

2014 MASTER PLAN UPDATE REFINEMENT

31 OCTOBER 2013



Tennessee Tech
UNIVERSITY

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2010 Master Plan Update Overview

The primary goal of the 2010 Master Plan was to update the 2004 Master Plan to incorporate two primary elements: the programmed Science complex and the Athletics Master Plan. The update also included some concepts for general campus enhancements including the Peachtree mall, street improvements, a bell tower, a centennial fountain, and an overview of Tech Village. The update provided visions on five, ten and thirty year horizons.

The prominent element of the plan was the science complex. The Science program developed with the campus by HOK included a four building concept for Biology, Chemistry, Chemical Engineering and the Water Center. The breadth of the program encompassed the two blocks bounded by Peachtree, Stadium, Seventh and Ninth. The master plan focused on the progression of the four phased project over time. Two alternatives were provided based upon the placement of the first building within the science complex. This entailed either beginning on the southern block and eliminating Capital Quad or starting on the northern block and eliminating the parking in this area. Over time, with the completion of the complex, the entire two block area would have been utilized.

The second primary focus of the 2010 Update was to incorporate the current Athletics Master Plan. While published as a separate document for fundraising, the Athletics Master Plan provided an overview of the needs for the athletic facilities and an anticipated scope to be accomplished. The plan established the northwestern quadrant as primarily dedicated to athletic facilities.

Yielding to other anticipated detailed analyses, the update intentionally did not focus on the specific requirements of the academic spaces and did not incorporate a specific housing study. As a separate activity, a building assessment of six representative buildings was conducted in association with Art Lidsky of Dober, Lidsky, Mathey. The study supplemented the Physical Facilities Survey and identified general insufficiencies of the facilities on campus. The study included Brown, Kittrell, Pennebaker, T.J. Farr, Henderson and South Hall to provide a cross section of the various eras of construction across campus. The campus has developed a plan for incrementally upgrading facilities across campus on an annual basis.

2014 Master Plan Update Refinements

The 2014 Master Plan Update Refinements are provided as an appendix and supplement the 2010 Master Plan Update. The 2014 Update is intended to incorporate the vision of the new university president, Dr. Philip Oldham, for the campus. The planning process included input from representatives of various areas on campus including Mark Burnett- Student Affairs, Mark Wilson-Athletics, Dr. Claire Stinson- Finance, and Jack Butler and Jim Cobb-Facilities. It also included representatives from the designers of upcoming projects on-campus including Brian Pierce and Mary Johnson of Michael Brady and Associates- Intramural Sports and Activities Building and Michael Black of Lose and Associates- parking and transportation improvements. The process also included Carl Manka of TBR and Bob Murphy and Amy Burch of RPM Transportation Consultants.

While many of the master plan concepts build upon and expand the initial update, the 2014 Refinements provide a distinct direction for three major items: the upcoming integrated Science Building, the upcoming Intramurals building and the greening of the campus. Each of the three major items infers a comprehensive series of opportunities to transform the campus within the near future. The 10, 20 and 30 year visions to realize these opportunities are illustrated on the following pages.

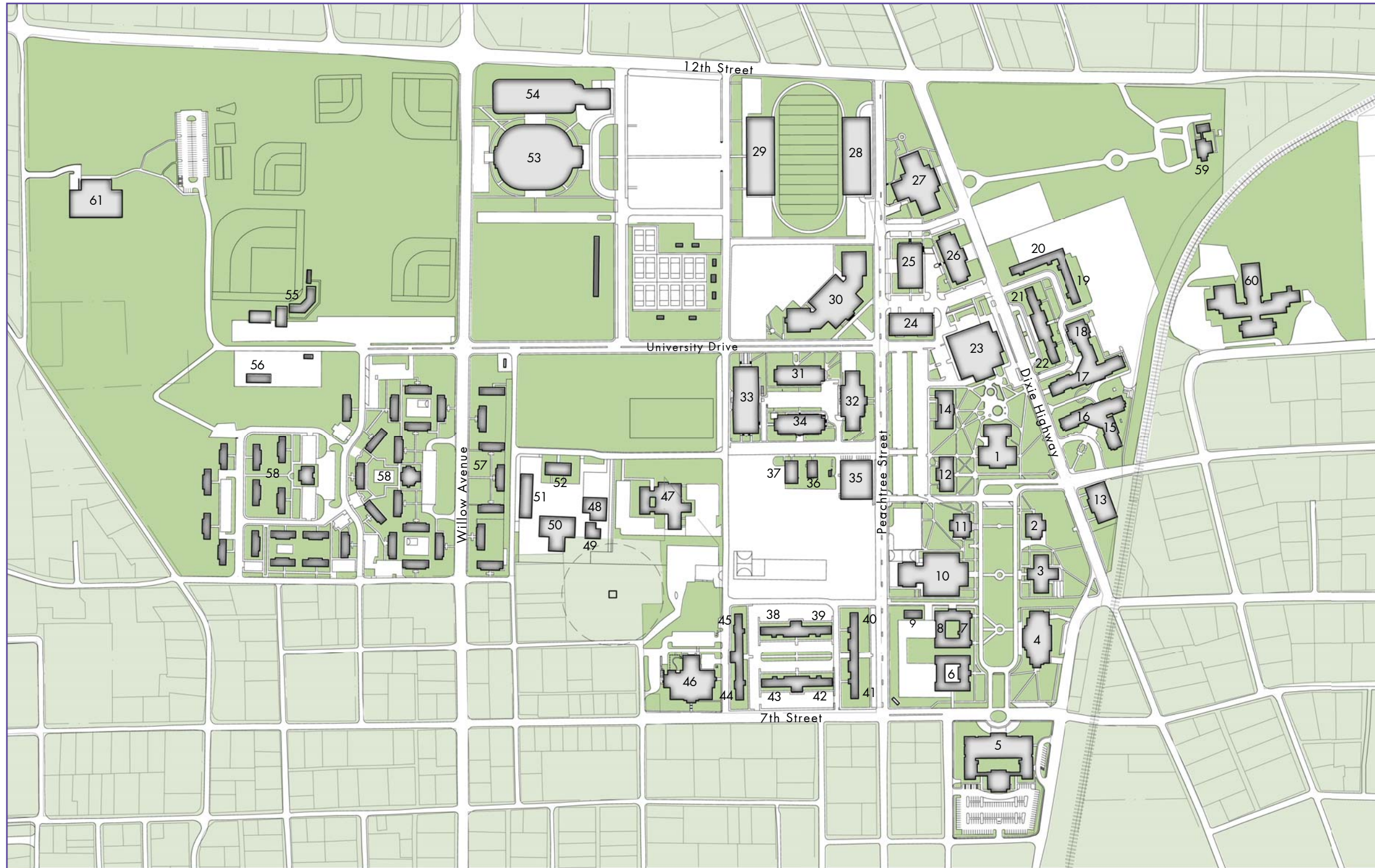
The university is currently refining the scope of the science complex program to respond to the current funding for the project. The program has been honed dramatically from a four phased, four building concept to a single building. It is anticipated that the program will incorporate approximately 150,000 gross square feet in a single building. The program will be integrated to include the chemistry program as well as some related biology and water center elements.

It is anticipated that funding for further science facilities may not be in the near future, therefore the remainder of the biology program will utilize a renovated Pennebaker Hall. The Master Plan envisions the new Science Building as the keynote building of a new east-west academic mall. The building and mall would replace the existing Peachtree parking lot and provide areas on the north and south sides for the development of future academic buildings.

A second major goal of the 2014 Refinements was to incorporate a location for the anticipated Student Intramural Building. Current discussions included the idea of converting the existing student Recreation building, just north of the Hooper Eblen Center, into a facility for athletics. This will require that the Intramural building program to be expanded to include the current recreation spaces as well as the needed expansion of the intramural facilities including most notably, more basketball courts. Through the process of the 2014 Update, a series of potential locations were considered with the area between University Drive and Seventh Street along Willow Avenue which is the selected area for development. The Update presents the corner of Seventh and Willow as the preferred location. Based upon the timing of the property acquisition in this area, a second option at the corner of University and Willow is presented as an alternative.

The third major initiative of the 2014 Refinements is the greening of the campus. This entails a number of items related to the first two initiatives including a north-south mall along Peachtree Street adjoining the new east-west academic mall and the relocation of the Facilities and Maintenance operation to provide areas for intramural fields. Items illustrated in the update relating to parking include: establishment of major parking lots on the perimeter of the campus, installation of a shuttle system, reduction of inner campus parking and enhancement of existing parking with straightened stalls and tree islands. Refinements for the major streets around the campus are proposed as well as a number of general campus improvements to also enhance the identity and perception of the campus.

Although the plan intentionally does not focus on the specific requirements of academic space and did not incorporate a dedicated housing study, proposed areas for the development of future academic buildings as well as student housing are included.

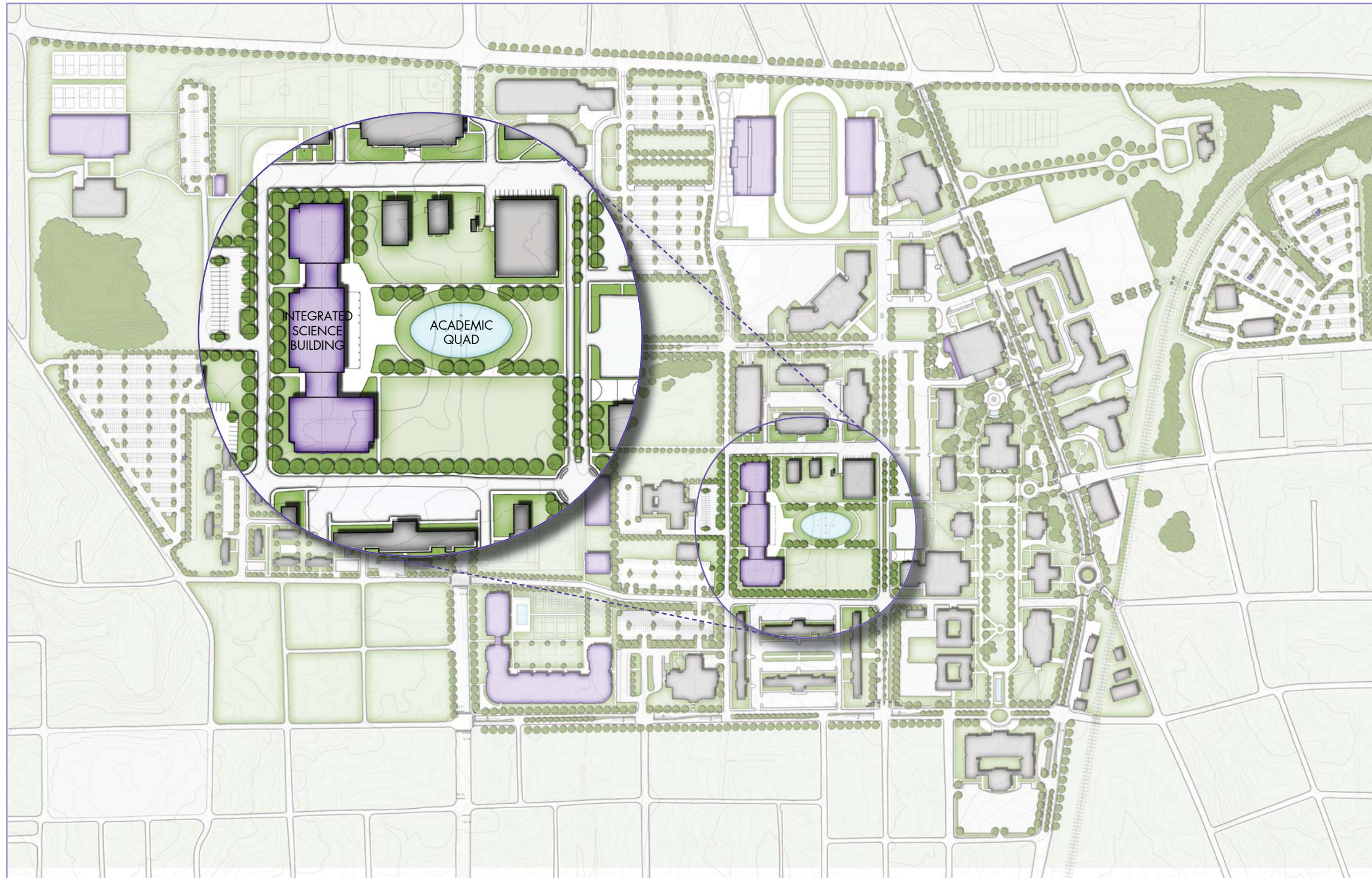


EXISTING BUILDINGS:

1. Derryberry Hall
2. Kittrell Hall
3. Jere Whitson Building
4. South Hall
5. Nursing & Health Sciences Building
6. Crawford Hall
7. Daniel Hall
8. Matthews Hall
9. University Police
10. Health & P.E. Building
11. Bartoo Hall
12. T. J. Farr Building
13. University Services Building
14. Henderson Hall
15. New Hall South
16. New Hall South
17. New Hall North
18. New Hall North
19. Murphy Hall
20. Jobe Hall
21. Pinkerton Hall
22. Mattie Sue Cooper Hall
23. Roaden University Center
24. Foster Hall
25. Johnson Hall
26. Pennebaker Hall
27. Bryan Fine Arts Building
28. East Stadium
29. West Stadium
30. Volpe Library and Media Center
31. Bruner Hall
32. Clement Hall
33. Prescott Hall
34. Brown Hall
35. Lewis Hall
36. Foundry Hall
37. Old Maintenance Building
38. Ellington Hall
39. Warf Hall
40. McCord Hall
41. Maddux Hall
42. Cooper Hall
43. Dunn Hall
44. Browning Hall
45. Evins Hall
46. Ray Morris Hall
47. Southwest Hall
48. Otis Carroll Building
49. Motor Pool Garage
50. Warehouse
51. George S. Ridley Carr Building
52. Facilities Services Offices
53. The Hooper Eblen Center
54. University Rec & Fitness Center
55. Clubhouse & Press box
56. Boat Storage
57. Tech Village East
58. Tech Village West
59. Walton House (President's Residence)
60. Foundation Hall
61. Athletic Performance Center

MAJOR CAMPUS INITIATIVES

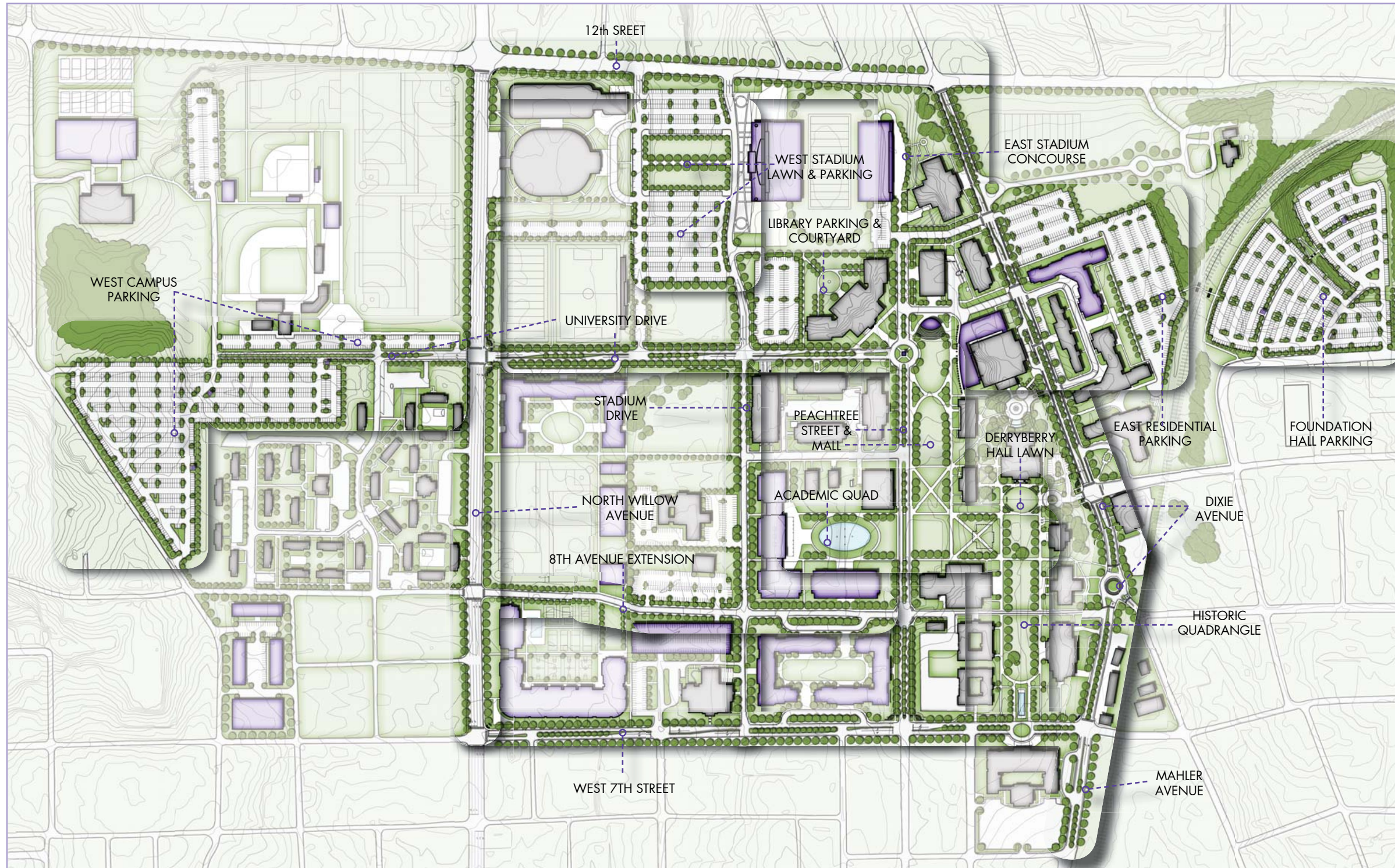
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INTEGRATED SCIENCE BUILDING

The proposed site for the new Science building is the block between Peachtree and Stadium drives and between the engineering complex and Capitol Quad housing. The site currently accommodates 859 cars which are highly visible to visitors travelling through TTU's campus along Peachtree Street. The placement and form of TTU's future Integrated Science Building will play a critical role in the successful joining of the campus's eastern and western halves. The placement of the science building is critical to the development and expansion of a cohesive academic core for the campus. Currently, the perceivable heart of the academic campus is contained within the Historic Quadrangle with the remainder of the academic buildings as disjointed groupings to the west and north.

Placing the Science Building at the western end of the chosen site and aligning its center with Bartoo and Kittrell Halls will allow the new structure to both establish an edge for the academic campus while responding to and extending the Campus's historic organization. The proposed Science Building and campus Mall will also provide future opportunities to increase connectivity throughout campus as it expands westward while creating a new, positive focal point for campus visitors and travelers moving along Peachtree Street.

