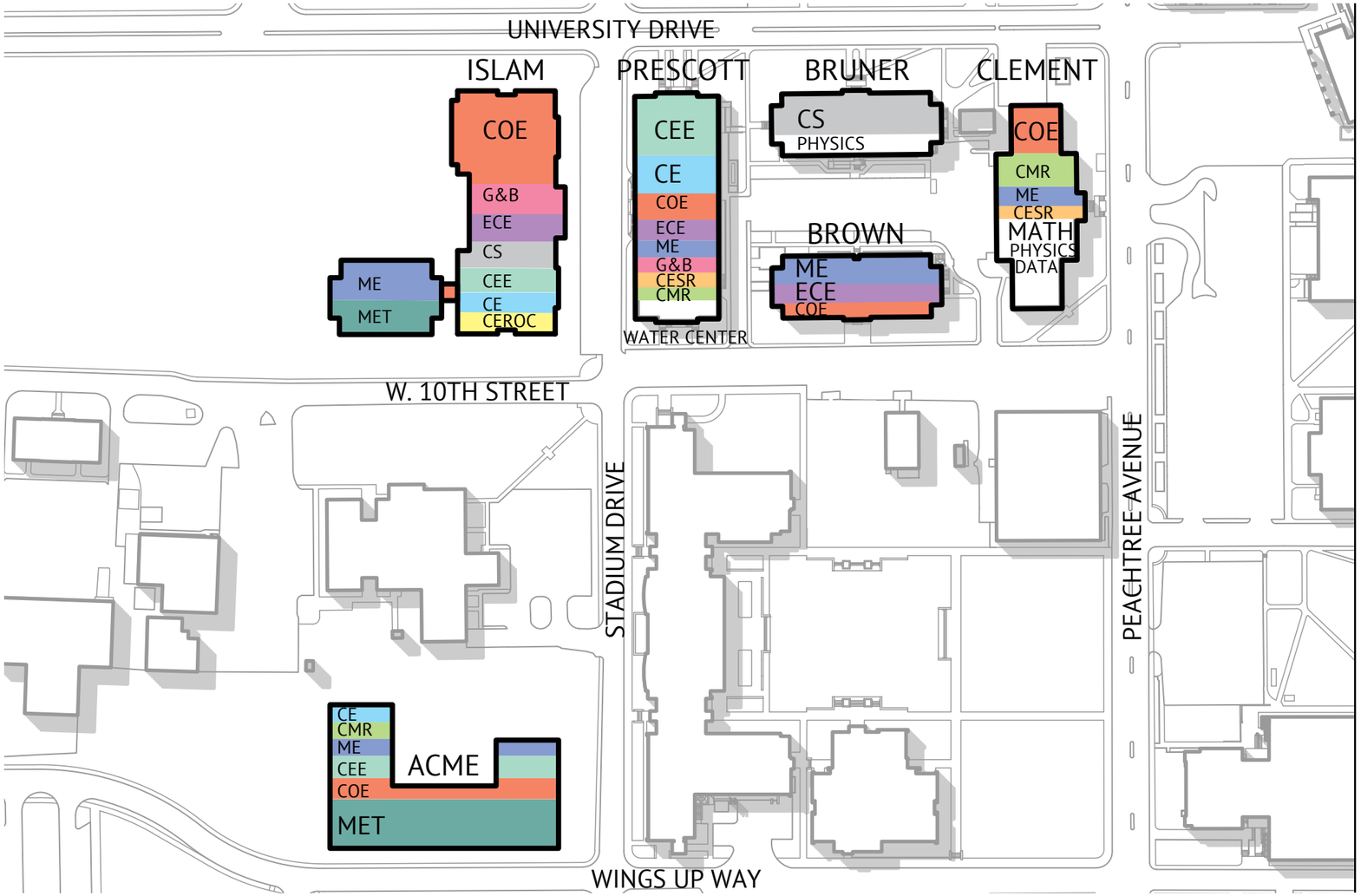
Figure 5.10 Engineering Migration Plan - Phase 1

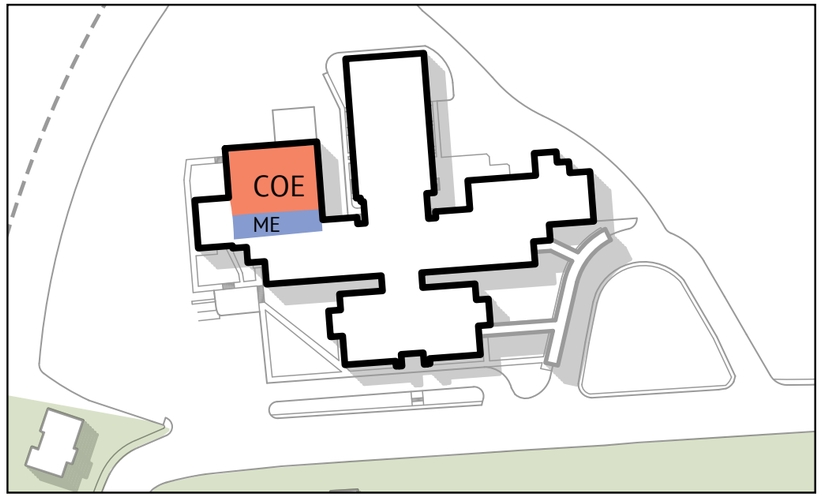
PHASE 1

ISLAM BUILDING

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

0' NTS





FOUNDATION HALL

ENGINEERING DEPARTMENTS - PRIMARY DEPARTMENTAL LOCATIONS

Figure 5.11 Engineering Migration Plan - Phase 2

PHASE 2

ACME BUILDING

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

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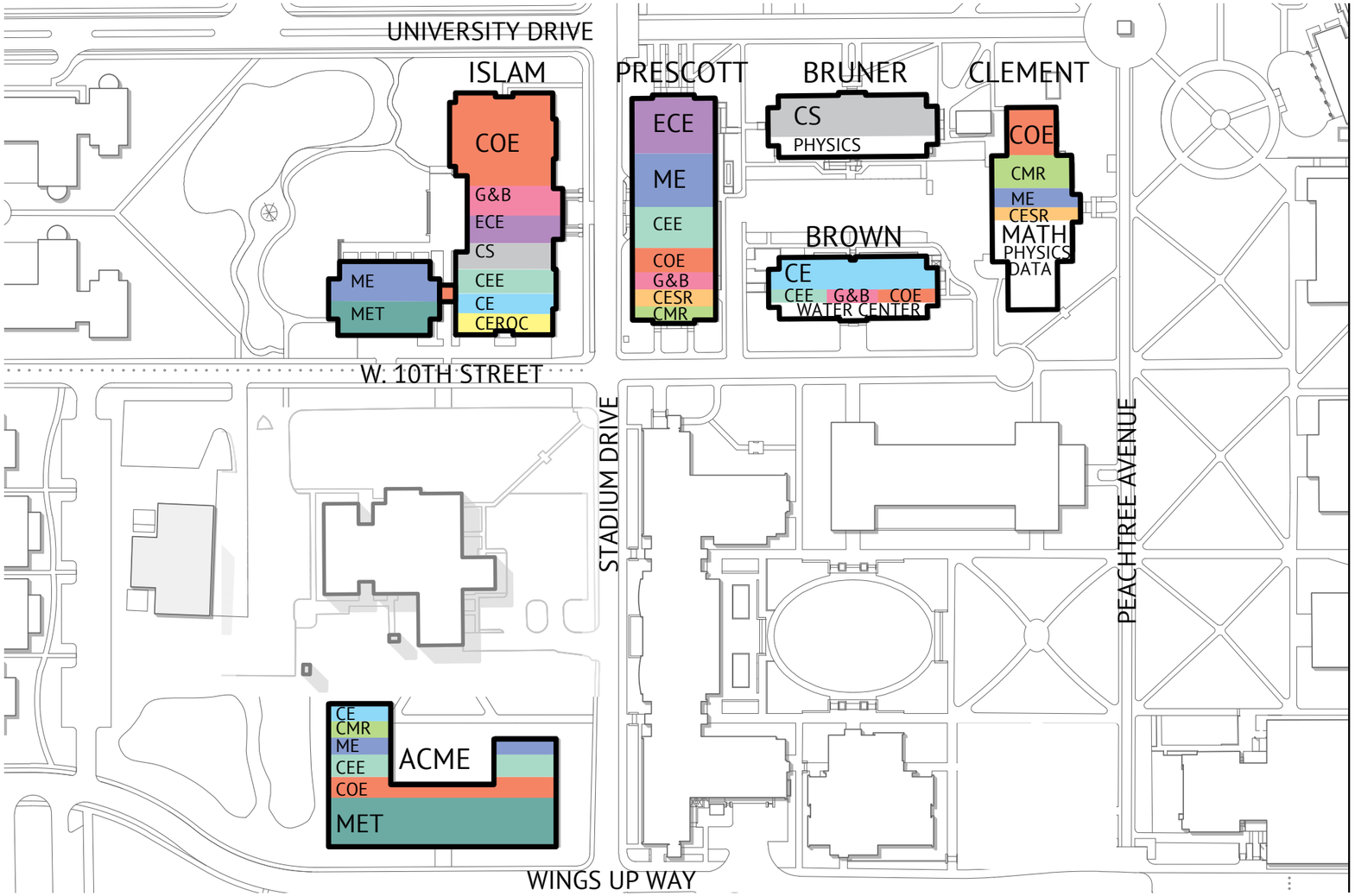

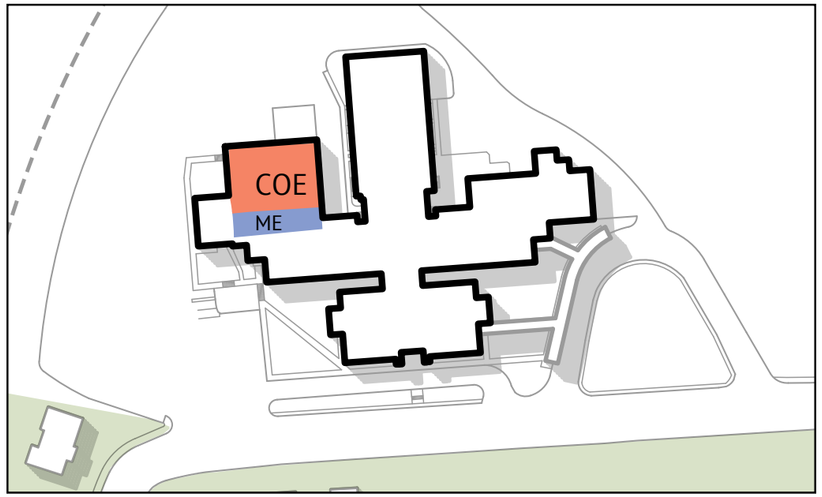

FOUNDATION HALL

ENGINEERING DEPARTMENTS - PRIMARY DEPARTMENTAL LOCATIONS

Figure 5.12 Engineering Migration Plan - Phase3

PHASE 3

BROWN | PRESCOTT RENOVATIONS

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

0' NTS

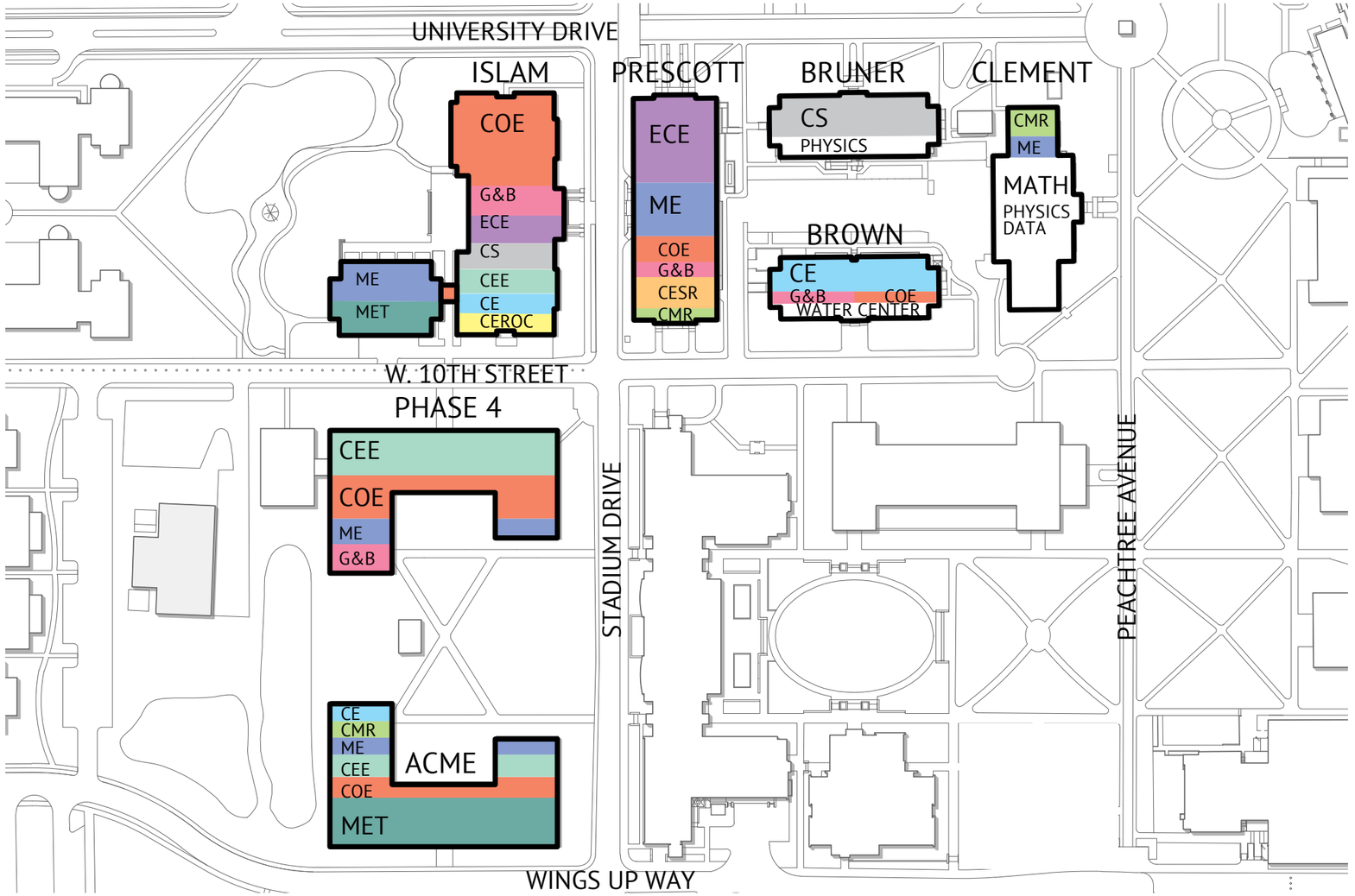

Figure 5.13 Engineering Migration Plan - Phase 4

PHASE 4

12,000 STUDENT HORIZON

ENGINEERING DEPARTMENTS - PRIMARY DEPARTMENTAL LOCATIONS

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

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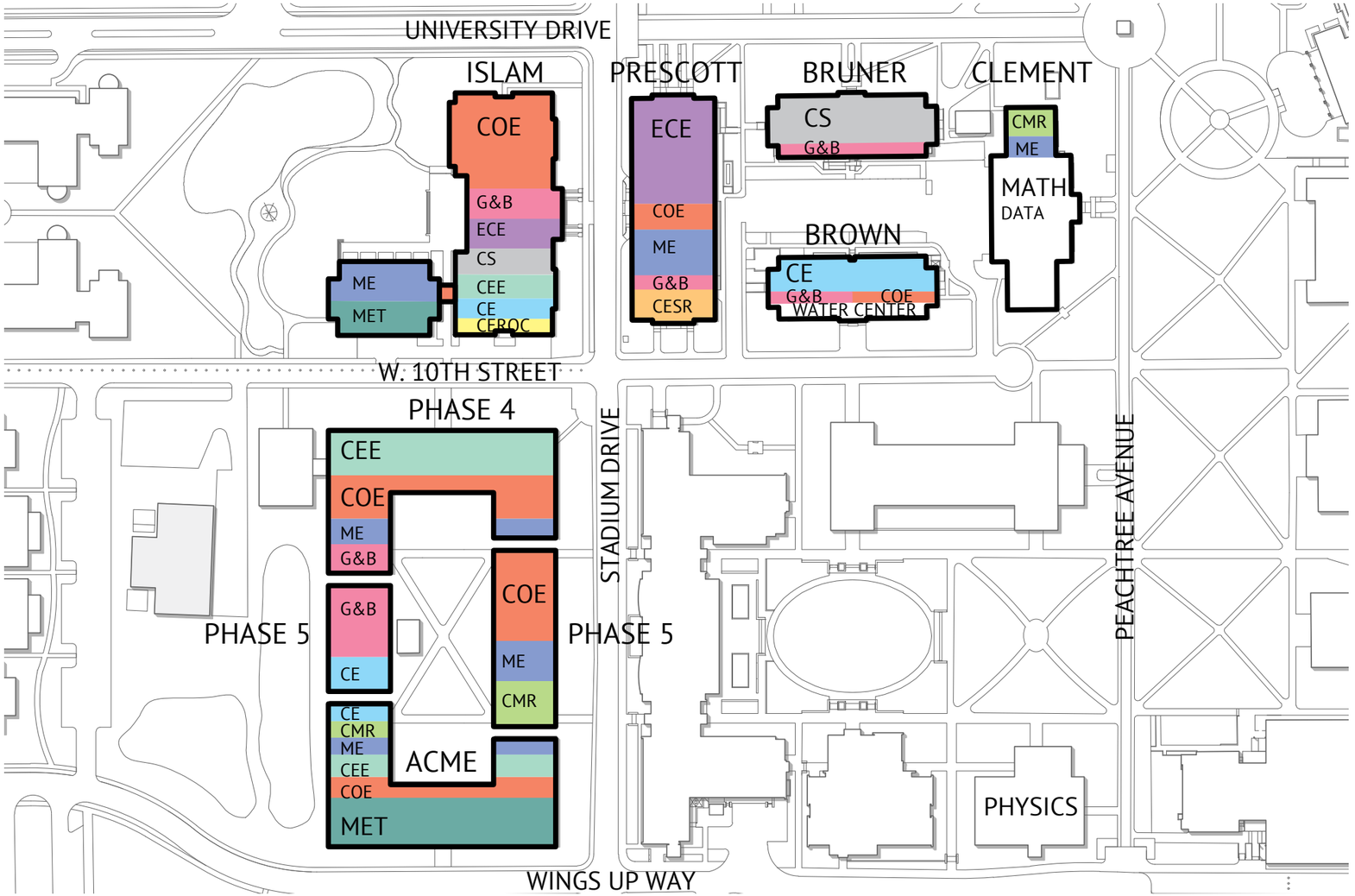

ENGINEERING DEPARTMENTS - PRIMARY DEPARTMENTAL LOCATIONS

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

0' NTS

Figure 5.14 Engineering Migration Plan - Phase 5

PHASE 5

15,000 STUDENT HORIZON

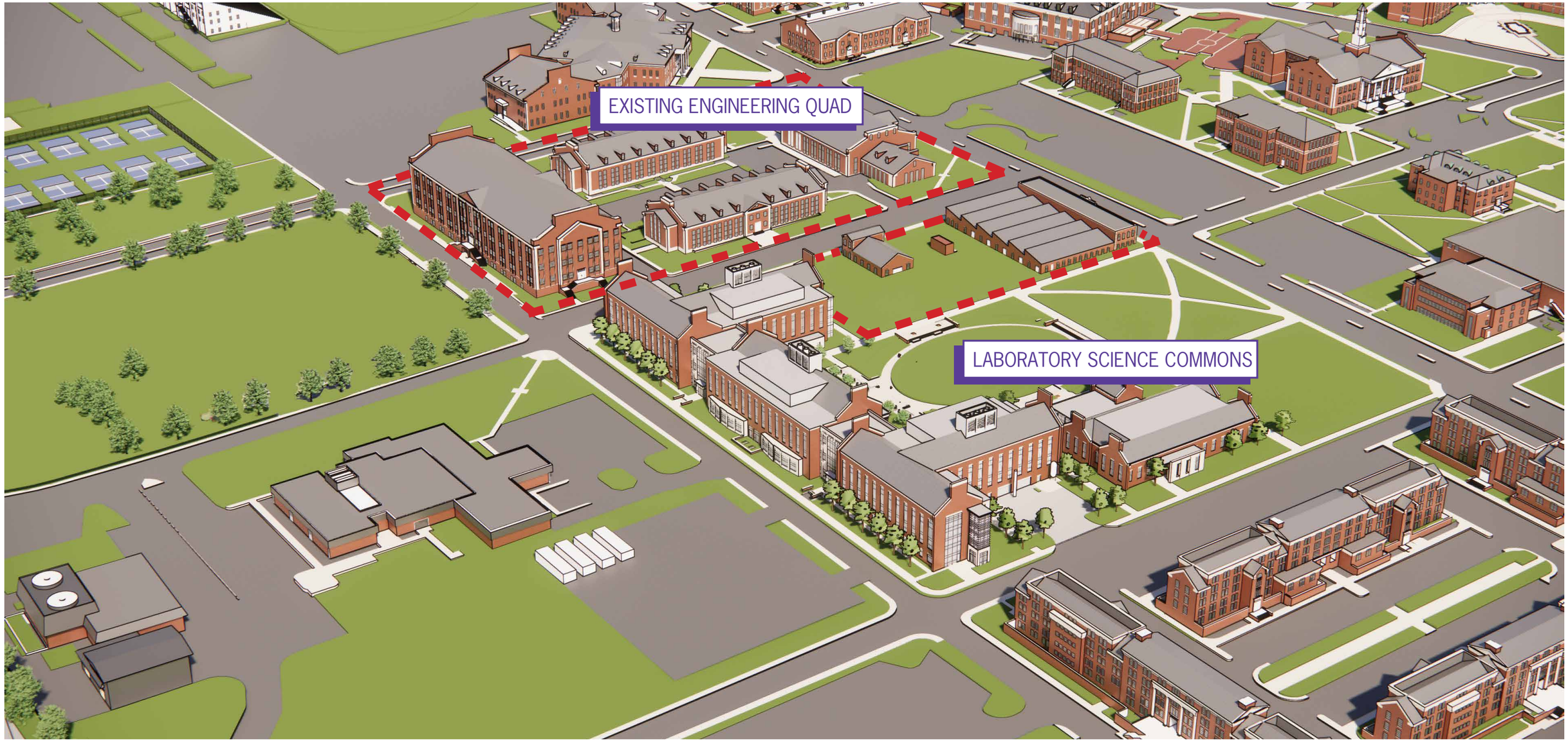

Figure 5.15 Engineering Master Plan Axon - Existing

Figure 5.16 Engineering Master Plan Axon - Phase 1

ASHRAF ISLAM ENGINEERING BUILDING

ENGINEERING MASTER PLAN AXON - PHASE 1

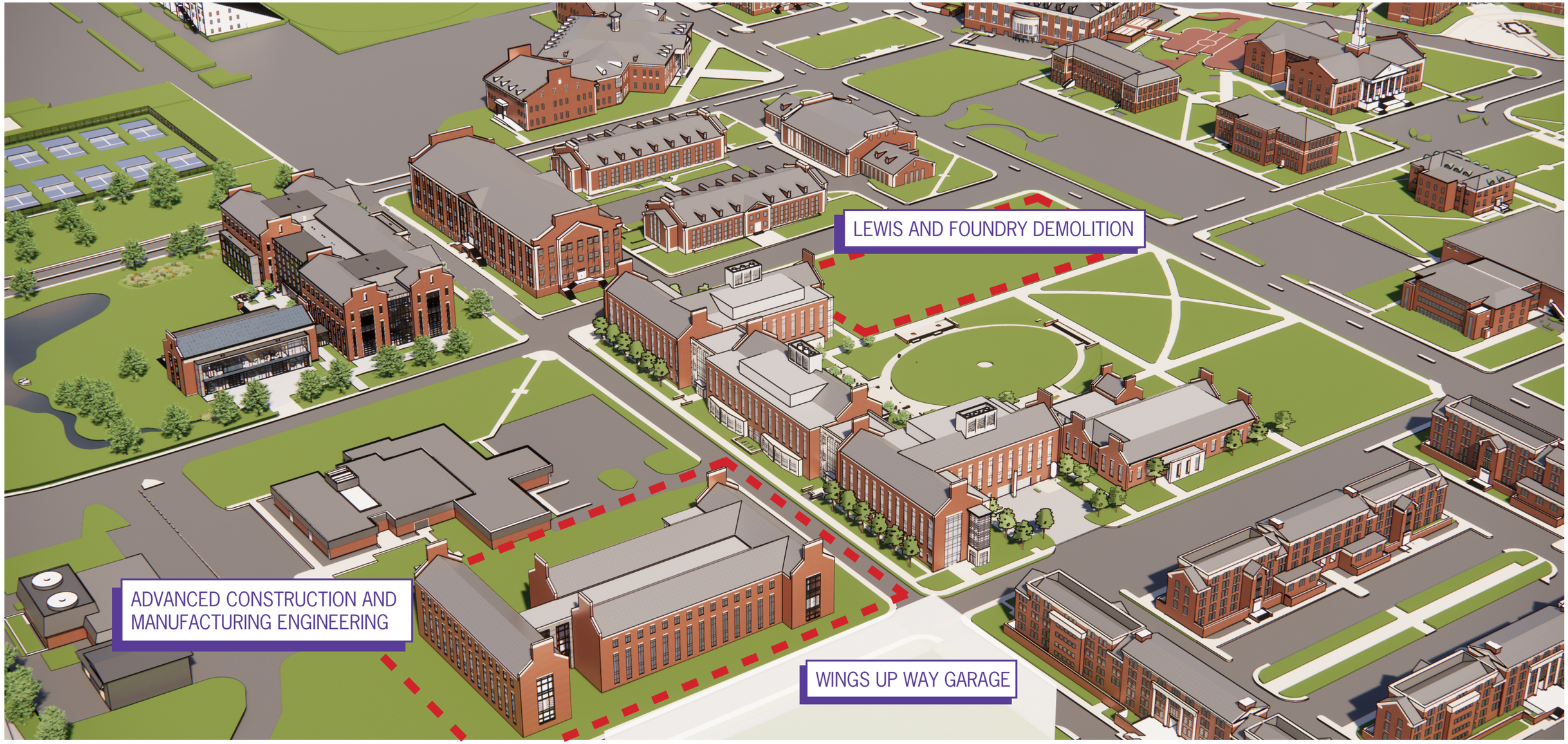

Figure 5.17 Engineering Master Plan Axon - Phase 2

ADVANCED CONSTRUCTION AND MANUFACTURING ENGINEERING BUILDING (ACME)