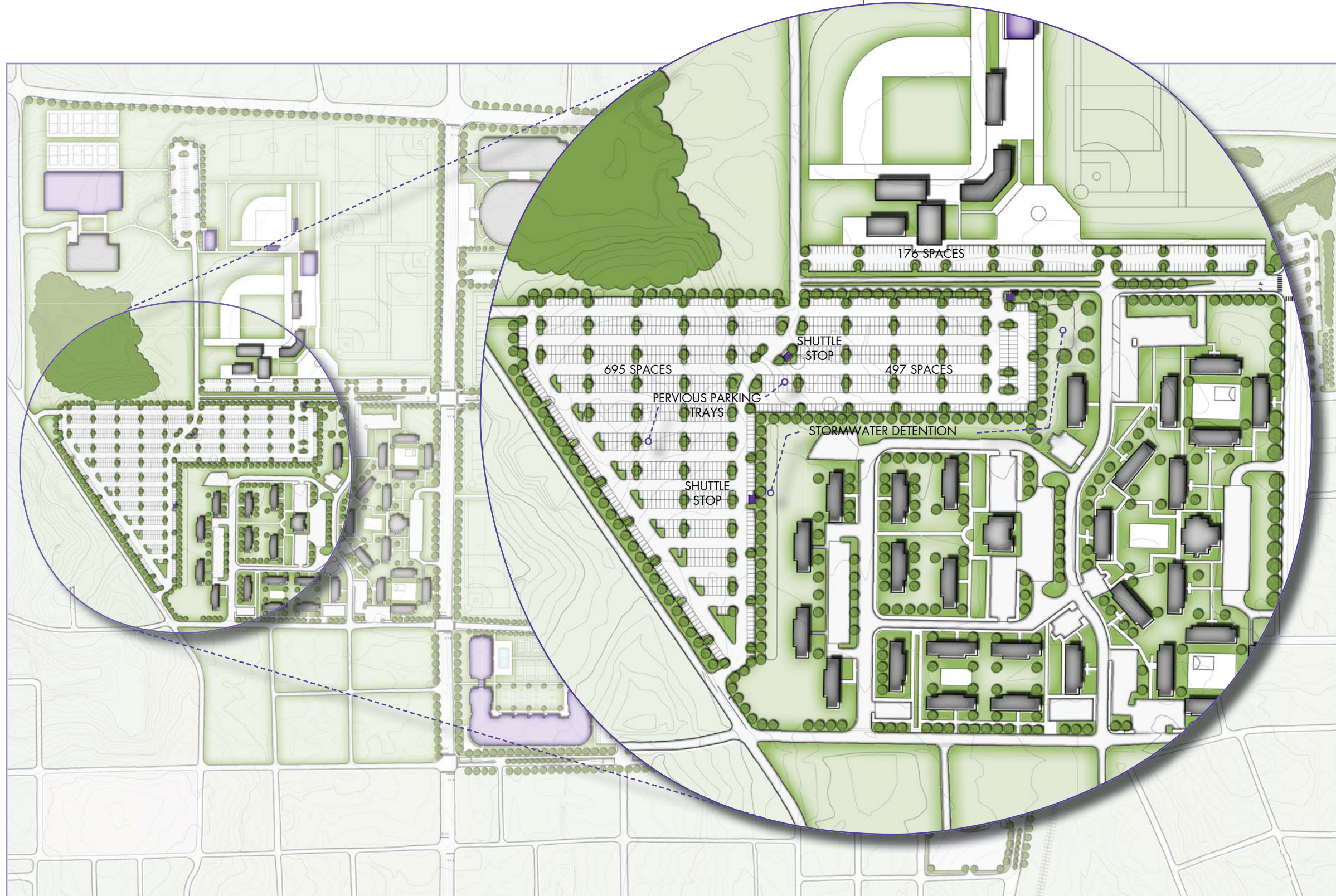


GREENING OF THE CAMPUS

A major initiative of the update refinements is the greening of the campus. This includes a progressive series of projects to maximize the green space opportunities and, in most cases, includes the removal, modification or elimination of parking spaces. As part of the process, two major collegiate mall spaces are proposed: the Peachtree Mall and the Academic Quadrangle associated with the new Science building. In each case, a significant parking area will be relocated to another portion of the campus. This will allow for the shift from personal convenience of a near-by parking space to the betterment of the on-campus environment and collegiate experience.

In an effort to drastically reduce the use of cars within the core of the campus, a series of parking space removals and relocations is also proposed. This includes removal of on-street parking and some parking lots. To provide greener and less crowded parking areas, the remaining and new parking lots are proposed to be provided with tree islands, straightened parking spaces and adequate drive aisles. New parking is also proposed to be constructed with pervious paving at the parking space areas to help the management of storm water.

The progression of greening efforts associated with parking is addressed in a summary in the appendix.



WEST CAMPUS PARKING

In order to meet TTU's growing parking needs as well as relocate parking spaces displaced by the planned Science Mall, a remote commuter lot is planned at the western-most edge of the campus property. The project could be divided into three phases and may be implemented incrementally or constructed at one time. The initial phase is proposed to be completed prior to the initiation of the Science building project and serve as a relocation of the existing parking capacity in that location and could include 695 parking spaces. The reconstruction of the current Athletic parking lot of 176 spaces and the refinement of University Drive could also be considered at this time. The third phase with 497 parking spaces can be considered based upon the campus needs. This third phase will require issues related to the relocation of the boat storage, elimination of the coal storage areas and storm water management to be resolved. The improvements are proposed to incorporate pervious paving at the parking areas and to avoid wetland areas.

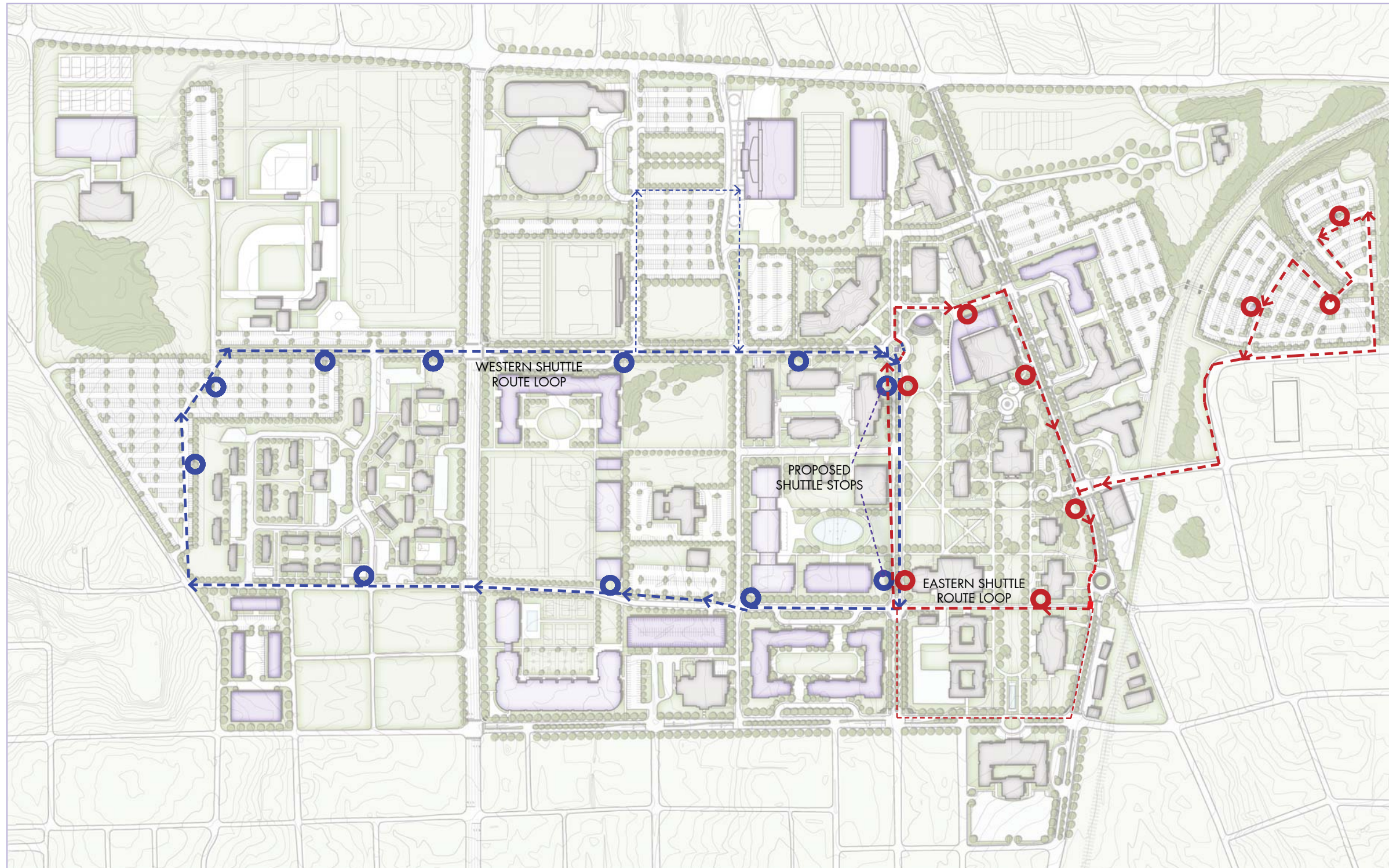
To support the relocation of parking to the perimeter of the campus, a shuttle service to transport commuters into TTU's central campus should be implemented as well. Improvements to the adjoining section of University Drive will become necessary with the construction of these two parking lots and implementation of the shuttle route (please refer to the following pages).



FOUNDATION HALL EAST PARKING

Based upon the parking study and anticipated greening efforts, as the student body approaches 13,000 students, a second remote parking lot and corresponding shuttle route will become necessary. Ultimately, over 900 parking spaces are proposed at the current Foundation Hall property on the eastern edge of the campus. The implementation of this project can also be divided into separate phases to be accomplished incrementally. Initial phases can include the northeast lot with 353 parking spaces at the lower field area as well as a 93 space lot at the southeastern corner of the property. This will allow the existing parking on the western portion of the property to remain in use with the Foundation Hall in the near future. As the Foundation Hall use as a surge space building is completed, it can be demolished and the full parking scheme completed. Should portions of Foundation Hall be used as a Facilities Services Building on an interim or long term basis, the parking areas would be reduced accordingly.

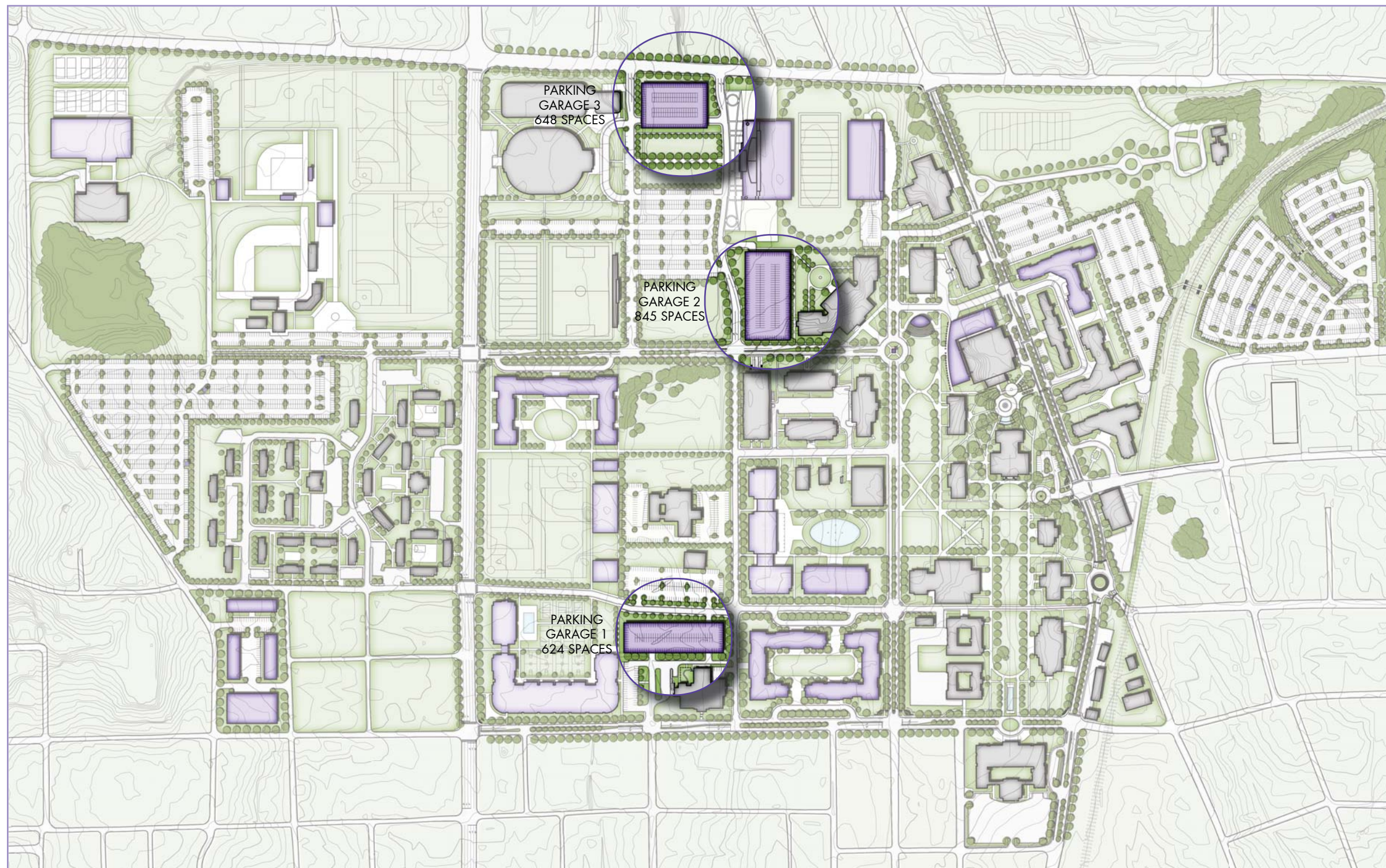
The proposed development of the Foundation Hall property should include pervious paving at the parking areas, tree islands, areas for shuttle stops and adequate storm water detention and treatment areas. The proposed Rail Trail has been incorporated on the western edge of the property. In addition, a pedestrian cross walk is shown to provide a limited and controlled access point to cross the train tracks.



SHUTTLE ROUTES

To support the large parking areas on the western and eastern edges of the campus, a shuttle system is proposed to be developed. This would include the development of a series of shuttle stops, controlled shuttle routes (dedicated to the degree possible) and a service area for parking and maintenance of the shuttle vehicles. The western route is proposed to utilize a renovated University Drive and a dedicated southern drive along a new realigned and extended Eighth Street with shuttle only light to control access across Willow Avenue (which will require coordination and approval by TDOT and the City of Cookeville). The north to south connection of the clockwise route is proposed to be along Peachtree Street. As Peachtree evolves over time, this route through the western core of the campus may remain as a dedicated drive. If it is desired by the university to eliminate all traffic adjacent to the Peachtree Mall, the route may loop around the eastern portion of the campus.

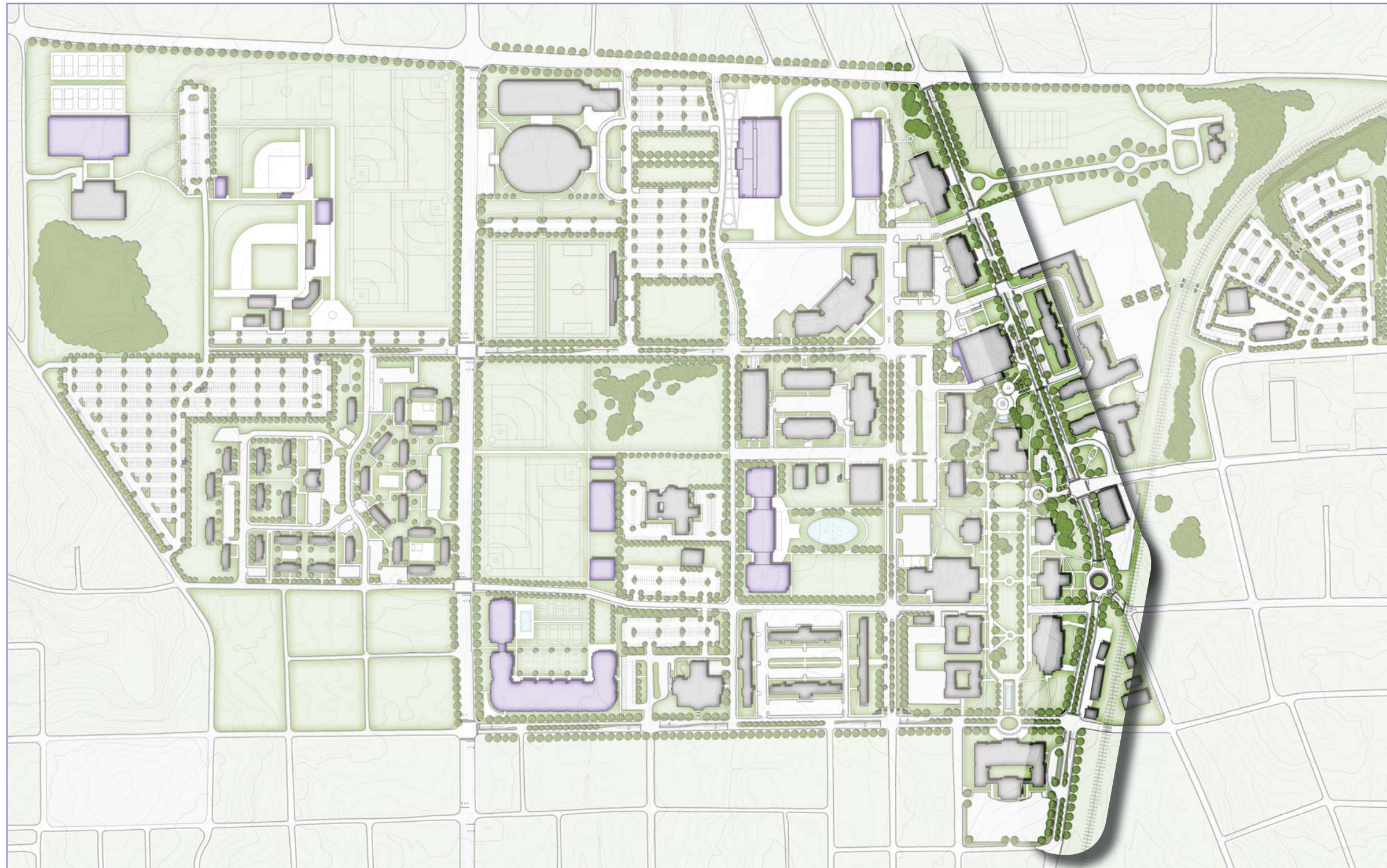
The Eastern Shuttle Route is anticipated to serve the Foundation Hall parking areas. To provide an efficient route, it is proposed to have a dedicated shuttle only access across the Historic Quadrangle. The route is proposed to intersect the western route to provide transfer opportunities to extend the ride to the west. The route is currently proposed to run along the Peachtree Mall with a reduced traffic volume; however it can also be extended to Stadium Avenue to avoid the Peachtree mall if desired.



PARKING GARAGES

Following the experience of other universities, the master plan update assumes that the on grade parking options will need to be exhausted prior to funding structured parking. Therefore, developing a cultural shift from convenient parking next to a destination to remote parking with the use of a shuttle, as described on the previous pages, would be the first step in the parking plan. As the required parking increases with the campus growth to 15,000 students, parking garages will need to be considered. With a cost in the range of 5-6 times that of surface parking, funding for this parking will be a consideration. At this point, it is anticipated that a graduated scale for parking permits closer to the core of campus would be more acceptable than implementing a fee to fund garages in today's environment with inexpensive central campus surface lots.

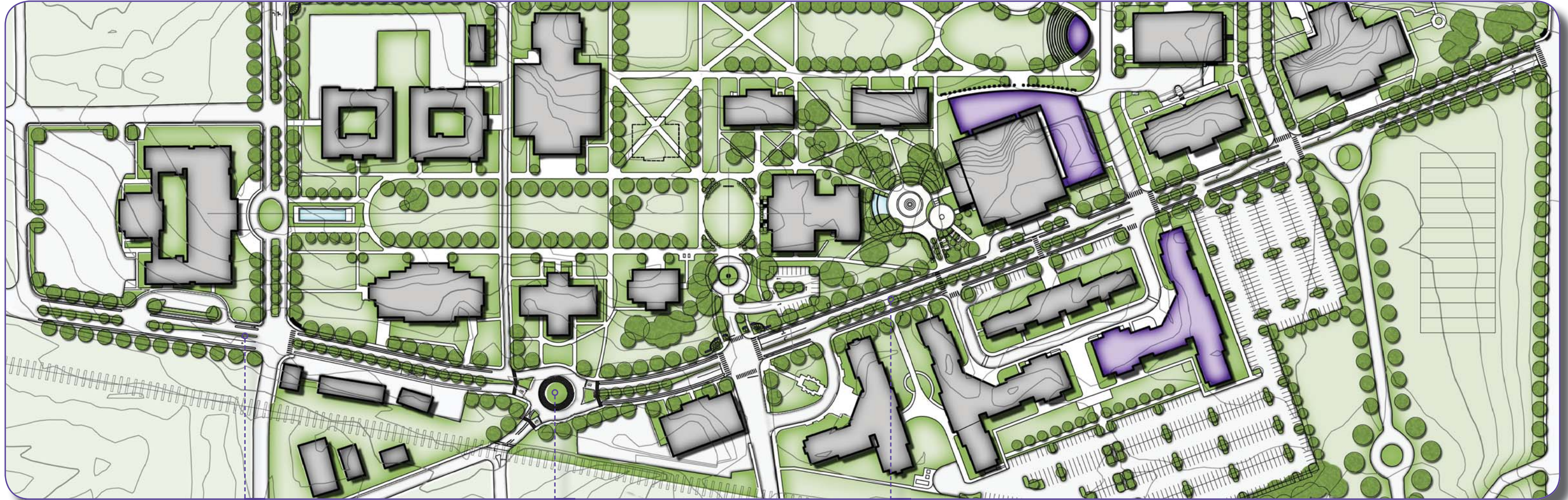
Three parking structures are projected to meet the need of the 15,000 student campus. The initial garage is projected to be near the proposed Intramural building. This garage could support the intramural activities as well as Capital Quad student housing, the STEM center and the western academic areas. The second garage is proposed at the opposite side of the campus to support the northern end of the academic areas as well as the athletic venues. The placement of these garages along Stadium Drive with primary access from perimeter roadways discourages heavy traffic from proceeding into the heart of campus as commuters would park and continue into campus on foot or via shuttle route. The third garage is proposed adjacent to the Library to also support the athletic venues as well as the center of the campus.