ENGINEERING MASTER PLAN AXON - PHASE 2

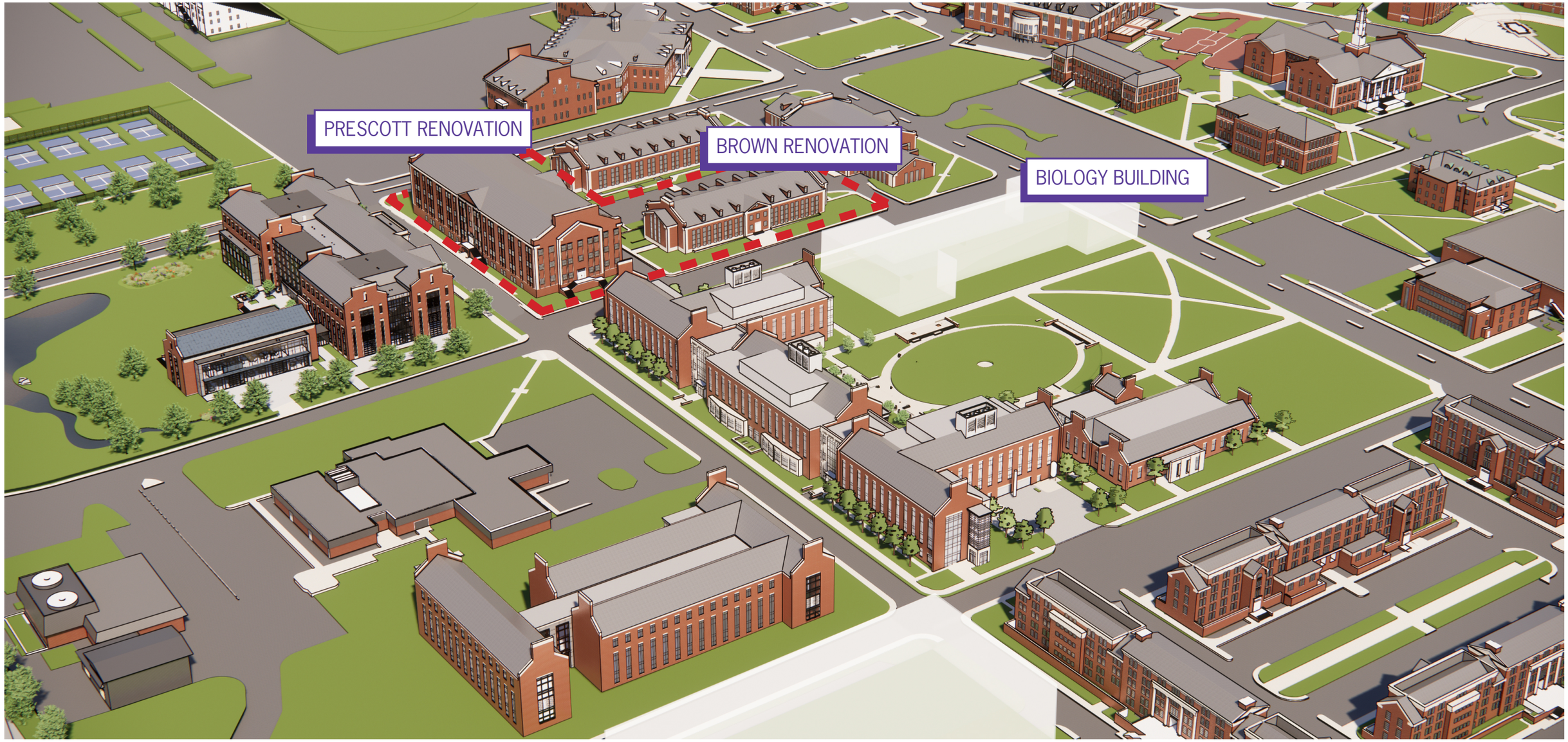

Figure 5.18 Engineering Master Plan Axon - Phase 3

BROWN HALL AND PRESCOTT HALL RENOVATIONS

ENGINEERING MASTER PLAN AXON - PHASE 3

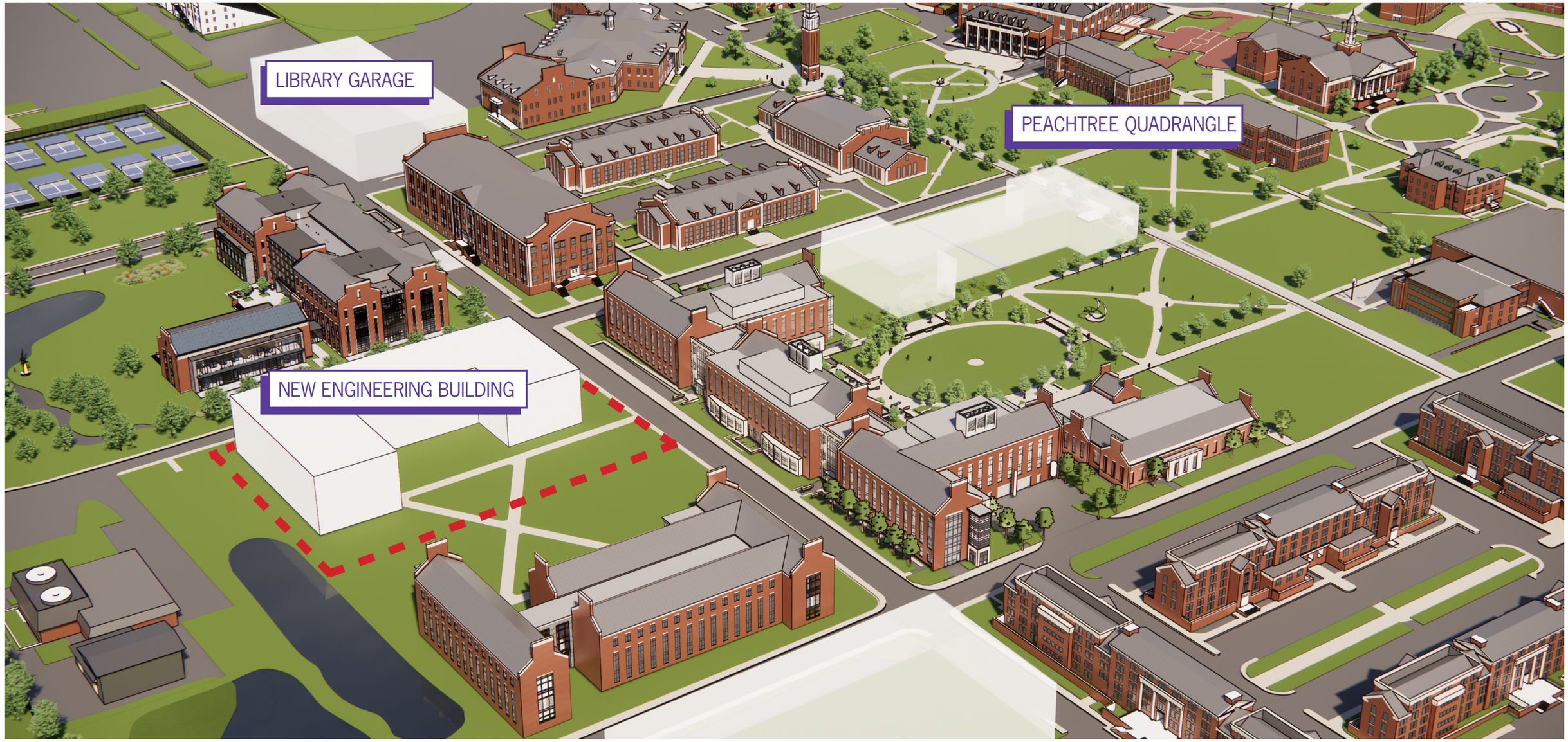

Figure 5.19 Engineering Master Plan Axon - Phase 4

NEW ENGINEERING BUILDING #2 - 12,000 STUDENT HORIZON

ENGINEERING MASTER PLAN AXON - PHASE 4

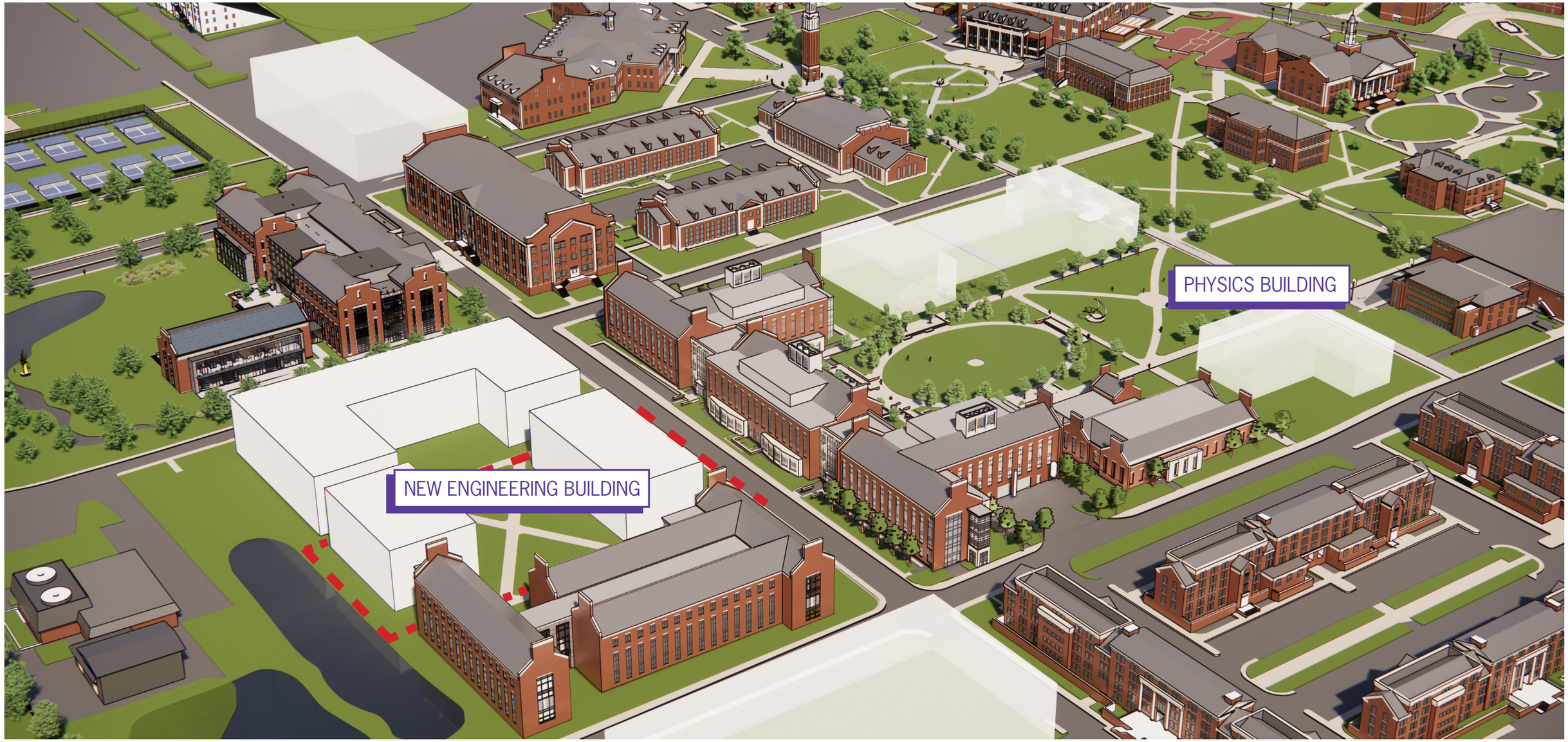

Figure 5.20 Engineering Master Plan Axon - Phase 5

NEW ENGINEERING BUILDING #3 - 15,000 STUDENT HORIZON

ENGINEERING MASTER PLAN AXON - PHASE 5

TENNESSEE TECH UNIVERSITY

APPENDIX

ENGINEERING MASTER PLAN

APPENDIX

The Engineering Master Plan appendix includes three supplemental items:

1. Advanced Construction and Manufacturing Building Program
The program summary for the Phase II- ACME building outlines the needs to accommodate the relocation of Advanced Manufacturing and the Foundry. It also includes the consolidation of the shop spaces throughout the college as well as various Mechanical (ME), College (COE) and Civil and Environmental (CEE) Labs.

2. Classroom Utilization Analysis
The analysis presents the utilization data for the classrooms in the college (Fall 2019- Pre-COVID). Per THEC guidelines, the target for classroom utilization is 60% and for usage is 30 hr/week. The classrooms shaded blue are envisioned to be replaced by classroom (Adaptive Learning Labs) in the new Ashraf Islam Engineering Building. The classrooms shaded red are underutilized classrooms that could be repurposed for other functions. These comments particularly apply to the classrooms within Prescott Hall and Brown Hall. The classroom usage should be considered as these buildings are reprogrammed for Phase III.

3. Floor by floor migration areas
The floor plans for each building with engineering spaces are presented with the current usage. The floor by floor migration areas are outlined for Phase I (Islam) and Phase II (ACME). Refer to the migration plan spreadsheet and overall building diagrams within the master plan for detailed space assignments at each phase.

Tennessee Tech University

Advanced Construction & Manufacturing Engineering Building

Program Space

Prog. #	Use Code	Use	Room Name	Qty	Cap	SF/	SF/Sp	Total SF
Manufacturing and Engineering Technology								
101	110	Manuf. Eng. Technology- MET	Classroom	1	40	20	800	800
102	210	Manuf. Eng. Technology- MET	Robotics	1	24	50	1200	1200
103	210	Manuf. Eng. Technology- MET	Computer Lab	1	40	20	800	800
104	210	Manuf. Eng. Technology- MET	Advanced Manufacturing	1	24	60	1440	1440
105	210	Manuf. Eng. Technology- MET	Electronics Lab				0	0
106	210	Manuf. Eng. Technology- MET	PLC Lab	1	24	50	1200	1200
107	310	Manuf. Eng. Technology- MET	Faculty- Chair	1	1	150	150	150
108	310	Manuf. Eng. Technology- MET	Faculty	4	1	150	150	600
109	310	Manuf. Eng. Technology- MET	Instructors	3	1	100	100	300
110	310	Manuf. Eng. Technology- MET	Adjunct Faculty	4	1	100	100	400
111	310	Manuf. Eng. Technology- MET	Lab Technician	1	1	100	100	100
112	310	Manuf. Eng. Technology- MET	Engineer	2	1	130	130	260
113	310	Manuf. Eng. Technology- MET	Department Office	1	1	240	240	240
114	310	Manuf. Eng. Technology- MET	Clerical	2	1	100	100	200
115	310	Manuf. Eng. Technology- MET	Student Workers	1	14	10	140	140
116	315	Manuf. Eng. Technology- MET	Workroom	1	5	50	250	250
117	315	Manuf. Eng. Technology- MET	File | Storage	1	5	50	250	250
118	315	Manuf. Eng. Technology- MET	Department Lounge	1	6	30	180	180
119	350	Manuf. Eng. Technology- MET	Conference Room	1	10	25	250	250
120	410	Manuf. Eng. Technology- MET	Collaboration- Small Group	10	6	25	150	1500
								10,260
Foundry								
130	210	Foundry	Casting Lab/Foundry	1	24	125	3000	3000
131	210	Foundry	Green Sand Lab	1	1	800	800	800
132	210	Foundry	Die Cast Lab	1	1	400	400	400
133	310	Foundry	Technician Office	1	1	120	120	120
134	215	Foundry	Material Storage	3	1	300	300	900
135	215	Foundry	Tool Storage	1	1	600	600	600
								5820
Fabrication								
140	210	Manuf. Eng. Technology- MET	Fabrication Lab	1	120	60	7200	7200
141	215	Manuf. Eng. Technology- MET	Material Storage	1	1	300	300	300
142	215	Manuf. Eng. Technology- MET	Equipment Storage	1	1	300	300	300
143	215	Manuf. Eng. Technology- MET	Prototyping	1	1	300	300	300
144	310	Manuf. Eng. Technology- MET	Technician's Office	0	1	100	100	0
								8100

Prog. #	Use Code	Use	Room Name	Qty	Cap	SF/	SF/Sp	Total SF
Material Formulation Lab								
150	210	Civil & Environmental	Material Formulation Lab	1	30	100	3000	3000
151	215	Civil & Environmental	Moist Room	1	1	150	150	150
152	215	Civil & Environmental	Abrasion Testing	1	1	150	150	150
153	215	Civil & Environmental	Material Storage	1	1	300	300	300
154	215	Civil & Environmental	Equipment Storage	1	1	300	300	300
								3900
Load Frame - Tensile Testing Lab								
160	210	Civil & Environmental	Tensile Testing Lab	1	20	100	2000	2000
161	220	Civil & Environmental	Lab Support	1	1	600	600	600
162	215	Civil & Environmental	Material Storage	1	1	300	300	300
163	215	Civil & Environmental	Instrument Storage	1	1	600	600	600
								3500
Material Characterization Lab								
170	210	College of Engineeering	Material Characterization Lab	1	20	100	2000	2000
171	215	College of Engineeering	Material Storage	1	1	600	600	600
								2600
Machine Shop								
180	220	Mech./MET/Chem./C&E/E&CS	Engineering Machine Shop	1	120	100	12,000	12,000
181	225	Mech./MET/Chem./C&E/E&CS	Tool Storage	1	1	600	600	600
182	225	Mech./MET/Chem./C&E/E&CS	Material Storage	1	1	600	600	600
								13,200
Engine Lab								
190	210	Mechanical	Engine Lab	1	20	50	1000	1000
191	210	Mechanical	Dynamometer	1	8	50	400	400
192	215	Mechanical	Equipment Storage	1	1	150	150	150
								1550
HVAC Lab								
200	210	Mechanical	Advanced HVAC lab	1	20	200	4000	4000
								4000
				Net SF Subtotal				**52,930**
				Grossing multiplier				1.51
				Gross SF Total				**79,924**
				Net/Gross Efficiency				66.23%

Table 5.3 ACME Building Program

Building	Room	FICM	Description	NASF	Stations	NASF /Station	Scheduled Sections	Mean Section size	% Station Utilization	Usage Hrs/Week		contact hrs	Comments / Proposed
Brown Hall	208	110	Classroom	754	37	20.4	3	7.7	21%	6.0		23.1	Eliminate 4 classrooms
Brown Hall	236	110	Classroom	802	40	20.1	9	19.3	48%	21.5		173.7	Move 2 classrooms to NEB
Brown Hall	237	110	Classroom	909	45	20.2	3	42.7	95%	9.0		128.1	revise classrooms to Collaborative/ G&B
Brown Hall	241	110	Classroom	754	37	20.4	2	14.5	39%	6.0		29.0	
Brown Hall	303	110	Classroom	774	38	20.4	9	14.3	38%	19.0		128.7	
Brown Hall	307	110	Classroom	774	38	20.4	3	25.0	66%	7.5		75.0	Converted to Measurements Lab 2021
Brown Hall	314	110	Classroom	764	38	20.1	8	16.9	44%	16.5		135.2	
Brown Hall	315	110	Classroom	1228	49	25.1	12	50.1	102%	32.5		601.2	
Brown Hall	320	110	Classroom	1008	49	20.6	10	29.8	61%	23.5		298.0	
Brown Hall	321	110	Classroom	756	37	20.4	7	14.7	40%	15.5		102.9	
Brown Hall	326	110	Classroom	766	38	20.2	2	27.5	72%	4.5		55.0	
				9289	**446**	**20.8**	**68**	**25.7**	**63%**	**14.7**		**1749.9**	
					40.5					161.5			
Clement Hall	212	110	Classroom	2539	126	20.2	16	79.3	63%	34.0		1268.8	Move 1 classroom to NEB
Clement Hall	410	110	Classroom	1076	49	22.0	9	22.2	45%	20.0		199.8	
				3615	**175**	**20.7**	**25**	**58.7**	**67%**	**27.0**		**1468.6**	
					87.5					54.0			
Lewis Hall	101	110	Classroom	869	43	20.2	11	26.7	62%	19.8		293.7	Eliminate 1 (or 2) classrooms
Lewis Hall	111	110	Classroom	706	35	20.2	2	19.0	54%	4.0		38.0	
Lewis Hall	201	110	Classroom	659	32	20.6	5	28.6	89%	6.0		143.0	
				2234	**110**	**20.3**	**18**	**26.4**	**72%**	**9.9**		**474.7**	
					36.7					29.8			
Prescott Hall	203	110	Classroom	816	40	20.4	6	15.7	39%	14.0		94.2	Eliminate 3 classrooms
Prescott Hall	204	110	Classroom	780	39	20.0	5	7.8	20%	10.0		39.0	revise classrooms to Collaborative/ G&B
Prescott Hall	205	110	Classroom	998	49	20.4	7	25.3	52%	12.5		177.1	
Prescott Hall	208	110	Classroom	749	37	20.2	7	19.0	51%	17.0		133.0	
Prescott Hall	215	110	Classroom	2491	350	7.1	14	66.4	19%	35.0		929.6	Move 2 classrooms to NEB
Prescott Hall	222	110	Classroom	750	37	20.3	10	22.5	61%	26.0		225.0	
Prescott Hall	226	110	Classroom	780	39	20.0	6	15.0	38%	13.0		90.0	
Prescott Hall	313	110	Classroom	916	45	20.4	6	21.0	47%	14.0		126.0	Converted to BIM Lab
Prescott Hall	325	110	Classroom	725	36	20.1	6	16.0	44%	14.5		96.0	
Prescott Hall	330	110	Classroom	985	49	20.1	9	38.0	78%	22.0		342.0	
Prescott Hall	425	110	Classroom	725	36	20.1	4	18.8	52%	12.0		75.2	
				10715	**757**	**14.2**	**80**	**29.1**	**42%**	**17.3**		**2327.1**	
					68.8					190.0			
College Wide Totals			**27**	**25,853**	**1488**	**17.4**	**191**	**31.5**		**16.1**		**6020.3**	
					55.1								
University Wide Totals			**150**	**139,086**	**6972.0**	**22**	**1132**	**30.9**	**63%**	**18.7**			

New and Renovated Engineering Classrooms

Building	Room	FICM	Description	NASF	Stations	NASF /Station	Scheduled Sections	Mean Section size	% Station Utilization	Usage Hrs/Week
Bruner Hall	209	110	Classroom	877						30
Bruner Hall	228	110	Classroom	1783						30
Bruner Hall	327	110	Classroom	983						30
Bruner Hall	410	110	Classroom	853						30
				4496						
Islam Bldg.	130	110		3530	126	28.0				30
Islam Bldg.	244	110		1733	66	26.3				30
Islam Bldg.	249	110		1747	66	26.5				30
Islam Bldg.	354	110		1404	48	29.3				30
Islam Bldg.	361	110		1405	48	29.3				30
				9819	354					

Classroom Analysis

Currently the University has enough Classroom capacity to serve the 15,000 campus

Current COE Enrollment	2517			
Enrollment @ 12,000	2811	112%	1.20 Median	
Enrollment @ 15,000	3235	129%		
Optimum Classroom Usage /week		30		
Optimum % Station Utilization		60%	Lecture Style	
Projected Optium % Utilization		80%	Collaborative	
NASF/Station		18-21	Lecture Style	
NASF/Station		25-28	Collaborative	

Proposed Moves

Utilize NEB classrooms and reassign existing classrooms being replaced

125 to 150 Usage hours available — 132.5 proposed relocations

Reduce underutilized Classrooms and assign to other functions

Renovate remaining existing classrooms to collaborative format

	Usage Hours	
Brown Hall	161.5	
	9.0	minus large relocated Classroom
	32.5	minus large relocated Classroom
	120.0	
	25	Median- 13,500
	4.8	classrooms needed
Clement Hall	54.0	
	34.0	minus large relocated Classroom
	20	
	25	Median- 13,500
	0.8	classrooms needed
Lewis Hall	29.8	
	25	Median- 13,500
	1.192	classrooms needed
Prescott Hall	190.0	
	35.0	minus large relocated Classroom
	22.0	minus large relocated Classroom
	133.0	
	25	Median- 13,500
	5.32	classrooms needed

Table 5.4 Engineering Classroom Utilization Analysis

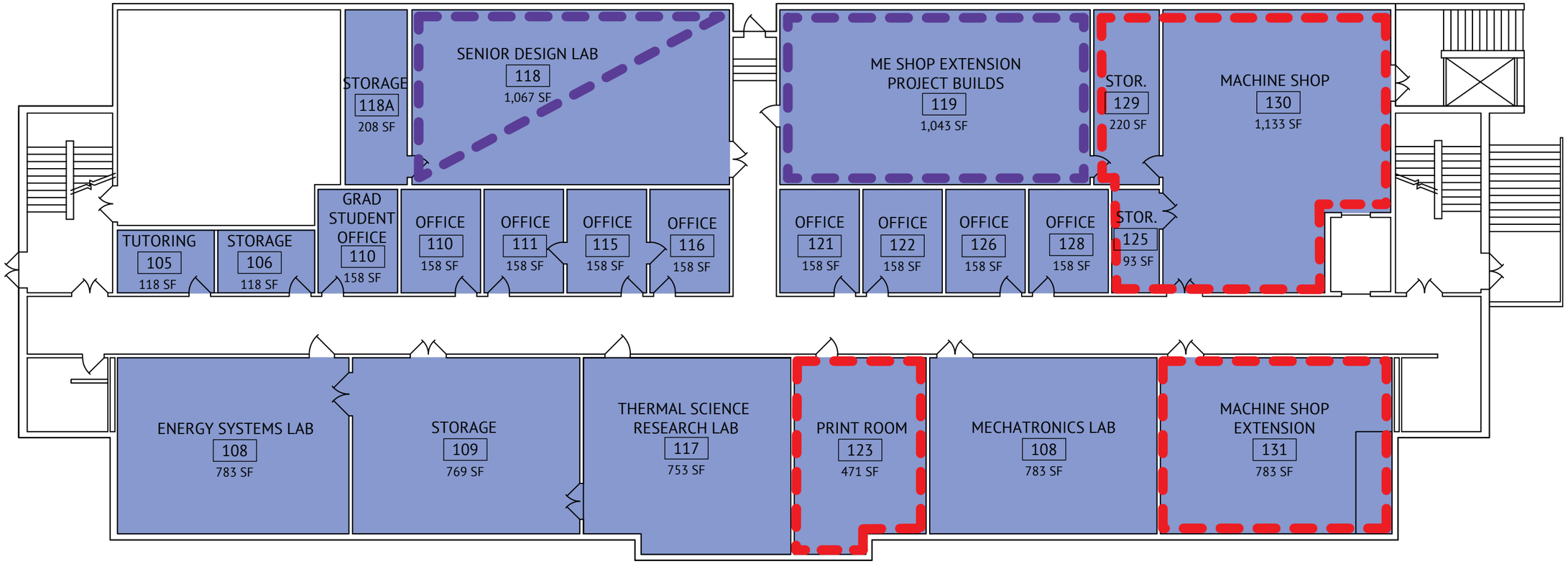

Figure 5.21 Brown Hall First Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

BROWN HALL - FIRST FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

- SPACES TO BE MOVED TO ISLAM BUILDING
- SPACES TO BE MOVED TO ACME BUILDING
- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

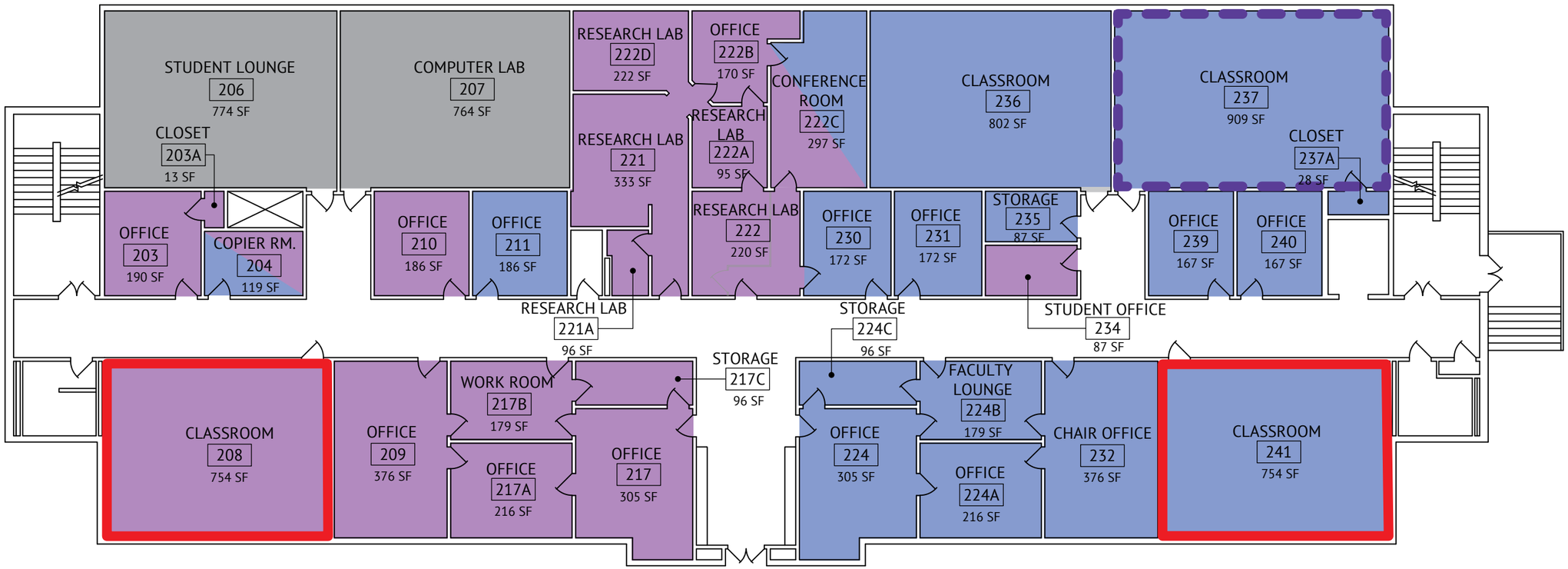

Figure 5.22 Brown Hall Second Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