NORTH DIXIE AVENUE

North Dixie Avenue currently lines the eastern edge of the TTU campus and, with improvements, will aid in defining the University District. The road's current conditions are not conducive to provide safe passage by the large amount of students crossing daily. The Master Plan proposes to remedy the situation by calming North Dixie with a reduction of the road from a four lane road to a two lane, tree-lined boulevard with left turn and bike lanes. A tree-lined median would run along the center of the boulevard and contain fencing and landscaping to restrict pedestrian traffic across Dixie with dedicated crossing points. These crossing points would be controlled with speed mounds and potentially crossing signals which will each alert drivers to potential student pedestrian traffic. In addition, the number of vehicular access drives along Dixie is proposed to be reduced. The same concepts would be applied to the blocks of Mahler between Sixth Street and Eighth Street and include the elimination of on-street parking.

The proposed Dixie Roundabout, centers on the Eastern face of the Jere Whitson Building, would reconcile the complicated intersection of Mahler Avenue, East Eighth Street, and North Dixie Avenue while calming traffic travelling through the University District from the south. Lighting standards, banners, and signage could all match city standards, as along Mahler Avenue to downtown, and should be developed in conjunction with the city. An engineering study is provided in the appendix.



PROJECT C:
MAHLER STREETSCAPE
& CALMING

PROJECT B:
DIXIE ROUNDABOUT

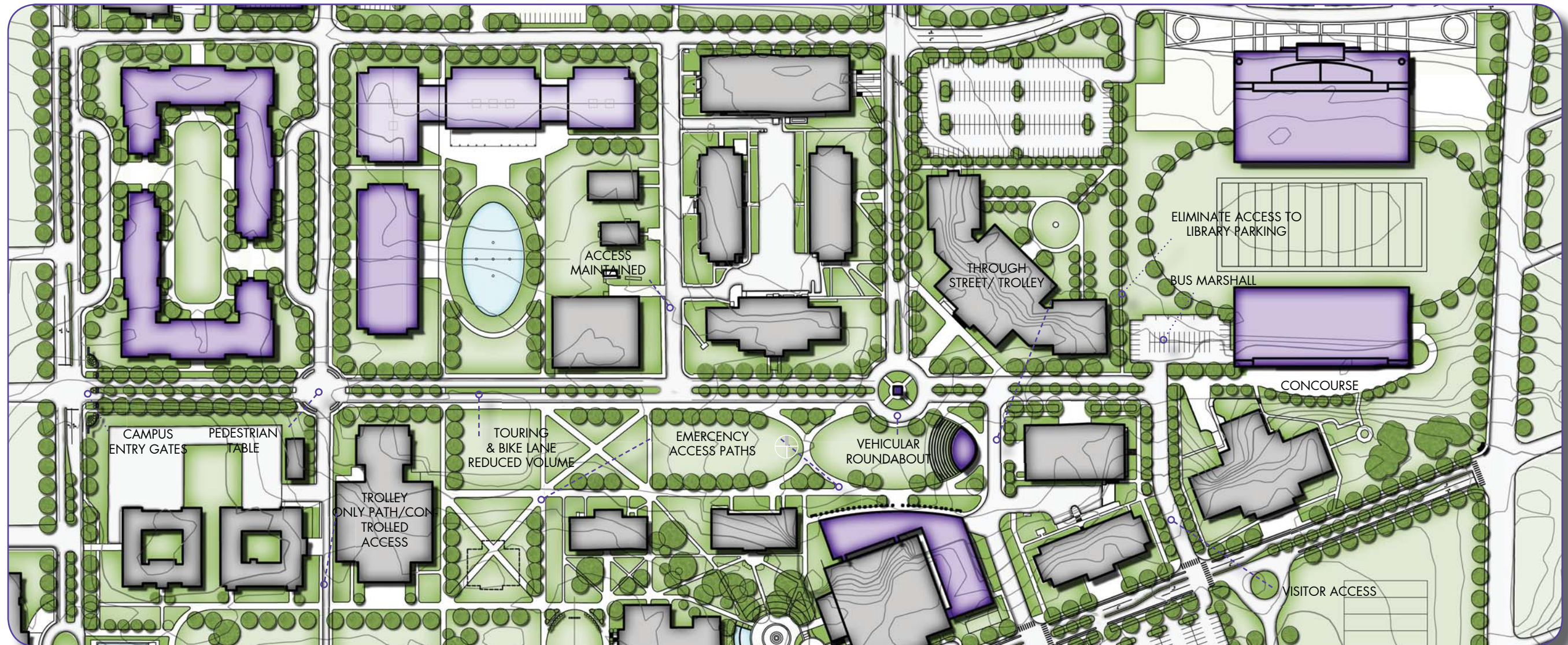
PROJECT A:
DIXIE STREETSCAPE & CALMING



PEACHTREE STREET & MALL

As further improvements occur within the campus, the development of Peachtree Street and the adjacent parking areas will become essential to the unification and expansion of the Campus as a whole. In conjunction with the removal and relocation of all parking central and adjacent to Peachtree Street and therefore no end destinations to draw additional heavy traffic, the central section of Peachtree Street is proposed to be reduced to two non-oversized lanes and serve as touring and shuttle drive. Bike lanes and a tree lined median running along its center will aid in calming Peachtree and transforming the street's current asphalt dominant character into that of a landscaped, pedestrian friendly boulevard. This central section of Peachtree could also evolve to a pedestrian only concourse in the future. The proposed Peachtree improvements are divided into five sections: Southern, Central, Roundabout, Northern and Stadium sections. These areas are outlined on the long range plan on the following page. The southern and central section improvements are proposed to be implemented by 2020 leaving the other three sections and the development of the Peachtree Mall to be developed within the second phase of the master plan.

The Peachtree Mall will act as the third arm of an overlapping greenway system completed by the Science Mall and Historic Quadrangle. These three grand mall spaces will layer to create vistas and work to connect the campus from North to South and from East to West, thus creating a new, expanded center for the campus. Pathways within these malls are proposed to be pedestrian only but will be constructed to accommodate emergency vehicles as well as service vehicles.



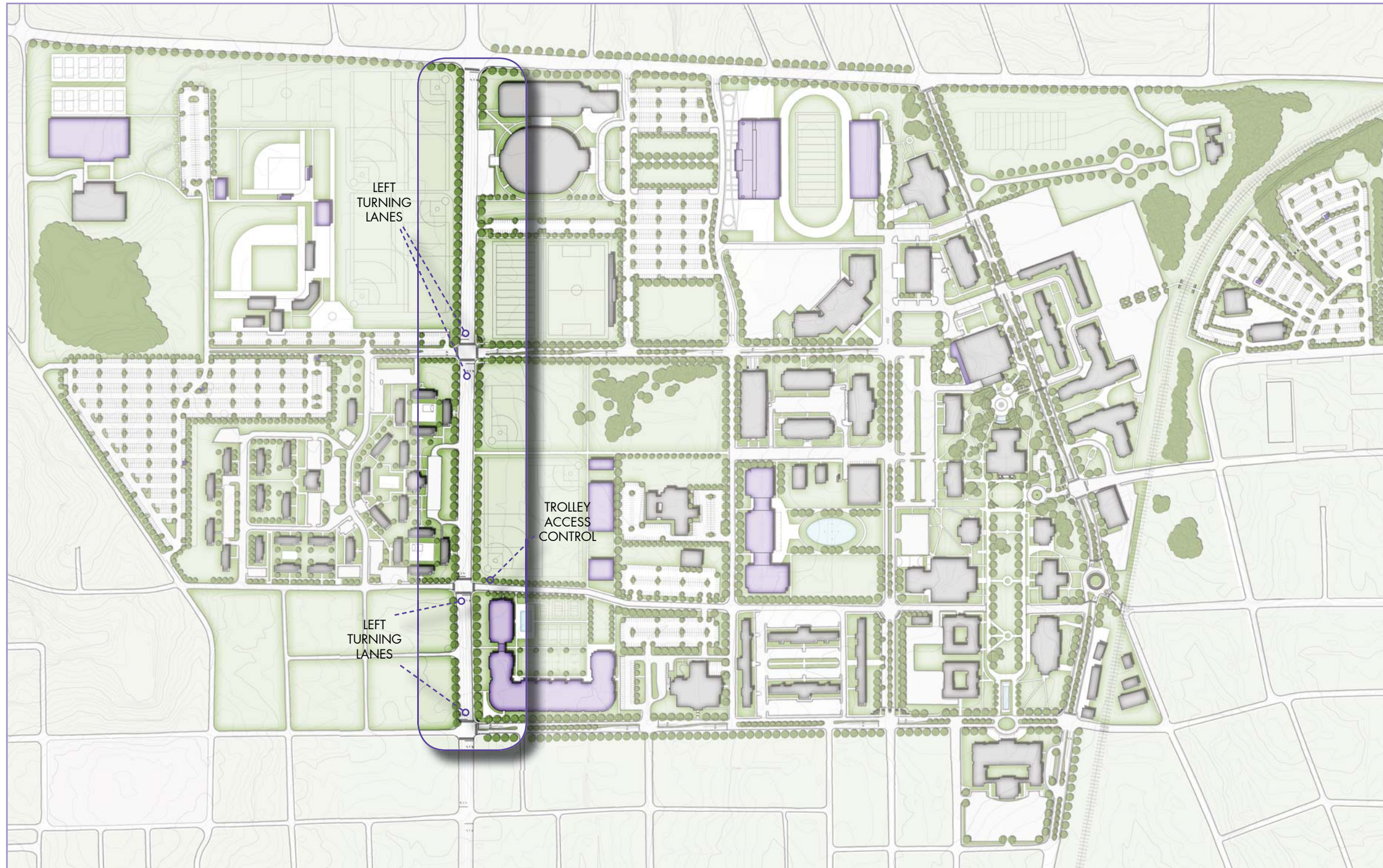
SOUTHERN SECTION
VEHICULAR TRAFFIC & BIKE

CENTRAL SECTION
TOURING AND BIKE LANE WITH EMERGENCY ACCESS

NORTHERN SECTION
VEHICLE & BIKE

STADIUM SECTION
CONCOURSE

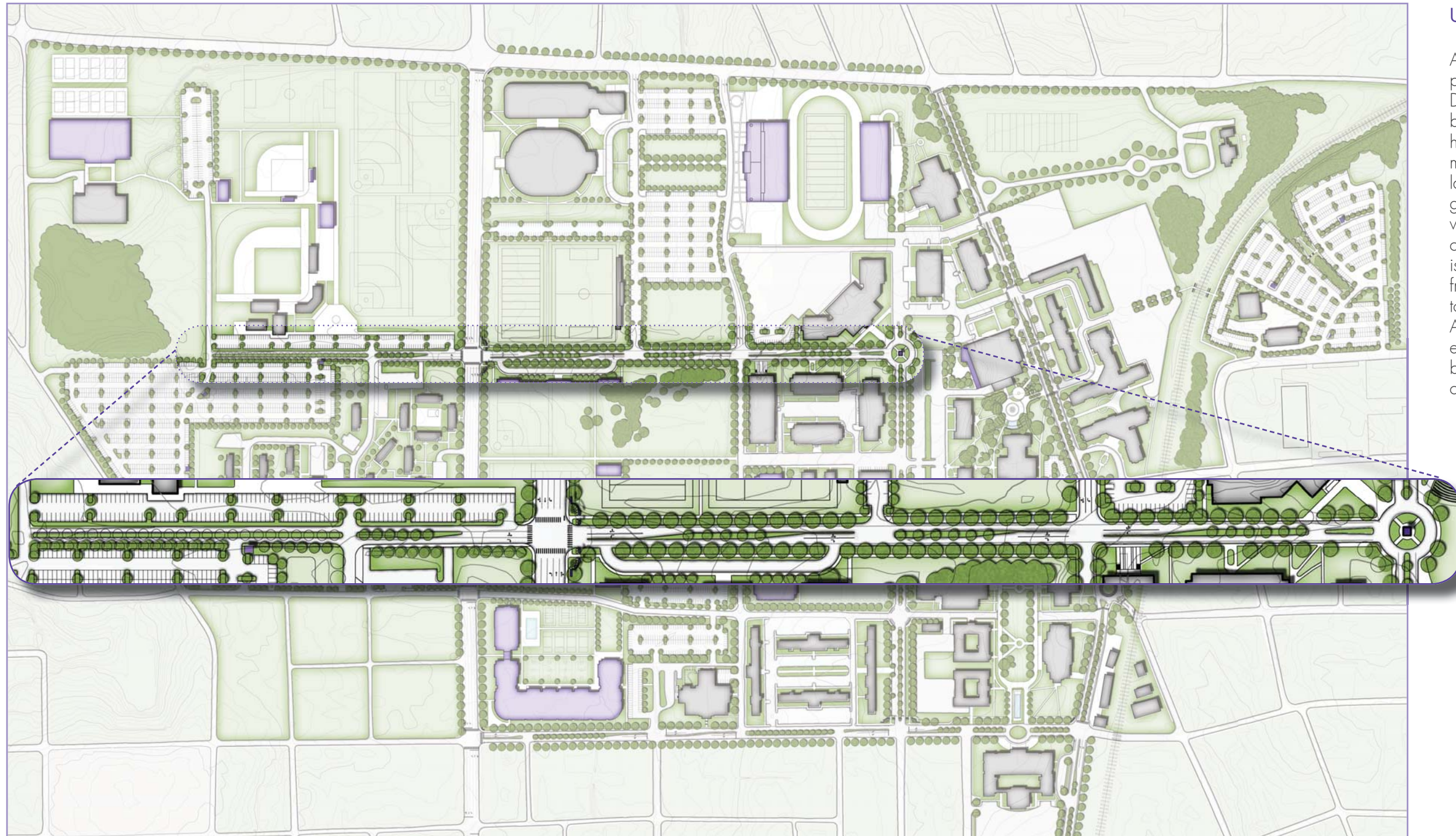
TOURING & BIKE LANE



NORTH WILLOW AVENUE

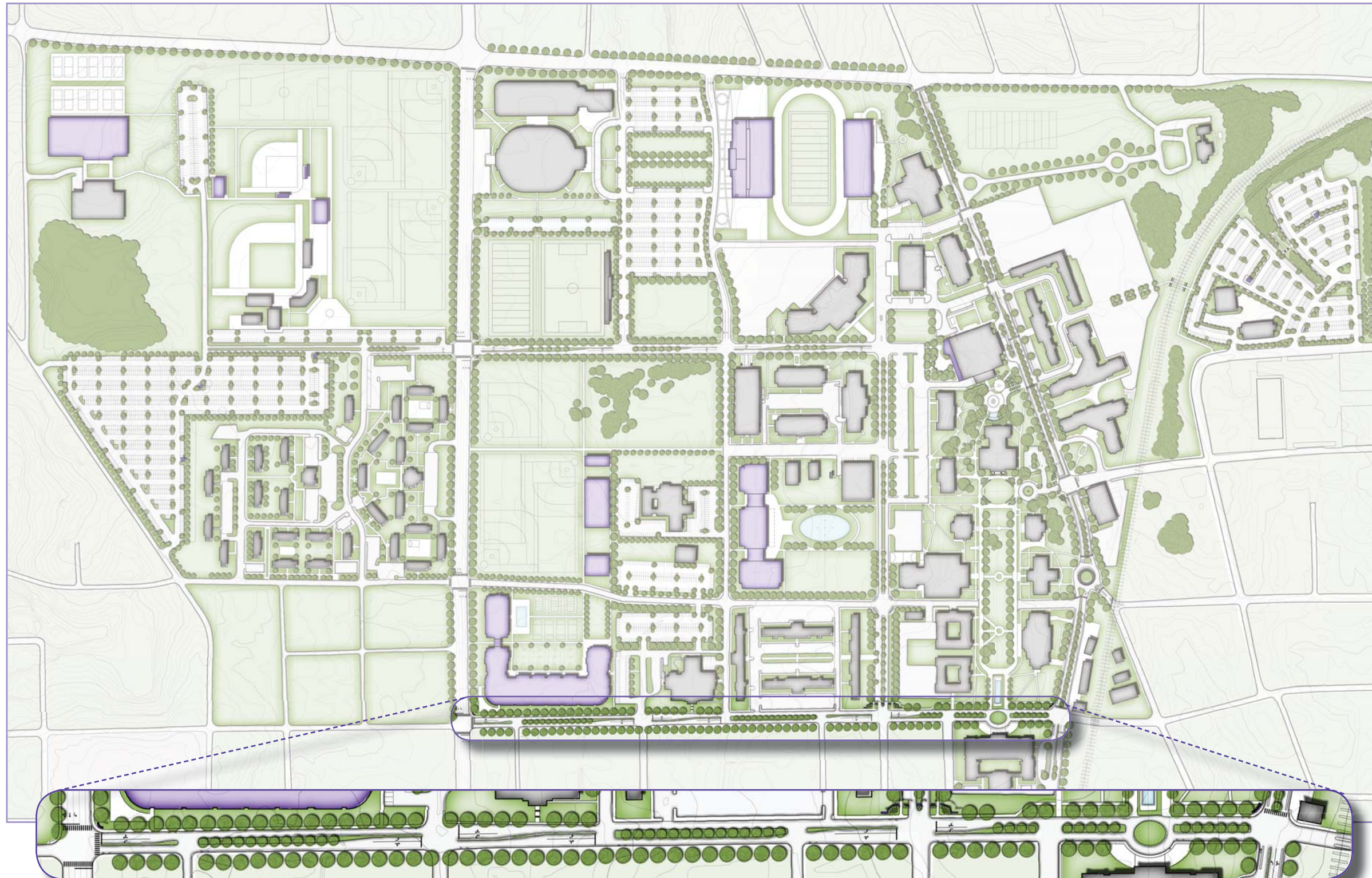
As a campus edge street similar to West Seventh Street, improvements to North Willow Avenue will be instrumental in helping to establish a recognizable University District. The proposed widening of the road will require right of way to be provided along Willow. Widening to the east side will require some utility relocation but will not adversely effect the Tech Village Housing. The widening will allow for left turn lanes onto the campus from each direction. Combined with the addition of trees at the street's edges, this will help to ease the flow of traffic while establishing the desired sense of entrance into the University area. Provisions for the addition of a tree-lined median through the center of North Willow would be advisable for calming purposes; however the viability of this concept will need to be reviewed with the city and the state.

The Willow Avenue improvements will require coordination with the city of Cookeville and the state should incorporate city standards for lighting and signage, as well as traffic controls and calming elements for pedestrian access. As the section of Willow Avenue to the south provides the most significant entrance to the campus, the perception of the road, in particular from the railroad underpass painted with TTU colors and inscription, is part of the initial impression of the campus. Therefore, the widening of Willow Avenue South with a center turn lane to the railroad overpass (and elimination of some structures) would be highly desirable and should be pursued with the city and the state.



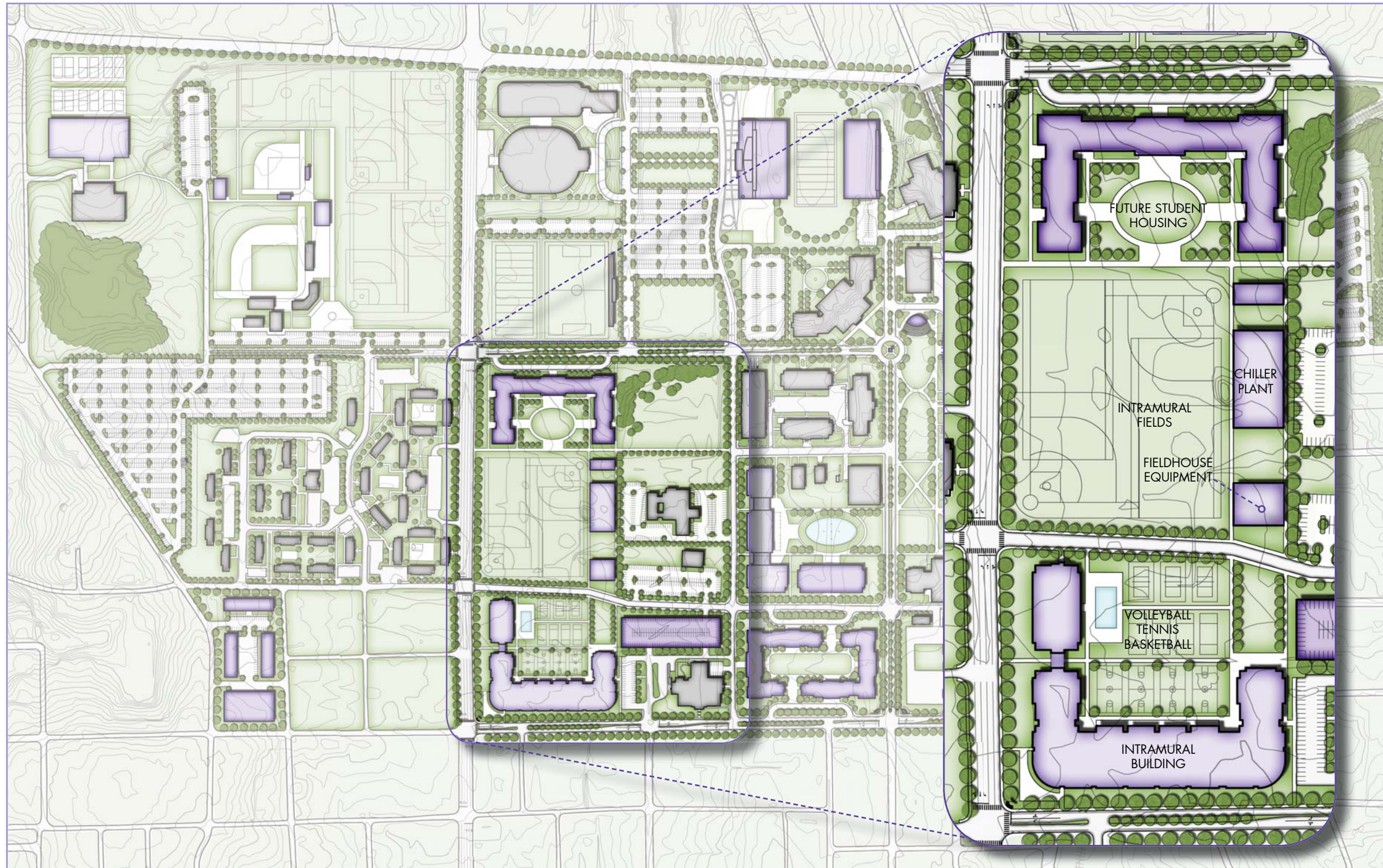
UNIVERSITY DRIVE

As the main vehicular entrance and processional path into the heart of the TTU campus, University Drive is proposed to be developed as a grand boulevard lined along each side with large hardwood canopy trees. In lieu of concrete medians, the center medians would be landscaped with flowering understory trees and ground cover. Left turn lanes and bicycle lanes would be implemented as well to aid in traffic calming. Smaller scale campus standard lighting is proposed to give a more intimate scale and frame vistas towards the historic campus center to create a dynamic procession into campus. As indicated in the Campus Gates section, the entry to the campus from Willow Avenue should be treated a prominent celebrated entry into the campus.



WEST SEVENTH STREET

As a primary boundary to the TTU campus, West Seventh Street should be developed to provide a very perceivable edge to the campus. The work provided by the city to date should be encouraged to be enhanced with more street trees, city lighting standards and banners, as well as traffic controls and calming elements for pedestrian access. Enhancement of campus edge conditions will help to define the University District for the outside community and represent the implied "border" of the campus perimeter.

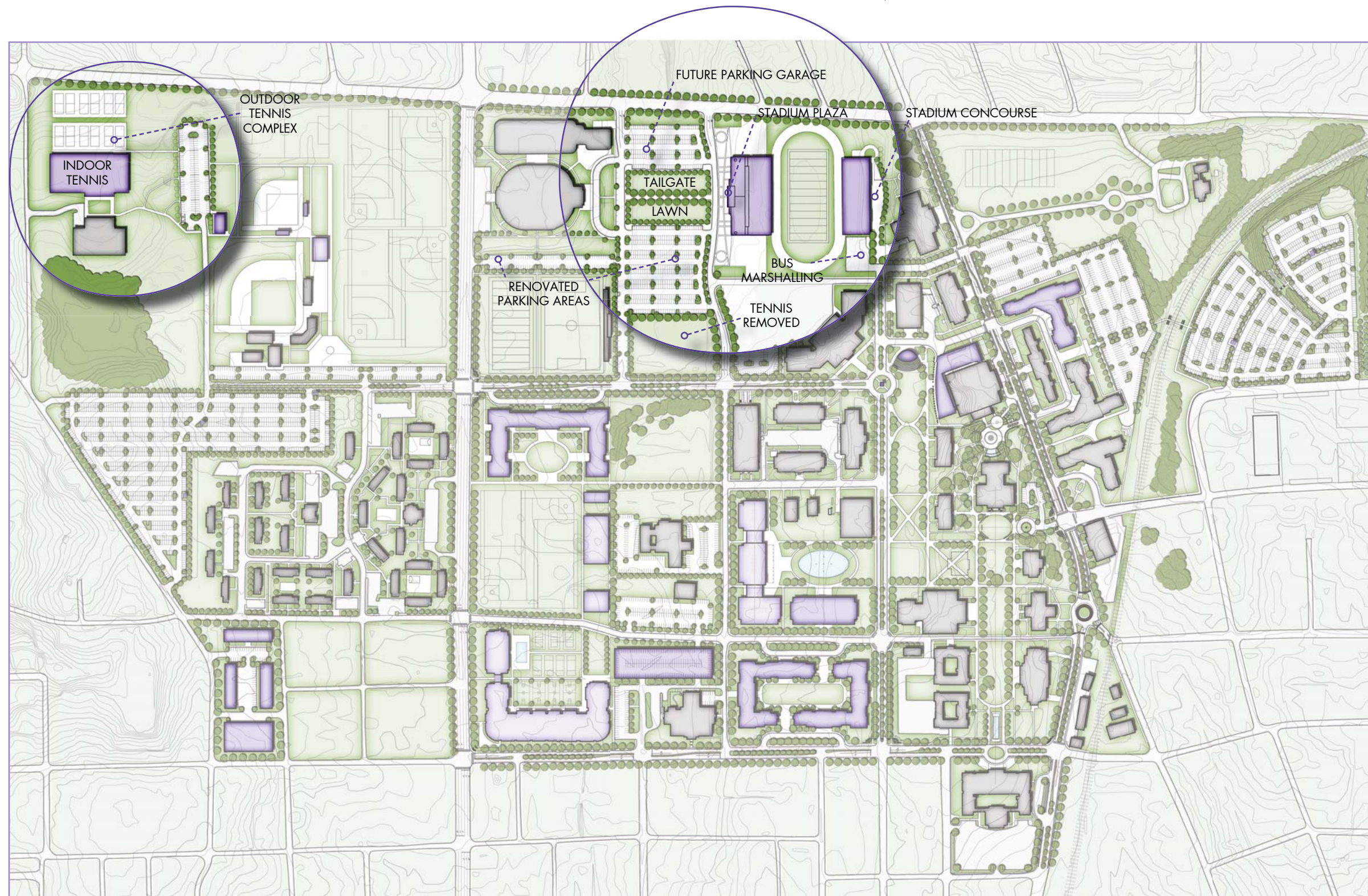


SOUTHWEST QUADRANT AND INTRAMURAL BUILDING

The southwest quadrant bordered by North Willow Avenue and West Seventh Street offers the prime expansion area for the campus. Currently, much of this area is designated as Acquisition Area #1 and consists of small businesses, a small apartment complex and a radio tower site. The anticipated acquisition of these properties along with the demolition of Tech Village East and the relocation of the Facilities operations will allow for the development of this area. Depending upon the timing of Property Acquisition and, the Housing and Intramural projects may need to swap sites.

The initial primary function for the area is the new Intramural Building and related intramural fields. The new Intramural Building is proposed on the corner of North Willow Avenue and West Seventh Street. This will provide a significant student oriented function on this prominent corner and provide an engaging first impression for the arriving students and others approaching the campus. New fields for soccer, football and softball are proposed adjacent to the Intramural building to supplement the current intramural fields on the west side of Willow. Future Student Housing is shown on the corner of Willow and University which will provide a significant presence at this main entry to the campus.

West Eighth Street is proposed to connect with West Ninth Street across the Southwest Quadrant allowing a path for the new Campus Shuttle. The current STEM Building, newly renovated Southwest Hall, Sherlock Park, and campus Chiller Plant are projected to be maintained within the site until a greater campus need for those properties becomes apparent.



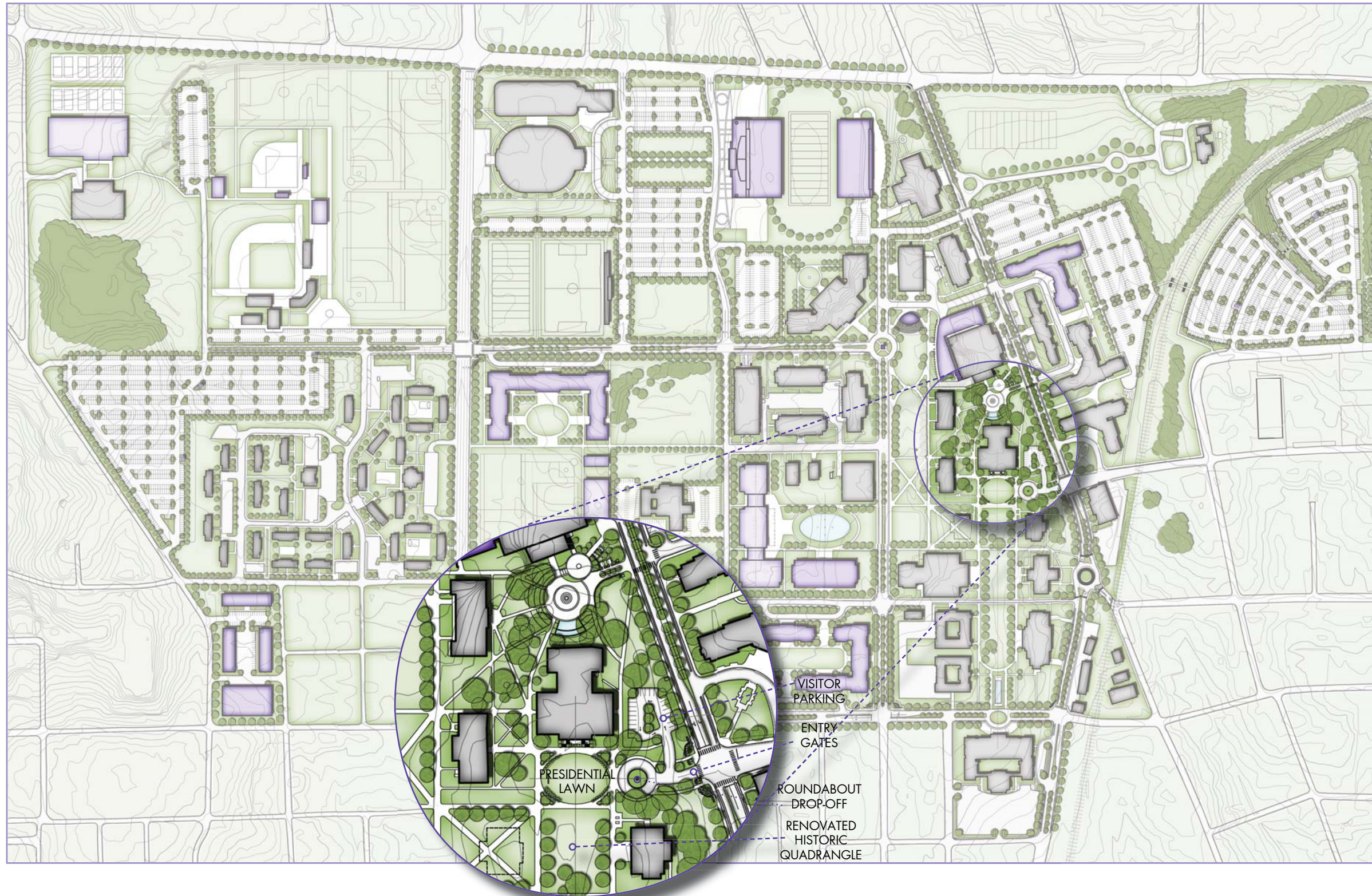
ATHLETIC CAMPUS IMPROVEMENTS

The Athletic Improvements are being studied in detail by an independent consultant directly for the athletic department and will be presented in a separate document. The Campus Master Plan update therefore provides an overview of the primary elements that have been discussed in association with athletics and their relationship to the campus.

Renovations to the western side of the TTU football stadium will provide an opportunity to establish a landscaped tailgating lawn and ceremonial Eagle Walk towards the new Home Team facilities on the west side of the stadium. The general campus parking improvement standards will apply with the refined parking areas. Renovations to the east side of the stadium are proposed to follow and should include the removal of the academic functions and addition of an eastern pedestrian concourse. Long range goals include the relocation of the track and soccer fields to another location which is likely off-campus. The existing tennis courts are proposed to be eliminated with a competitive tennis facility developed on the northwestern corner of the campus and recreational courts built in association with the intramural facilities.

GENERAL CAMPUS
IMPROVEMENTS

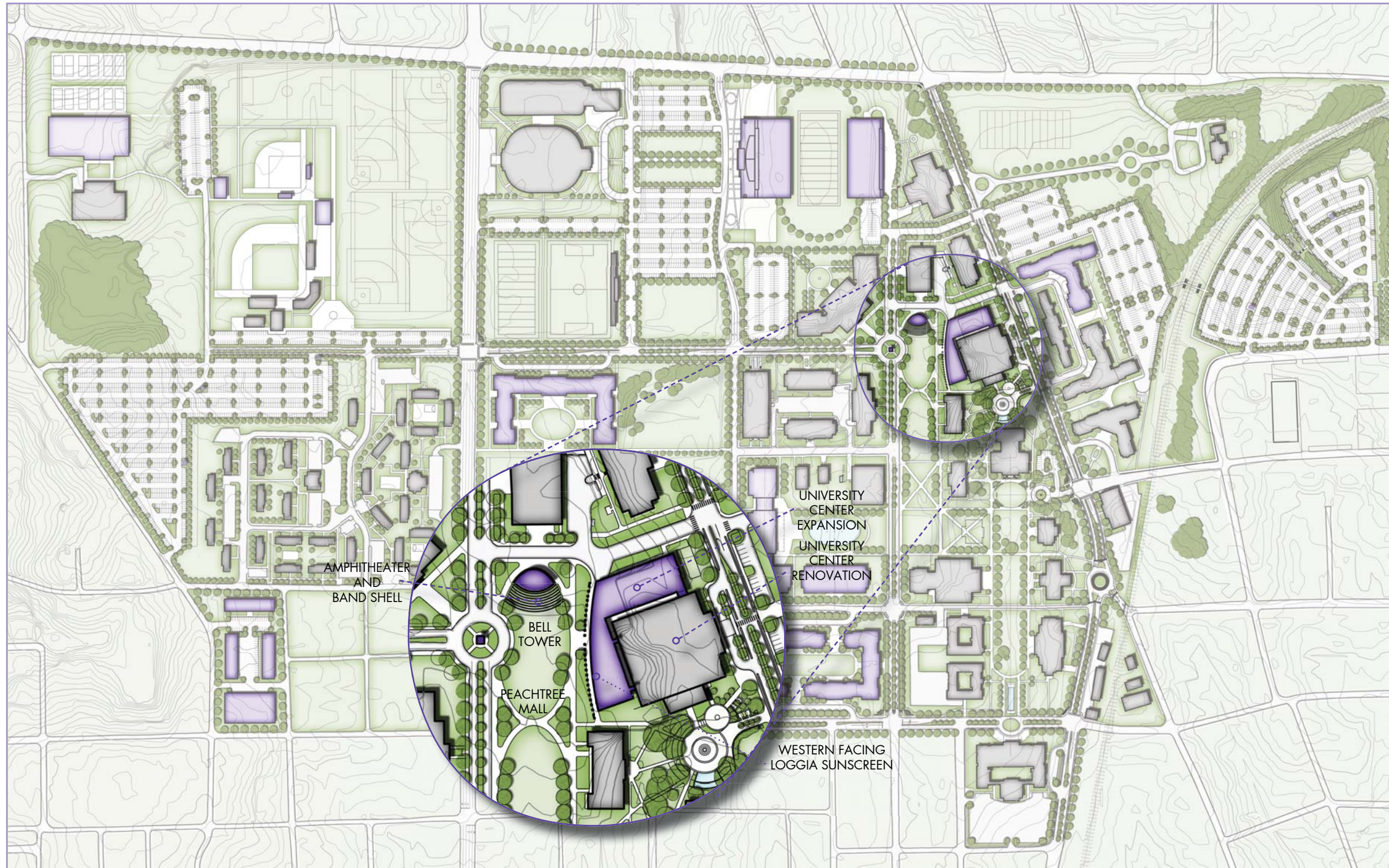
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DERRYBERRY HALL LAWN

The initial effort in greening the campus through the removal of traffic and parking is proposed at the front of Derryberry Hall. The existing front parking area and cross drives are proposed to be removed to create a Presidential Front Lawn. This new formal outdoor gathering space will complement the ongoing work to develop student plazas to the north between Derryberry and the University Center.

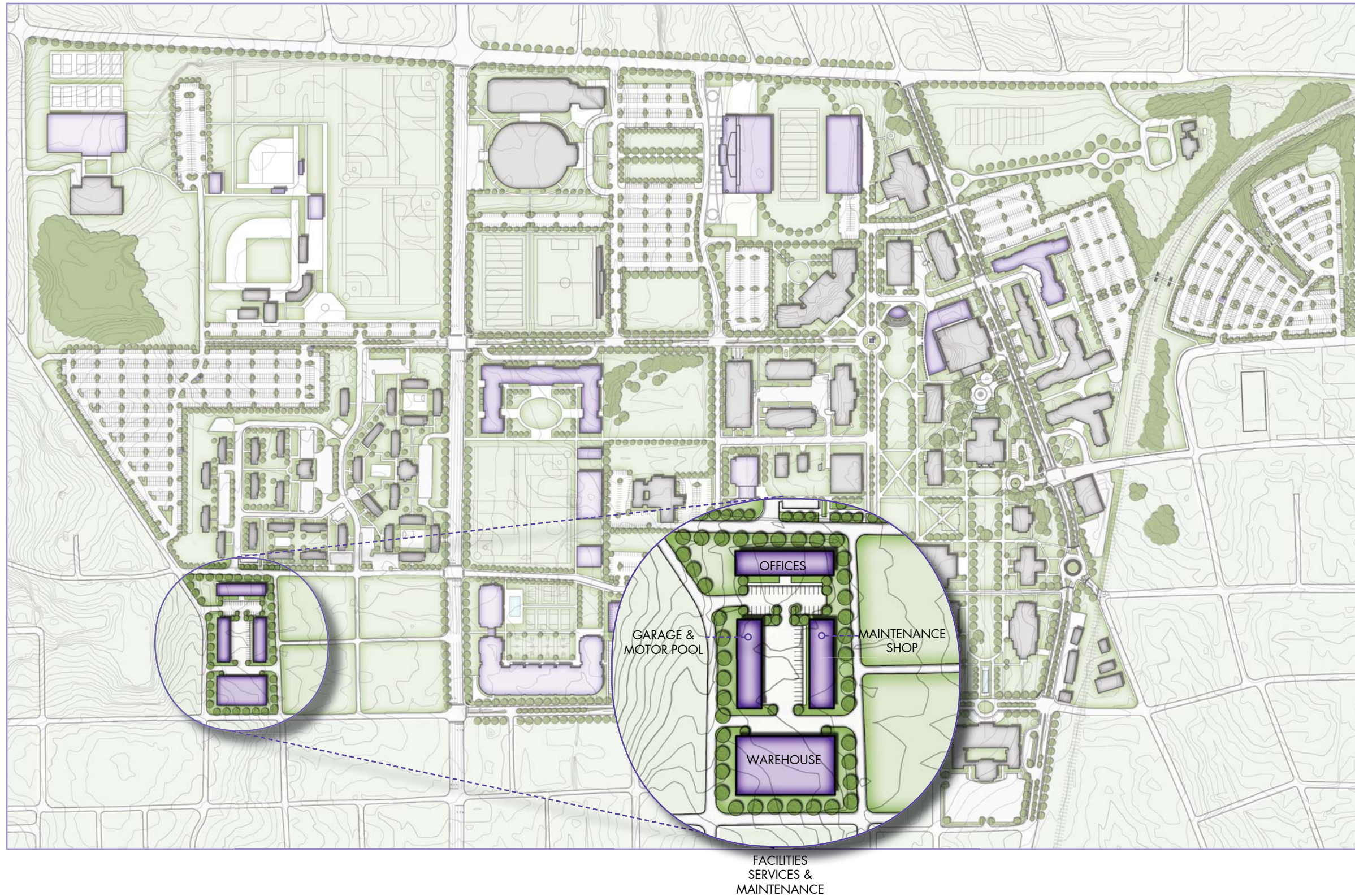
A roundabout abutting the newly placed Presidential Lawn will provide a drop off point and allow visitors to glimpse into the Historic Quadrangle as they arrive. An adjacent parking lot is provided for visitors, admissions and presidential parking needs. This lot will be tucked discretely between tree lined North Dixie Avenue and preserved trees currently surrounding Derryberry Hall.