BROWN HALL - SECOND FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
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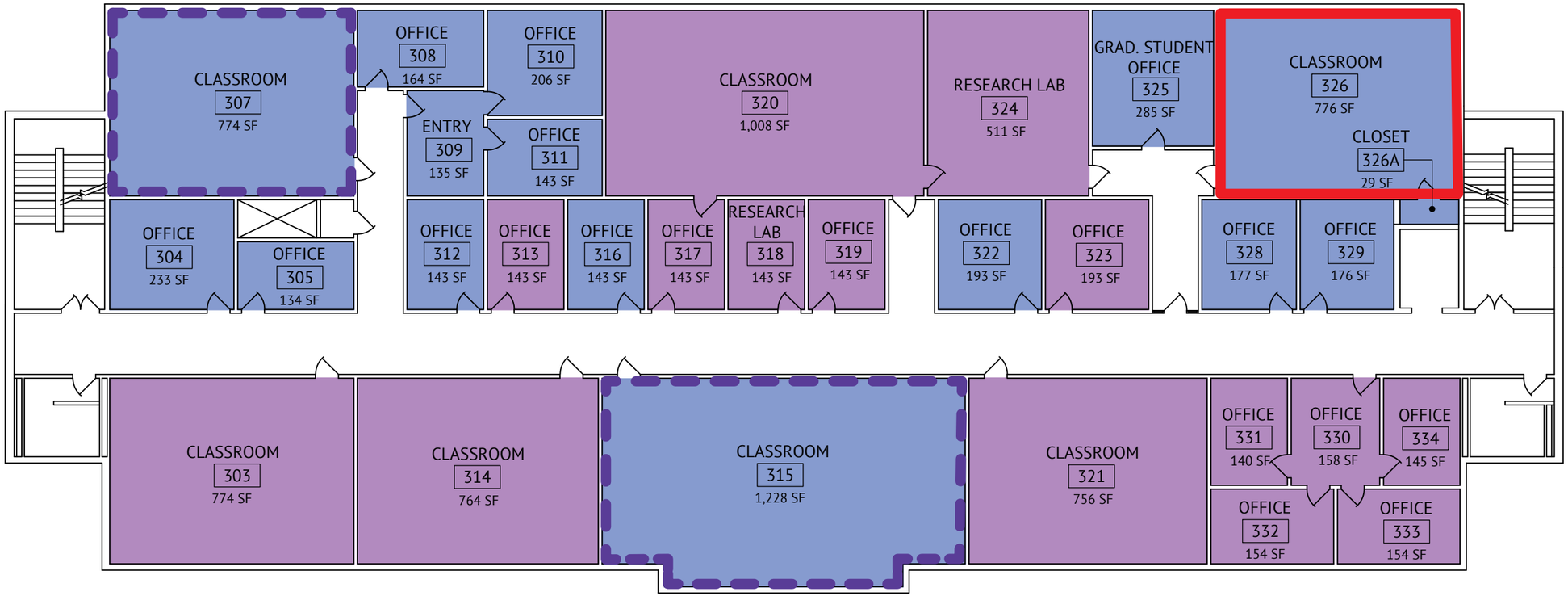

Figure 5.23 Brown Hall Third Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

BROWN HALL - THIRD FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
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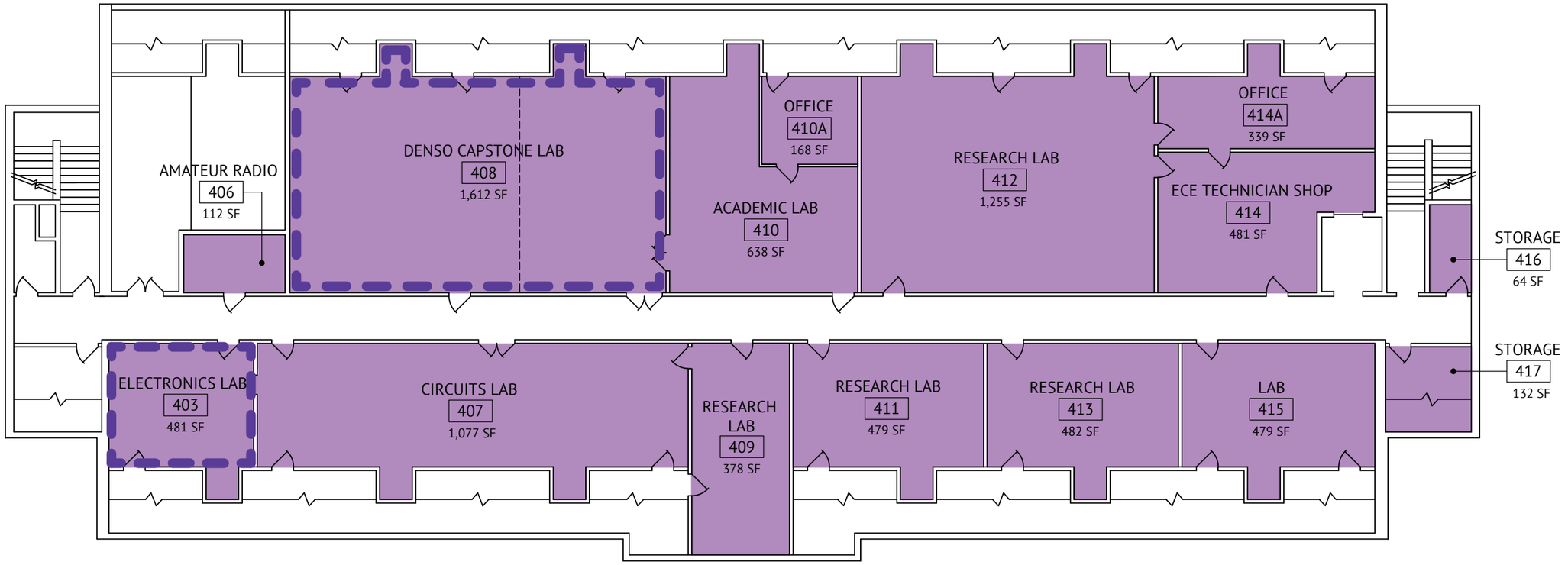

Figure 5.24 Brown Hall Fourth Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

BROWN HALL - FOURTH FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
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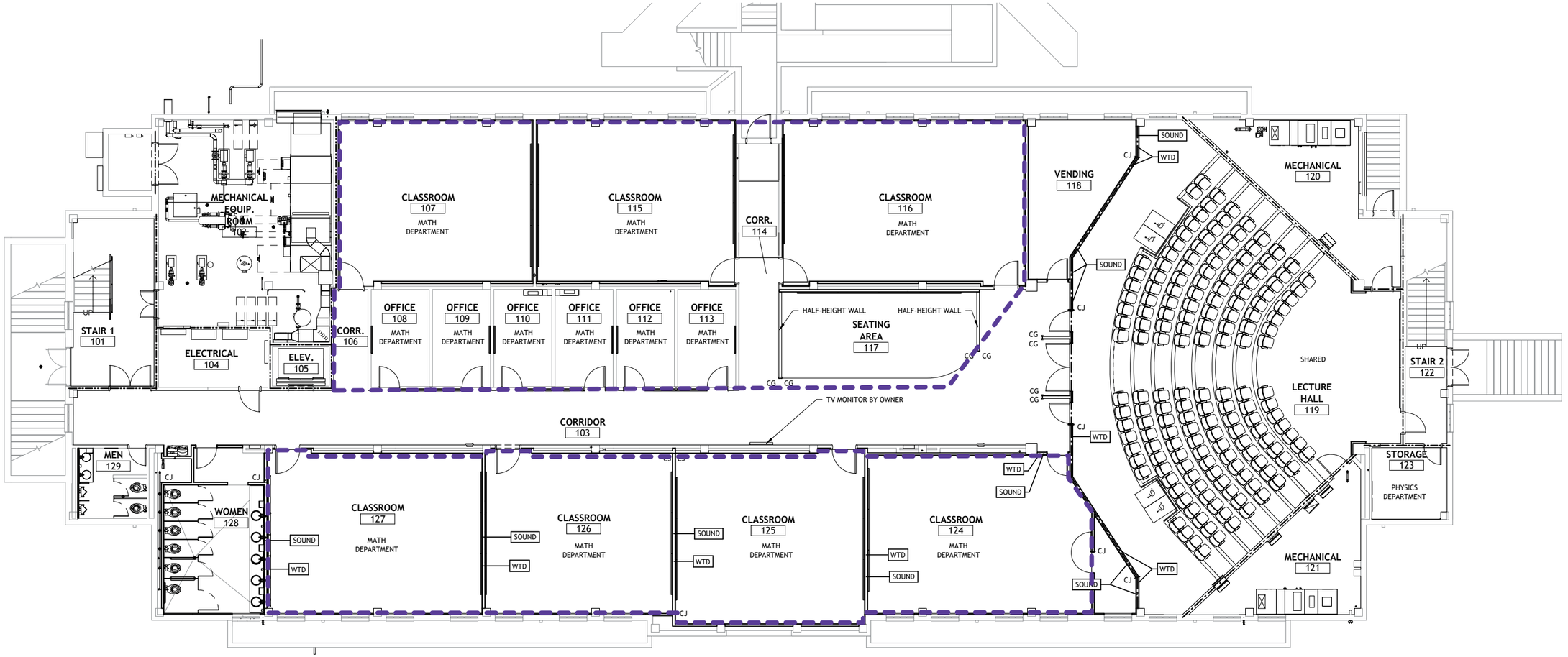

Figure 5.25 Bruner Hall First Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

BRUNER HALL - FIRST FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
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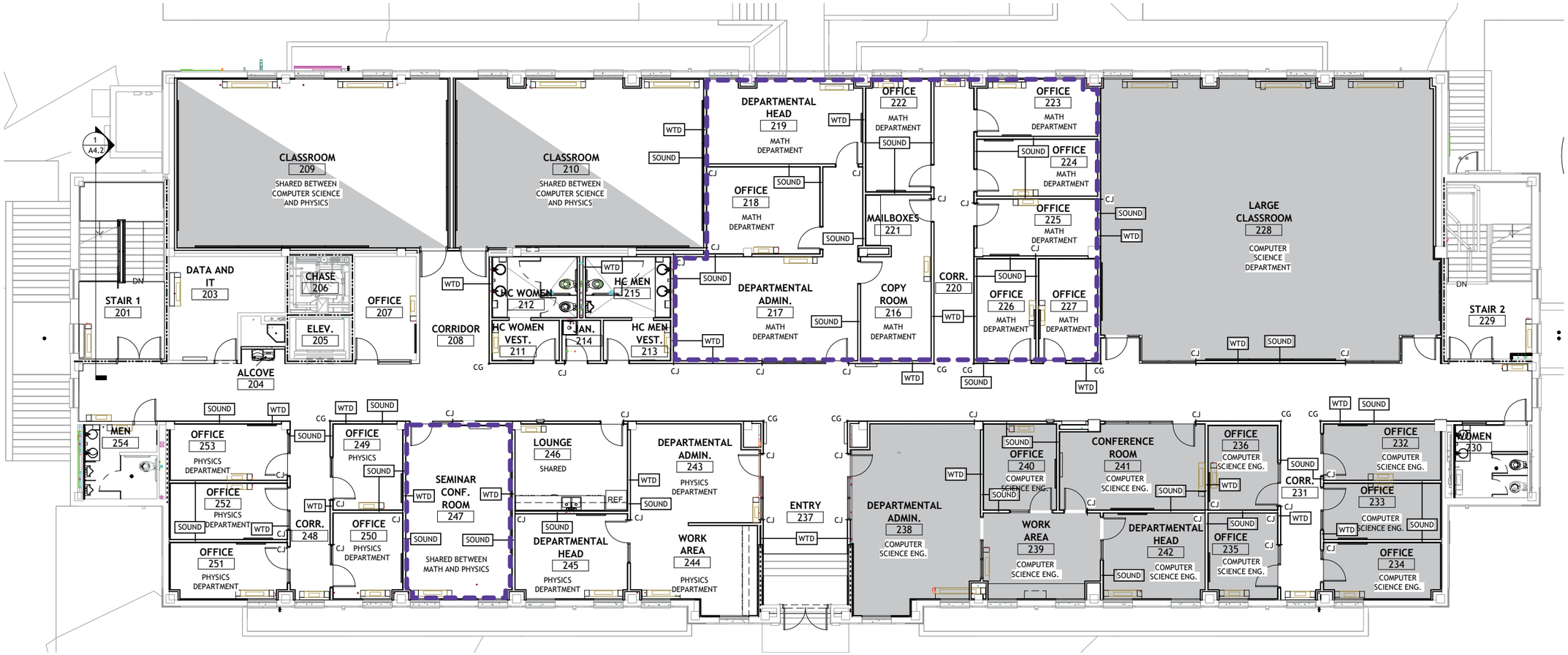

Figure 5.26 Bruner Hall Second Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

BRUNER HALL - SECOND FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
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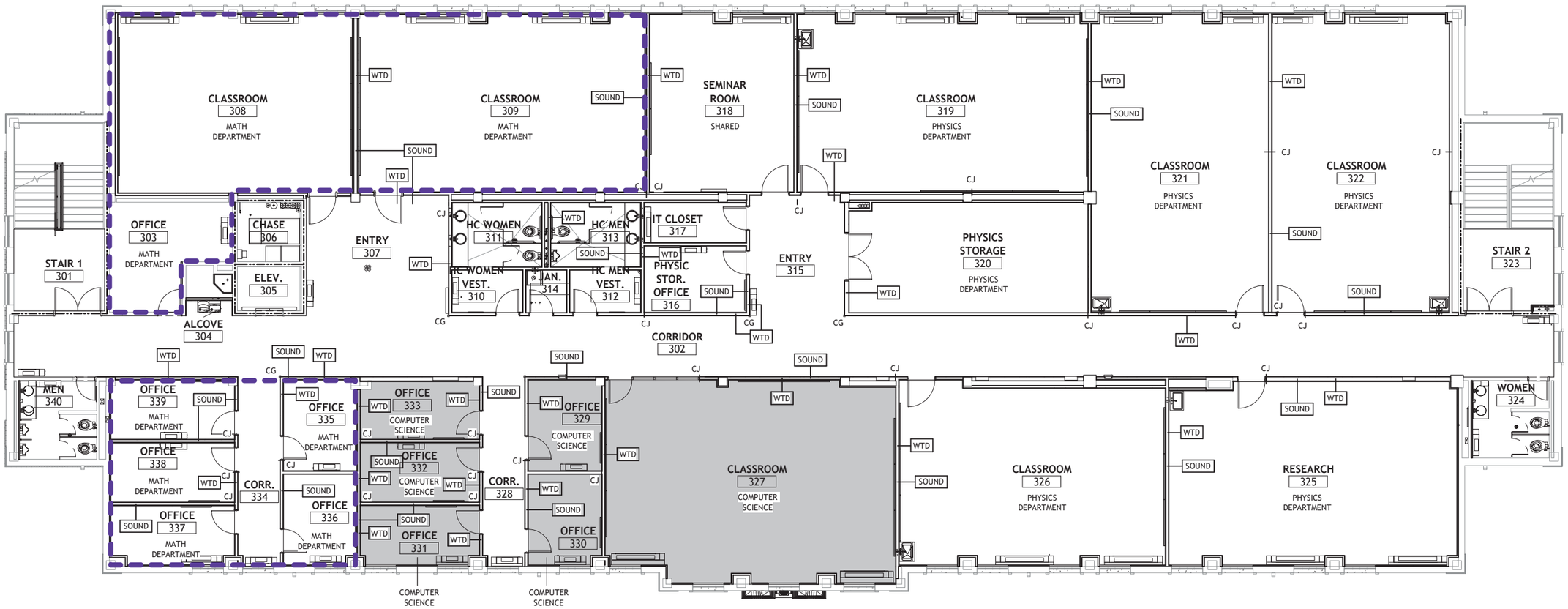

Figure 5.27 Bruner Hall Third Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

BRUNER HALL - THIRD FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
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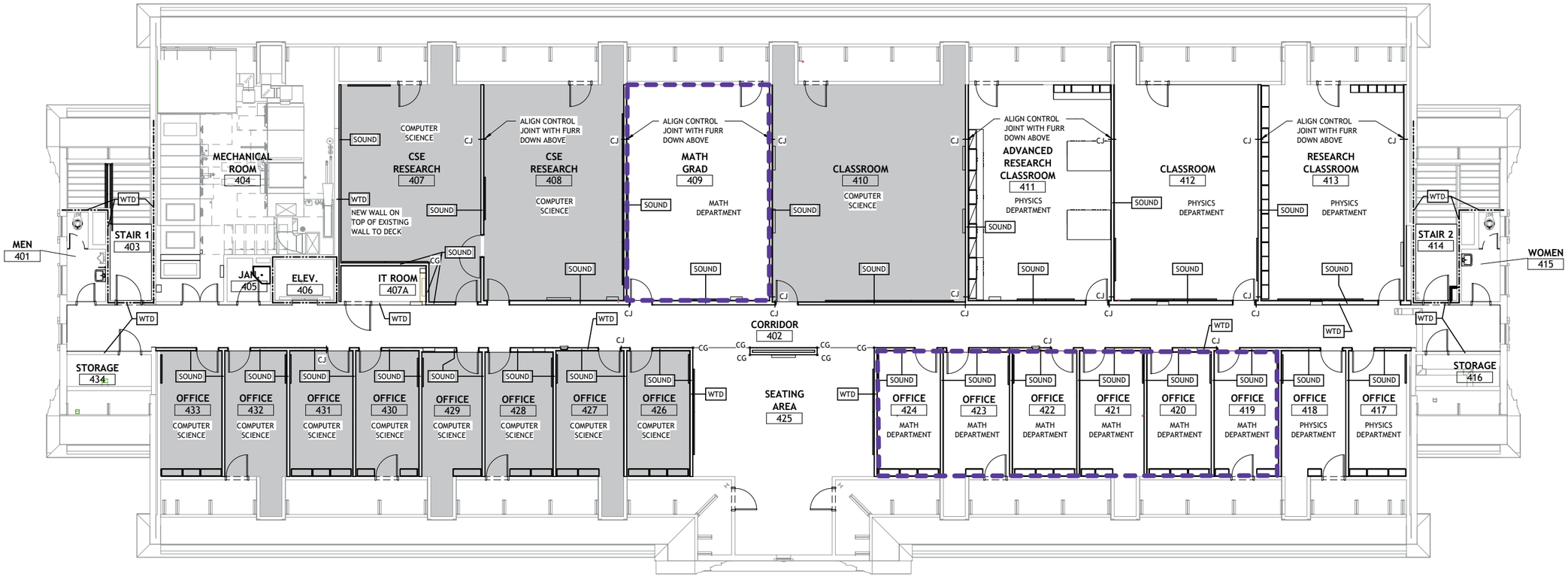

Figure 5.28 Bruner Hall Fourth Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

BRUNER HALL - FOURTH FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
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- SPACES TO BE MOVED TO ISLAM BUILDING
- SPACES TO BE MOVED TO ACME BUILDING
- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

Figure 5.29 Prescott Hall First Floor

ENGINEERING DEPARTMENTS

PRESCOTT HALL - FIRST FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

- SPACES TO BE MOVED TO ISLAM BUILDING
- SPACES TO BE MOVED TO ACME BUILDING
- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

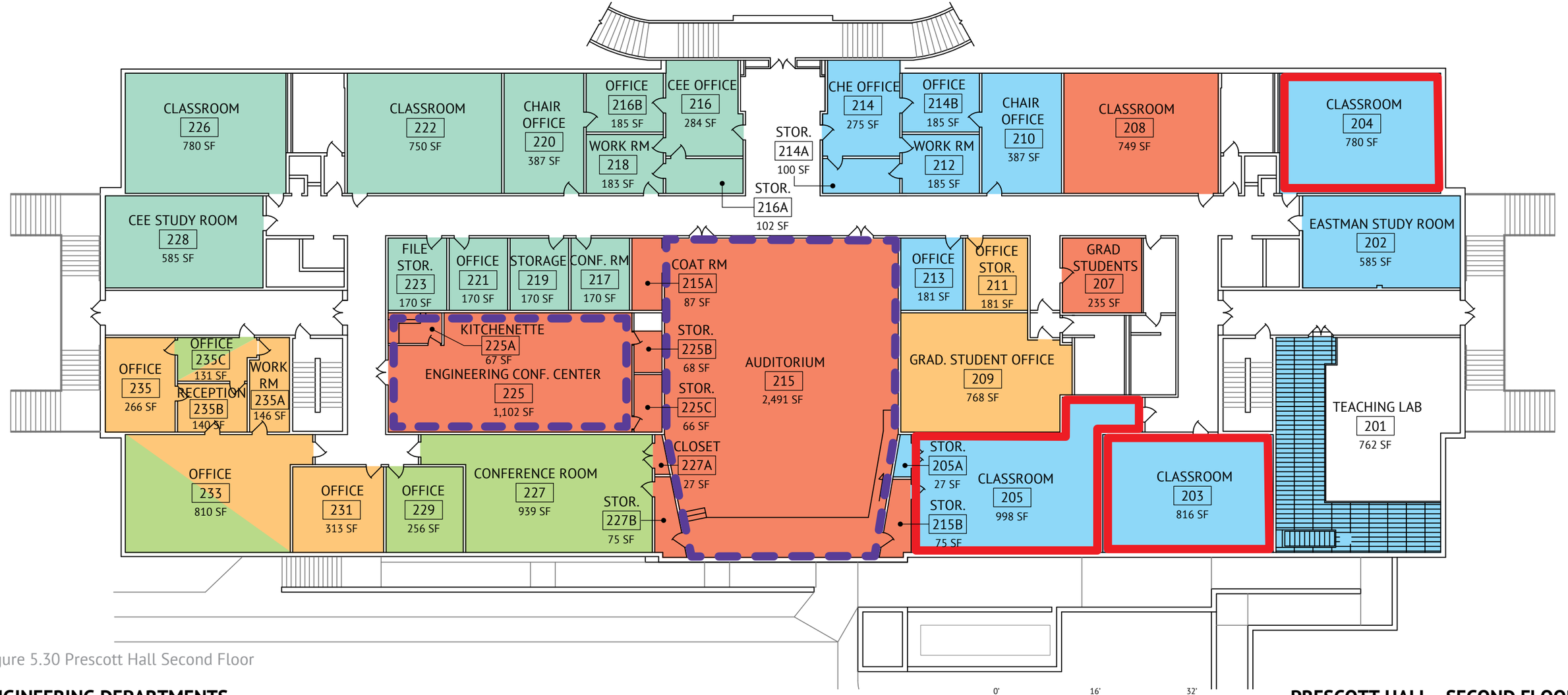

Figure 5.30 Prescott Hall Second Floor

ENGINEERING DEPARTMENTS

PRESCOTT HALL - SECOND FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
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- SPACES TO BE MOVED TO ACME BUILDING
- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

Figure 5.31 Prescott Hall Third Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

PRESCOTT HALL - THIRD FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
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- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

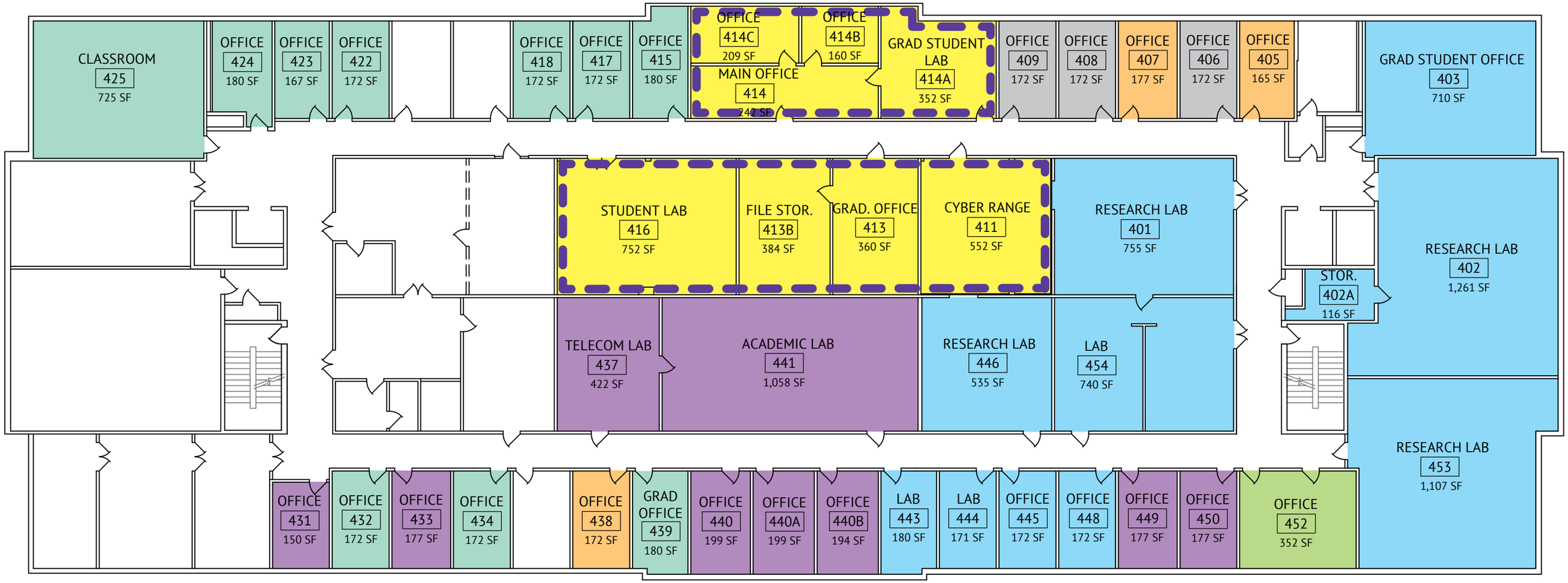

Figure 5.32 Prescott Hall Fourth Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

PRESCOTT HALL - FOURTH FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
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- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

Figure 5.33 Clement Hall First Floor

ENGINEERING DEPARTMENTS

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
- NON-ENGINEERING OR UNASSIGNED
- CENTER FOR ENERGY SYSTEMS RESEARCH (CESR)
- CENTER FOR MANUFACTURING RESEARCH (CMR)
- CYBERSECURITY EDUCATION, RESEARCH, & OUTREACH (CEROC)

0' 16' 32'

CLEMENT HALL - FIRST FLOOR

- SPACES TO BE MOVED TO ISLAM BUILDING
- SPACES TO BE MOVED TO ACME BUILDING
- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

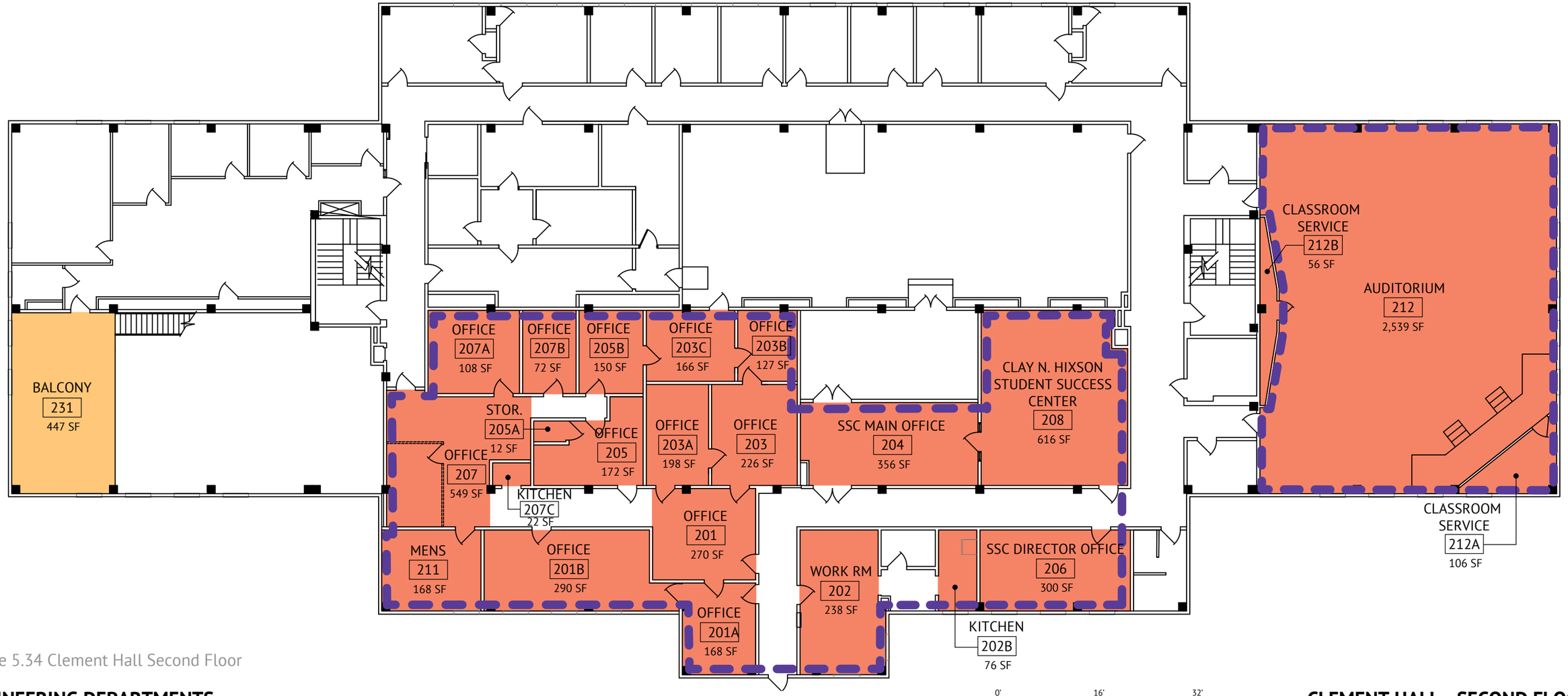

Figure 5.34 Clement Hall Second Floor

ENGINEERING DEPARTMENTS

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
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CLEMENT HALL - SECOND FLOOR

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- SPACES TO BE MOVED TO ACME BUILDING
- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

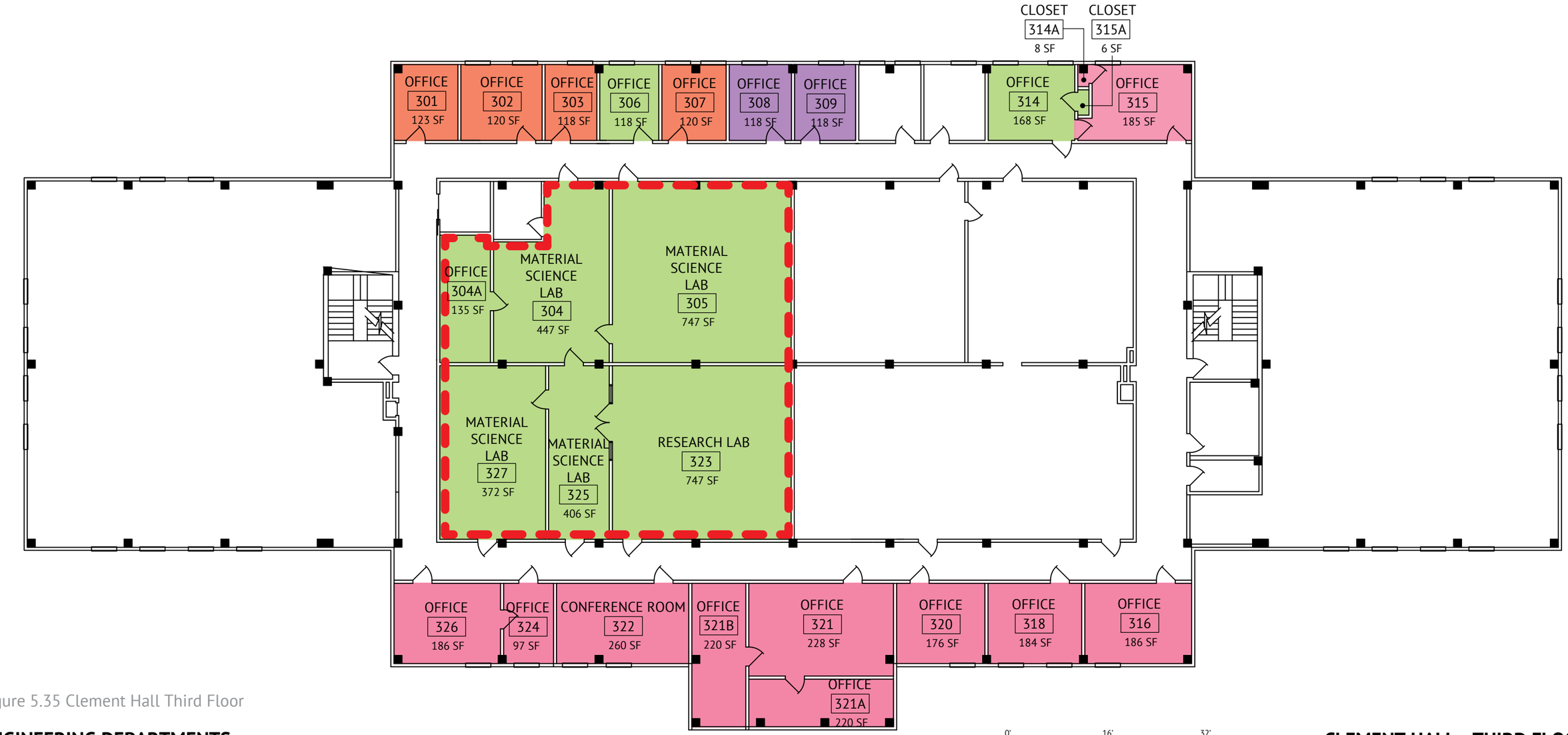

Figure 5.35 Clement Hall Third Floor

ENGINEERING DEPARTMENTS

CLEMENT HALL - THIRD FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
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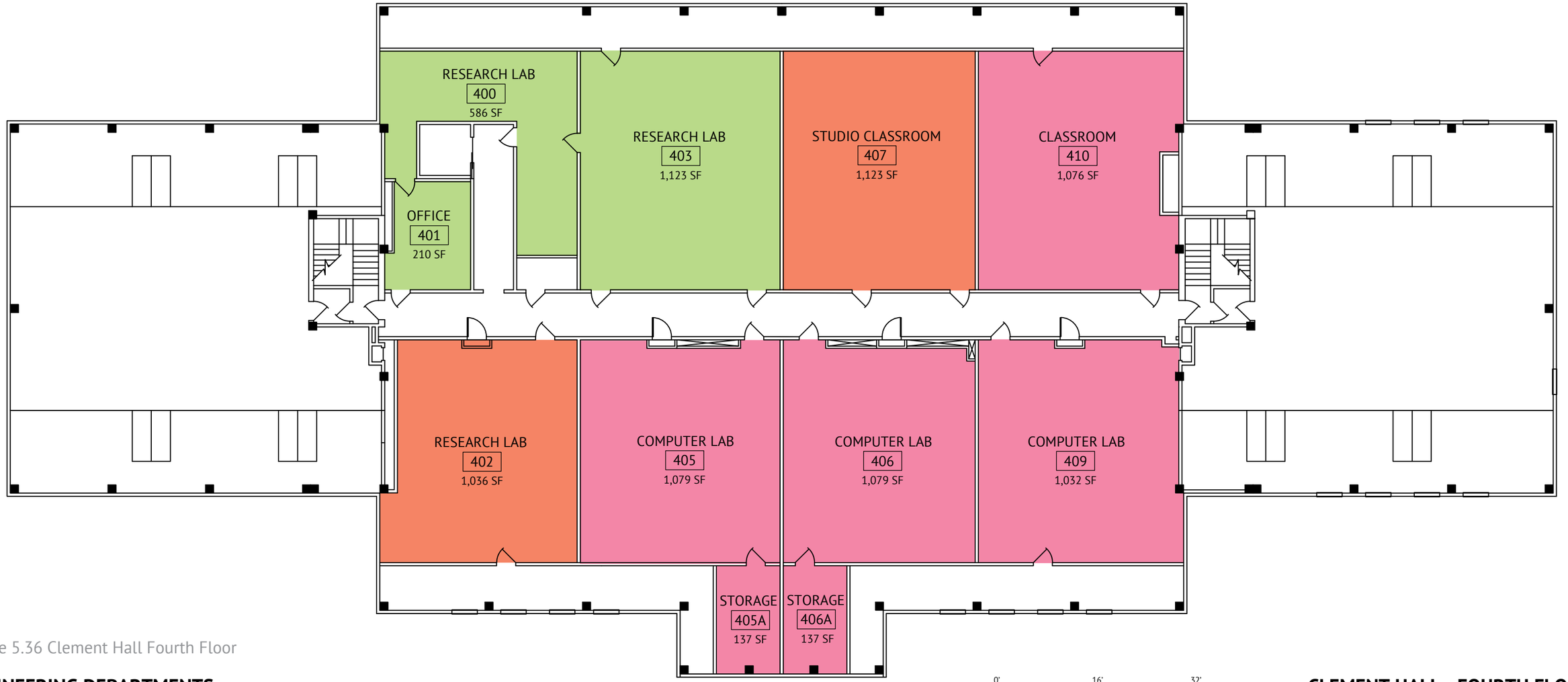

Figure 5.36 Clement Hall Fourth Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

CLEMENT HALL - FOURTH FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
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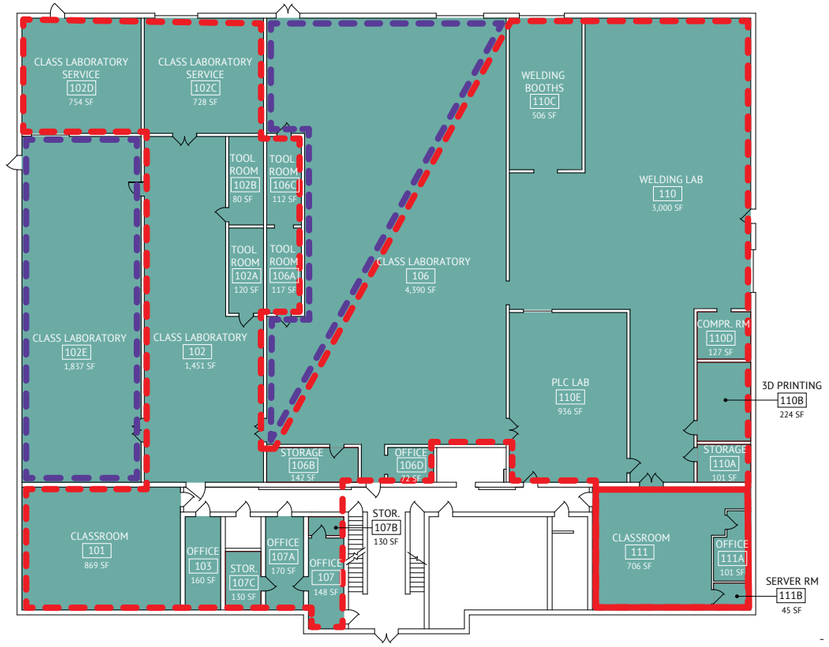

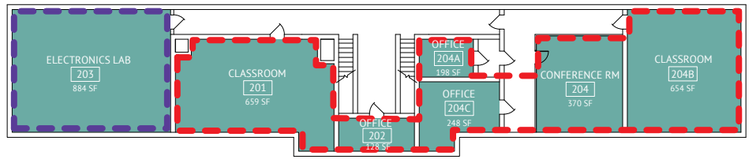

Figure 5.37 Lewis Hall First and Second Floors

ENGINEERING DEPARTMENTS

0' 32' 64'

LEWIS HALL - FIRST AND SECOND FLOORS

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
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- NON-ENGINEERING OR UNASSIGNED
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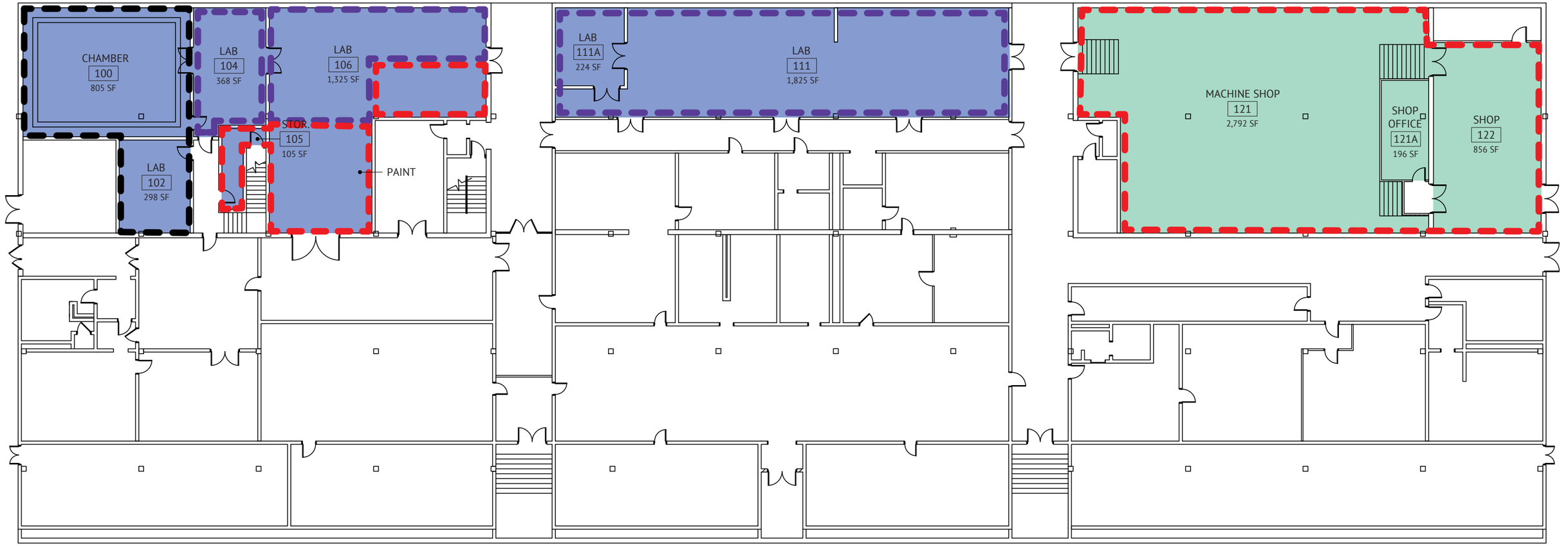

Figure 5.38 East Stadium Ground Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

EAST STADIUM - GROUND FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
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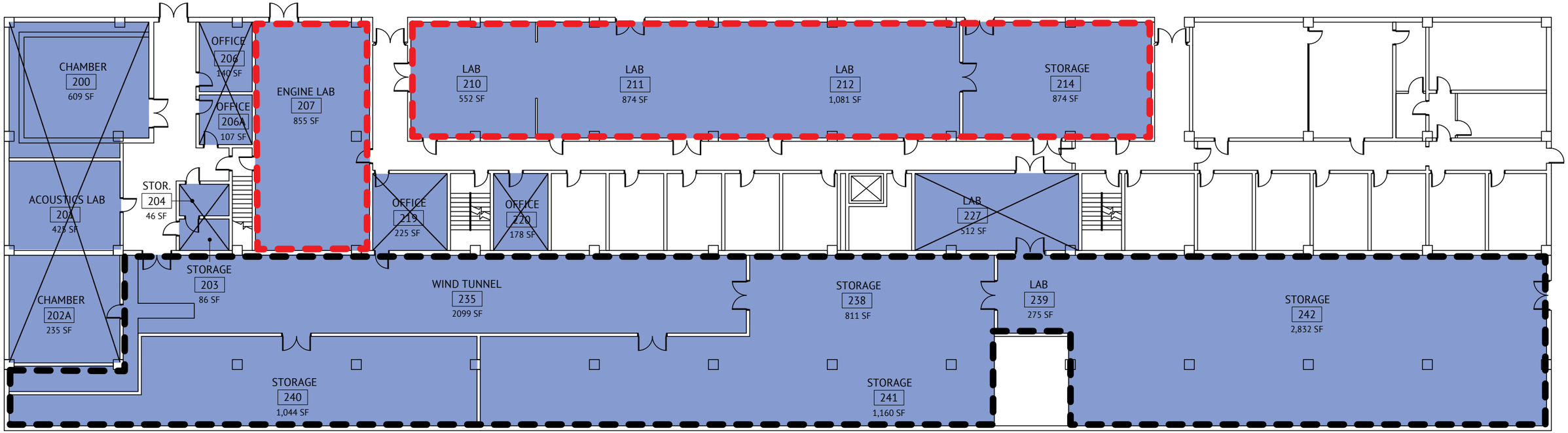

Figure 5.39 East Stadium Second Floor

ENGINEERING DEPARTMENTS

0' 16' 32'

EAST STADIUM - SECOND FLOOR

- COLLEGE OF ENGINEERING
- CIVIL & ENVIRONMENTAL ENGINEERING
- CHEMICAL ENGINEERING
- COMPUTER SCIENCE
- GENERAL & BASIC ENGINEERING
- ELECTRICAL & COMPUTER ENGINEERING
- MANUFACTURING & ENGINEERING TECHNOLOGY
- MECHANICAL ENGINEERING
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- PROPOSED CLASSROOM REPURPOSING
- SPACES CURRENTLY VACANT BUT ASSIGNED
- SPACES VACATED IN PHASE 2

APPENDIX C

HOUSING & DINING MASTER PLAN

Tennessee TECH

Housing and Dining Master Plan

BRIEFING DOCUMENT / SEPTEMBER 2020

BRAILSFORD & DUNLAVEY

INSPIRE. EMPOWER. ADVANCE.

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Preface

In January of 2020, Tennessee Tech ("TTU" or "University") engaged Brailsford & Dunlavey, Inc. ("B&D") to conduct a comprehensive Housing and Dining Master Plan (the "Plan"). The goal of this engagement was to assess current and future housing and dining demand to empower TTU to maximize investments in its housing and dining and develop a long-term strategy to support student enrollment and retention.

B&D would like to thank the Project Steering Committee ("Steering Committee") for their assistance in this effort. The Steering Committee was comprised of the following individuals:

- Dr. Claire Stinson, Vice President of Planning and Finance
- Kerri Demeri, Director of Auxiliaries
- Josh Edmonds, Director, Office of Residential Life

The following report has been prepared to summarize the key findings and resulting conclusions of the Plan. The findings contained herein represent the professional opinions of B&D's personnel based on assumptions and conditions detailed in this report at the time of analysis. B&D conducted research using both primary and secondary information sources that are deemed to be reliable but whose accuracy cannot be guaranteed. B&D provides no guarantee that the estimates and projections presented in this report will reflect TTU's actual costs and financial performance. Economic and market conditions, TTU's actions, and implementation timing, as well as other important circumstances beyond B&D's control, often do not occur as planned and such deviations can be material.

The B&D Project Team ("Project Team") that prepared this report was comprised of the following individuals:

- Jeff Turner, Executive Vice President
- Ryan Jensen, Director
- John Spearman, Associate
- Amy Ellingson, Project Analyst

Work Plan

B&D's approach yielded an evidence-based strategy that empowers TTU to address the current needs of housing and dining and to maintain student success while growing for the future. To this end, the Housing & Dining Master Plan seeks to identify demand for new and/or renovated housing and dining facilities, as well as to understand student preferences and satisfaction, the surrounding off-campus housing market, and the financial implications of improvements.

The methodologies employed as part of this planning effort included the following:

A tour of existing campus housing, sites and related campus facilities was conducted to provide a visual background for the data and improve the Project Team's understanding of the University's on-campus housing system. During the tours a visual inspection was conducted to inform an adequacy and efficacy assessment related to current program distribution and functionality of facilities.

A Strategic Asset Value ("SAV") workshop was conducted on February 13, 2020, with key University stakeholders to identify and prioritize the strategic objectives that any future projects must address to help advance the University's mission and strategic objectives. This session informed the strategic framework outlined within this report, which set the context for subsequent research, recommendations, and decision-making related to this Plan.

Stakeholder interviews were held with more than 15 key University staff members to understand their departmental perspectives on current housing and dining offerings, their goals / vision for TTU, and considerations for new or improved housing and dining. Collectively, these staff members represented their respective departments, which resulted in the Plan reaching a larger portion of the campus community.

Four in-person focus group sessions were held with TTU students during the Spring 2020 semester to gain qualitative information regarding housing preferences and current living conditions, as well as to inform the content of the survey discussed later in this document.

An off-campus housing market analysis was performed to understand better the costs, amenities, competition, and other key elements of the housing market proximate to TTU's campus.

In order to understand the relative position of TTU housing and dining in comparison to peer institutions, a **competitive context assessment** was completed. TTU's programs were compared to the following eight (8) peer institutions for benchmarking purposes: Appalachian State University, Austin Peay State University, Eastern Kentucky University, Middle Tennessee State University, University of Tennessee at Chattanooga, University of Alabama in Huntsville, University of North Carolina Asheville, and Virginia

Tech University. The key characteristics of these housing and dining systems were analyzed, including their scale, capacity and bed / unit mix type, rental rates and dining costs, and recent projects, among other aspects.

An existing conditions assessment was conducted to understand current facility offerings, space types, and programmatic spaces outside the living unit within each housing facility. TTU's inventory was then compared to national standards to understand any shortage or over-supply.

To gather quantitative data to help inform the Plan, the Project Team instituted an **Internet-based survey** for TTU students, faculty, and staff. The survey asked a variety of questions related to current housing and dining patterns, satisfaction levels, pricing sensitivities, and demand preferences related to future housing and dining offerings. A total of 1,103 students and 283 faculty and staff responded to the survey, representing approximately 11% of the student population and 20% of the employee population. A statistically significant representation of the overall population responded with a + / - 2.6% margin of error, assuming a 95% confidence interval. Survey responses were sorted by various demographic characteristics to further investigate current housing situations and the impact of housing on retention.

Based on the results of the Internet-based survey, a **housing and dining demand assessment** was conducted to understand the opportunity to increase on-campus capture rates at survey-tested housing and dining options. The demand assessment was conducted using B&D's proprietary demand-based programming methodology, which utilizes predictive analytics to project demand from statistically significant survey responses and enrollment figures provided by the University. Housing demand figures contain detailed insights into housing preferences for various unit types, bedroom occupancy preferences, and rental rates tested within the survey. Dining demand figures provide insights into dining preferences for various campus locations and meal types.

Planning scenarios were developed by the Project Team based on the strategic framework, market / demand findings, and other analyses. The scenario planning process helped develop a comprehensive strategy for improving the housing system through a series of projects, including new construction and renovation. Individual projects and scenarios were reconciled with site considerations, neighborhood creation, and other strategic objectives.

An integrated financial model was developed to project how the proposed improvements would affect the existing housing system. The flexible model was designed to exhibit the influence of variables such as delivery methods, revenues, expenses, and capital budgets on development and reinvestment decisions.

Strategic Framework

Tennessee Tech University is a public, comprehensive university located in Cookeville, Tennessee. The University's mission is to create, advance, and apply knowledge to expand opportunity and economic competitiveness as a STEM-infused institution. Tennessee Tech is committed to fulfilling its mission by delivering enduring education, impactful research, and collaborative service.

Tennessee Tech is in an ideal position to educate students on the social, economic, and historical impact of technological achievements. It is Tennessee's best university for "a real education for real people who seek real careers."[1] TTU has made a commitment to developing and supporting the success of rural areas throughout Tennessee in a way that can be replicated to help other rural areas throughout the country and the world.

STRATEGIC VALUE OF HOUSING & DINING

At the beginning of the Plan, B&D gathered University leadership and key stakeholders together to conduct the Strategic Asset Value ("SAV") analysis. The SAV analysis is designed to reconcile current practices and policies with future aspirations, thus preparing Tennessee Tech for making critical decisions about the future directions for its housing and dining. B&D, with the confirmation and support from the Project Steering Committee, synthesized the SAV framework into a document that defines the strategic outcomes TTU must follow to achieve its new reality. The full SAV story is provided in **Appendix A** of this document.

The Tennessee Tech housing and dining programs must work together to support a vibrant campus environment that enables student success and increases the attractiveness of TTU. To achieve this, Tennessee Tech must focus on the following project drivers.

- TTU must have modern and attractive housing facilities to increase its recruiting radius.
- The residential program must support student retention and enhance campus life.
- TTU must enhance and diversify housing offerings but not price itself out of the affordable off-campus market.
- Dining must deliver a campus service that amplifies the residential experience and supports commuter student, faculty, and staff needs.
- Dining should facilitate out-of-class activity that strengthens relationships within the campus community.
- TTU should incrementally extend its dining footprint as campus development creates new demand and to enhance the program to support recruitment goals.

[1] Tennessee Tech University Strategic Plan retrieved from https://www.tntech.edu/strategic/.

Key Findings

B&D's comprehensive planning process included a series of qualitative and quantitative analyses resulting in the following key findings related to students' experiences in the housing system, dining program, and off-campus market. The process also identified growth opportunities, future demand, and the financial implications related to change. Overall, findings suggest an opportunity to grow the on-campus population, increase participation in the dining program, and improve the overall campus experience.

HOUSING

EXISTING CONDITIONS

Current housing facilities are well-maintained, and Tennessee Tech provides a valuable experience for lower-division students. Current on-campus offerings cater heavily to a first-year population with predominantly traditional style, shared bedroom living options.

Tennessee Tech has a first year live-on requirement, but housing capture rates decline sharply as students advance. First-year students are required to live on campus, but they are not restricted in their choice of housing options. **Exhibit 1** shows enrollment and on-campus residents by class for fall 2019. Despite the live-on requirement, TTU's first-year capture rate is slightly below average compared to peer institutions.