ROADEN UNIVERSITY CENTER

The University Center building is ranked very low on the Facilities Assessment survey. Based upon a Building Envelope Investigation by Richard Rinks and Associates in June of 2013, the building has significant issues on the western facing facade and adjoining areas. Coupled with the need for more space, a renovation and addition is proposed for the building. Within its current site, an addition of ~60% may be added to the current building with the elimination of the parking area to the immediate west, as illustrated on the adjacent drawing.

An addition to the University Center provides the opportunity for the building to respond to and enhance the proposed Peachtree Mall. By allowing the addition to wrap the northern and western sides of the current building and centering the western facade on the University Bell Tower and University Avenue, the addition would provide an impressive face to travelers entering the campus along University. Supplemental space, if needed by the program, could be gained by extending the building into the north end of the Peachtree Mall. However, at this point, an amphitheater with a north side stage and bandstand is proposed to provide a conclusion to the Peachtree Mall prior to encountering the end of Johnson Hall. The replacement of the University Center could also be considered as a viable option.



FACILITIES SERVICES RELOCATION

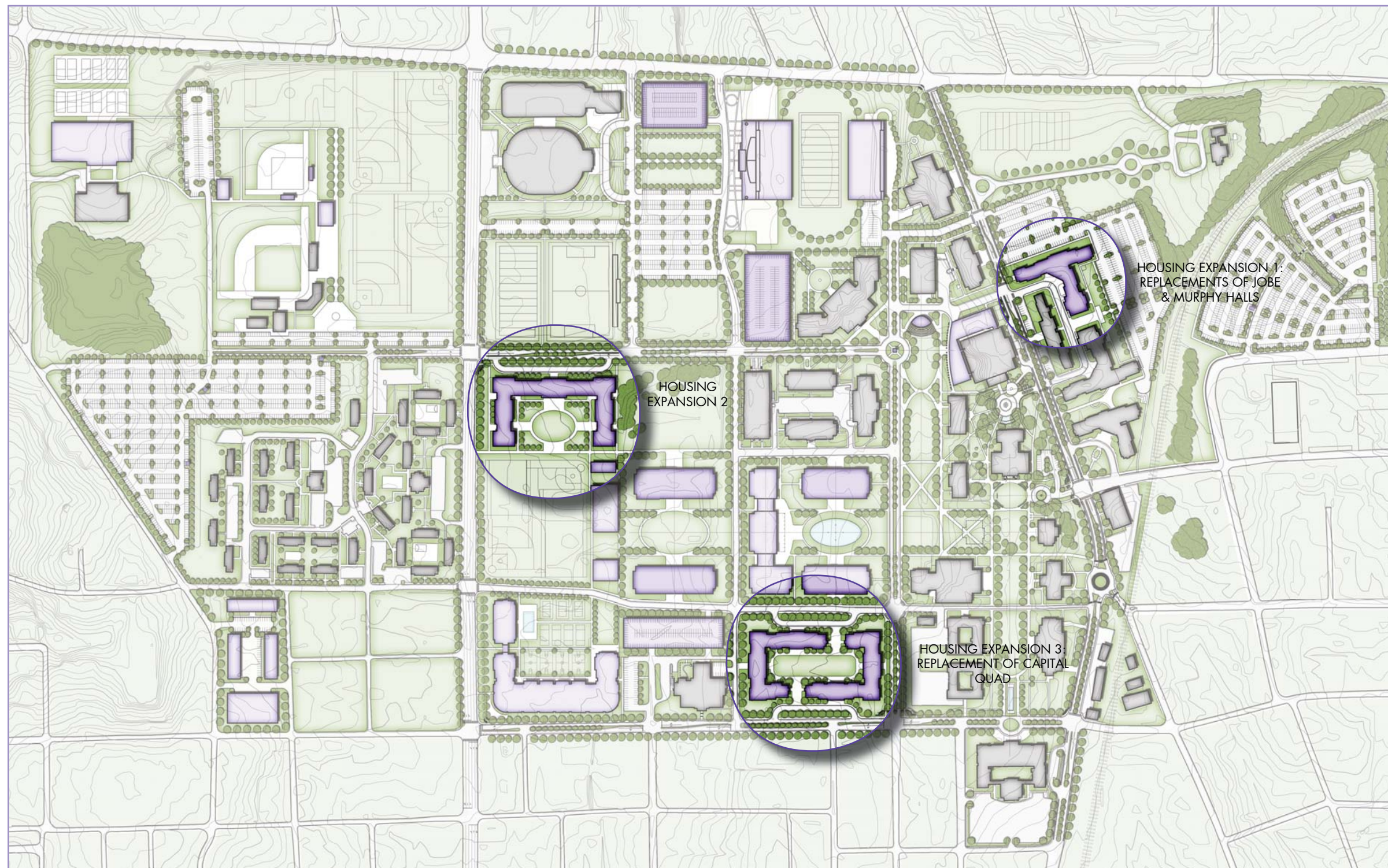
To allow for the development of the western portion of the campus between Seventh Street and University Drive, the relocation of the Facilities and Maintenance operations is a significant benefit. As the chiller plant serving the campus will likely be the most costly to relocate, it has been shown to remain in place while the other facilities are relocated. Ideally, the maintenance and grounds operations would be located on, or conveniently adjacent to, the campus to allow for ease of access by slow moving vehicles such as lawn mowers.

Several options are presented for consideration with some potentially utilized as interim solutions for portions of the operation over time. Options considered include the gym(s) and southern (newest) portions of Foundation Hall for warehouse space, offices and shops, the University Services building after the elimination of coal and acquisition property such as Twelfth Street and Washington Avenue or the triangular lot to the east of the Presidential Residence. The proposed location for the operation is the property on the southwest of the acquisition plan, just south of Tech Village. While small grounds crew facilities may need to be located within the primary sections of the campus, this property provides a convenient location for the other operations.



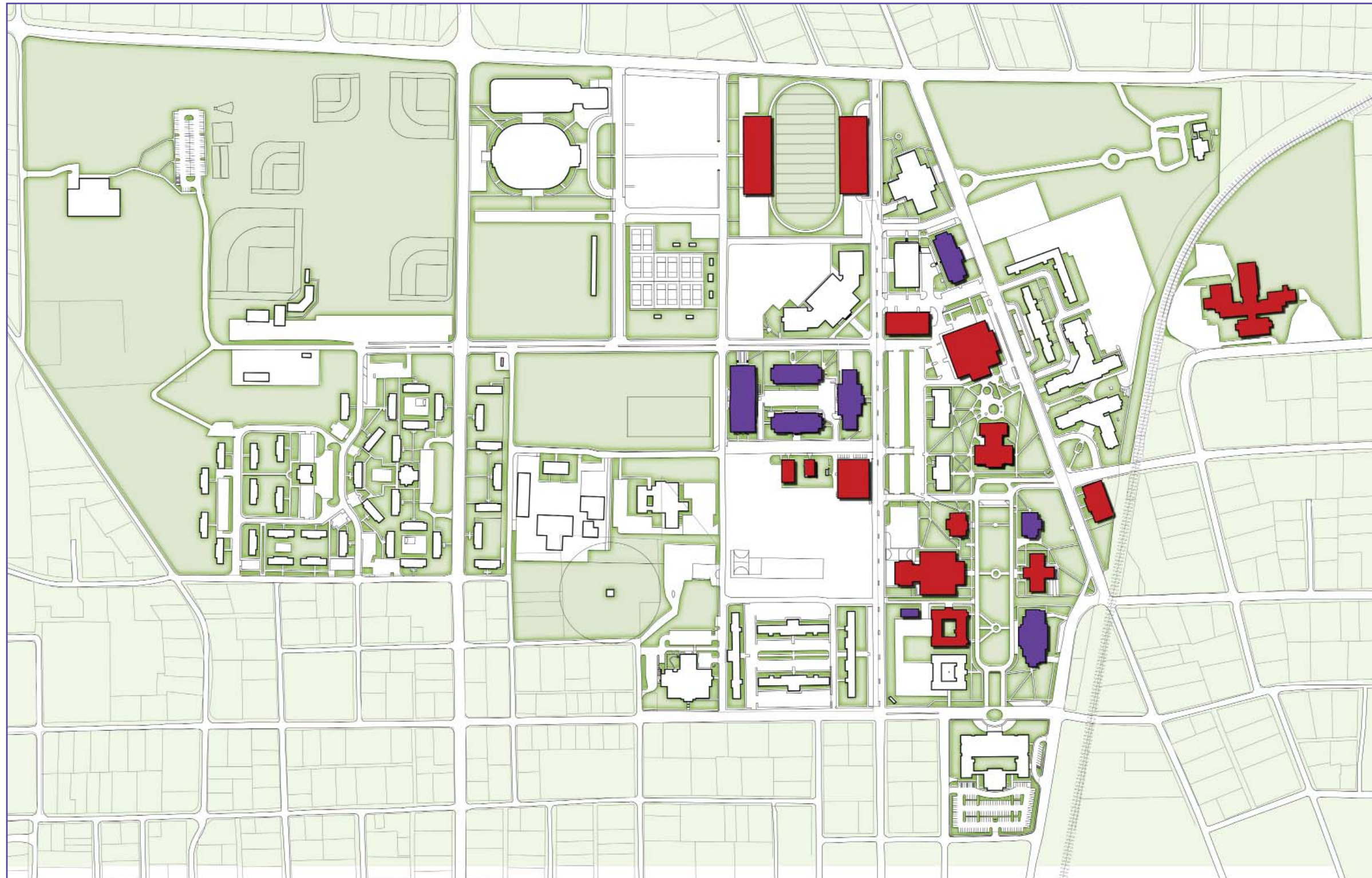
SHIPLEY FARM

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 rolling property could be considered for supplemental land uses in the future. Activities such as intramurals, recreation and maintenance and facilities operations were discussed during the planning process and ultimately rejected to defer to the agricultural functions.



STUDENT HOUSING EXPANSION

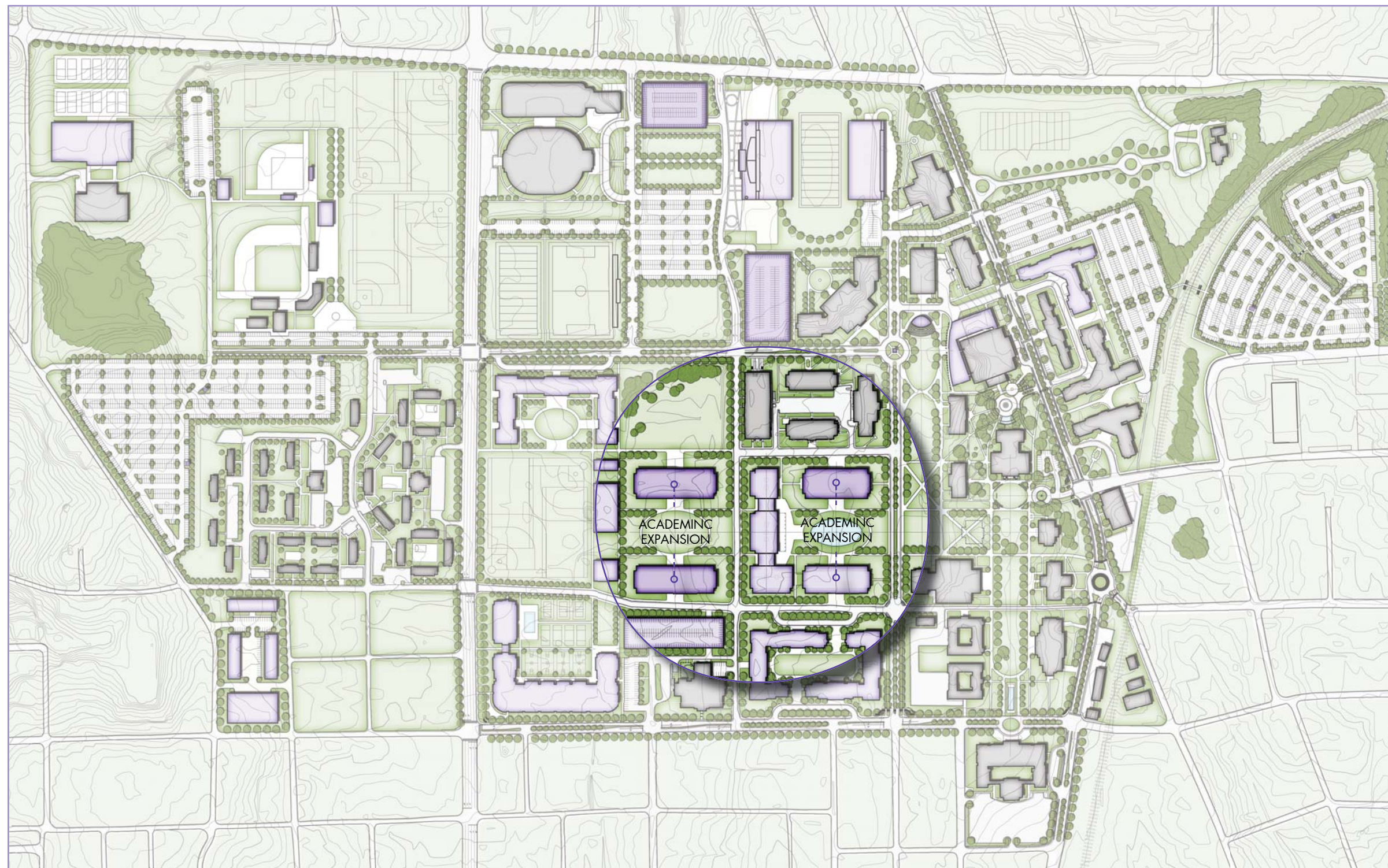
With a current student body of ~11,500, the intent of the master plan has been to consider growth of the campus to accommodate 15,000 students. While a specific housing study should be commissioned to formally analyze the housing needs, several opportunities have been outlined in the master plan update to provide locations for housing in the future. The southeast corner of North Willow Avenue and University Drive provides close proximity to athletics, student life, and intramural facilities. The western expansion, opposite the new science building, also offers a similar location with a direct connection to the academic core of the campus through the science building for housing or academic functions. While Capital Quad offers an affordable housing option for the current students, replacement of these facilities could be considered in the future. Likewise, the replacement of Jobe and Murphy Halls as the third new complex along Dixie Avenue could also be considered.



BUILDING ASSESSMENT

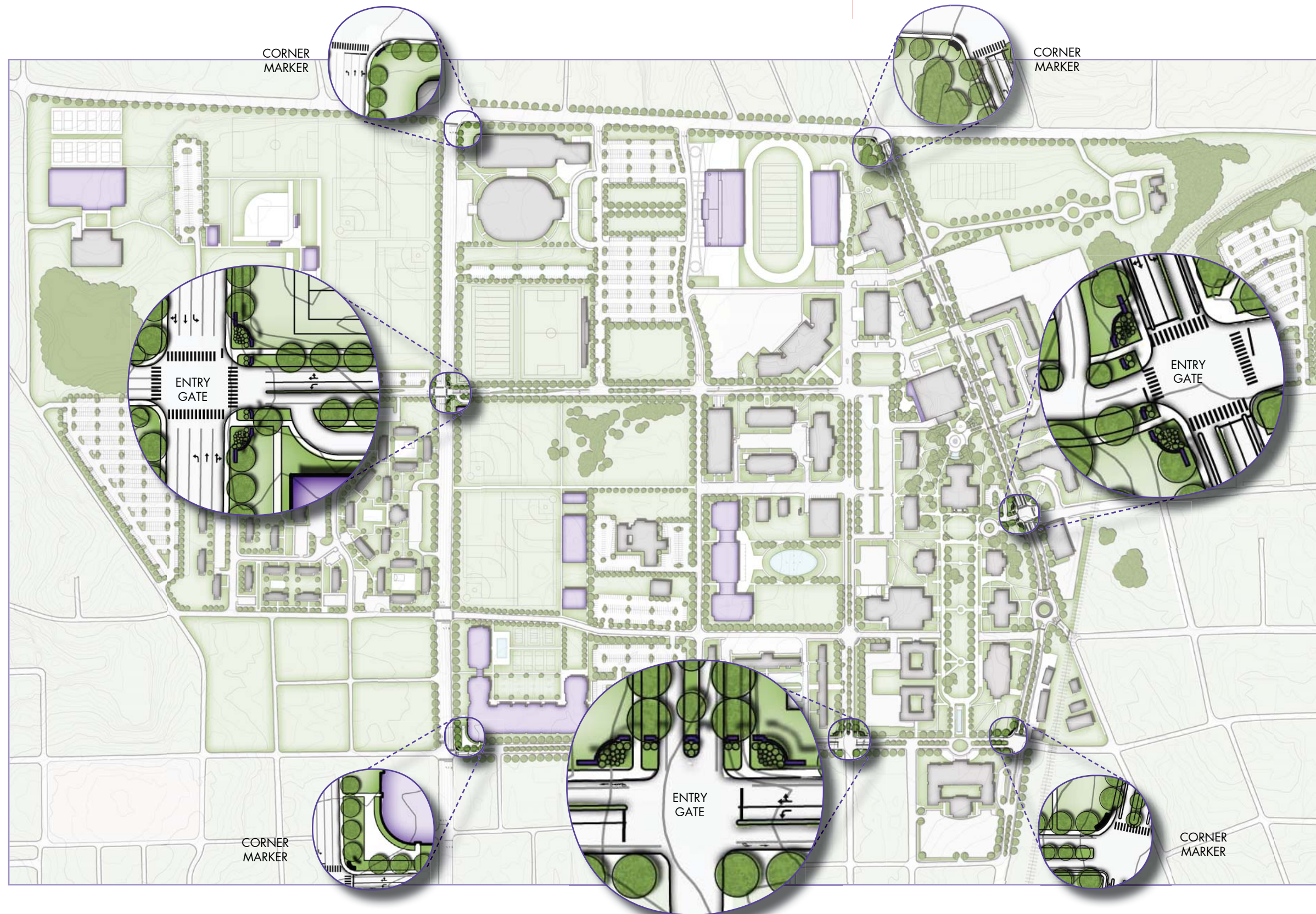
Attached within the Appendix is the current Facilities Survey itemizing the ratings of the physical condition of each academic building on the campus. Typically, an overall rating below 70 indicates a building in need of significant renovation or consideration for removal and replacement. The diagram to the left indicates each of the academic and core campus buildings with a score below 70. Non Educational and Core buildings such as Athletic and Housing are not included in this assessment. As this includes the majority of the campus buildings, it represents a staggering and nonviable prospect for replacement. Many of the buildings with ratings in the 60's were reviewed as a separate Six Building Assessment study during the 2010 Update process (available as a separate document) and are part of an ongoing comprehensive incremental renovation and maintenance program. Therefore, the buildings with an overall rating below 60 have been highlighted in red to bring a focus to those in the most need.