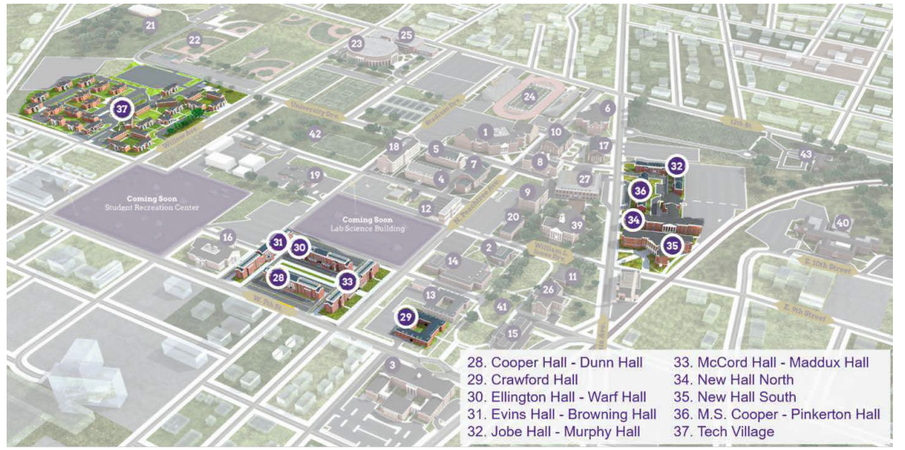
EXHIBIT 1. FALL 2019 ENROLLMENT AND RESIDENTS BY CLASS

	Fall 2019 Enrollment	Current Capture Rates	Current Residents
First-Time Freshmen	1,705	69%	1,177
Continuing Freshmen / Sophomores	2,381	22%	530
Juniors	2,037	12%	241
Seniors	2,620	8%	197
Graduate students	1,183	4%	43
TOTAL STUDENTS	**9,926**	**22%**	**2,188**

Tennessee Tech's Residential Life program offers approximately 2,500 beds in nine residential communities and one apartment complex (Tech Village), distributed as shown below in **Exhibit 2**. Residence hall and Tech Village apartment occupancy has been steady over the past 10 years and

typically over 90% for every fall semester, however residence hall occupancy dipped below 90% in fall 2019 reflecting a slight decline in enrollment that year.

EXHIBIT 2. CAMPUS HOUSING MAP



Compared to its peers, Tennessee Tech has an above-average percentage of traditional-style beds at 54%. Of the remaining beds, 28% are suite style and 18% are apartments. All the apartment units are in Tech Village on the west side of campus, and all the suite-style units are concentrated on the east side of campus in New Hall North and New Hall South. All four class years are represented in each neighborhood, with the largest concentrations of first-year students in the residence hall neighborhoods and the largest concentrations of juniors and seniors in the Tech Village apartment complex.

While Tennessee Tech has made significant capital investments in its housing inventory through a series of renovations starting in 2011 and concluding in 2020 there has been limited new construction. The most recent addition was of two suite-style residence halls (New Hall North and South) in 2004 and 2010, respectively. With these improvements, all residential facilities have either been renovated or constructed in the past 10 years except for New Hall South (built in 2004) and Crawford Hall.

HOUSING MARKET CONSIDERATIONS

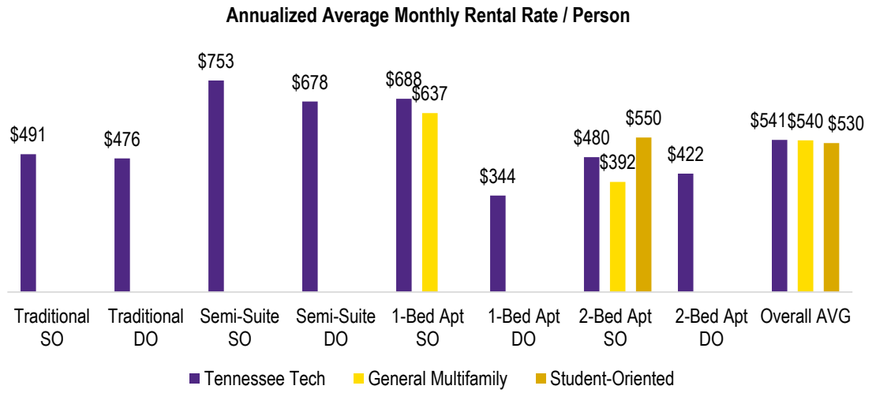
Tennessee Tech housing is competitively priced compared to peer institutions; however, an inexpensive off-campus market provides challenges to retaining students on campus. The University needs to highlight the value, convenience, and community aspects of on-campus living to remain competitive with a strong off-campus market.

Compared to peer institutions, the price of a traditional on-campus unit is close to the average and the price of a suite-style unit is about 28% above average. For both unit types, the single-occupancy premium is low compared to peer institutions. This premium is only 17% at TTU compared to an average 30% for traditional units and 22% for suite-style units at peer institutions. These variances suggest an opportunity for TTU to consider greater pricing differentiation between shared and private units.

In analyzing the off-campus rental market, B&D found there are over 1,500 rental units with an average vacancy of 5.9% within a two-mile radius of campus (data as of spring 2020). The off-campus market saw healthy 12% growth in multifamily units from 2015 to 2017 and has remained flat through 2020. Three student-oriented housing properties (defined as those catering to student renters with individual leases and other amenities) represent 20% of the total beds within a two-mile radius. These three student-oriented properties are an average of one mile from campus, advertise all-inclusive rental rates, and are typically more expensive than the general multi-family options in the market. These properties have an average vacancy rate of 3.9%.

Tennessee Tech's rental rates appear more expensive than the off-campus market on a monthly basis; however, the rates are comparable when accounting for lease term and utility costs. TTU offers value to students as off-campus lease terms are 12 months, so students renting off campus must cover three months of summer rent, as well as utilities. Additionally, based on survey data, over 75% of students living off campus pay for at least one utility in addition to their rent. As shown in **Exhibit 3** below, when TTU rental rates are annualized over the 12-month period and all living costs are accounted for, the overall average monthly cost is generally in line with the off-campus market. General multifamily represents the housing properties that do not cater specifically to student renters.

EXHIBIT 3. AVERAGE MONTHLY RENTAL RATES



Based on survey data, 68% of off-campus students pay less than $500 per month for rent and 83% pay less than $150 per month for utilities. As the survey data and off-campus market research point out, this is a relatively inexpensive rental market for students. In an effort to differentiate on-campus offerings, Tennessee Tech should highlight the value of academic-year lease terms along with the convenience and community aspects of on-campus living.

OPPORTUNITIES TO GROW THE ON-CAMPUS POPULATION

Improved student life will be an important component of realizing recruitment and retention goals for both local and non-local students; therefore, TTU should look to modernize, diversify, and expand housing offerings that align with student preferences.

On-campus housing is an important recruitment asset, especially to first-time freshmen and non-Tennessee residents. Based on survey data, 75% of first-time freshmen and 64% of out-of-state students said the availability of on-campus housing was very important or important in their decision to attend the University.

Students find value living on campus and overwhelmingly agreed that living there provided a convenient living option, helped them acclimate to life at Tennessee Tech, and allowed them to be part of a community. Living in residence halls provides a different on-campus experience than living in the Tech Village apartments. Based on survey results, residence halls have a more positive impact on academic performance, provide a greater sense of community, and encourage students to be more involved on campus.

When making housing decisions, convenient laundry facilities, total cost of rent and utilities, and proximity to classes are important considerations for undergraduate students. Access to campus dining is also very important to first-time freshmen, while the availability of a kitchen is important to upper-division students. Students say they choose to live off campus because it is more cost effective, there is more living space and privacy, and they have access to their own kitchen.

While proximity to classes is important to students, those who live at home tend to have longer commute times than students who rent off campus. Most off-campus students who rent an apartment or house commute less than 10 minutes to campus. Over a third of students who live with parents or other family members commute more than 30 minutes to campus, and 15% commute 50 minutes or more. TTU may have an opportunity to capture a portion of students with long commute times due to the added convenience of living on campus.

B&D's proprietary student housing demand model uses student survey responses to quantify on-campus demand by individual unit type. The model projects demand under the assumption that housing will be developed to match student preferences and affordability levels. The survey tested a range of unit types

at various pricing tiers to evaluate price sensitivity across enrollment classifications and unit types. Based on B&D's demand-based programming methodology, there is an opportunity to increase housing capture rates with more non-traditional style units, if offered at competitive price points. Specifically, untapped demand exists among non-freshman students. Based on student demand, Tennessee Tech has an over-supply of traditional double-occupancy units and one-bedroom suites (i.e., New Hall units), and there is additional demand for apartments and semi-suite units.

As shown below in **Exhibit 4**, TTU has a shortage of beds based on current student demand, which includes first-year students who are required to live on campus. The University's enrollment goal of 10,000 undergraduate and 2,000 graduate students would increase this deficit to almost 1,000 beds.

EXHIBIT 4. CURRENT AND FUTURE HOUSING DEMAND

CURRENT DEMAND

Enrollment Classification	Enrollment ('19-'20)	Capture Rates	Recommended Program
1st-Time Freshman	1,705	70%	1,194
Sophomore/Continuing FR	2,381	30%	710
Junior	2,037	20%	358
Senior	2,620	18%	520
Graduate	1,183	14%	163
TOTAL	9,926	30%	2,941
EXISTING BED COUNT			2,512
NET DEMAND (SURPLUS / (DEFICIT)			(429)

FUTURE HOUSING NEED

Future Enrollment	Capture Rates	Future Housing Need
1,950	70%	1,365
2,723	30%	817
2,330	20%	466
2,997	18%	539
2,000	14%	280
12,000	30%	3,467
		2,512
		(955)

B&D's demand methodology highlights the opportunity for Tennessee Tech to capture additional students in on-campus housing based on current enrollment and student demographics. Increased enrollment as outlined in enrollment projections will drive the need for additional housing inventory. Additionally, if the proportion of non-local students as a percentage of the overall student body increases, these capture rates are likely to grow as non-local students are more likely to reside on campus. These demand assumptions depend on offering the unit types desired by students at an affordable price point.

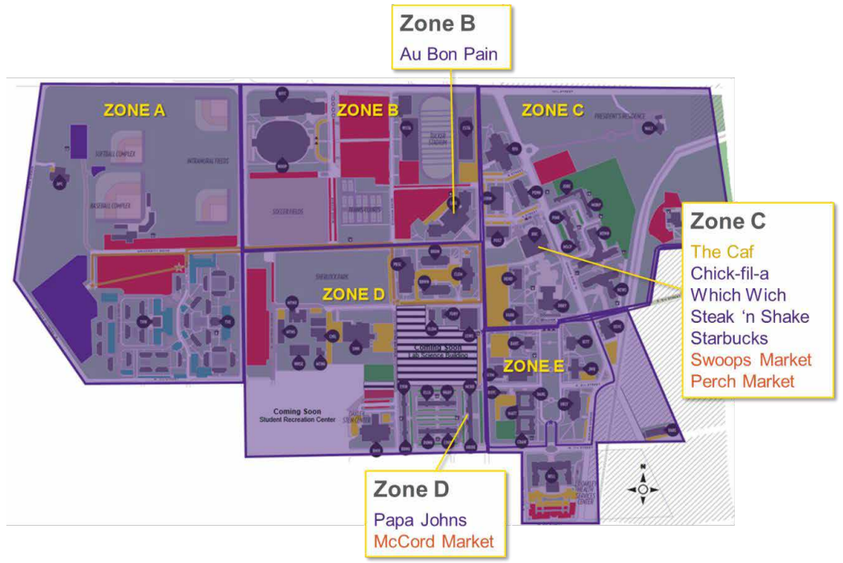
DINING

EXISTING CONDITIONS

Tennessee Tech provides a variety of on-campus dining venues but generally offers less diversity of options than its peer institutions.

Tennessee Tech's current dining program has ten dining venues close to housing and integrated with student life assets such as the Roaden University Center and Volpe Library. The dining venues offer a variety of service styles, concepts, and menu options that include customizable options, quick grab-and-go selections, and pre-packaged meals. **Exhibit 5** below identifies current dining locations. The all-you-care-to-eat (AYCTE) dining venue, The Caf, is conveniently located in the Roaden University Center and provides numerous options to accommodate a variety of dietary preferences. TTU has six national retail concepts and three convenience stores that offer pre-packaged foods and sundry items.

EXHIBIT 5. CAMPUS DINING LOCATIONS



Most campus dining venues, including The Caf, are concentrated in the Roaden University Center in Zone C, as shown in **Exhibit 5**. During peak lunch times, the only other dining option on campus is in the Volpe Library. This concentration of dining venues facilitates the community-building aspect of campus dining and provides for operational efficiencies but, at times, can lead to crowded venues. Although Tennessee Tech provides a good variety of dining options on campus, peer institutions have as many or more dining venues and fewer students per location on average. If TTU realizes its anticipated enrollment growth, these gaps will widen, putting more pressure on existing venues.

Tennessee Tech requires freshman residential students to participate in a meal plan program. Freshmen have four options, which allow them to adjust their meal swipes and price points, ranging from unlimited access every day or unlimited access Monday through Friday. All residential meal plans include dining dollars, which can be used at any of the on-campus retail dining facilities. Additionally, two of the four residential plans allow for a daily meal exchange to use a traditional meal swipe at some of the retail venues on campus. Although residential meal plans offer considerable flexibility, they are generally priced higher than peer institutions and this added cost appears to be a deterrent to living on campus for some students.

Tennessee Tech offers six additional meal plan options that cater to upper-division students on campus and students who live off campus. Currently, 26% of students participate in a meal plan program, with most enrolled in one of the four residential meal plans. Almost a third of meal plan holders live off campus.

The unlimited residential meal plans have the highest enrollment but are under-utilized, with students only using 54% of meal swipes on average. The weekly meal plans have the lowest student enrollment, but the allotted weekly meal swipes are utilized (84%) by the students who choose them. The block meal plans allot meal swipes per semester and have the second highest enrollment after the required freshman residential meal plans. Students use 96% of their block meal swipes on average. Overall, students use 94% of their dining dollars. The weekly and block meal plans are extremely flexible as they allow for a meal exchange option for all allotted meal swipes.

OPPORTUNITIES TO GROW ON-CAMPUS DINING

Tennessee Tech students, faculty, and staff are generally satisfied with the dining program, but there is an opportunity to engage a broader cross section of the TTU community and enhance the strategic value of campus dining. To do increase dining participation, TTU should focus on improving the perceived value of AYCTE offerings and rebalancing the retail portfolio.

Overall, the Tennessee Tech community is satisfied with the dining program. This satisfaction is driven by facility amenities, convenient locations, and good weekday hours; however, gaps exist in perceived value for price, menu variety, and food quality. These factors are consistent across the three target markets: on-campus students, off-campus students, and employees. The Tennessee Tech community is price sensitive and there is a desire for broader menu variety.

Survey respondents were asked to identify the importance of various factors when selecting a place to eat on campus and then were asked to indicate their satisfaction with each of those factors. **Exhibit 6** below shows the five most important factors for each target market and the percentage of each target market that indicated they were either satisfied or very satisfied. Value for Price was among the top three

most important dining factors for all three target markets, and less than two-thirds of each group indicated they were either satisfied or very satisfied with value for price paid. Combined, 40% of all students indicated they were either dissatisfied or very dissatisfied with value for price of food offerings on campus.

EXHIBIT 6. CAMPUS DINING LOCATIONS

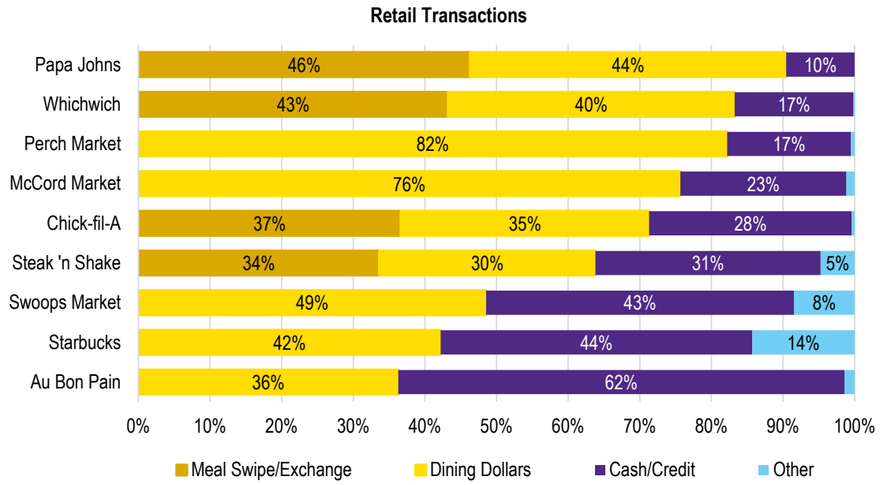
	On-Campus Students		Off-Campus Students		Faculty/Staff	
		Satisfaction		*Satisfaction*		*Satisfaction*
More Important ↑ 1	Quality of food	*78%*	**Value for price**	***57%***	**Value for price**	***58%***
2	Quality of service	*89%*	Quality of food	*80%*	Quality of food	*81%*
3	**Value for price**	***65%***	Location convenience	*93%*	Quality of service	*95%*
4	**Menu variety**	***68%***	Speed of service	*84%*	Menu variety	*73%*
↓ Less Important 5	Weekday hours of operation	*90%*	Quality of service	*90%*	Speed of service	*92%*

Even though 82% of on-campus students participate in a meal plan program, one third of them report typically eating dinner off campus. On-campus students choose to eat off campus because they do not like the food selection on campus. Off-campus students choose to eat off campus because it is more convenient and less expensive. Currently, only about a third of off-campus students typically eat lunch on campus. While TTU will never accommodate all students in on-campus dining, these data points highlight opportunities to increase dining utilization across different market segments and, simultaneously, drive meal plan value and student affordability by mitigating additional off-campus spending. AYCTE dining offerings should be improved, varied, and marketed to bolster residential meal plan value perceptions.

Meal plan satisfaction is high overall, largely driven by significant flexibility between retail and AYCTE venues. However, this meal plan flexibility produces a residential saturation of the retail dining portfolio, inhibiting non-meal plan holders (predominantly off-campus students, faculty, and staff) from engaging in retail options. Currently, half of all meal plan transactions happen at retail dining venues on campus, including meal swipes/exchanges and dining dollars, with Chick-fil-A accounting for almost a quarter of all meal plan transactions.

As shown below in **Exhibit 7**, 63% of all transactions at retail venues are from meal exchanges or dining dollars, meaning less than a quarter of Tennessee Tech students represent over half of all retail transactions. The heavy residential use at retail venues in Swoops, particularly during peak times, leads to overcrowding at popular venues, deterring off-campus students, faculty, and staff customers from engaging in the dining program and fostering a broad community customer base.

EXHIBIT 7. RETAIL TRANSACTIONS BY TENDER



Note: Data from a typical week during the fall semester 2019

B&D heard anecdotally about crowding at The Caf and Swoops food court during peak times, but information regarding traffic counts was not available. Faculty and staff are the only target market who indicated in the survey that campus dining venues are too crowded, but the faculty and staff dining space in The Caf is underutilized. Tennessee Tech can accommodate current demand in The Caf, but that could change with enrollment growth and a larger on-campus residential population.

All current retail venues on campus are national brands but seeking a national brand food provider was identified by students as the least important factor in deciding where to eat on campus. National brands provide strong brand recognition with students, but unique, internal brands can drive value for students and allow for customization and flexibility.

There is some uncaptured dining demand around existing campus dining locations, and there is additional potential demand near new developments on the west side of campus in Zone D (shown earlier in **Exhibit 4**). Dining must follow the campus master plan and respond to the growth strategy in this part of campus. There is unrealized dining demand for grab-n-go breakfast options and seated dinner options around existing campus dining locations. This excess demand could be accommodated by providing additional retail dining locations on campus and shifting some existing demand from the center of campus.

Recommendations

B&D's market analyses were filtered through the strategic objectives and decision-making criteria developed with key University stakeholders to establish recommendations. These recommendations are intended to inform TTU of current market conditions that impact the housing and dining programs, as well as provide strategic next steps to move both programs forward.

HOUSING

Tennessee Tech's ability to increase its residential population depends on how successfully it can combine competitive rental rates, desirable unit mixes, and an attractive campus location with desired community and academic resources.

Facility Modernization

Strategic reinvestment in the residence halls will maximize the long-term value of existing residential assets and diversify the current unit mix on campus. With housing improvements made over the past 10 years, all residential facilities have either been renovated or constructed, with the exception of New Hall South (built in 2004) and Crawford Hall, which is planned to be converted to academic or administrative use. M.S. Cooper and Pinkerton Halls and Ellington and Warf Halls were renovated early in the 10-year plan and are likely to need updates within the next 5-10 years. Pending a more detailed architectural analysis, B&D recommends renovating M.S. Cooper and Pinkerton and Ellington and Warf Halls to convert them from traditional to semi-suite units. This would allow for continued diversification of the housing stock to meet future student needs.

Beyond renovation of existing facilities, B&D recommends that TTU move forward with a phase I housing project. This 400-bed project will be located in Sherlock Park with a targeted delivery of fall 2023 to align with other development near the site. TTU intends to offer an innovative living-learning concept within this new residence hall to align with academic initiatives and attract prospective students. To keep pace with projected enrollment growth, additional proposed projects are outlined in the long-term housing plan. This includes at least one additional residence hall in the Sherlock Park area. The proposed projects over the next 10 years to grow and diversify the TTU housing inventory are outlined below. While this phasing plan provides a long-term vision for the growth of on-campus housing, B&D recommends that TTU revisit student enrollment and demand prior to embarking on each new project.

EXHIBIT 8. HOUSING PHASING PLAN

RESIDENTIAL FACILITY	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Cooper Hall	Under Const	Reno	Reno	Reno	Reno	Reno	Reno	Reno	Reno	Reno	Reno
Dunn Hall	Under Const	Reno	Reno	Reno	Reno	Reno	Reno	Reno	Reno	Reno	Reno
Crawford Hall	On-line	On-line	On-line	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line
M.S. Cooper Hall	On-line	On-line	On-line	On-line	Under Const	Reno	Reno	Reno	Reno	Reno	Reno
Pinkerton Hall	On-line	On-line	On-line	On-line	Under Const	Reno	Reno	Reno	Reno	Reno	Reno
Ellington Hall	On-line	On-line	On-line	On-line	On-line	Under Const	Reno	Reno	Reno	Reno	Reno
Warf Hall	On-line	On-line	On-line	On-line	On-line	Under Const	Reno	Reno	Reno	Reno	Reno
Browning Hall	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Evins Hall	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Jobe Hall	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Murphy Hall	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Maddux Hall	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
McCord Hall	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
New Hall North	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
New Hall South	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Tech Village	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
NEW CONSTRUCTION											
PHASE I PROJECT	-	-	-	Under Const	New	New	New	New	New	New	New
NEW PROJECT #2	-	-	-	-	-	Under Const	New	New	New	New	New
NEW PROJECT #3	-	-	-	-	-	-	Under Const	New	New	New	New
BED COUNT	**2,429**	**2,639**	**2,639**	**2,419**	**2,645**	**2,602**	**3,072**	**3,372**	**3,372**	**3,372**	**3,372**

Program Improvements

Housing supports student success by providing students with opportunities to become more connected to the life of the university, particularly in residence halls that facilitate community building. With a particular focus on student retention among first-year students, B&D would recommend no longer allowing freshmen to reside in Tech Village.

Living and learning villages (LLVs) integrate students' social and academic lives. Residential Life should continue to take a leadership role in partnering with academic or administrative departments to develop and provide LLVs on campus. A detailed evaluation of these programs as a part of a broader operational assessment of Residential Life is recommended. B&D has initiated this assessment with a focus on ensuring an effective organizational structure is in place to support departmental needs and ensure the on-campus experience at TTU maximizes student success.

Financial Capacity

Tennessee Tech has maintained a financially stable housing portfolio and the system is able to financially support the proposed new development while continuing to invest in the existing inventory. As a part of this Plan, B&D developed a fully integrated housing model and incorporates all revenue and expense

projections and capital projects (a summary is available in **Appendix B**). The primary assumptions informing this financial model are as follows:

- All operating expenses are allocated to existing and future facilities on a per square foot basis, based on FY19 actuals.
- All revenues and expenses are inflated at 2% annually.
- In order to support additional debt service, new / renovated housing options are priced at a 10% premium over comparable existing unit types.
- All new projects are assumed to be 100% debt-financed.

Based on these assumptions and the proposed phasing plan outlined in **Exhibit 8** above, the housing system is able to maintain a healthy debt coverage ratio and generate excess cash flow throughout the course of the Plan.

- Pricing Strategy: Given the healthy state of TTU housing financials, multiple options exist to optimize the rental rate structure. First, TTU should consider utilizing more of the reserve balance to subsidize current operations and/or capital projects to reduce rental rate increases. The model currently assumes that 15% of project costs are covered through reserve contributions. Additionally, Tennessee Tech should consider increasing all single-occupancy room rates to maximize the financial capabilities of the current housing portfolio and be more aligned with peers. This would not only be a more equitable pricing approach but may also allow for a slight reduction in double-occupancy rates.
- Residential Life Operating Expenses: Based on an initial assessment, TTU's housing operating expenses appear below industry averages. As a next step in TTU's efforts to improve its housing program, B&D recommends an operations assessment to evaluate individual expense categories, assess organizational structures, and outline best practices that will optimize the performance of the housing portfolio. B&D believes that opportunities exist to improve current operations that will help broader goals for the housing program such as student success, retention, and community building.
- Support Dining Improvements: As noted in the dining findings, high meal plan rates are an impediment to students living on campus. TTU should consider opportunities to support the dining program which may increase the desirability of living on campus.

DINING

Tennessee Tech must improve operational efficiencies, redirect meal plan customers to The Caf through policy and increased appeal, and increase retail dining participation by providing more attractive dining choices.

Operational Efficiency

Tennessee Tech should work with its dining partner, Chartwells, to assess and maximize efficiency and throughput at each individual retail venue across campus. The result of this process will allow the University and Chartwells to identify and implement operational improvements to maximize participation and revenue potential at each dining venue. This assessment must include collecting and analyzing detailed traffic counts and transaction types across the dining portfolio during peak and off-peak times. The ability to distinguish between residential and voluntary dining dollars would provide more insight into whether these dollars contribute to additional revenue beyond the required residential meal plans.

While reviewing efficiency, Tennessee Tech and Chartwells should also review the appeal and performance of each venue, particularly at any concepts that are determined to be underutilized or inefficient. As part of efficiency assessments, it is an opportune time to evaluate the retail portfolio's menus, service styles, and price points to determine if each responds to customer preferences. Replacing underutilized national branded concepts with Chartwells' internal brands, or unique TTU concepts could offer more value and variety to students. Based on survey data, students indicated they would like to see a Mexican or Asian option on campus. There may also be an opportunity to partner with local restaurants to bring popular brands from the community onto campus. When asked in the survey to list their favorite places to dine off campus, almost half of the students listed a local or regional brand.

The campus dining contract between Tennessee Tech and Chartwells, a division of Compass Group, is effective for the period beginning July 1, 2017 and ending on June 30, 2027. The current contract outlines a financial structure under which TTU receives a guaranteed minimum annual commission, plus a percentage of gross sales beyond a specified target for each year. This financial structure operates on the assumption that TTU maintains a mandatory meal plan purchase requirement for freshmen living on campus. The agreement also included a capital investment funded by Chartwells and amortized on a straight-line basis over the term of the contract. The contract allows for the possibility of the University and Chartwells to elect to transfer to a second financial option and work together toward the construction of a new dining facility on campus. B&D recognizes the ongoing conversations between Tennessee Tech and Chartwells regarding the contract terms in light of the challenges this year, which may result in changes to the agreements outlined here. However, B&D is actively working with TTU on new housing and dining offerings on the west side of campus, so potential Chartwells contributions to grow the dining program should be considered.

Meal Plan Policy

Tennessee Tech should consider limiting meal exchange policies, while amplifying the Caf's culinary appeal, to encourage residential students to dine at The Caf, especially during peak times. These changes, along with improving the perceived value of AYCTE offerings, would reduce the pressure on Swoops' retail venues, improve residential community building, and expand dining access for commuters, faculty, and staff.