Of the thirteen buildings with a rating below 60, the lowest rated buildings, Matthews, Daniels and the East Stadium Lab spaces should be considered for immediate replacement. Foster Hall is scheduled for demolition after the new Science building and Pennebaker renovations are completed. Foundation Hall's use as a flex space should not deter its future as providing parking. Lewis Hall, the Foundry and the Old Maintenance are considered as place holders for academic expansion along the new Science Quad. The most challenging opportunities will be the repurposing or replacement of Jere Whitson and the Health and PE Building. As keynote buildings, The University Center and Derryberry Hall should be significantly renovated.



ACADEMIC EXPANSION

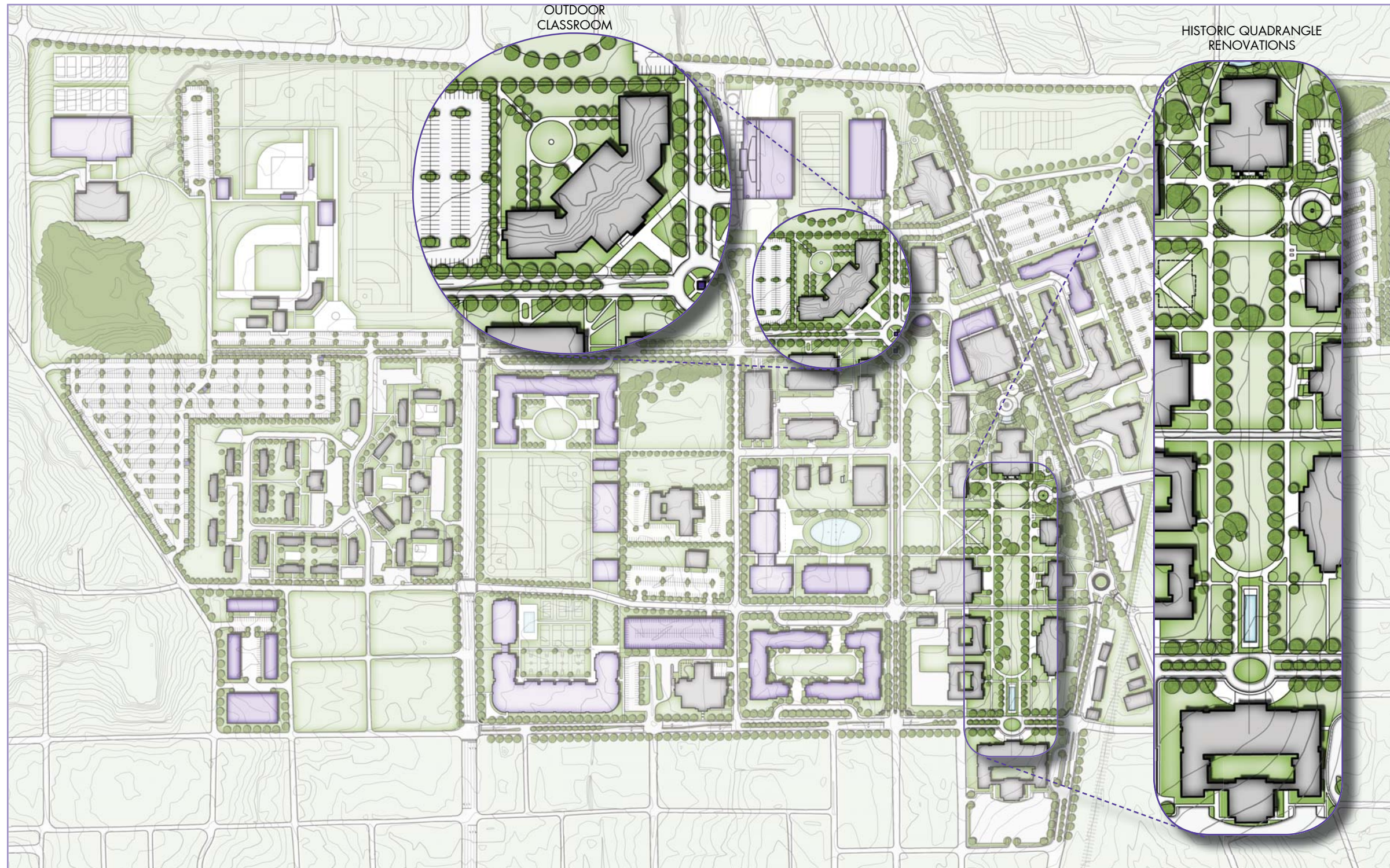
As further academic space is required in the future, the replacement of buildings such as Jere Whitson and the Health and P.E. building are options for consideration. In addition, the new science building provides several opportunities for structures in nearby locations. The removal of Lewis Hall, Foundry Building, and the Old Maintenance Building will allow for a 100,000 square foot building to be added to the North edge of the Science Mall. A similar sized building could also be added to the south side of the Science Mall to complete the formation of the mall's outdoor space. Additional square footage may also be added to the west side of Stadium Drive flanking an outdoor space aligned with the new science building. The design of the science building can therefore be developed as an ending to the new east-west science mall as well as a breezeway connection to the future quad beyond to the west.



CAMPUS GATES

To provide a sense of prominence and greet visitors to the campus with a traditional academic architectural element, ceremonial gates are proposed at the primary significant "main entry" points into the campus. These include the University Drive entry at North Willow Avenue and the Peachtree Street entry at 7th Avenue, which both begin the ceremonial procession to the future Bell tower in the center of campus. In addition, a ceremonial gate is proposed for the entry at William L. Jones Drive leading to Derryberry Hall.

To further signify the boundaries of the campus and enhance the perception of the campus as a leading academic institution, entry markers are proposed at the secondary entries into the campus. Combined with improvements to North Willow Avenue, North Dixie Avenue, 7th Street, and University Drive, these elements will elevate the TTU campus image to reflect the prominence of the State's foremost technological university.



HISTORIC QUADRANGLE RENOVATIONS

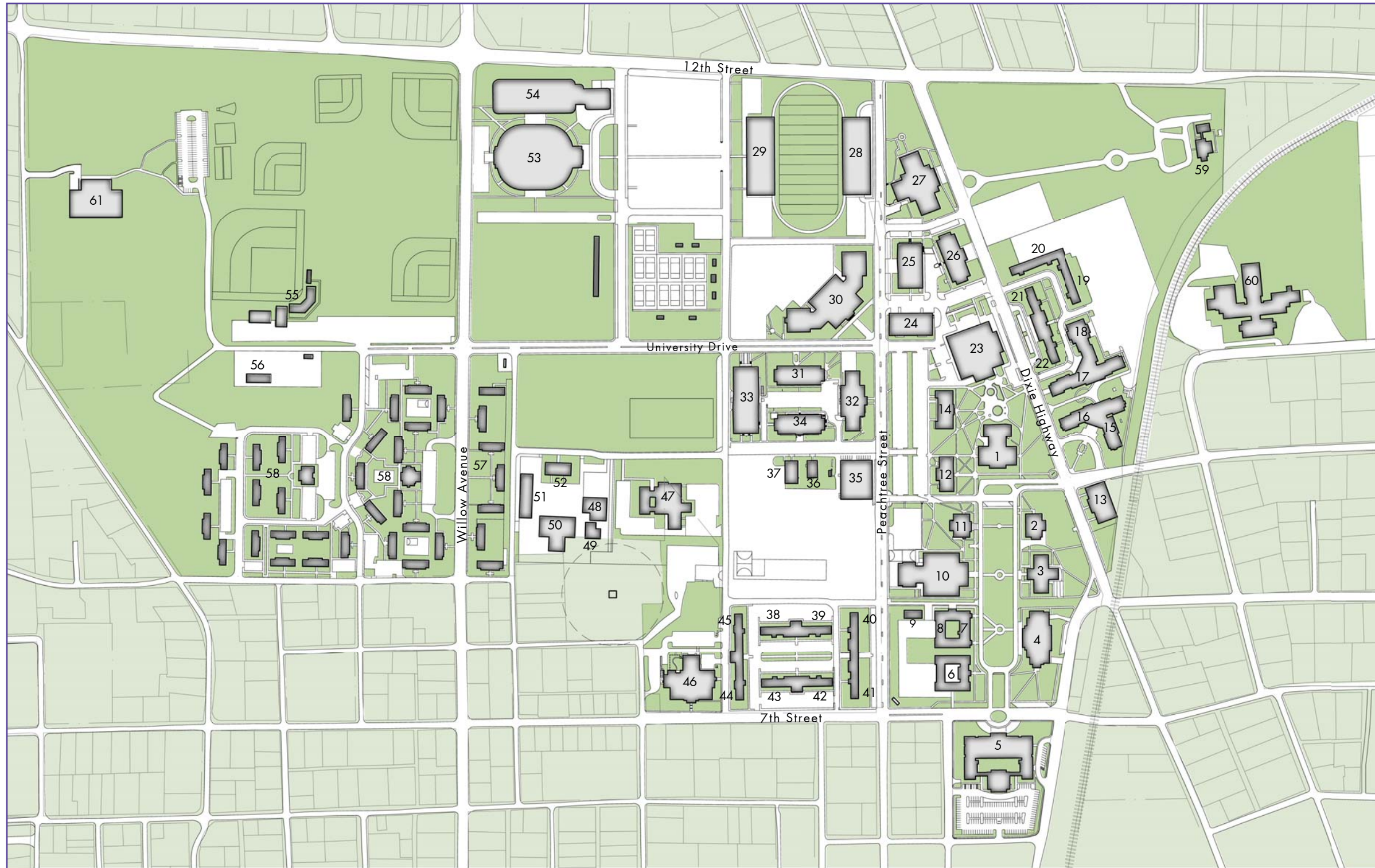
As the heart of the original campus, the Quadrangle provides a recognizable and memorable image of the campus. Proposed improvements to the Quad include simplification of the pedestrian circulation by reducing the current street and sidewalk combination to a single grand walkway. The formal promenade will encircle the lawn and be located to provide relief to the existing trees as well as the existing buildings while still allowing for emergency access as well as maintenance vehicles. This further greening of the Quad will tie to the proposed Derryberry front lawn improvements illustrated earlier.

CAMPUS IMPROVEMENTS

Additional improvements to the campus will include the efforts outlined in the 2010 Update such as the Bell Tower and the Centennial Fountain. As part of the ongoing process to green the campus and reduce traffic within the core of the campus, a series of parking improvements are outlined in the Strategic Parking Analysis in the appendix. As part of that effort, provisions for an outdoor classroom space behind the Library are shown on the adjacent drawing.

MASTER PLAN

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20 Year Master Plan Vision	37
30 Year Master Plan Vision	39



EXISTING BUILDINGS:

1. Derryberry Hall
2. Kittrell Hall
3. Jere Whitson Building
4. South Hall
5. Nursing & Health Sciences Building
6. Crawford Hall
7. Daniel Hall
8. Matthews Hall
9. University Police
10. Health & P.E. Building
11. Bartoo Hall
12. T. J. Farr Building
13. University Services Building
14. Henderson Hall
15. New Hall South
16. New Hall South
17. New Hall North
18. New Hall North
19. Murphy Hall
20. Jobe Hall
21. Pinkerton Hall
22. Mattie Sue Cooper Hall
23. Roaden University Center
24. Foster Hall
25. Johnson Hall
26. Pennebaker Hall
27. Bryan Fine Arts Building
28. East Stadium
29. West Stadium
30. Volpe Library and Media Center
31. Bruner Hall
32. Clement Hall
33. Prescott Hall
34. Brown Hall
35. Lewis Hall
36. Foundry Hall
37. Old Maintenance Building
38. Ellington Hall
39. Warf Hall
40. McCord Hall
41. Maddux Hall
42. Cooper Hall
43. Dunn Hall
44. Browning Hall
45. Evins Hall
46. Ray Morris Hall
47. Southwest Hall
48. Otis Carroll Building
49. Motor Pool Garage
50. Warehouse
51. George S. Ridley Carr Building
52. Facilities Services Offices
53. The Hooper Eblen Center
54. University Rec & Fitness Center
55. Clubhouse & Press box
56. Boat Storage
57. Tech Village East
58. Tech Village West
59. Walton House (President's Residence)
60. Foundation Hall
61. Athletic Performance Center



ACQUISITION PLAN

The Acquisition Plan has been updated to reflect the current status of campus expansion opportunities. The former Prescott Middle school site was purchased by the TTU Foundation and is serving as a flex surge space as various building are renovated as well as a parking resource. The top priority remains the parcels in the northeast corner of Seventh and Willow as the site for the anticipated Intramural Recreation building. The property at the south end of Peachtree across Seventh has been added to provide for more area adjacent to the core of the campus.

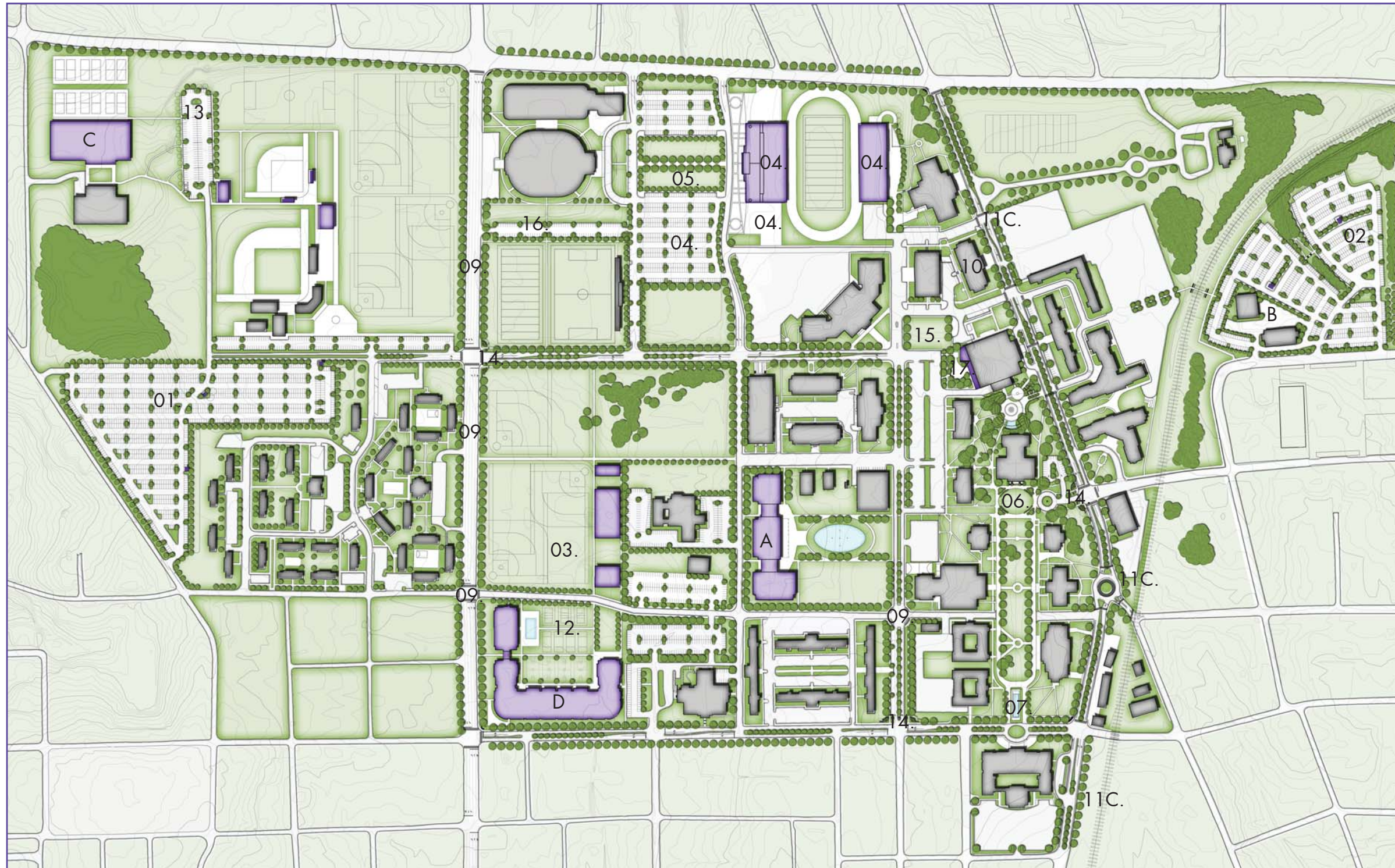
The property at the northwest corner of Seventh and Willow has been purchased and is being developed into multi-family housing with a greater density than the small single family houses previously on the site. The property surrounding this area remains a priority for the potential to expand the campus and specifically for the Facilities and Maintenance Operations.

Potential off-site acquisitions, not shown on the immediate campus plan, that should be considered include:

1. Golf course
2. Area for the Facilities and Maintenance operations
3. Track and Soccer field relocation
4. Office Space

- Existing Campus Property
- High Priority Acquisition Area
- Long Range and Opportunistic Areas



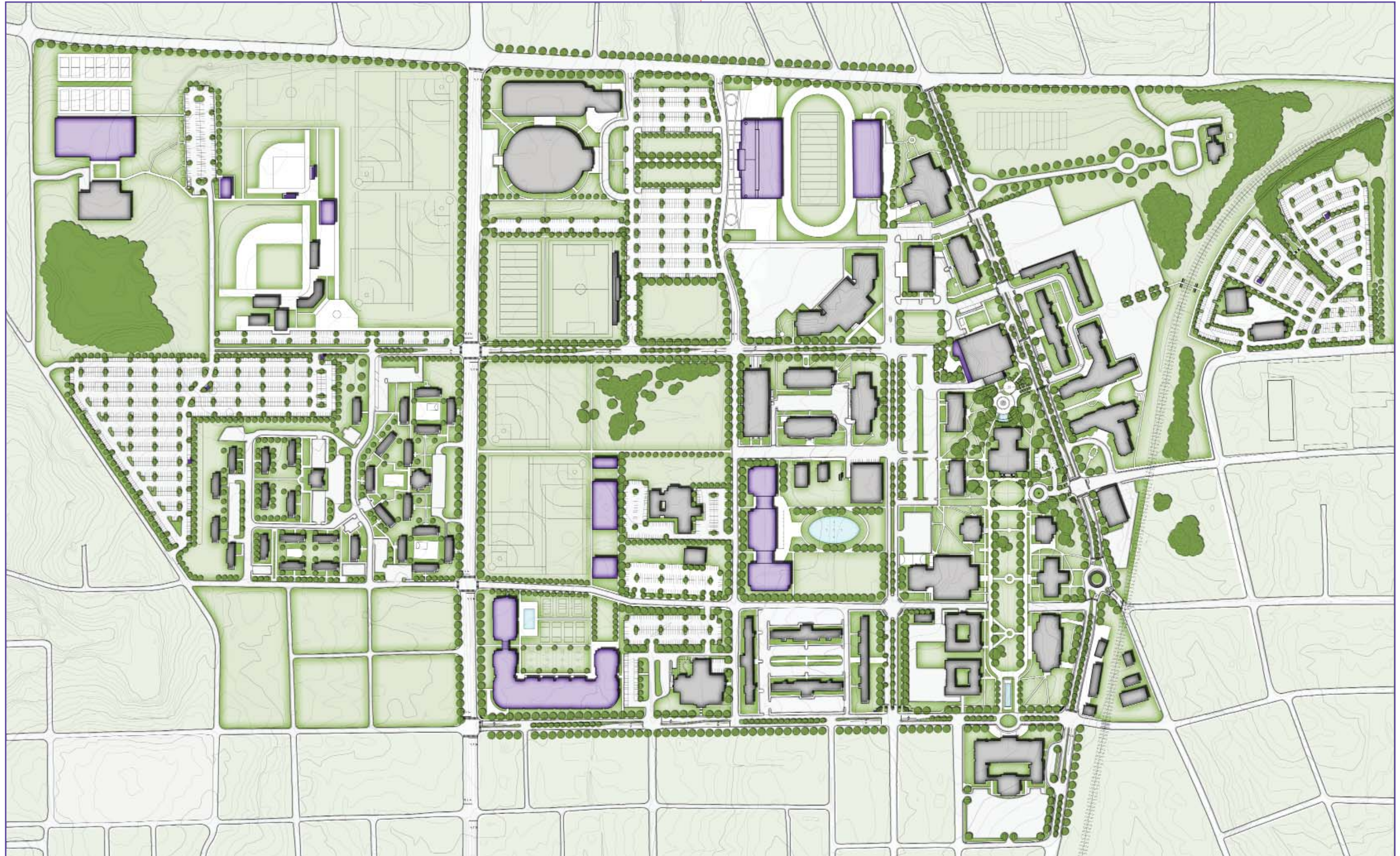


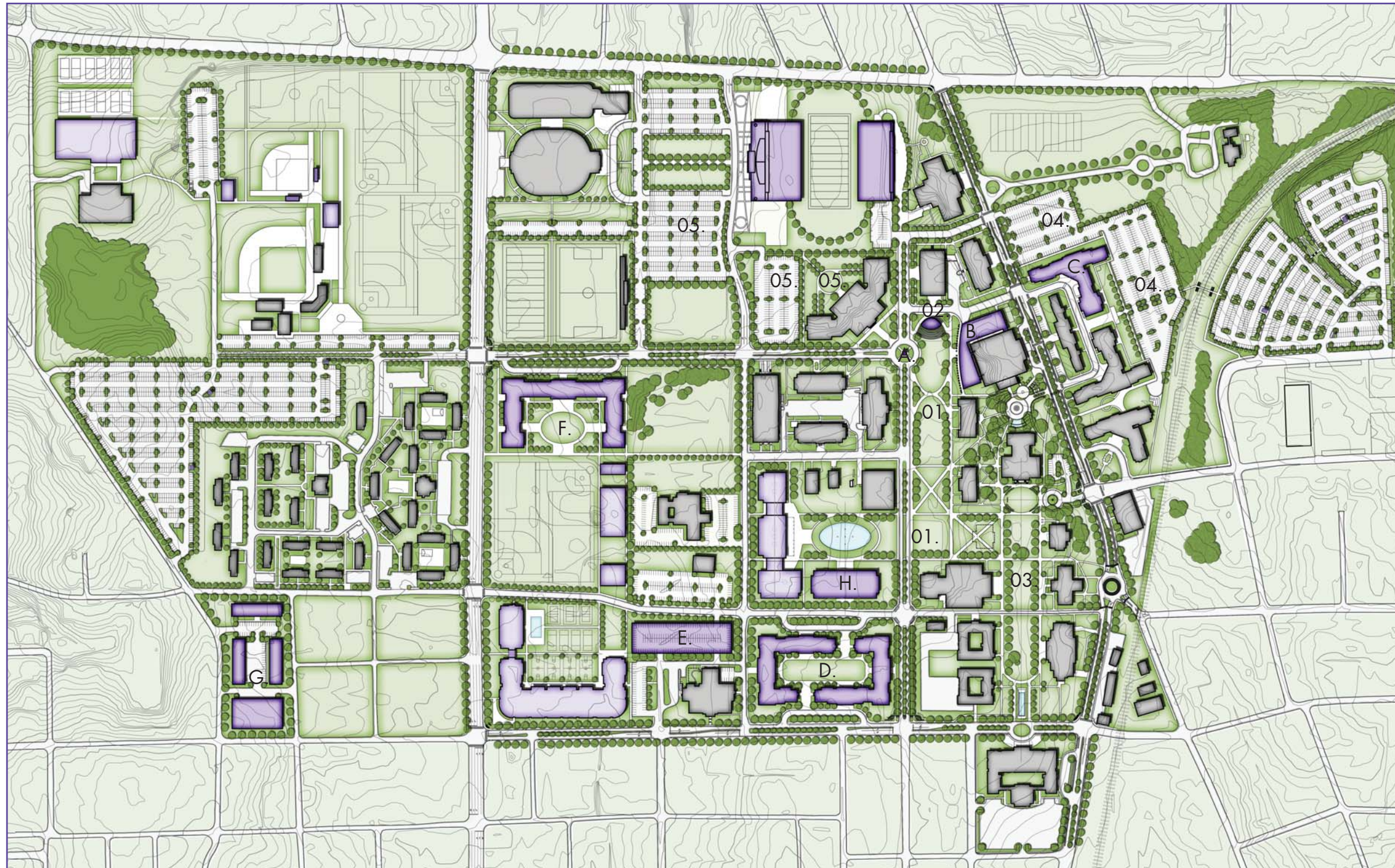
NEW BUILDINGS:

- A. Integrated Science Building
- B. Facilities Services Temporary Relocation
- C. Tennis Court Facility
- D. Intramural Building with corresponding fields

CAMPUS IMPROVEMENTS:

- 01. West Campus Parking Lot
 - a. University Drive Upgrades
 - b. Current Athletic Lot Upgrades
 - c. Shuttle Route I
- 02. Foundation Hall Parking
- 03. Southwest Intramural Quad
- 04. West Stadium Renovations
 - Stadium West Parking Greening
 - Stadium Southwest Parking Removed
- 05. Tailgate Lawn Implemented
- 06. Derryberry Front & Rear Lawn Improvements
- 07. Centennial Fountain
- 08. Peachtree Central & South Sections with Pedestrian Rotary
- 09. Willow Improvements
- 10. Pennebaker Renovations
- 11. Dixie Improvements
 - a. Dixie Avenue
 - b. Roundabout
 - c. Mahler Avenue
- 12. Rec. Tennis Courts relocated
- 13. Tennis Facility parking extended
- 14. Campus Gates established
- 15. Foster Demolition
- 16. Hooper Eblen Parking Greening
- 17. UC Improvements



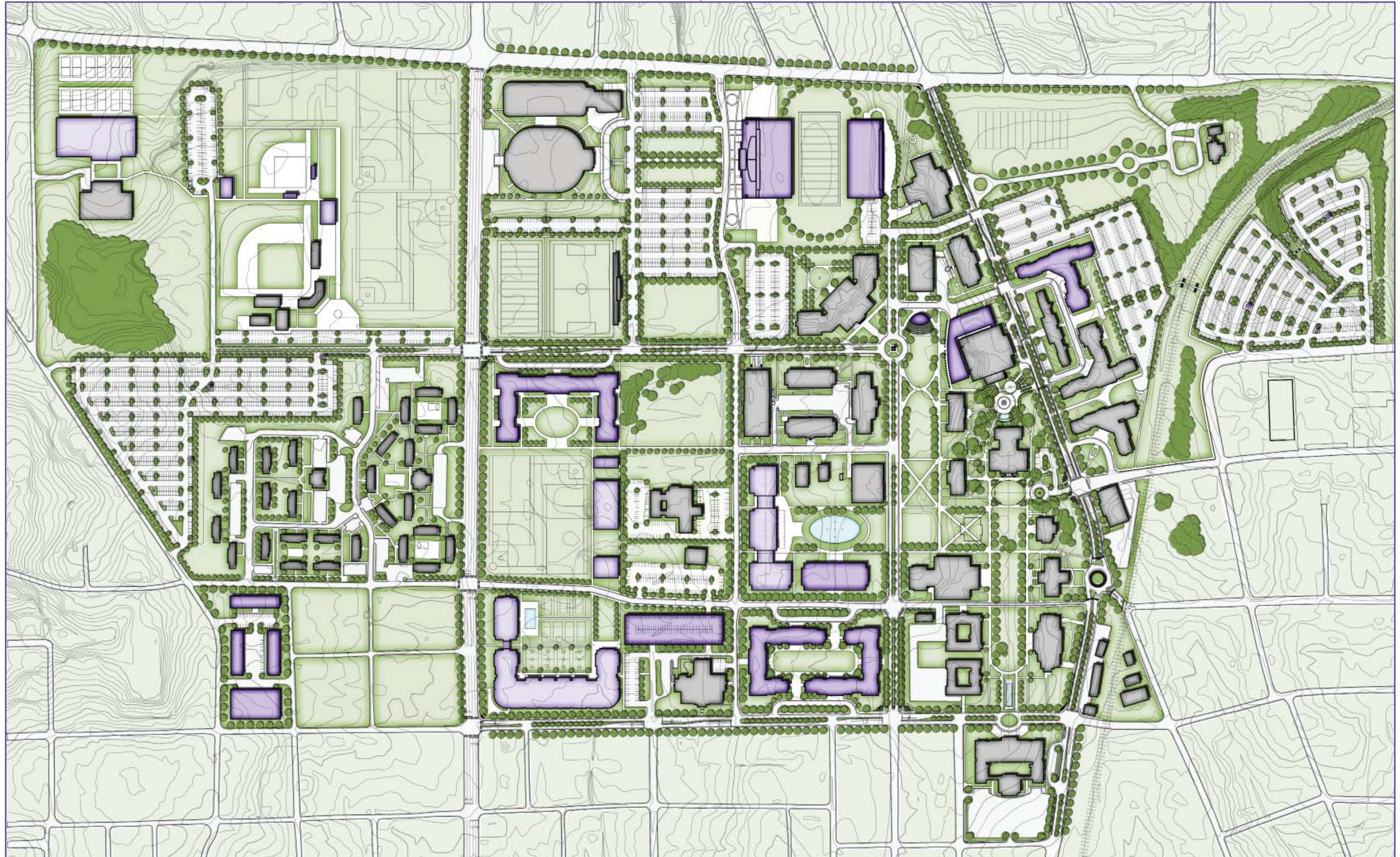


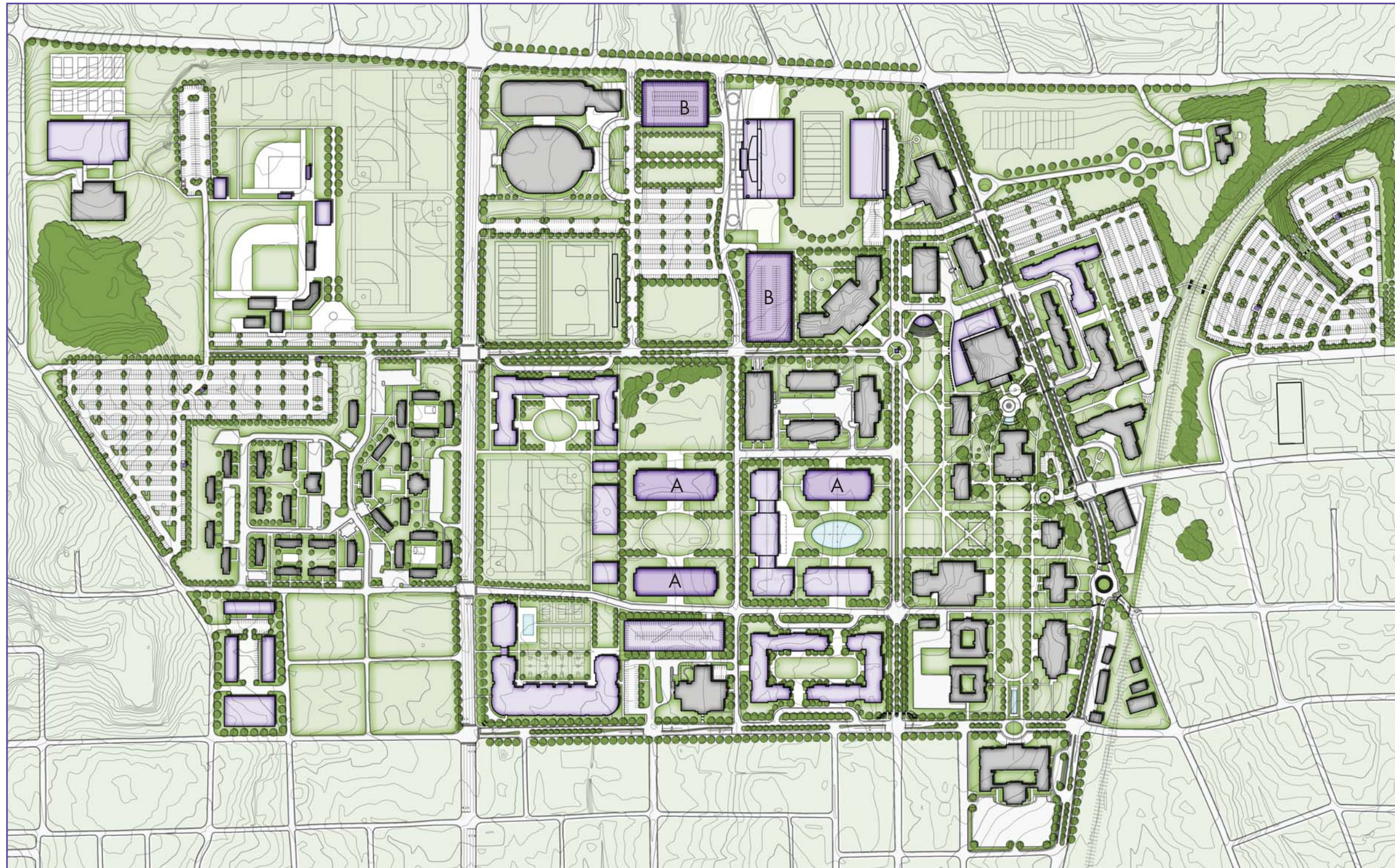
NEW BUILDINGS:

- A. TTU Bell Tower
- B. University Center Expansion
- C. New Jobe/Murphy Student Housing
- D. Capital Quad Housing Replacement
- E. 8th Street Parking Garage
- F. Campus Housing Expansion at University & Willow
- G. Facilities Services Relocation
- H. Academic Expansion
- J. West Stadium Expansion
- K. East Stadium Improvements

CAMPUS IMPROVEMENTS:

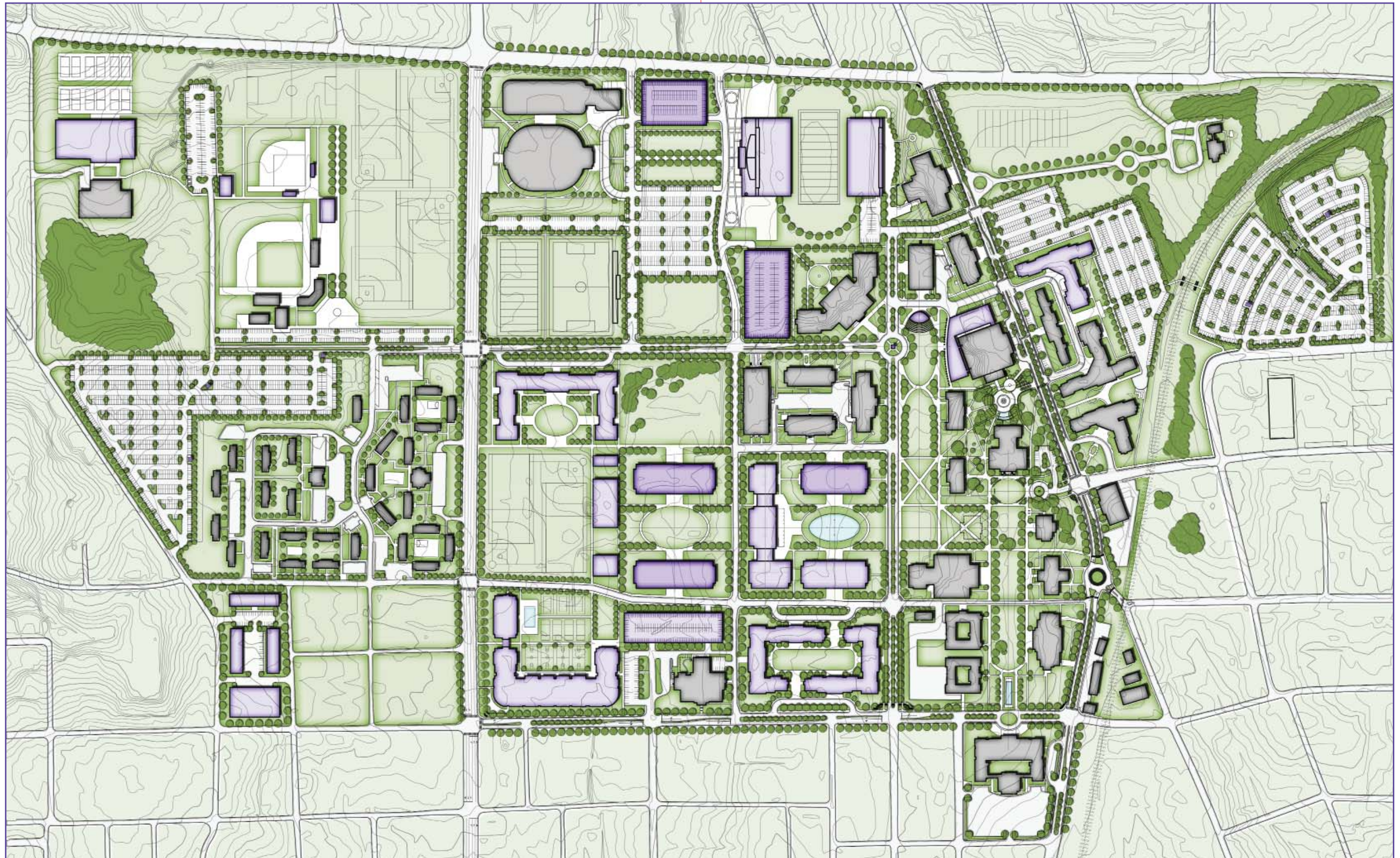
- 01. Peachtree Street and Mall
- 02. Peachtree Mall Amphitheater
- 03. Historic Quad Renovations
a. 8th Street Extension
- 04. Jobe/Murphy Housing Parking Improvements
- 05. Library parking improvements & outdoor classroom.
- 06. Track and Soccer Developed Off-campus





NEW BUILDINGS:

- A. Future Academic Expansion
- B. Additional Parking Structures



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Dixie Avenue Traffic Study	55