Expand Dining Footprint

Once the university has shifted residential demand to the Caf and allowed other campus customers to engage in existing retail, Tennessee Tech should consider utilizing dining to strategically activate spaces on campus during evenings and weekends. Any dining expansion would need to carefully consider the operating and financial implications to maximize the concept's value while managing operating costs accordingly to maintain the financial goals of the program. The Perch is a good candidate for innovative dining solutions that would help build campus community. It currently contains a market and teaching kitchen and, anecdotally, is underutilized by students as a gathering space. TTU should work with Chartwells to consider ways to activate the space with pop-up activities in the teaching kitchen or technology solutions like robots and vending machines that would be popular with students.

B&D recommends that TTU strategically expand the current dining footprint to meet demand in Zone D, as shown in **Exhibit 5**, which encompasses the new student recreation and fitness center, the new lab science building, and Sherlock Park on the west side of campus. Based on survey data, students are looking for more variety of quality food options and venues across campus. Students indicated they would like to see more grab-and-go service style options, healthier menu options, and extended hours of operation to include more dining options after 10:00 p.m.

The new lab science building will contain a dining space of approximately 1,300 square feet. Considering the limitations of the allocated space, B&D recommends this venue as a unique, flexible, inhouse concept that can adapt as the west side of campus grows. The concept should provide healthy options that flex between peak and off-peak times to balance the desire for extended dining hours on campus with operational efficiency and offer a mostly grab-and-go service style with some made-to-order items like sandwiches or smoothies. This location should target commuter students looking for convenience and serve traffic between the recreation and fitness center and the center of campus.

Based on unmet demand, Tennessee Tech should consider including a dining component in the phase I housing project to provide a more substantial dining option on the west side of campus; however, additional dining capacity should not outpace residential growth on campus. This venue would create a good opportunity to build a unique concept that utilizes innovative dining technology, thus integrating well with the science and engineering focuses of this part of campus. If TTU increases its residential population by meeting enrollment goals and building more housing, there may be a need in the future to build another residential dining facility on the west side of campus.

A

SAV Story

Appendix A: Strategic Asset Value Story

The **SAV Story** is synthesized into four chapters that articulate the attributes that the Plan must achieve:

QUANTITY + LOCATION OF HOUSING / DINING

- TTU desires to **improve the attractiveness of the on-campus environment to support recruitment efforts**. As such, **targeted capture rates** by enrollment level will increase as the institution attracts more non-local students.
    - TTU intends to provide a sufficient number of developmentally appropriate housing options to support the freshman live-on policy.
        - **First-Time Freshmen**: 80% - 85% live on campus.
    - Living options with increasing levels of independence and less programmatic support shall be available for sophomores, juniors, and seniors desiring to remain on campus.
        - **Sophomores**: 20% - 25% live on campus.
        - **Juniors / Seniors**: 15% - 20% live on campus.
    - Housing for graduate students may be necessary to support institutional goals; however, these options are flexible with respect to location and living arrangement.
        - **Graduate Students**: 5% - 10% live on campus.
- TTU should continue to build **successful residential neighborhoods** by clustering new housing in areas that provide adequate support services, resources, and quality-of-life facilities.
- As the campus continues to expand to the west, TTU should consider additional dining options to complement existing venues and satisfy new demand.
- The University desires to **grow the residential population to support a more vibrant campus experience** that is attractive to prospective students and supports retention.
- TTU desires to **provide housing for all students wanting** to live on campus.
- As the recruiting radius expands, the availability of **quality on-campus housing and dining options** will become increasingly important for competitive reasons. Dining venues and hours of operation will need to expand incrementally as the on-campus population grows.

TARGET MARKET + PROGRAMMATIC REQUIREMENTS

- A residential experience with intentional academic, co-curricular, and support resources should be provided for all students; however, offerings should be differentiated by class level.
    - Housing should facilitate a common **first-year experience** that is consistent across residential communities. First-year student living units and floor configurations should encourage both formal and informal interactions among residents.
    - **Upper-division and graduate student housing** should be market responsive and supplement the off-campus market. This housing will provide opportunities for students who need and/or value the nature of development support and engagement opportunities better achieved by living on campus. Living options with increasing levels of independence that allows them to "graduate up" from the community-oriented living arrangements should be available.
- In order to advance student retention efforts, **housing should be physically and programmatically integrated with academic support services** and campus initiatives / organizations that will help to support student success and improve the student experience.
- TTU desires to provide students with a variety of living and dining choices that respond to market demands.
- **Any dining facility should be leveraged as a primary platform for creating and strengthening relationships** across the campus where community building happens around food. Spaces should be designed in such a way that students, faculty, and staff feel comfortable dining, studying, and lounging both independently and in groups.

FINANCIAL ACCESSIBILITY + QUALITY RECONCILIATION

- Quality standards and offerings must reflect an **awareness of competition** from peer institutions and the off-campus market.
- TTU desires a **balanced pricing approach** that promotes equity while maintaining a high-quality standard for operations and maintenance.
- Living arrangements, both in existing and future housing, should meet various price points to allow TTU to serve a student population that is growing increasingly diverse from a socio-economic standpoint.

FINANCIAL PERFORMANCE + INSTITUTIONAL WILL

- The housing system must continue to be financially successful to allow for reinvestment and new construction to support modernization of inventory.
- Maintaining financial self-sustainability across the system is critical.
- New projects should **standalone financially**.
- While TTU would be open to housing all students desiring to live on campus, the University will **proceed with caution** when building a product type **in direct competition** with the off-campus market.
- TTU **prioritizes student affordability** for housing and dining to support recruitment / retention efforts and accommodate student needs.

B

Housing Financial Model

Tennessee Technological University
System-Wide Housing Model
Summary Proforma
As of ***9/17/2020***

SCENARIO
Scenario #1

Scenario Description:
Growth & Diversification

	BASE YR FY 2019	COVID-19 YR FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Total GSF	602,855	602,855	649,874	649,874	607,832	672,513	680,887	817,832	907,832	907,832	907,832	907,832
Total Beds	2,429	2,429	2,639	2,639	2,419	2,645	2,602	3,072	3,372	3,372	3,372	3,372
REVENUES												
Student Rent Fall	13,058,000	13,920,000	15,443,000	15,752,000	15,134,000	18,448,000	19,213,000	24,345,000	27,939,000	28,498,000	29,068,000	29,649,000
Student Rent Summer	86,000	72,000	80,000	81,000	77,000	87,000	90,000	111,000	125,000	128,000	130,000	133,000
Student Rent Subtotal	***$13,144,000***	***$13,992,000***	***$15,523,000***	***$15,833,000***	***$15,211,000***	***$18,535,000***	***$19,303,000***	***$24,456,000***	***$28,064,000***	***$28,626,000***	***$29,198,000***	***$29,782,000***
Special & Clinic Rentals	$247,000	$209,000	$229,000	$234,000	$223,000	$252,000	$260,000	$319,000	$361,000	$368,000	$375,000	$383,000
Loss & Damage	$10,000	$9,000	$9,000	$10,000	$9,000	$10,000	$11,000	$13,000	$15,000	$15,000	$16,000	$16,000
Other Income	$316,000	$267,000	$293,000	$299,000	$285,000	$322,000	$333,000	$407,000	$461,000	$471,000	$480,000	$490,000
TOTAL REVENUE	**$13,717,000**	**$14,477,000**	**$16,054,000**	**$16,376,000**	**$15,728,000**	**$19,119,000**	**$19,907,000**	**$25,195,000**	**$28,901,000**	**$29,480,000**	**$30,069,000**	**$30,671,000**
EXPENSES												
Salaries and Benefits	($2,143,000)	($1,990,000)	($1,986,000)	($2,025,000)	($1,932,000)	($2,357,000)	($2,404,000)	($2,759,000)	($3,124,000)	($3,186,000)	($3,250,000)	($3,315,000)
Administrative	($488,000)	($450,000)	($452,000)	($461,000)	($440,000)	($536,000)	($547,000)	($628,000)	($711,000)	($725,000)	($740,000)	($755,000)
General	($659,000)	($609,000)	($610,000)	($623,000)	($594,000)	($724,000)	($739,000)	($848,000)	($960,000)	($979,000)	($999,000)	($1,019,000)
Custodial/Maintenance/Lighting	($682,000)	($637,000)	($632,000)	($645,000)	($615,000)	($750,000)	($765,000)	($878,000)	($994,000)	($1,014,000)	($1,034,000)	($1,055,000)
Telephone/Cable	($447,000)	($411,000)	($414,000)	($422,000)	($403,000)	($491,000)	($501,000)	($575,000)	($651,000)	($664,000)	($677,000)	($691,000)
Security	($9,000)	($9,000)	($9,000)	($9,000)	($8,000)	($10,000)	($10,000)	($12,000)	($14,000)	($14,000)	($14,000)	($14,000)
Engineering, Business, Honors, International	($25,000)	($21,000)	($23,000)	($23,000)	($22,000)	($27,000)	($28,000)	($32,000)	($36,000)	($37,000)	($37,000)	($38,000)
Miscelaneous	($16,000)	($13,000)	($15,000)	($15,000)	($14,000)	($17,000)	($18,000)	($20,000)	($23,000)	($24,000)	($24,000)	($24,000)
TOTAL EXPENSES	**($4,469,000)**	**($4,140,000)**	**($4,141,000)**	**($4,223,000)**	**($4,028,000)**	**($4,912,000)**	**($5,012,000)**	**($5,752,000)**	**($6,513,000)**	**($6,643,000)**	**($6,775,000)**	**($6,911,000)**
NET OPERATING INCOME	**$9,248,000**	**$10,337,000**	**$11,913,000**	**$12,153,000**	**$11,700,000**	**$14,207,000**	**$14,895,000**	**$19,443,000**	**$22,388,000**	**$22,837,000**	**$23,294,000**	**$23,760,000**
Additional Debt	$0	$0	$430,000	$430,000	$430,000	$2,513,000	$3,105,000	$5,317,000	$7,075,000	$7,075,000	$7,075,000	$7,075,000
Existing Debt	$3,758,000	$4,336,000	$6,176,000	$6,526,000	$6,708,000	$6,323,000	$6,386,000	$6,353,000	$6,328,000	$5,850,000	$5,980,000	$4,735,000
TOTAL DEBT SERVICE	**$3,758,000**	**$4,336,000**	**$6,606,000**	**$6,956,000**	**$7,138,000**	**$8,836,000**	**$9,491,000**	**$11,670,000**	**$13,403,000**	**$12,925,000**	**$13,055,000**	**$11,810,000**
DEBT COVERAGE RATIO	***2.46***	***2.38***	***1.80***	***1.75***	***1.64***	***1.61***	***1.57***	***1.67***	***1.67***	***1.77***	***1.78***	***2.01***
CASH FLOW AFTER DEBT SERVICE	**$5,490,000**	**$6,001,000**	**$5,307,000**	**$5,197,000**	**$4,562,000**	**$5,371,000**	**$5,404,000**	**$7,773,000**	**$8,985,000**	**$9,912,000**	**$10,239,000**	**$11,950,000**
OTHER ALLOCATIONS / TRANSFERS												
Data Processing, Insurance, Institutional Support	$1,556,000	$1,750,000	$1,785,000	$1,820,000	$1,857,000	$1,894,000	$1,932,000	$1,971,000	$2,010,000	$2,050,000	$2,091,000	$2,133,000
Renewal and Replacement	$108,000	$425,000	$462,000	$462,000	$423,000	$463,000	$455,000	$538,000	$590,000	$590,000	$590,000	$590,000
ANNUAL CASH FLOW	**$5,382,000**	**$5,576,000**	**$4,845,000**	**$4,735,000**	**$4,139,000**	**$4,908,000**	**$4,949,000**	**$7,235,000**	**$8,395,000**	**$9,322,000**	**$9,649,000**	**$11,360,000**
ANNUAL RESERVE CONTRIBUTION	***$3,826,000***	***$3,826,000***	***$3,060,000***	***$2,915,000***	***$2,282,000***	***$3,014,000***	***$3,017,000***	***$5,264,000***	***$6,385,000***	***$7,272,000***	***$7,558,000***	***$9,227,000***
RESERVE BALANCE (Before Project Cap. Contrib)	***$15,351,019***	***$19,177,019***	***$22,237,019***	***$25,152,019***	***$27,434,019***	***$30,448,019***	***$33,465,019***	***$38,729,019***	***$45,114,019***	***$52,386,019***	***$59,944,019***	***$69,171,019***

Tennessee Technological University
System-Wide Housing Model
Facilities Status Matrix

Facility Status	Construction	During Renovation	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Browning Hall	0	0%	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Evins Hall	0	0%	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Cooper Hall	Medium Renovation	0%	Under Constr.	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno
Dunn Hall	Medium Renovation	0%	Under Constr.	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno
Crawford Hall	0	0%	On-line	On-line	On-line	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line
Ellington Hall	Medium Renovation	0%	On-line	On-line	On-line	On-line	On-line	Under Constr.	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno
Warf Hall	Medium Renovation	0%	On-line	On-line	On-line	On-line	On-line	Under Constr.	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno
Jobe Hall	0	0%	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Murphy Hall	0	0%	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Maddux Hall	0	0%	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
McCord Hall	0	0%	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
MSCooper Hall	Medium Renovation	0%	On-line	On-line	On-line	On-line	Under Constr.	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno
Pinkerton Hall	Medium Renovation	0%	On-line	On-line	On-line	On-line	Under Constr.	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno
New Hall North	0	0%	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
New Hall South	0	0%	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
Tech Village	0	0%	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line	On-line
NEW PROJECT #1	New Construction	0%	Off-line	Off-line	Off-line	Under Constr.	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno
NEW PROJECT #2	New Construction	0%	Off-line	Off-line	Off-line	Off-line	Off-line	Under Constr.	New / Reno	New / Reno	New / Reno	New / Reno	New / Reno
NEW PROJECT #3	New Construction	0%	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line	Under Constr.	New / Reno	New / Reno	New / Reno	New / Reno

Tennessee Technological University
System-Wide Housing Model
Operating Assumptions

	Expenses	Non-Rent Revenue	Avg. Rent Rev. Per RH
Inflation Assumptions	2.00%	2.00%	2.00%
One-time Premium (New Construction/Reno Beds)	15.0%		
R&R reserve (0-20 years)	$175		

	BASE YEAR		Browning Hall	Evins Hall	Cooper Hall	Dunn Hall	Crawford Hall	Ellington Hall	Warf Hall	Jobe Hall	Murphy Hall	Maddux Hall	McCord Hall	MSCooper Hall	Pinkerton Hall	New Hall North	New Hall South	Tech Village	NEW PROJECT #1	NEW PROJECT #2	NEW PROJECT #3
Gross Square Feet	*729,616*		*28,163*	*28,059*	*23,512*	*23,507*	*42,042*	*23,438*	*23,507*	*35,462*	*31,170*	*28,718*	*27,217*	*28,684*	*26,635*	*94,400*	*92,680*	*172,422*	*120,000*	*90,000*	*90,000*
Annual Rental Revenue Inflation Per RH			***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***	***2.00%***
	FY 2019	**Per GSF**																			
Rental Summer Term	*$85,889*	*$0.12*	*$3,315*	*$3,303*	*$2,768*	*$2,767*	*$4,949*	*$2,759*	*$2,767*	*$4,175*	*$3,669*	*$3,381*	*$3,204*	*$3,377*	*$3,135*	*$11,113*	*$10,910*	*$20,297*	*$14,126*	*$10,595*	*$10,595*
Special & Clinic Rentals	$247,417	$0.34	$9,550	$9,515	$7,973	$7,971	$14,257	$7,948	$7,971	$12,025	$10,570	$9,738	$9,229	$9,727	$9,032	$32,012	$31,428	$58,469	$40,693	$30,520	$30,520
Loss & Damage	$10,231	$0.01	$395	$393	$330	$330	$590	$329	$330	$497	$437	$403	$382	$402	$373	$1,324	$1,300	$2,418	$1,683	$1,262	$1,262
Other Income	$316,433	$0.43	$12,214	$12,169	$10,197	$10,195	$18,234	$10,165	$10,195	$15,380	$13,518	$12,455	$11,804	$12,440	$11,552	$40,941	$40,195	$74,779	$52,044	$39,033	$39,033
Total Non-Rental Revenues	**$574,081**	**$0.79**	**$22,159**	**$22,078**	**$18,500**	**$18,496**	**$33,080**	**$18,442**	**$18,496**	**$27,902**	**$24,525**	**$22,596**	**$21,415**	**$22,569**	**$20,957**	**$74,276**	**$72,923**	**$135,666**	**$94,419**	**$70,814**	**$70,814**
TOTAL NON-RENTAL REV PER SF	**$0.79**		**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**	**$0.79**
Salaries and Benefits	($2,142,816)	($2.94)	($82,712)	($82,407)	($69,053)	($69,038)	($123,474)	($68,835)	($69,038)	($104,149)	($91,543)	($84,342)	($79,934)	($84,242)	($78,225)	($277,244)	($272,193)	($506,388)	($352,429)	($264,322)	($264,322)
Administrative	($487,749)	($0.67)	($18,827)	($18,757)	($15,718)	($15,714)	($28,105)	($15,668)	($15,714)	($23,706)	($20,837)	($19,198)	($18,195)	($19,175)	($17,806)	($63,107)	($61,957)	($115,264)	($80,220)	($60,165)	($60,165)
General	($658,674)	($0.90)	($25,425)	($25,331)	($21,226)	($21,221)	($37,954)	($21,159)	($21,221)	($32,014)	($28,139)	($25,926)	($24,571)	($25,895)	($24,045)	($85,221)	($83,669)	($155,657)	($108,332)	($81,249)	($81,249)
Custodial/Maintenance/Lighting	($681,932)	($0.93)	($26,322)	($26,225)	($21,975)	($21,971)	($39,294)	($21,906)	($21,971)	($33,144)	($29,133)	($26,841)	($25,438)	($26,809)	($24,894)	($88,231)	($86,623)	($161,153)	($112,157)	($84,118)	($84,118)
Telephone/Cable	($446,558)	($0.61)	($17,237)	($17,173)	($14,390)	($14,387)	($25,732)	($14,345)	($14,387)	($21,704)	($19,077)	($17,577)	($16,658)	($17,556)	($16,302)	($57,777)	($56,724)	($105,530)	($73,445)	($55,084)	($55,084)
Security	($9,270)	($0.01)	($358)	($357)	($299)	($299)	($534)	($298)	($299)	($451)	($396)	($365)	($346)	($364)	($338)	($1,199)	($1,178)	($2,191)	($1,525)	($1,143)	($1,143)
Engineering, Business, Honors, International	($24,640)	($0.03)	($951)	($948)	($794)	($794)	($1,420)	($792)	($794)	($1,198)	($1,053)	($970)	($919)	($969)	($899)	($3,188)	($3,130)	($5,823)	($4,052)	($3,039)	($3,039)
Summer Conferences	($15,805)	($0.02)	($610)	($608)	($509)	($509)	($911)	($508)	($509)	($768)	($675)	($622)	($590)	($621)	($577)	($2,045)	($2,008)	($3,735)	($2,599)	($1,950)	($1,950)
Total Expenses	**($4,467,444)**	**($6.12)**	**($172,442)**	**($171,805)**	**($143,964)**	**($143,934)**	**($257,423)**	**($143,511)**	**($143,934)**	**($217,134)**	**($190,854)**	**($175,841)**	**($166,650)**	**($175,632)**	**($163,086)**	**($578,012)**	**($567,480)**	**($1,055,741)**	**($734,761)**	**($551,071)**	**($551,071)**
TOTAL COSTS PER SF	**($6.12)**		**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**	**($6.12)**

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Survey Results

Tennessee Tech University - Spring 2020

Description:
Date Created: 2/6/2020 3:55:34 PM
Date Range: 4/7/2020 12:00:00 AM - 4/24/2020 11:59:00 PM
Total Respondents: 1401

Q1. What is your current position on campus?		
Count	Percent	
368	26.27%	First-Time Freshman
241	17.20%	Sophomore
241	17.20%	Junior
197	14.06%	Senior
56	4.00%	Graduate/Professional student
283	20.20%	Faculty / Staff member
15	1.07%	Other
1401	Respondents	

Q2. What is your current status?		
Count	Percent	
1053	95.99%	Full time
44	4.01%	Part time
1097	Respondents	

Q3. What is your marital/family status?		
Count	Percent	
1060	77.60%	Single without child(ren)/dependent(s)
33	2.42%	Single with child(ren)/dependent(s)
120	8.78%	Married/partnered without child(ren)/dependent(s)
153	11.20%	Married/partnered with child(ren)/dependent(s)
1366	Respondents	

Q4. Where are you currently living while attending Tennessee Tech?		
Count	Percent	
525	50.34%	On campus
518	49.66%	Off campus
1043	Respondents	

Q5. Which years have you lived in Tennessee Tech's student housing? SELECT ALL THAT APPLY, INCLUDING PARTIAL YEARS.

Count	Respondent %	Response %	
228	21.82%	15.80%	None
736	70.43%	51.00%	First year
278	26.60%	19.27%	Sophomore year
143	13.68%	9.91%	Junior year
52	4.98%	3.60%	Senior year (including fifth year and beyond)
6	0.57%	0.42%	Graduate/professional year(s)
1045	Respondents		
1443	Responses		

Q6. How important was the availability of on-campus housing in your decision to attend Tennessee Tech?

Count	Percent	
320	30.62%	Very important
320	30.62%	Important
278	26.60%	Unimportant
127	12.15%	Very unimportant
1045	Respondents	

Q7. If currently living in Tennessee Tech's student housing, in which building do you reside?

Count	Percent	
31	6.03%	Browning & Evins Halls
0	0.00%	Cooper & Dunn Halls
64	12.45%	Crawford Halls
34	6.61%	Ellington & Warf Halls
71	13.81%	Jobe & Murphy Halls
54	10.51%	Maddux & McCord Halls
26	5.06%	M.S. Cooper & Pinkerton Halls
85	16.54%	New Hall North
62	12.06%	New Hall South
87	16.93%	Tech Village Apartments
514	Respondents	

Q8. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus helped acclimate me to life at Tennessee Tech.

Count	Percent	
389	50.65%	Strongly agree
321	41.80%	Agree
40	5.21%	Disagree
18	2.34%	Strongly disagree
768	Respondents	

Q9. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus provided me with a sense of community.

Count	Percent	
257	33.64%	Strongly agree
323	42.28%	Agree
147	19.24%	Disagree
37	4.84%	Strongly disagree
764	Respondents	

Q10. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus had a positive influence on my academic performance.

Count	Percent	
277	36.11%	Strongly agree
351	45.76%	Agree
109	14.21%	Disagree
30	3.91%	Strongly disagree
767	Respondents	

Q11. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus provided me with a safe, secure environment.

Count	Percent	
365	48.09%	Strongly agree
336	44.27%	Agree
45	5.93%	Disagree
13	1.71%	Strongly disagree
759	Respondents	

Q12. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus provided me with leadership opportunities.

Count	Percent	
142	18.59%	Strongly agree
298	39.01%	Agree
261	34.16%	Disagree
63	8.25%	Strongly disagree
764	Respondents	

Q13. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus introduced me to new friends.

Count	Percent	
368	48.55%	Strongly agree
285	37.60%	Agree
78	10.29%	Disagree
27	3.56%	Strongly disagree
758	Respondents	

Q14. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus provided me with a convenient living option.

Count	Percent	
447	58.28%	Strongly agree
263	34.29%	Agree
37	4.82%	Disagree
20	2.61%	Strongly disagree
767	Respondents	

Q15. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus provided me with a cost effective living option.

Count	Percent	
105	13.83%	Strongly agree
207	27.27%	Agree
248	32.67%	Disagree
199	26.22%	Strongly disagree
759	Respondents	

Q16. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus helped me learn about people different from me.

Count	Percent	
208	27.33%	Strongly agree
342	44.94%	Agree
165	21.68%	Disagree
46	6.04%	Strongly disagree
761	Respondents	

Q17. If you have lived in university student housing at any time, please indicate your level of agreement with each of the following statements: - Living on campus encouraged me to become more involved at Tennessee Tech.

Count	Percent	
218	28.87%	Strongly agree
310	41.06%	Agree
179	23.71%	Disagree
48	6.36%	Strongly disagree
755	Respondents	

Q18. Compared to other college or university student housing with which you are familiar, how would you rate Tennessee Tech's student housing?

Count	Percent	
87	9.92%	Very satisfactory
404	46.07%	Satisfactory
96	10.95%	Unsatisfactory
23	2.62%	Very unsatisfactory
267	30.44%	Not familiar with any other college or university student housing
877	Respondents	

Q19. Where do you currently live off campus?

Count	Percent	
241	53.08%	Apartment/condo rented
5	1.10%	Apartment/condo owned by me or my spouse/partner
5	1.10%	Apartment/condo owned by a family member other than a spouse/partner
51	11.23%	House rented
20	4.41%	House owned by me or my spouse/partner
23	5.07%	House owned by a family member other than a spouse/partner
2	0.44%	Individual room rented in a house
96	21.15%	With parents or other family members other than a spouse/partner
11	2.42%	Other (please specify)
454	Respondents	

Q20. Do you rent an apartment in any of the following buildings?

Count	Percent	
21	8.79%	Campus Edge Apartments
6	2.51%	Chelsea Place Apartments
2	0.84%	Cherokee Court Apartments
0	0.00%	College Court Apartments
0	0.00%	Cypress Creek Apartments
1	0.42%	Eagles Bend Apartments
14	5.86%	Eagles Landing Apartments
7	2.93%	Eagles Summit Apartments
9	3.77%	Eagle Village Apartments
2	0.84%	Hampton Creek Apartments
0	0.00%	Laurel Creek Apartments
3	1.26%	Myleigh Apartments
10	4.18%	Saxony Apartments
1	0.42%	Terrace View Townhomes
0	0.00%	The Edge Apartments
5	2.09%	The Gables at Veterans
11	4.60%	University Center Townhomes
1	0.42%	University Towers
14	5.86%	Washington Place Apartments
1	0.42%	Willow Park Apartments
131	54.81%	No, I live in a different apartment complex.
239	Respondents	

Q21. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Total cost of rent and utilities

Count	Percent	
465	61.10%	Very important
211	27.73%	Important
59	7.75%	Unimportant
26	3.42%	Very unimportant
761	Respondents	

Q22. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Availability of my preferred housing unit type (double room, private room, apartment, suite, etc.)

Count	Percent	
378	49.41%	Very important
262	34.25%	Important
88	11.50%	Unimportant
37	4.84%	Very unimportant
765	Respondents	

Q23. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Ability to choose my own roommate(s)

Count	Percent	
418	54.64%	Very important
192	25.10%	Important
104	13.59%	Unimportant
51	6.67%	Very unimportant
765	Respondents	

Q24. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Parent's or family's wishes

Count	Percent	
160	21.08%	Very important
261	34.39%	Important
212	27.93%	Unimportant
126	16.60%	Very unimportant
759	Respondents	

Q25. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Proximity to classes

Count	Percent	
359	47.24%	Very important
285	37.50%	Important
84	11.05%	Unimportant
32	4.21%	Very unimportant
760	Respondents	

Q26. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Proximity to other students

Count	Percent	
115	15.07%	Very important
245	32.11%	Important
284	37.22%	Unimportant
119	15.60%	Very unimportant
763	Respondents	

Q27. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Proximity to, or availability of, convenient parking or public transportation

Count	Percent	
301	39.76%	Very important
252	33.29%	Important
132	17.44%	Unimportant
72	9.51%	Very unimportant
757	Respondents	

Q28. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Proximity to my work

Count	Percent	
158	20.95%	Very important
222	29.44%	Important
214	28.38%	Unimportant
160	21.22%	Very unimportant
754	Respondents	

Q29. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Proximity to shopping, entertainment, or restaurants

Count	Percent	
88	11.80%	Very important
217	29.09%	Important
289	38.74%	Unimportant
152	20.38%	Very unimportant
746	Respondents	

Q30. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Reliability of maintenance and custodial services

Count	Percent	
257	34.54%	Very important
309	41.53%	Important
118	15.86%	Unimportant
60	8.06%	Very unimportant
744	Respondents	

Q31. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Opportunity to live in a building that has the physical features I desire (furnished, modern, well maintained, attractive, etc.)

Count	Percent	
207	27.38%	Very important
320	42.33%	Important
172	22.75%	Unimportant
57	7.54%	Very unimportant
756	Respondents	

Q32. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Flexible lease/rental terms

Count	Percent	
227	29.83%	Very important
304	39.95%	Important
162	21.29%	Unimportant
68	8.94%	Very unimportant
761	Respondents	

Q33. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Opportunity to be involved in university residential communities (living & learning villages, academic villages, etc.)

Count	Percent	
100	13.19%	Very important
165	21.77%	Important
305	40.24%	Unimportant
188	24.80%	Very unimportant
758	Respondents	

Q34. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Availability of a private (single) bedroom

Count	Percent	
314	41.15%	Very important
190	24.90%	Important
167	21.89%	Unimportant
92	12.06%	Very unimportant
763	Respondents	

Q35. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Availability of a private bathroom

Count	Percent	
329	43.75%	Very important
189	25.13%	Important
169	22.47%	Unimportant
65	8.64%	Very unimportant
752	Respondents	

Q36. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Availability of additional living space outside my bedroom but within my unit

Count	Percent	
261	34.39%	Very important
264	34.78%	Important
168	22.13%	Unimportant
66	8.70%	Very unimportant
759	Respondents	

Q37. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Availability of a kitchen

Count	Percent	
405	53.86%	Very important
180	23.94%	Important
120	15.96%	Unimportant
47	6.25%	Very unimportant
752	Respondents	

Q38. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Availability of convenient laundry facilities

Count	Percent	
469	61.63%	Very important
217	28.52%	Important
51	6.70%	Unimportant
24	3.15%	Very unimportant
761	Respondents	

Q39. Please rate how important each of the following factors was in your decision on where to live this year: SELECT ONE RESPONSE FOR EACH FACTOR - Access to campus dining

Count	Percent	
227	29.91%	Very important
201	26.48%	Important
189	24.90%	Unimportant
142	18.71%	Very unimportant
759	Respondents	

Q40. Who made the decision regarding where you lived this year?

Count	Percent	
371	47.93%	I did solely
13	1.68%	My parent(s)/guardian(s) solely
320	41.34%	My parent(s)/guardian(s) and I jointly
40	5.17%	My spouse/partner and I jointly
30	3.88%	Other (please specify)
774	Respondents	

Q41. Where do you plan to live next year?		
Count	Percent	
193	24.97%	On campus
437	56.53%	Off campus
65	8.41%	Undecided on where to live
78	10.09%	Not applicable; I will not be attending Tennessee Tech next year.
773	Respondents	

Q42. If considering living OFF CAMPUS next year, why would you prefer to do so? SELECT ALL THAT APPLY			
Count	Respondent %	Response %	
14	2.87%	0.31%	I may not be attending Tennessee Tech next year
16	3.28%	0.36%	I am ineligible to live in Tennessee Tech's student housing
193	39.55%	4.34%	To live in a quieter environment
30	6.15%	0.67%	To satisfy my parent's/family's wishes
266	54.51%	5.98%	Fewer rules and regulations
114	23.36%	2.56%	Proximity to amenities and services (e.g. restaurants, grocery stores, etc.)
104	21.31%	2.34%	Proximity to non-academic interests (e.g. job, church, activities, etc.)
221	45.29%	4.97%	More convenient parking or public transportation
429	87.91%	9.64%	More cost effective
292	59.84%	6.56%	Better living unit amenities
225	46.11%	5.06%	Ability to live with or near friends
103	21.11%	2.32%	Ability to live with or near family or partner
377	77.25%	8.48%	More privacy
391	80.12%	8.79%	More living space
298	61.07%	6.70%	No meal plan requirement
378	77.46%	8.50%	Access to my own kitchen
288	59.02%	6.47%	More convenient laundry facilities
173	35.45%	3.89%	Better physical condition of the building
105	21.52%	2.36%	Better building management and staffing
112	22.95%	2.52%	Better maintenance and housekeeping services
105	21.52%	2.36%	To live away from other students
179	36.68%	4.02%	To have a pet
35	7.17%	0.79%	Other (please specify)
488	Respondents		
4448	Responses		

Q43. With whom do you currently live?

Count	Percent	
52	13.44%	I live alone
142	36.69%	With other Tennessee Tech roommate(s)
14	3.62%	With other non-Tennessee Tech roommate(s)
17	4.39%	With both Tennessee Tech and non-Tennessee Tech roommate(s)
8	2.07%	With members of my Tennessee Tech Greek community.
93	24.03%	With my parent(s) or other relative(s)
50	12.92%	With my spouse/partner and/or children
11	2.84%	Other (please specify)
387	Respondents	

Q44. How do you typically get to and from campus?

Count	Percent	
73	18.96%	Walk
252	65.45%	Drive alone
43	11.17%	Drive/ride with others
8	2.08%	Ride a bicycle/motorcycle
1	0.26%	Ride the Tennessee Tech shuttle bus
1	0.26%	Ride public transportation
7	1.82%	Other (please specify)
385	Respondents	

Q45. How long is your typical one-way commute to campus?

Count	Percent	
133	34.55%	Less than 5 minutes
146	37.92%	5 - 10 minutes
48	12.47%	11 - 20 minutes
19	4.94%	21 - 30 minutes
4	1.04%	31 - 40 minutes
16	4.16%	41 - 50 minutes
19	4.94%	More than 50 minutes
385	Respondents	

Q46. What is your personal share of monthly rent/housing costs excluding utilities?

Count	Percent	
3	1.20%	Less than $100
7	2.79%	$100 - $199
38	15.14%	$200 - $299
62	24.70%	$300 - $399
61	24.30%	$400 - $499
35	13.94%	$500 - $599
23	9.16%	$600 - $699
8	3.19%	$700 - $799
3	1.20%	$800 - $899
0	0.00%	$900 - $999
0	0.00%	$1,000 - $1,099
0	0.00%	$1,100 - $1,199
1	0.40%	$1,200 and over
10	3.98%	I don't know
251	Respondents	

Q47. In addition to your rent, for which of the following utilities do you currently pay? SELECT ALL THAT APPLY

Count	Respondent %	Response %	
56	22.40%	7.48%	Not applicable; I do not pay for any utilities
36	14.40%	4.81%	Cable/satellite television
76	30.40%	10.15%	Heat
167	66.80%	22.30%	Internet
177	70.80%	23.63%	Electric
110	44.00%	14.69%	Water
78	31.20%	10.41%	Sewer
26	10.40%	3.47%	Telephone
23	9.20%	3.07%	Trash
250	Respondents		
749	Responses		

Q48. How much is your individual monthly cost for all the utilities selected in the previous question?

Count	Percent	
6	3.11%	Less than $25
41	21.24%	$25 - $49
77	39.90%	$50 - $99
36	18.65%	$100 - $149
14	7.25%	$150 - $199
9	4.66%	$200 or more
10	5.18%	Don't know
193	Respondents	

Q49. How long is your current lease?

Count	Percent	
10	4.00%	Not applicable; I have no lease
4	1.60%	More than 12 months
168	67.20%	12 months
10	4.00%	Academic year (approximately 9 months)
10	4.00%	Academic term (e.g., semester)
37	14.80%	Monthly
11	4.40%	Other (please specify)
250	Respondents	

Q50. If all of the unit types described above were available on Tennessee Tech's campus at the rents outlined, what would have been your living preference for this academic year (2019-2020)?

Count	Percent	
57	23.55%	Unit A: Traditional - Double (shared bedroom): $2,990 /Semester/Person
24	9.92%	Unit B: Traditional - Single (private bedroom): $3,110 /Semester/Person
28	11.57%	Unit C: Semi-Suite - Two-Bedroom Double (shared bedrooms): $3,310 /Semester/Person
61	25.21%	Unit D: Semi-Suite - Two Bedroom Single (private bedrooms): $3,600 /Semester/Person
12	4.96%	Unit E: Semi-Suite - One Bedroom Double (shared bedroom): $4,070 /Semester/Person
25	10.33%	Unit F: Semi-Suite - One Bedroom Single (private bedroom): $4,520 /Semester/Person
35	14.46%	I would have preferred not to live on campus
242	Respondents	

Q51. If your preferred unit type were unavailable, what would your second choice have been for this academic year?

Count	Percent	
35	16.99%	Unit A: Traditional - Double (shared bedroom): $2,990 /Semester/Person
47	22.82%	Unit B: Traditional - Single (private bedroom): $3,110 /Semester/Person
36	17.48%	Unit C: Semi-Suite - Two-Bedroom Double (shared bedrooms): $3,310 /Semester/Person
23	11.17%	Unit D: Semi-Suite - Two Bedroom Single (private bedrooms): $3,600 /Semester/Person
23	11.17%	Unit E: Semi-Suite - One Bedroom Double (shared bedroom): $4,070 /Semester/Person
27	13.11%	Unit F: Semi-Suite - One Bedroom Single (private bedroom): $4,520 /Semester/Person
15	7.28%	I would have preferred not to live on campus
206	Respondents	

Q52. If all of the unit types described above were available on Tennessee Tech's campus at the rents outlined, what would have been your living preference for this academic year (2019-2020)?

Count	Percent	
38	7.29%	Unit A: Traditional - Double (shared bedroom): $2,990 /Semester/Person
5	0.96%	Unit B: Semi-Suite - Two-Bedroom Double (shared bedrooms): $3,310 /Semester/Person
37	7.10%	Unit C: Semi-Suite - Two Bedroom Single (private bedrooms): $3,600 /Semester/Person
34	6.53%	Unit D: Semi-Suite - One Bedroom Single (private bedroom): $4,520 /Semester/Person
8	1.54%	Unit E: Full Suite - Two Bedroom Double (shared bedrooms): $4,410 /Semester/Person
9	1.73%	Unit F: Full Suite - Four Bedroom Single (private bedrooms): $4,910 /Semester/Person
66	12.67%	Unit G: 1BR Apartment Single (private bedroom): $5,400 /Semester/Person
96	18.43%	Unit H: 2BR Apartment Double (shared bedrooms): $1,800 /Semester/Person
90	17.27%	Unit I: 4BR Apartment Single (private bedrooms): $3,150 /Semester/Person
138	26.49%	I would have preferred not to live on campus
521	Respondents	

Q53. If your preferred unit type were unavailable, what would your second choice have been for this academic year?		
Count	Percent	
37	9.87%	Unit A: Traditional - Double (shared bedroom): $2,990 /Semester/Person
28	7.47%	Unit B: Semi-Suite - Two-Bedroom Double (shared bedrooms): $3,310 /Semester/Person
49	13.07%	Unit C: Semi-Suite - Two Bedroom Single (private bedrooms): $3,600 /Semester/Person
36	9.60%	Unit D: Semi-Suite - One Bedroom Single (private bedroom): $4,520 /Semester/Person
10	2.67%	Unit E: Full Suite - Two Bedroom Double (shared bedrooms): $4,410 /Semester/Person
24	6.40%	Unit F: Full Suite - Four Bedroom Single (private bedrooms): $4,910 /Semester/Person
35	9.33%	Unit G: 1BR Apartment Single (private bedroom): $5,400 /Semester/Person
55	14.67%	Unit H: 2BR Apartment Double (shared bedrooms): $1,800 /Semester/Person
39	10.40%	Unit I: 4BR Apartment Single (private bedrooms): $3,150 /Semester/Person
62	16.53%	I would have preferred not to live on campus
375	Respondents	

Q54. If the apartment you selected was unavailable, would you live in another unit type on campus?		
Count	Percent	
47	16.79%	Yes, I would live in a traditional unit.
39	13.93%	Yes, I would live in a semi-suite unit.
38	13.57%	Yes, I would live in a full suite unit.
156	55.71%	No, I would have preferred not to live on campus
280	Respondents	

Q55. Are/were you affiliated with a Living & Learning Village?		
Count	Percent	
141	25.31%	Yes, I am/was affiliated with an Living & Learning Village
280	50.27%	No, I am/was not affiliated with an Academic or Living & Learning Village
136	24.42%	Not sure
557	Respondents	

Q56. With which Living & Learning Village are/were you affiliated?		
Count	Percent	
11	7.80%	Arts & Media Village
7	4.96%	The Cave: Men's Village
26	18.44%	Crawford Village: Women's Village
13	9.22%	The Embassy: Global Village
26	18.44%	Engineering Village
29	20.57%	Service & Leadership Learning Village
19	13.48%	The Treehouse: Engineering Village
10	7.09%	Not sure / Do not remember
141	Respondents	

Q57. How would you describe your experience living in a Living & Learning Village?		
Count	Percent	
38	26.95%	Very satisfactory
90	63.83%	Satisfactory
9	6.38%	Unsatisfactory
4	2.84%	Very unsatisfactory
141	Respondents	

Q58. How important was the availability of a Living & Learning Village in your decision to attend Tennessee Tech?		
Count	Percent	
16	11.35%	Very important
25	17.73%	Important
50	35.46%	Unimportant
50	35.46%	Very unimportant
141	Respondents	

Q59. In general, how satisfied are you with Tennessee Tech's current dining program?		
Count	Percent	
117	11.96%	Very satisfied
606	61.96%	Satisfied
201	20.55%	Dissatisfied
54	5.52%	Very dissatisfied
978	Respondents	

Q60. Did you have a meal plan this semester?

Count		Percent	
545		55.73%	No
119		12.17%	Gold Plus; Unlimited Everyday cafeteria access, $225 Dining dollars, 1 Daily Meal Exchange, and 8 Guest Meals
25		2.56%	Gold; Unlimited Everyday cafeteria access, $225 Dining dollars, and 6 Guest Meals
73		7.46%	Purple Plus; Unlimited Mon-Fri cafeteria access, $225 Dining dollars, 1 Daily Meal Exchange, and 8 Guest Meals
42		4.29%	Purple; Unlimited Everyday cafeteria access, $225 Dining dollars, and 6 Guest Meals
30		3.07%	Tech 95; 95 Meals per semester, $400 Dining dollars, and Meal Exchange option for all meals
40		4.09%	Tech 65; 65 Meals per semester, $200 Dining dollars, and Meal Exchange option for all meals
22		2.25%	Tech 40; 40 Meals per semester, $100 Dining dollars, and Meal Exchange option for all meals
15		1.53%	Eagle 10; 10 Meals per week, $300 Dining dollars, Meal Exchange option for all meals, and 4 Guest Meals/Semester
5		0.51%	Eagle 7; 7 Meals per week, $400 Dining dollars, Meal Exchange option for all meals, and 4 Guest Meals/Semester
62		6.34%	Eagle 300; $300 Dining dollars per Semester
978	Respondents		

Q61. How satisfied are you with your current meal plan?

Count		Percent	
113		26.10%	Very satisfied
243		56.12%	Satisfied
59		13.63%	Dissatisfied
18		4.16%	Very dissatisfied
433	Respondents		

Q62. Which of the following characteristics below reflect your satisfaction with the dining program? SELECT UP TO THREE (3) RESPONSES.

Count		Respondent %	Response %	
80		22.60%	8.37%	The food offered meets my dietary needs
125		35.31%	13.08%	I like the food quality
128		36.16%	13.39%	I like the food variety
158		44.63%	16.53%	The dollar allowance on my plan aligns with my dining needs
106		29.94%	11.09%	Venue hours of operation accommodate my schedule well
146		41.24%	15.27%	Existing dining options are conveniently located relative to my current living arrangement
41		11.58%	4.29%	Existing dining options are affordable
166		46.89%	17.36%	Ability to socialize with friends and classmates over meals
6		1.69%	0.63%	Other (please specify)
354	Respondents			
956	Responses			

Q63. Which characteristics below reflect your dissatisfaction with the dining program? (SELECT UP TO THREE)

Count	Respondent %	Response %	
12	15.58%	6.00%	The food offered does not meet my dietary needs
21	27.27%	10.50%	I don't eat on campus enough to fully use my meal plan
32	41.56%	16.00%	I dislike the food quality on campus
36	46.75%	18.00%	I dislike the food variety on campus
12	15.58%	6.00%	The amount of meals on my plan do not align with the amount of times I want to eat on campus
17	22.08%	8.50%	The hours of operation do not accommodate my schedule
3	3.90%	1.50%	The location of dining venues do not accommodate my schedule
12	15.58%	6.00%	The speed of service does not accommodate my schedule
3	3.90%	1.50%	On-campus dining atmosphere is not appealing
41	53.25%	20.50%	The value of the meal plan does not align with the cost of the meal plan
11	14.29%	5.50%	Other (please specify)
77	Respondents		
200	Responses		

Q64. How important is each of the following factors when selecting a place to eat on campus? - Weekday hours of operation that accommodate my schedule

Count	Percent	
560	60.34%	Very important
296	31.90%	Important
50	5.39%	Unimportant
22	2.37%	Very unimportant
928	Respondents	

Q65. How important is each of the following factors when selecting a place to eat on campus? - Weekend hours of operation that accommodate my schedule

Count	Percent	
317	34.76%	Very important
251	27.52%	Important
204	22.37%	Unimportant
140	15.35%	Very unimportant
912	Respondents	

Q66. How important is each of the following factors when selecting a place to eat on campus? - Atmosphere (overall ambiance, decor, seating, lighting)

Count	Percent	
183	19.93%	Very important
448	48.80%	Important
227	24.73%	Unimportant
60	6.54%	Very unimportant
918	Respondents	

Q67. How important is each of the following factors when selecting a place to eat on campus? - Facility design amenities (Wi-Fi, electrical outlets, etc.)

Count	Percent	
293	32.16%	Very important
381	41.82%	Important
180	19.76%	Unimportant
57	6.26%	Very unimportant
911	Respondents	

Q68. How important is each of the following factors when selecting a place to eat on campus? - Space supporting socializing (wall divides, designated spaces for small groups, hang-out seating, etc.)

Count	Percent	
244	26.55%	Very important
418	45.48%	Important
196	21.33%	Unimportant
61	6.64%	Very unimportant
919	Respondents	

Q69. How important is each of the following factors when selecting a place to eat on campus? - Location convenience

Count	Percent	
464	50.16%	Very important
402	43.46%	Important
38	4.11%	Unimportant
21	2.27%	Very unimportant
925	Respondents	

Q70. How important is each of the following factors when selecting a place to eat on campus? - Speed of service

Count	Percent	
509	55.15%	Very important
350	37.92%	Important
49	5.31%	Unimportant
15	1.63%	Very unimportant
923	Respondents	

Q71. How important is each of the following factors when selecting a place to eat on campus? - Quality of service

Count	Percent	
578	62.83%	Very important
296	32.17%	Important
32	3.48%	Unimportant
14	1.52%	Very unimportant
920	Respondents	

Q72. How important is each of the following factors when selecting a place to eat on campus? - Quality of food

Count	Percent	
724	78.61%	Very important
172	18.68%	Important
14	1.52%	Unimportant
11	1.19%	Very unimportant
921	Respondents	

Q73. How important is each of the following factors when selecting a place to eat on campus? - Value for price

Count	Percent	
671	72.78%	Very important
224	24.30%	Important
16	1.74%	Unimportant
11	1.19%	Very unimportant
922	Respondents	

Q74. How important is each of the following factors when selecting a place to eat on campus? - National Brand Food Provider

Count	Percent	
151	16.34%	Very important
303	32.79%	Important
361	39.07%	Unimportant
109	11.80%	Very unimportant
924	Respondents	

Q75. How important is each of the following factors when selecting a place to eat on campus? - Menu variety

Count	Percent	
434	47.28%	Very important
412	44.88%	Important
52	5.66%	Unimportant
20	2.18%	Very unimportant
918	Respondents	

Q76. How important is each of the following factors when selecting a place to eat on campus? - Diet / allergy / restriction conscious (gluten free, vegan, kosher)

Count	Percent	
247	26.82%	Very important
240	26.06%	Important
278	30.18%	Unimportant
156	16.94%	Very unimportant
921	Respondents	

Q77. How satisfied are you with Dining Services with respect to the following factors? - Weekday hours of operation

Count	Percent	
315	34.28%	Very satisfied
524	57.02%	Satisfied
60	6.53%	Dissatisfied
20	2.18%	Very dissatisfied
919	Respondents	

Q78. How satisfied are you with Dining Services with respect to the following factors? - Weekend hours of operation

Count	Percent	
185	20.46%	Very satisfied
482	53.32%	Satisfied
169	18.69%	Dissatisfied
68	7.52%	Very dissatisfied
904	Respondents	

Q79. How satisfied are you with Dining Services with respect to the following factors? - Atmosphere (overall ambiance, decor, seating, lighting)

Count	Percent	
246	27.09%	Very satisfied
596	65.64%	Satisfied
51	5.62%	Dissatisfied
15	1.65%	Very dissatisfied
908	Respondents	

Q80. How satisfied are you with Dining Services with respect to the following factors? - Facility design amenities (Wi-Fi, electrical outlets, etc.)

Count	Percent	
212	23.43%	Very satisfied
580	64.09%	Satisfied
93	10.28%	Dissatisfied
20	2.21%	Very dissatisfied
905	Respondents	

Q81. How satisfied are you with Dining Services with respect to the following factors? - Space supporting socializing (wall divides, designated spaces for small groups, hang-out seating, etc.)

Count	Percent	
230	25.30%	Very satisfied
568	62.49%	Satisfied
92	10.12%	Dissatisfied
19	2.09%	Very dissatisfied
909	Respondents	

Q82. How satisfied are you with Dining Services with respect to the following factors? - Location convenience

Count	Percent	
345	37.79%	Very satisfied
509	55.75%	Satisfied
47	5.15%	Dissatisfied
12	1.31%	Very dissatisfied
913	Respondents	

Q83. How satisfied are you with Dining Services with respect to the following factors? - Speed of service

Count	Percent	
242	26.54%	Very satisfied
548	60.09%	Satisfied
101	11.07%	Dissatisfied
21	2.30%	Very dissatisfied
912	Respondents	

Q84. How satisfied are you with Dining Services with respect to the following factors? - Quality of service

Count	Percent	
293	32.13%	Very satisfied
533	58.44%	Satisfied
69	7.57%	Dissatisfied
17	1.86%	Very dissatisfied
912	Respondents	

Q85. How satisfied are you with Dining Services with respect to the following factors? - Quality of food

Count	Percent	
226	24.73%	Very satisfied
497	54.38%	Satisfied
135	14.77%	Dissatisfied
56	6.13%	Very dissatisfied
914	Respondents	

Q86. How satisfied are you with Dining Services with respect to the following factors? - Value for price

Count	Percent	
128	13.96%	Very satisfied
421	45.91%	Satisfied
260	28.35%	Dissatisfied
108	11.78%	Very dissatisfied
917	Respondents	

Q87. How satisfied are you with Dining Services with respect to the following factors? - Menu variety

Count	Percent	
155	16.90%	Very satisfied
485	52.89%	Satisfied
212	23.12%	Dissatisfied
65	7.09%	Very dissatisfied
917	Respondents	

Q88. How satisfied are you with Dining Services with respect to the following factors? - Diet / allergy / restriction conscious (gluten free, vegan, kosher)

Count	Percent	
189	20.88%	Very satisfied
570	62.98%	Satisfied
93	10.28%	Dissatisfied
53	5.86%	Very dissatisfied
905	Respondents	

Q89. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat BREAKFAST in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Monday

Count	Percent	
205	23.84%	None
58	6.74%	Zone A
64	7.44%	Zone B
327	38.02%	Zone C
121	14.07%	Zone D
85	9.88%	Zone E
860	Respondents	

Q90. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat BREAKFAST in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Tuesday

Count	Percent	
206	23.95%	None
53	6.16%	Zone A
64	7.44%	Zone B
328	38.14%	Zone C
120	13.95%	Zone D
89	10.35%	Zone E
860	Respondents	

Q91. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat BREAKFAST in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Wednesday

Count	Percent	
206	23.95%	None
50	5.81%	Zone A
70	8.14%	Zone B
320	37.21%	Zone C
122	14.19%	Zone D
92	10.70%	Zone E
860	Respondents	

Q92. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat BREAKFAST in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Thursday

Count	Percent	
212	24.74%	None
48	5.60%	Zone A
57	6.65%	Zone B
329	38.39%	Zone C
120	14.00%	Zone D
91	10.62%	Zone E
857	Respondents	

Q93. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat BREAKFAST in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Friday

Count	Percent	
218	25.38%	None
49	5.70%	Zone A
66	7.68%	Zone B
321	37.37%	Zone C
119	13.85%	Zone D
86	10.01%	Zone E
859	Respondents	

Q94. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat BREAKFAST in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Saturday

Count	Percent	
405	47.48%	None
57	6.68%	Zone A
43	5.04%	Zone B
218	25.56%	Zone C
80	9.38%	Zone D
50	5.86%	Zone E
853	Respondents	

Q95. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat BREAKFAST in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Sunday

Count	Percent	
413	48.82%	None
55	6.50%	Zone A
38	4.49%	Zone B
210	24.82%	Zone C
82	9.69%	Zone D
48	5.67%	Zone E
846	Respondents	

Q96. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LUNCH in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Monday

Count	Percent	
109	12.59%	None
35	4.04%	Zone A
85	9.82%	Zone B
415	47.92%	Zone C
125	14.43%	Zone D
97	11.20%	Zone E
866	Respondents	

Q97. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LUNCH in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Tuesday

Count	Percent	
97	11.20%	None
37	4.27%	Zone A
75	8.66%	Zone B
425	49.08%	Zone C
135	15.59%	Zone D
97	11.20%	Zone E
866	Respondents	

Q98. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LUNCH in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Wednesday

Count	Percent	
103	11.89%	None
30	3.46%	Zone A
71	8.20%	Zone B
419	48.38%	Zone C
139	16.05%	Zone D
104	12.01%	Zone E
866	Respondents	

Q99. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LUNCH in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Thursday

Count	Percent	
106	12.24%	None
36	4.16%	Zone A
73	8.43%	Zone B
423	48.85%	Zone C
134	15.47%	Zone D
94	10.85%	Zone E
866	Respondents	

Q100. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LUNCH in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Friday

Count	Percent	
127	14.67%	None
31	3.58%	Zone A
79	9.12%	Zone B
399	46.07%	Zone C
133	15.36%	Zone D
97	11.20%	Zone E
866	Respondents	

Q101. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LUNCH in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Saturday

Count	Percent	
391	45.15%	None
43	4.97%	Zone A
50	5.77%	Zone B
245	28.29%	Zone C
93	10.74%	Zone D
44	5.08%	Zone E
866	Respondents	

Q102. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LUNCH in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Sunday

Count	Percent	
399	46.07%	None
42	4.85%	Zone A
55	6.35%	Zone B
237	27.37%	Zone C
86	9.93%	Zone D
47	5.43%	Zone E
866	Respondents	

Q103. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat DINNER in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Monday

Count	Percent	
257	29.68%	None
46	5.31%	Zone A
69	7.97%	Zone B
323	37.30%	Zone C
113	13.05%	Zone D
58	6.70%	Zone E
866	Respondents	

Q104. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat DINNER in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Tuesday

Count	Percent	
254	29.33%	None
39	4.50%	Zone A
57	6.58%	Zone B
341	39.38%	Zone C
114	13.16%	Zone D
61	7.04%	Zone E
866	Respondents	

Q105. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat DINNER in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Wednesday

Count	Percent	
256	29.56%	None
38	4.39%	Zone A
76	8.78%	Zone B
320	36.95%	Zone C
115	13.28%	Zone D
61	7.04%	Zone E
866	Respondents	

Q106. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat DINNER in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Thursday

Count	Percent	
255	29.45%	None
38	4.39%	Zone A
61	7.04%	Zone B
339	39.15%	Zone C
109	12.59%	Zone D
64	7.39%	Zone E
866	Respondents	

Q107. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat DINNER in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Friday

Count	Percent	
288	33.26%	None
45	5.20%	Zone A
60	6.93%	Zone B
306	35.33%	Zone C
107	12.36%	Zone D
60	6.93%	Zone E
866	Respondents	

Q108. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat DINNER in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Saturday

Count	Percent	
402	46.42%	None
43	4.97%	Zone A
49	5.66%	Zone B
236	27.25%	Zone C
88	10.16%	Zone D
48	5.54%	Zone E
866	Respondents	

Q109. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat DINNER in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Sunday

Count	Percent	
400	46.19%	None
43	4.97%	Zone A
52	6.00%	Zone B
237	27.37%	Zone C
84	9.70%	Zone D
50	5.77%	Zone E
866	Respondents	

Q110. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LATE NIGHT MEALS in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Monday

Count	Percent	
336	38.80%	None
54	6.24%	Zone A
78	9.01%	Zone B
240	27.71%	Zone C
115	13.28%	Zone D
43	4.97%	Zone E
866	Respondents	

Q111. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LATE NIGHT MEALS in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Tuesday

Count	Percent	
322	37.18%	None
55	6.35%	Zone A
81	9.35%	Zone B
245	28.29%	Zone C
124	14.32%	Zone D
39	4.50%	Zone E
866	Respondents	

Q112. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LATE NIGHT MEALS in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Wednesday

Count	Percent	
331	38.22%	None
49	5.66%	Zone A
85	9.82%	Zone B
243	28.06%	Zone C
112	12.93%	Zone D
46	5.31%	Zone E
866	Respondents	

Q113. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LATE NIGHT MEALS in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Thursday

Count	Percent	
316	36.49%	None
54	6.24%	Zone A
80	9.24%	Zone B
248	28.64%	Zone C
124	14.32%	Zone D
44	5.08%	Zone E
866	Respondents	

Q114. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LATE NIGHT MEALS in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Friday

Count	Percent	
354	40.88%	None
46	5.31%	Zone A
74	8.55%	Zone B
236	27.25%	Zone C
110	12.70%	Zone D
46	5.31%	Zone E
866	Respondents	

Q115. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LATE NIGHT MEALS in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Saturday

Count	Percent	
411	47.46%	None
48	5.54%	Zone A
70	8.08%	Zone B
205	23.67%	Zone C
97	11.20%	Zone D
35	4.04%	Zone E
866	Respondents	

Q116. If all your desired dining improvements were implemented (such as additional venues, food concepts, hours of operations, etc.), please indicate how frequently you would eat LATE NIGHT MEALS in the zones outlined on the map above. Please select one response for each day of the week you are on campus. - Sunday

Count	Percent	
409	47.23%	None
48	5.54%	Zone A
69	7.97%	Zone B
206	23.79%	Zone C
90	10.39%	Zone D
44	5.08%	Zone E
866	Respondents	

Q117. What is your desired BREAKFAST style if dining on campus?

Count	Percent	
457	54.08%	Grab-and-go
160	18.93%	All you care to eat (buffet / stations)
43	5.09%	Sit down service
28	3.31%	Food Truck / Stand
133	15.74%	Fast Casual
24	2.84%	Other
845	Respondents	

Q118. What is your desired BREAKFAST type if dining on campus? SELECT ALL THAT APPLY.

Count	Respondent %	Response %	
504	59.57%	21.25%	Self-served hot breakfast (e.g., eggs, waffles, bacon, etc.)
279	32.98%	11.76%	Self-served cold breakfast (e.g. fruit salad, cereal, muffins, etc.)
367	43.38%	15.47%	Customized hot breakfast (e.g., made-to-order omelets, etc.)
263	31.09%	11.09%	Customized cold breakfast (e.g., smoothies, parfait)
517	61.11%	21.80%	Pre-made grab-and-go option (e.g., breakfast sandwich, donuts/pastries, bagel with cream cheese, etc.)
191	22.58%	8.05%	Pre-packaged convenience store items (e.g. granola bar, nutrition shake, crackers, etc.)
251	29.67%	10.58%	Coffee / beverage only
846	Respondents		
2372	Responses		

Q119. What is your desired LUNCH style if dining on campus?

Count	Percent	
173	20.35%	Grab-and-go
233	27.41%	All you care to eat (buffet / stations)
134	15.76%	Sit down service
66	7.76%	Food Truck / Stand
236	27.76%	Fast Casual
8	0.94%	Other
850	Respondents	

Q120. What is your desired LUNCH type if dining on campus? SELECT ALL THAT APPLY.			
Count	Respondent %	Response %	
547	64.43%	22.05%	Self-served hot lunch
348	40.99%	14.03%	Self-served cold lunch (e.g., salad bar, make your own sandwich, etc.)
576	67.84%	23.22%	Customized hot lunch
363	42.76%	14.63%	Customized cold lunch (e.g., deli, salad, etc.)
413	48.65%	16.65%	Pre-made grab-and-go option (e.g., wraps, sandwiches, salads, etc.)
137	16.14%	5.52%	Pre-packaged convenience store or vending items (e.g. granola bar, chips, crackers, etc.)
97	11.43%	3.91%	Coffee / beverage only
849	Respondents		
2481	Responses		

Q121. What is your desired DINNER style if dining on campus?		
Count	Percent	
84	10.08%	Grab-and-go
298	35.77%	All you care to eat (buffet / stations)
292	35.05%	Sit down service
25	3.00%	Food Truck / Stand
113	13.57%	Fast Casual
21	2.52%	Other
833	Respondents	

Q122. What is your desired DINNER type if dining on campus? SELECT ALL THAT APPLY.			
Count	Respondent %	Response %	
598	72.31%	25.47%	Self-served hot dinner (e.g., pizza slices, grilled chicken, ravioli, etc.)
320	38.69%	13.63%	Self-served cold option (e.g., salad bar, make your own sandwich, etc.)
676	81.74%	28.79%	Customized hot dinner (e.g., made-to-order burger, pasta, stir-fry, pizza, etc.)
318	38.45%	13.54%	Customized cold option (e.g., deli, salad, etc.)
266	32.16%	11.33%	Pre-made grab-and-go option (e.g., wraps, sandwiches, salads, etc.)
100	12.09%	4.26%	Pre-packaged convenience store or vending items (e.g. granola bar, chips, crackers, etc.)
70	8.46%	2.98%	Coffee / beverage only
827	Respondents		
2348	Responses		

Q123. What is your desired LATE NIGHT style if dining on campus?		
Count	Percent	
499	60.12%	Grab-and-go
38	4.58%	All you care to eat (buffet / stations)
37	4.46%	Sit down service
37	4.46%	Food Truck / Stand
169	20.36%	Fast Casual
50	6.02%	Other
830	Respondents	

Q124. What is your desired LATE NIGHT type if dining on campus? SELECT ALL THAT APPLY.

Count	Respondent %	Response %	
361	44.35%	17.66%	Self-served hot dinner (e.g., pizza slices, grilled chicken, ravioli, etc.)
191	23.46%	9.34%	Self-served cold option (e.g., salad bar, make your own sandwich, etc.)
307	37.71%	15.02%	Customized hot dinner (e.g., made-to-order burger, pasta, stir-fry, pizza, etc.)
179	21.99%	8.76%	Customized cold option (e.g., deli, salad, etc.)
449	55.16%	21.97%	Pre-made grab-and-go option (e.g., wraps, sandwiches, salads, etc.)
382	46.93%	18.69%	Pre-packaged convenience store or vending items (e.g. granola bar, chips, crackers, etc.)
175	21.50%	8.56%	Coffee / beverage only
814	Respondents		
2044	Responses		

Q125. In general, my preferred dietary pattern is:

Count	Percent	
537	63.85%	Eat most everything
218	25.92%	Prefer mostly healthy options
34	4.04%	Vegetarian
8	0.95%	Vegan
1	0.12%	Kosher
5	0.59%	Halal
9	1.07%	Gluten-free / Intolerance
29	3.45%	Other (please specify)
841	Respondents	

Q126. Do you have any medical dietary restrictions (e.g. food allergies, lactose-intolerant, gluten-free, etc.)?

Count	Respondent %	Response %	
674	80.62%	77.74%	No
24	2.87%	2.77%	Yes, gluten-free
86	10.29%	9.92%	Yes, lactose-intolerant
40	4.78%	4.61%	Yes, milk, eggs, fish, shellfish, tree nuts, peanuts, wheat, soy, and/or sesame
33	3.95%	3.81%	Yes, other (please specify)
10	1.20%	1.15%	I do not know
836	Respondents		
867	Responses		

Q127. For days that you are on campus, please indicate how you typically eat breakfast: SELECT UP TO THREE (3) CHOICES.

Count	Respondent %	Response %	
397	47.32%	26.05%	Typically skip this meal
396	47.20%	25.98%	Prepare and eat this meal at home
268	31.94%	17.59%	Bring this meal from home, and eat on campus
273	32.54%	17.91%	Buy this meal at an on-campus eatery
42	5.01%	2.76%	Buy this meal from a vending machine on campus
58	6.91%	3.81%	Buy this meal at an off-campus convenience store or grocery store
51	6.08%	3.35%	Eat at an off-campus restaurant
6	0.72%	0.39%	Have this meal delivered from an off-campus restaurant
10	1.19%	0.66%	Eat at a catered event
23	2.74%	1.51%	Other
839	Respondents		
1524	Responses		

Q128. For days that you are on campus, please indicate how you typically eat lunch: SELECT UP TO THREE (3) CHOICES.

Count		Respondent %	Response %	
70		8.34%	4.18%	Typically skip this meal
258		30.75%	15.40%	Prepare and eat this meal at home
327		38.97%	19.52%	Bring this meal from home, and eat on campus
581		69.25%	34.69%	Buy this meal at an on-campus eatery
54		6.44%	3.22%	Buy this meal from a vending machine on campus
71		8.46%	4.24%	Buy this meal at an off-campus convenience store or grocery store
236		28.13%	14.09%	Eat at an off-campus restaurant
31		3.69%	1.85%	Have this meal delivered from an off-campus restaurant
27		3.22%	1.61%	Eat at a catered event
20		2.38%	1.19%	Other
839	Respondents			
1675	Responses			

Q129. For days that you are on campus, please indicate how you typically eat dinner: SELECT UP TO THREE (3) CHOICES.

Count		Respondent %	Response %	
26		3.17%	1.63%	Typically skip this meal
475		57.86%	29.78%	Prepare and eat this meal at home
105		12.79%	6.58%	Bring this meal from home, and eat on campus
385		46.89%	24.14%	Buy this meal at an on-campus eatery
22		2.68%	1.38%	Buy this meal from a vending machine on campus
94		11.45%	5.89%	Buy this meal at an off-campus convenience store or grocery store
351		42.75%	22.01%	Eat at an off-campus restaurant
72		8.77%	4.51%	Have this meal delivered from an off-campus restaurant
32		3.90%	2.01%	Eat at a catered event
33		4.02%	2.07%	Other
821	Respondents			
1595	Responses			

Q130. For days that you are on campus, please indicate how you typically eat late night meals (after 9pm): SELECT UP TO THREE (3) CHOICES.

Count		Respondent %	Response %	
313		38.26%	21.51%	Typically skip this meal
321		39.24%	22.06%	Prepare and eat this meal at home
56		6.85%	3.85%	Bring this meal from home, and eat on campus
184		22.49%	12.65%	Buy this meal at an on-campus eatery
109		13.33%	7.49%	Buy this meal from a vending machine on campus
150		18.34%	10.31%	Buy this meal at an off-campus convenience store or grocery store
196		23.96%	13.47%	Eat at an off-campus restaurant
65		7.95%	4.47%	Have this meal delivered from an off-campus restaurant
8		0.98%	0.55%	Eat at a catered event
53		6.48%	3.64%	Other
818	Respondents			
1455	Responses			

Q131. What does convenient dining mean to you? (SELECT UP TO THREE)

Count		Respondent %	Response %	
333		39.98%	15.10%	Dining options close to housing
441		52.94%	19.99%	Dining options close to classes
30		3.60%	1.36%	Dining options close to athletic facilities
142		17.05%	6.44%	Dining options close to parking
116		13.93%	5.26%	Dining options close to academic resources
404		48.50%	18.31%	Dining options with flexible or extended hours of operation
410		49.22%	18.59%	Dining options with short lines and minimal wait-to-order times
317		38.06%	14.37%	Dining options with "to go" capability
13		1.56%	0.59%	Other (please specify)
833	Respondents			
2206	Responses			

Q132. How often do you buy meals from an off-campus dining location?		
Count	Percent	
21	2.53%	Never
135	16.28%	A few times per semester
121	14.60%	Less than once per week
299	36.07%	1 - 2 times per week
160	19.30%	3 - 4 times per week
93	11.22%	5 or more times per week
829	Respondents	

Q133. During a typical academic week (Mon-Fri), how often did you purchase dinner off campus?		
Count	Percent	
55	6.69%	Never
142	17.27%	A few times per semester
123	14.96%	Less than once per week
296	36.01%	1 - 2 times per week
112	13.63%	3 - 4 times per week
94	11.44%	5 or more times per week
822	Respondents	

Q134. Which meals do you typically buy from an off-campus location? (SELECT UP TO THREE)			
Count	Respondent %	Response %	
82	10.82%	4.44%	Weekday Breakfast
254	33.51%	13.76%	Weekday Lunch
450	59.37%	24.38%	Weekday Dinner
168	22.16%	9.10%	Weekday Late-Night
82	10.82%	4.44%	Weekend Breakfast
242	31.93%	13.11%	Weekend Lunch
434	57.26%	23.51%	Weekend Dinner
134	17.68%	7.26%	Weekend Late-Night
758	Respondents		
1846	Responses		

Q135. What were your top three favorite places to dine off campus in the Cookeville area?			
Count	Respondent %	Response %	
728	100.00%	33.64%	1.
725	99.59%	33.50%	2.
711	97.66%	32.86%	3.
728	Respondents		
2164	Responses		

Q136. How much do you typically spend when you buy breakfast at an off-campus dining location?		
Count	Percent	
26	16.25%	$2.99 or less
28	17.50%	$3.00 - $3.99
34	21.25%	$4.00 - $4.99
28	17.50%	$5.00 - $5.99
15	9.38%	$6.00 - $6.99
19	11.87%	$7.00 - $7.99
10	6.25%	$8.00 or more
160	Respondents	

Q137. How much do you typically spend when you buy lunch at an off-campus dining location?		
Count	Percent	
7	1.55%	$2.99 or less
8	1.77%	$3.00 - $3.99
28	6.18%	$4.00 - $4.99
96	21.19%	$5.00 - $5.99
81	17.88%	$6.00 - $6.99
100	22.08%	$7.00 - $7.99
133	29.36%	$8.00 or more
453	Respondents	

Q138. How much do you typically spend when you buy dinner at an off-campus dining location?		
Count	Percent	
8	1.24%	$2.99 or less
9	1.39%	$3.00 - $3.99
18	2.79%	$4.00 - $4.99
58	8.98%	$5.00 - $5.99
73	11.30%	$6.00 - $6.99
134	20.74%	$7.00 - $7.99
346	53.56%	$8.00 or more
646	Respondents	

Q139. Which two statements most closely reflect your reasons for dining off campus? (Select up to two)

Count	Respondent %	Response %	
215	26.28%	14.86%	It is more convenient to eat off campus
174	21.27%	12.02%	I am meeting someone
220	26.89%	15.20%	To take a break from the academic atmosphere
116	14.18%	8.02%	Campus dining venues are too crowded
227	27.75%	15.69%	It is less expensive to eat off campus
224	27.38%	15.48%	I do not like the food/selection on campus
145	17.73%	10.02%	On campus venues are not open when I would like to eat
48	5.87%	3.32%	I can better accommodate my dietary restrictions
78	9.54%	5.39%	Other (please specify)
818	Respondents		
1447	Responses		

Q140. How many times in a typical week do you have a meal with students/peers?

Count	Percent	
78	9.48%	Never
209	25.39%	Occasionally
177	21.51%	1 - 2 times per week
173	21.02%	3 - 5 times per week
186	22.60%	5 or more times per week
823	Respondents	

Q141. Which meals do you typically have with students/peers? (SELECT ALL THAT APPLY)

Count	Respondent %	Response %	
91	12.36%	4.84%	Weekday Breakfast
545	74.05%	28.96%	Weekday Lunch
401	54.48%	21.31%	Weekday Dinner
146	19.84%	7.76%	Weekday Late-Night
59	8.02%	3.13%	Weekend Breakfast
195	26.49%	10.36%	Weekend Lunch
247	33.56%	13.12%	Weekend Dinner
114	15.49%	6.06%	Weekend Late-Night
84	11.41%	4.46%	All meals are with students
736	Respondents		
1882	Responses		

Q142. If dining with students/peers, where do you go for meals? (SELECT ALL THAT APPLY)

Count	Respondent %	Response %	
463	62.91%	30.76%	Off campus
343	46.60%	22.79%	The Caf (RUC 1st Floor)
44	5.98%	2.92%	Take food from "The Caf" to eat somewhere else
442	60.05%	29.37%	Swoops Retail Dining (RUC Ground Floor)
112	15.22%	7.44%	Au Bon Pain (Volpe Library)
78	10.60%	5.18%	Papa Johns (McCord Hall)
23	3.13%	1.53%	20-20 Market (McCord Hall)
736	Respondents		
1505	Responses		

Q143. Please choose the top three priorities that Tennessee Tech should consider when making improvements to on-campus dining:

Count	Respondent %	Response %	
263	32.35%	11.95%	Extend hours of operation to include more dining options after 10:00 p.m.
281	34.56%	12.77%	Provide more "grab-and-go" options
208	25.58%	9.45%	Provide healthier options
78	9.59%	3.54%	Provide more custom, made-to-order options (non-national brand)
115	14.15%	5.22%	Provide more custom, made-to-order options(national brand)
186	22.88%	8.45%	Provide more dining venues close to classes
142	17.47%	6.45%	Improve speed of service
91	11.19%	4.13%	Provide more options to accommodate dietary needs such as vegetarian, gluten free, dairy free, halal, kosher, etc.)
31	3.81%	1.41%	Improve cleanliness
115	14.15%	5.22%	Include additional social spaces in dining venues (e.g. couches, movable seating, meeting areas, performance stage, etc.)
457	56.21%	20.76%	Provide more variety of food options and venues across campus
234	28.78%	10.63%	Provide more menu variety
813	Respondents		
2201	Responses		

Q144. Do you have responsibility for ordering catered food or beverages for meeting or events at Tennessee Tech?

Count	Percent	
700	85.47%	No
14	1.71%	Yes, at least once per week
27	3.30%	Yes, at least once per month
60	7.33%	Yes, a few times per year
18	2.20%	Yes, less than once per year
819	Respondents	

Q145. In general, to what extent does the current dining operator's catering meet your expectations for the event?

Count	Percent	
16	13.45%	Exceeds my expectations
66	55.46%	Meets my expectations
37	31.09%	Does not meet my expectations
119	Respondents	

Q146. Approximately how often do you use an off-campus caterer for a university meeting or event?

Count	Percent	
14	11.76%	Always
17	14.29%	75% of the time
17	14.29%	50% of the time
34	28.57%	25% of the time
37	31.09%	Never, I always use the on-campus caterer
119	Respondents	

Q147. If you used an off-campus caterer for a university-related meeting or event, which one did you use?

Count	Percent	
63	100.00%	
63	Respondents	

Q148. Please select the most important factors in your decision to select a caterer for a university-related meeting or event: SELECT THREE

Count	Respondent %	Response %	
47	40.52%	15.72%	Food variety
76	65.52%	25.42%	Food quality
90	77.59%	30.10%	Menu pricing
26	22.41%	8.70%	Service quality
21	18.10%	7.02%	Service reliability
9	7.76%	3.01%	Event management
8	6.90%	2.68%	Payment options
7	6.03%	2.34%	Event location
1	0.86%	0.33%	Alcohol availability
14	12.07%	4.68%	Convenience (please elaborate on your definition of convenience)
116	Respondents		
299	Responses		

Q149. How satisfied are you with Tennessee Tech's on-campus caterer?

Count	Percent	
16	13.56%	Very satisfied
65	55.08%	Satisfied
28	23.73%	Dissatisfied
9	7.63%	Very dissatisfied
118	Respondents	

Q150. How easy is each of the following tasks when organizing and hosting a meeting or event with Tennessee Tech's on-campus caterer? - Communicating with the catering staff before the event

Count	Percent	
20	18.35%	Very easy
59	54.13%	Easy
26	23.85%	Difficult
4	3.67%	Very difficult
109	Respondents	

Q151. How easy is each of the following tasks when organizing and hosting a meeting or event with Tennessee Tech's on-campus caterer? - Negotiating and establishing a final price for the event

Count	Percent	
19	17.59%	Very easy
58	53.70%	Easy
23	21.30%	Difficult
8	7.41%	Very difficult
108	Respondents	

Q152. How easy is each of the following tasks when organizing and hosting a meeting or event with Tennessee Tech's on-campus caterer? - Finalizing and confirming essential details

Count	Percent	
20	18.35%	Very easy
64	58.72%	Easy
25	22.94%	Difficult
0	0.00%	Very difficult
109	Respondents	

Q153. How easy is each of the following tasks when organizing and hosting a meeting or event with Tennessee Tech's on-campus caterer? - Supervising the event's pre-service preparation

Count	Percent	
20	18.52%	Very easy
56	51.85%	Easy
28	25.93%	Difficult
4	3.70%	Very difficult
108	Respondents	

Q154. How easy is each of the following tasks when organizing and hosting a meeting or event with Tennessee Tech's on-campus caterer? - Making sure the event starts on time

Count	Percent	
26	24.07%	Very easy
63	58.33%	Easy
15	13.89%	Difficult
4	3.70%	Very difficult
108	Respondents	

Q155. How easy is each of the following tasks when organizing and hosting a meeting or event with Tennessee Tech's on-campus caterer? - Supervising the service during the event

Count	Percent	
24	22.02%	Very easy
67	61.47%	Easy
14	12.84%	Difficult
4	3.67%	Very difficult
109	Respondents	

Q156. How easy is each of the following tasks when organizing and hosting a meeting or event with Tennessee Tech's on-campus caterer? - Supervising the post-event clean-up

Count	Percent	
26	24.07%	Very easy
70	64.81%	Easy
10	9.26%	Difficult
2	1.85%	Very difficult
108	Respondents	

Q157. How easy is each of the following tasks when organizing and hosting a meeting or event with Tennessee Tech's on-campus caterer? - Receiving and settling the final invoice(s)

Count	Percent	
26	23.85%	Very easy
71	65.14%	Easy
10	9.17%	Difficult
2	1.83%	Very difficult
109	Respondents	

Q158. Compared to your experiences with external caterers, how do you rate the current on-campus caterer?

Count	Percent	
10	8.47%	Superior
12	10.17%	Somewhat better
31	26.27%	About the same
39	33.05%	Somewhat inferior
13	11.02%	Very inferior
13	11.02%	Not applicable; I have not worked with caterers outside of Chartwells
118	Respondents	

Q159. Are you a student athlete?

Count	Percent	
27	4.26%	Yes
607	95.74%	No
634	Respondents	

Q160. What is your age?

Count	Percent	
0	0.00%	17 or under
240	29.81%	18 - 19
252	31.30%	20 - 21
101	12.55%	22 - 24
50	6.21%	25 - 29
19	2.36%	30 - 34
28	3.48%	35 - 39
25	3.11%	40 - 44
20	2.48%	45 - 49
31	3.85%	50 - 54
23	2.86%	55 - 59
13	1.61%	60 -4
3	0.37%	65 or over
805	Respondents	

Q161. With which gender do you currently identity? (optional)

Count	Percent	
504	62.69%	Woman
273	33.96%	Man
0	0.00%	Transgender woman
0	0.00%	Transgender man
4	0.50%	Non-binary (includes Bigender, Agender, Genderfluid, and Genderqueer/Gender non-conforming)
6	0.75%	Preferred Gender Identity not listed above (please specify)
17	2.11%	I prefer not to answer
804	Respondents	

Q162. What is your current residency status?

Count	Percent	
602	95.40%	Domestic student, Resident of Tennessee (U.S. citizen or permanent resident)
17	2.69%	Domestic student, Out-of-state resident (U.S. citizen or permanent resident)
12	1.90%	International student
631	Respondents	

Q163. What is the zip code of your home/permanent residence? (Input zip code. If an international student, please enter the name of your home country.)

Count	Percent
793	100.00%
793	Respondents

Q164. What is the ZIP code of the local residence where you currently live while attending Tennessee Tech?

Count	Percent
607	100.00%
607	Respondents

Q165. What are the primary sources of funding for your academic expenses (tuition, fees, books, etc.)? SELECT ALL THAT APPLY

Count	Respondent %	Response %	
388	61.49%	24.36%	Family support
299	47.39%	18.77%	Personal support
287	45.48%	18.02%	Student loan(s)
371	58.80%	23.29%	Academic scholarship(s)
20	3.17%	1.26%	Athletic scholarship(s)
179	28.37%	11.24%	Grant(s)
27	4.28%	1.69%	Employer reimbursement or tuition program
22	3.49%	1.38%	Other (please specify)
631	Respondents		
1593	Responses		

Q166. What are the primary sources of funding for your living expenses (housing, food, travel, entertainment, etc.)? SELECT ALL THAT APPLY

Count	Respondent %	Response %	
406	64.55%	31.77%	Family support
397	63.12%	31.06%	Personal support
162	25.76%	12.68%	Student loan(s)
162	25.76%	12.68%	Academic scholarship(s)
12	1.91%	0.94%	Athletic scholarship(s)
98	15.58%	7.67%	Grant(s)
18	2.86%	1.41%	Employer reimbursement or tuition program
23	3.66%	1.80%	Other (please specify)
629	Respondents		
1278	Responses		

Q167. What was your classification upon entering Tennessee Tech for the first time?

Count	Percent	
494	78.29%	New student (undergraduate)
126	19.97%	Transfer student (undergraduate)
9	1.43%	New student (graduate/professional)
2	0.32%	Transfer student (graduate/professional)
631	Respondents	

Q168. Paying for my Tennessee Tech educational expenses (tuition, fees, books, housing, food, entertainment, etc.) is:			
Count		Percent	
115	18.23%		Easy and should never be a problem
220	34.87%		Easy for now, but may be a problem in the future
225	35.66%		Difficult, but my family and I are managing for now
71	11.25%		Very difficult and represents a major struggle for my family and me
631	Respondents		

Q169. Please feel free to provide any additional comments related to the content of this survey. No comment will be personally attributable to any individual who completed this survey.		
Count		Percent
211	100.00%	
211	Respondents	

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LIVE WINGS UP
TENNESSEE TECH UNIVERSITY

AMENDMENTS

1. ACADEMIC CLASSROOM BUILDING

Page 07	Clarify renovation goal
Page 11	Revised list to show Crawford to be demolished
Page 13	Updated footprint for new Academic Classroom Building
Page 14	Updated footprint for new Academic Classroom Building
Page 35	Crawford rating revised to be <60 and to be demolished
Page 75	Updated narrative for Academic Classroom Building
Page 77	Updated Capital Improvement list and footprint of Academic Classroom Building
Page 81	Updated footprint for new Academic Classroom Building
Page 97	Updated Implementation table
Page 98	Updated footprint for new Academic Classroom Building
Page 99	Updated footprint for new Academic Classroom Building

2. CROSSVILLE CAMPUS

Page 26	Updated narrative and University Property chart
Page 28	Added the Crossville Campus to the map
Page 29	Updated narrative
Page 78A	Added page to show Crossville Campus property and proximity map