Bldg Name	Bldg ID	Old Bldg ID	Use Code	Camp. Orig.	Rvw	Fndtn	Bsmnt Constr.	Spr-struc	Ext Encl.	Roof	Int. Const.	Strs	Int. Fnsh	Convy	Plmb	HVAC	Fire Prot.	Elec.	Data & Comm	Equip & Frnsh	Spcl Constr.	Site Cond.	Sfty Stds	Bldg Suit.	Bldg Adapt.
Bartoo Hall	50-107	ZOOBH	10	64.4	66.1	90	60	80	50	90	60	60	60	90	50	70	70	40	80	50	0	60	50	40	30
Daniel Hall	50-134	ZOODN	10	46.9	71.3	20	40	50	50	40	40	90	50	60	50	30	90	50	80	50	70	60	50	20	10
Foundation Hall	FNDH	FNDH	10	57.6	100	90	90	80	80	50	60	70	50	50	50	30	30	40	50	40	0	90	50	90	90
Henderson Hall	50-109	ZOOHH	10	71	64.3	70	70	70	80	90	60	30	90	60	50	90	90	70	70	70	100	60	50	40	30
Jere Whitson Building	50-103	ZOOJW	10	57.4	62.3	90	100	90	50	40	70	30	50	50	50	30	70	70	80	50	0	60	50	30	30
Johnson Hall	50-112	ZOOJH	10	78.6	100	90	80	90	70	90	70	70	70	90	60	70	100	80	80	70	0	80	70	90	90
Kittrell Hall	50-102	ZOOKH	10	65.2	64.4	90	80	70	70	90	60	40	50	90	50	70	70	50	70	50	0	70	50	40	30
Matthews Hall	50-135	ZOOMH	10	46.8	70.5	60	60	40	60	40	50	30	50	0	50	30	90	50	80	50	0	50	50	20	10
Nursing & Health Serv. Bldg.	50-132	ZOONH	10	95.4	100	90	90	100	100	90	100	100	90	100	100	90	100	100	100	100	0	100	100	100	100
South Hall	50-104	ZOOSH	10	67.2	64.7	90	70	60	70	60	70	70	60	80	60	50	80	70	80	50	100	70	50	70	70
T.J. Farr Building	50-108	ZOOFB	10	73.7	58.1	80	80	70	60	40	90	30	90	90	50	90	80	80	90	90	0	50	80	80	70
Bruner Hall	50-151	ZOBR	11	66.4	62.4	90	100	90	60	40	70	70	60	90	50	40	70	90	70	50	0	60	50	80	80
Foster Hall	50-111	ZOOFH	11	55.9	58.6	90	100	90	60	80	60	20	40	50	50	30	70	50	70	40	30	60	20	20	20
Pennebaker Hall	50-113	ZOOPR	11	62.9	67.5	90	90	90	70	40	50	70	50	70	50	40	70	60	90	50	0	60	50	80	70
Brown Hall	50-149	ZOBN	12	66.2	65.3	90	100	90	70	40	60	70	60	50	50	50	70	70	80	50	0	70	60	80	80
Clement Hall	50-148	ZOCH	12	57.4	55.9	90	90	90	60	40	60	50	60	50	50	30	70	50	70	50	50	80	30	50	50
Foundry	50-146	ZOOFN	12	59.9	59.5	80	100	50	70	90	70	10	60	0	40	50	30	50	80	50	80	80	60	90	70
Lewis Hall	50-145	ZOOLH	12	53	52.9	70	50	80	50	80	50	30	60	0	40	40	70	40	80	50	0	60	30	50	50
Old Maintenance Building	50-147	ZOOM	12	45.6	46.4	80	100	40	60	90	40	20	30	0	40	20	70	40	40	20	0	50	30	50	20
Prescott Hall	50-150	ZOPH	12	69.7	63.8	90	100	90	60	100	70	70	70	70	40	50	80	50	80	50	70	50	50	80	80
Ray Morris Hall	50-159	ZORM	12	95.7	100	90	100	100	100	90	100	100	90	100	100	90	100	100	100	100	0	100	100	100	100
Bryan Fine Arts Building	50-106	ZOFA	13	80.5	100	90	90	90	80	100	70	80	50	60	60	80	90	80	80	50	0	90	90	100	80
IT Welding Storage	50-191	Z0191	14	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Health & P.E. Building	50-105	ZOHP	15	52.4	52.3	80	50	60	50	40	30	50	30	100	40	40	70	90	50	40	30	50	30	40	30
Derryberry Hall	50-101	ZODH	16	55.1	61.9	90	60	60	70	40	60	80	50	60	50	30	70	30	60	50	0	80	60	70	50
Southwest Hall	50-160		16	94.8	100	100	100	100	100	40	100	100	100	100	100	100	100	100	100	100	0	100	100	100	100
University Police	50-136	ZOUP	16	67.1	55	80	60	80	60	80	80	30	50	10	70	40	90	90	70	100	100	50	70	70	80
Volpe Library	50-152	ZOOLM	17	81.8	100	90	90	100	50	50	90	90	80	90	80	80	90	90	90	80	0	90	90	90	90
Hyder/Burks Arena	50-408	ZOOAA	29	98	100	100	100	100	100	80	100	100	100	100	100	100	90	100	100	100	100	100	100	100	100
Hyder/Burks Barn	50-407	ZOOAB	29	97.2	100	100	100	100	90	90	100	100	100	100	100	90	100	100	100	100	100	100	100	100	100
University Center	50-110	ZOUC	40	58.5	56.7	60	70	90	40	70	60	60	70	50	50	40	70	30	80	40	100	70	40	80	80

Bldg Name	Bldg ID	Old Bldg ID	Use Code	Camp. Orig.	Rvw	Fndtn	Bsmnt Constr.	Spr-struc	Ext Encl.	Roof	Int. Const.	Strs	Int. Fnsh	Convy	Plmb	HVAC	Fire Prot.	Elec.	Data & Comm	Equip & Frnsh	Spcl Constr.	Site Cond.	Sfty Stds	Bldg Suit.	Bldg Adapt.
Chiller Plant	50-180	Z0180	30	85.8	100	100	100	100	70	70	90	100	80	100	90	90	50	90	100	100	100	90	70	100	50
Maintenance Garage	50-179	Z0179	30	65.2	100	100	100	100	30	40	30	100	40	100	50	80	50	70	100	50	100	40	30	60	10
Maintenance Office Bldg	50-176	Z0176	30	81.7	100	100	100	100	60	60	80	100	70	100	90	80	50	80	100	80	100	80	70	100	80
Maintenance Shops	50-177	Z0177	30	82.2	100	100	100	100	50	80	100	100	80	100	80	80	50	80	100	50	100	90	70	80	60
Maintenance Whse.	50-178	Z0178	30	85.2	100	100	100	100	100	80	80	90	80	90	90	80	40	80	100	50	100	70	70	100	100
University Services	50-125	Z00US	30	47.5	44.3	70	60	50	40	60	50	30	50	10	40	40	70	40	90	30	60	50	20	20	20
Athletic Performance Center	50-170	Z00AP	15	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Baseball Clubhouse	50-175	Z00BC	15	90.7	100	100	100	100	100	80	90	100	90	100	90	80	70	90	100	100	100	100	90	100	80
East Stadium	50-154	Z00ES	58	45.9	51.7	80	100	70	50	30	60	30	50	0	50	20	30	50	70	50	60	50	40	20	20
Hooper Eblen Center	50-157	Z00EC	15	77.2	100	100	90	100	50	90	70	80	50	80	70	70	70	70	100	50	100	60	70	100	70
Indoor Tennis Center	50-185	Z00TC	15	78.1	100	60	100	90	60	90	50	100	50	100	70	80	80	80	100	80	100	60	80	90	90
West Stadium	50-155	Z00WS	58	45.9	48.5	80	100	70	50	30	60	30	60	10	50	20	30	40	70	50	50	60	40	20	20
Recreation & Fitness Center	50-158	Z00RF	60	92.8	100	100	100	100	80	60	90	90	90	100	100	100	100	100	100	90	100	80	100	100	60

PARKING STUDY MEMORANDUM

Project: Tennessee Technological University, Master Plan

Client: Tennessee Tech
Cookeville, TN

To: Garry Askew, Bauer Askew Architecture

From: Amy Burch, P.E.

Date: August 22, 2013

Introduction

Tennessee Technological University (TTU) is currently in the process of updating its campus master plan with the guidance and assistance of Bauer Askew Architecture. One component of the master plan is a university parking plan and parking needs. As part of the master planning process, RPM Transportation Consultants conducted a parking study of the university campus. The scope of the parking study was to determine the existing parking conditions, to determine the future parking demand, and recommend options for accommodating the future parking demand with consideration for the campus construction projects outlined in the master plan. In general, the campus goals for parking revolve around the concept of removing the vast amount of surface parking in the center of campus and relocating parking to the periphery and consideration of parking garages. This memo summarizes the parking study that was conducted by RPM.

Data Collection

In order to provide existing data for the parking analysis, manual parking lot occupancy counts were performed at all of the TTU parking facilities shown in Figure 1. These counts were conducted on two separate typical weekdays by RPM Transportation Consultants. Specifically, the parking occupancy counts were conducted on Wednesday, February 27, 2013 from 10:00 AM – 5:00 PM and on Tuesday, March 5, 2013 from 11:00 AM – 3:00 PM. The observation times were selected based on information provided by TTU representatives, indicating these were the times when activity (parking demand) on campus is highest. The parking data collection consisted of counting the number of occupied spaces in each parking lot every hour throughout the count time intervals.

Existing Data Analysis and Results

Analysis of the parking lot occupancy counts indicate that the peak parking period is from 10:00 – 11:00 AM on a Wednesday with approximately 83% of the total 5,457 parking spaces occupied. According to TTU representatives, the spring semester enrollment is approximately 92% of the fall semester. Therefore, since the parking occupancy counts were conducted during the spring semester, it is reasonable to adjust the parking counts and calculated rates to account for the fall semester parking demand. The adjusted fall semester parking occupancy is approximately 90%.

During the peak period, the parking occupancy percentage was calculated for each of the parking lots. The attached parking occupancy table shows the parking occupancy for each of the TTU campus parking facilities. The campus parking facilities were subdivided into zones to identify the parking occupancy characteristics of the various areas of campus. Zone 1 includes the Tech Village area in the southwest corner of campus. Zone 2 includes the northwest quadrant, the athletic area, and a portion of the central campus south of Sherlock Park. Zone 3 is the central parking core of campus, including all of the parking spaces specifically assigned to commuters. Zone 4 includes the northeast quadrant and the Prescott Middle School lots. Zone 5 includes the southeast quadrant. A summary of the parking occupancy counts at peak time is provided in Table 1. As shown in Table 1, the total parking spaces counted is 5,457 spaces, which includes the new athletic parking lot near the baseball fields and the paved surface parking lots at the former Prescott Middle School, which is owned by TTU. The detailed parking lot occupancy data showed that nearly all of the large parking lots near the center of campus (Zone 3) were fully occupied during the peak hour of demand and for most of the day. Primarily, the majority of the vacant spaces are located in the outer perimeter of campus and in the Tech Village residential area.

**Table 1. Spring 2013 Parking Occupancy for TTU Campus by Zone
(Obtained from RPM Manual Parking Counts)**

Lot Number	Capacity (# Spaces)	WEDNESDAY, FEBRUARY 27, 2013		
		10 AM - 11 AM	Percent Occupied	# Available Spaces during Peak
Zone 1	391	209	53%	182
Zone 2	1,555	989	64%	566
Zone 3	1,798	1,754	98%	44
Zone 4	1,304	1,218	93%	86
Zone 5	409	373	91%	36
SPRING TOTAL	5,457	4,543	83%	914
FALL TOTAL	5,457	4,938	90%	519



The attached figures illustrate the results of the parking data that was collected. The figures identify the peak period parking occupancy by zone as well as by parking lot/facility. The most compelling figure is the one illustrating the number of vacant spaces during the peak parking demand. As shown, there is effectively no vacancy in the central core of campus for the commuter-assigned lots and faculty/staff-assigned lots. The residential-assigned lots are also fully occupied. Essentially, the only vacancy during peak times is in the open parking lots on the perimeter of campus and in Tech Village. This means that the most desirable parking spaces are full most of the day. It is likely that the full occupancy adds to unnecessary vehicular circulation on campus as people first drive to the central part of campus looking for “the last space” then circulate around to the campus perimeter to park in one of the open parking lots, which has a longer walking distance to reach their campus destination.

According to TTU representatives, the campus enrollment is approximately 11,000 students. Therefore, based on an estimated peak parking demand of 4,938 spaces for the fall semester, the peak parking demand for the campus is approximately 0.45 spaces per student. The current parking supply on campus is approximately 0.50 spaces per student enrollment. Table 2 presents the parking analysis for the entire TTU campus. The data has been adjusted to account for the fall semester, which has a higher enrollment and parking demand. The data presented in Table 2 was used to estimate the future parking demand for the university and identify how to accommodate the future parking demand.

Table 2. Existing Parking Data Analysis Results

2013 Student Enrollment	11,000
Number of Staff and Faculty	1,200
Peak Parking Demand Occurs	Wednesdays, 10:00-11:00 AM
Total Peak Parking Demand (Occupied Spaces)	4,938
Peak Parking Occupancy Percent	90%
Total Parking Spaces (Capacity)	5,457
Parking Demand Rate per Student (space/student)	0.45

Future Parking Demand and Accommodation

According to TTU representatives, the student enrollment goal is 15,000 students. Currently, the enrollment is approximately 11,000 students with a peak parking demand rate of 0.45 spaces per student. Assuming a similar parking demand rate for the future, would require approximately 6,750 parking spaces for an enrollment of 15,000 students. Therefore, an additional 1,300 parking spaces will be needed to accommodate the university’s future enrollment growth goal.

In addition to campus growth, which will require additional parking facilities, the campus master plan calls for new academic buildings and green spaces to enhance the campus environment in the locations of much of the current parking supply. TTU currently has a “convenient parking culture,” which locates vast parking lots directly adjacent to the academic buildings in the center of campus. However, if buildings and green spaces are constructed where existing parking is located, new parking facilities will need to be constructed to make up for the parking supply loss. Two locations within campus have been identified as good options to relocate the existing parking from the center to the campus perimeter.

A surface lot could be constructed in the southwestern quadrant of campus between the back of Tech Village and Franklin Avenue. Preliminary concept designs indicate that approximately 1,100 spaces can be provided within a new lot on the west side of campus. Similarly, the former Prescott Middle School could be demolished in order to construct a new surface lot on the east side of campus. Preliminary concept designs indicate that approximately 920 spaces can be provided on the former school property if the school buildings are removed. The design of both parking lots should include landscaping, lighting, and water quality accommodations. If financially feasible, it would be beneficial to utilize some pervious pavement for the parking lot construction.

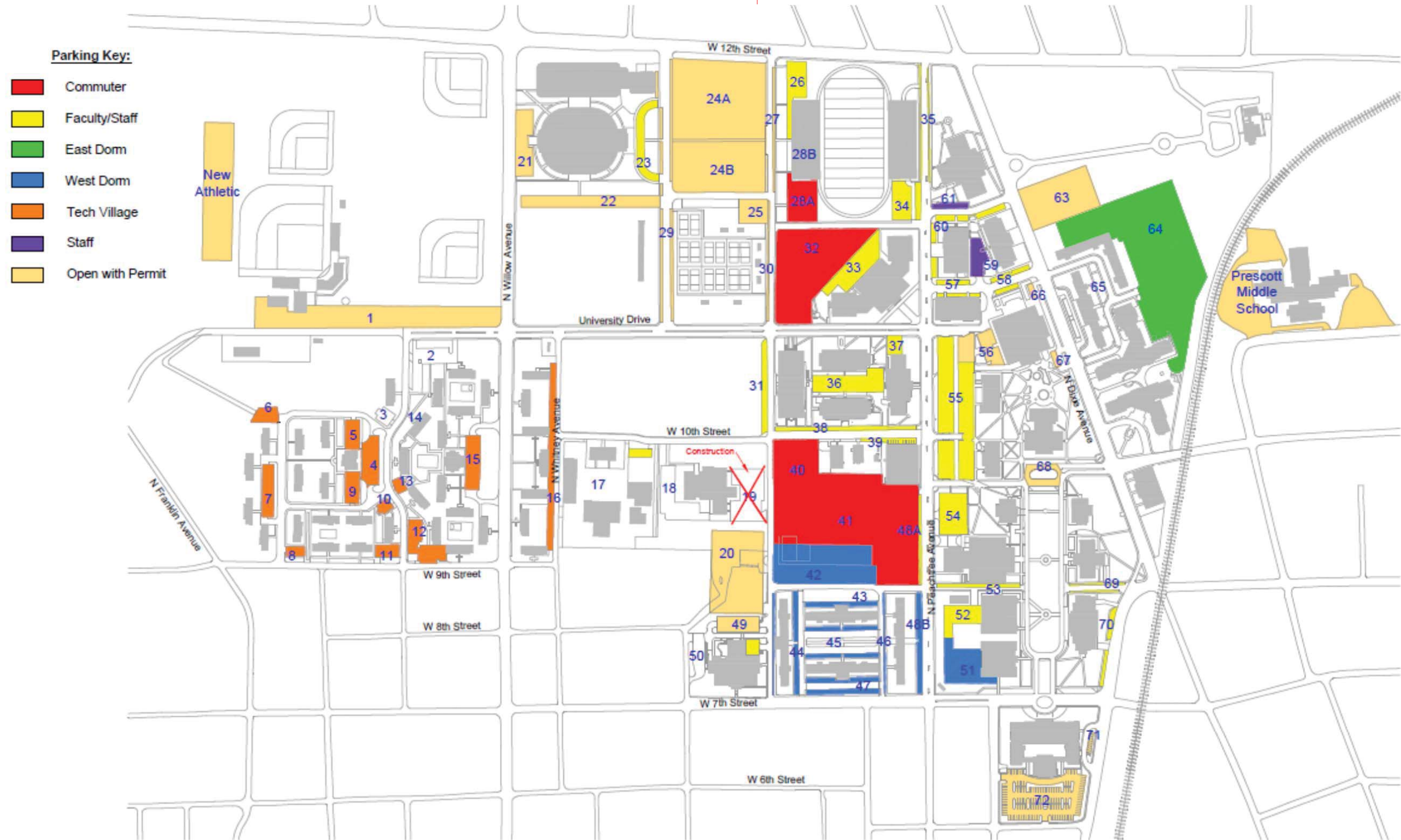
Both of these two potential new surface parking locations are nearly a half-mile or more from the academic core of campus. Therefore, it is recommended to provide shuttle routes for each lot that operate in a loop between parking lot and campus core. The two separate routes are needed in order to ensure the shuttle time is efficient and convenient for those parking in the perimeter lots. The specific shuttle route alignments should be evaluated at the time the parking lots are designed in order to determine the location and number of shuttle shelters within the lots and along the routes. The route alignments should minimize the loop travel times. A number of shuttle route alignments are possible and may depend on the timing of other construction projects and streetscape plans for Peachtree Avenue, Dixie Avenue, and other internal campus roadways.

It is difficult to identify when or at what level of enrollment new parking facilities will be needed since the construction of new parking is primarily dependent on relocating the existing parking and when other construction projects are programmed. The new parking and associated shuttle service will need to be constructed and in operation prior to any removal of existing parking since the current parking demand is 90% of the existing capacity. As student enrollment increases and construction projects and campus “greening” occurs, the parking supply should continue to be a minimum of 0.45 parking spaces per student enrollment, with a target goal of approximately 7,000 spaces when enrollment reaches 15,000 students. It is estimated that two parking garages will be needed in the future to provide the total parking capacity needed since several parking lots will be eliminated through the master plan implementation. Preliminary master planning by Bauer Askew Architecture identifies a parking garage location along the south side of campus off of 7th Street near the planned science building and along the north side of campus off of 12th Street near the stadium. Constructing new parking garages on the north and south sides of campus as well as the two surface parking lots on the east and west sides of campus would locate nearly all of the parking supply to the perimeter of campus, which would contribute to transforming the campus into a more pedestrian/cyclist-friendly environment for students, faculty, staff, and visitors.

PARKING LOT OCCUPANCY SUMMARY BY ZONE

Lot Number (Reference Map IDs)	Capacity (# Spaces)	WEDNESDAY, FEBRUARY 27, 2013		
		10 AM - 11 AM	Percent Occupied	# Available Spaces during Peak
Zone 1				
4	23	11	48%	12
5	21	7	33%	14
6	20	10	50%	10
7	53	26	49%	27
8	23	16	70%	7
9	22	13	59%	9
10	12	6	50%	6
11	20	14	70%	6
12	39	28	72%	11
13	8	6	75%	2
15	60	18	30%	42
16	90	54	60%	36
Zone 1	391	209	53%	182
Zone 2				
1	195	44	23%	151
17	85	76	89%	9
18	85	40	47%	45
20	180	191	106%	-11
31	35	35	100%	0
49	37	35	95%	2
50	15	9	60%	6
21	8	0	0%	8
22	102	29	28%	73
23	28	22	79%	6
24A	312	198	63%	114
24B	208	184	88%	24
25	25	17	68%	8
29	109	85	78%	24
30	21	21	100%	0
New Athletic	110	3	3%	107
Zone 2	1555	989	64%	566
Zone 3				
26	35	18	51%	17
27	25	25	100%	0
28A	41	34	83%	7
28B	11	6	55%	5
32	326	326	100%	0
33	46	42	91%	4
34	17	13	76%	4

36	63	62	98%	1
37	13	11	85%	2
38	55	54	98%	1
39	22	21	95%	1
40	167	174	104%	-7
41	522	525	101%	-3
42	126	125	99%	1
43	47	45	96%	2
44	40	40	100%	0
45	64	63	98%	1
46	39	38	97%	1
47	61	61	100%	0
48A	35	30	86%	5
48B	43	41	95%	2
Zone 3	1798	1754	98%	44
Zone 4				
35	46	44	96%	2
55	235	205	87%	30
56	24	20	83%	4
57	30	30	100%	0
58	25	23	92%	2
59	20	19	95%	1
60	17	17	100%	0
61	41	41	100%	0
63	162	163	101%	-1
64	569	563	99%	6
65	14	13	93%	1
66	8	7	88%	1
67	8	7	88%	1
Prescott MS	135	93	69%	42
Zone 4	1334	1245	93%	89
Zone 5				
51	57	54	95%	3
52	24	17	71%	7
53	7	7	100%	0
54	64	56	88%	8
68	39	37	95%	2
69	24	22	92%	2
70	23	23	100%	0
71	8	7	88%	1
72	133	123	92%	10
Zone 5	379	346	91%	33
TOTAL	5457	4543	83%	914



TTU Parking Facility Map and Lot ID #s

0' 400' 800' GRAPHIC SCALE

Figure 1.

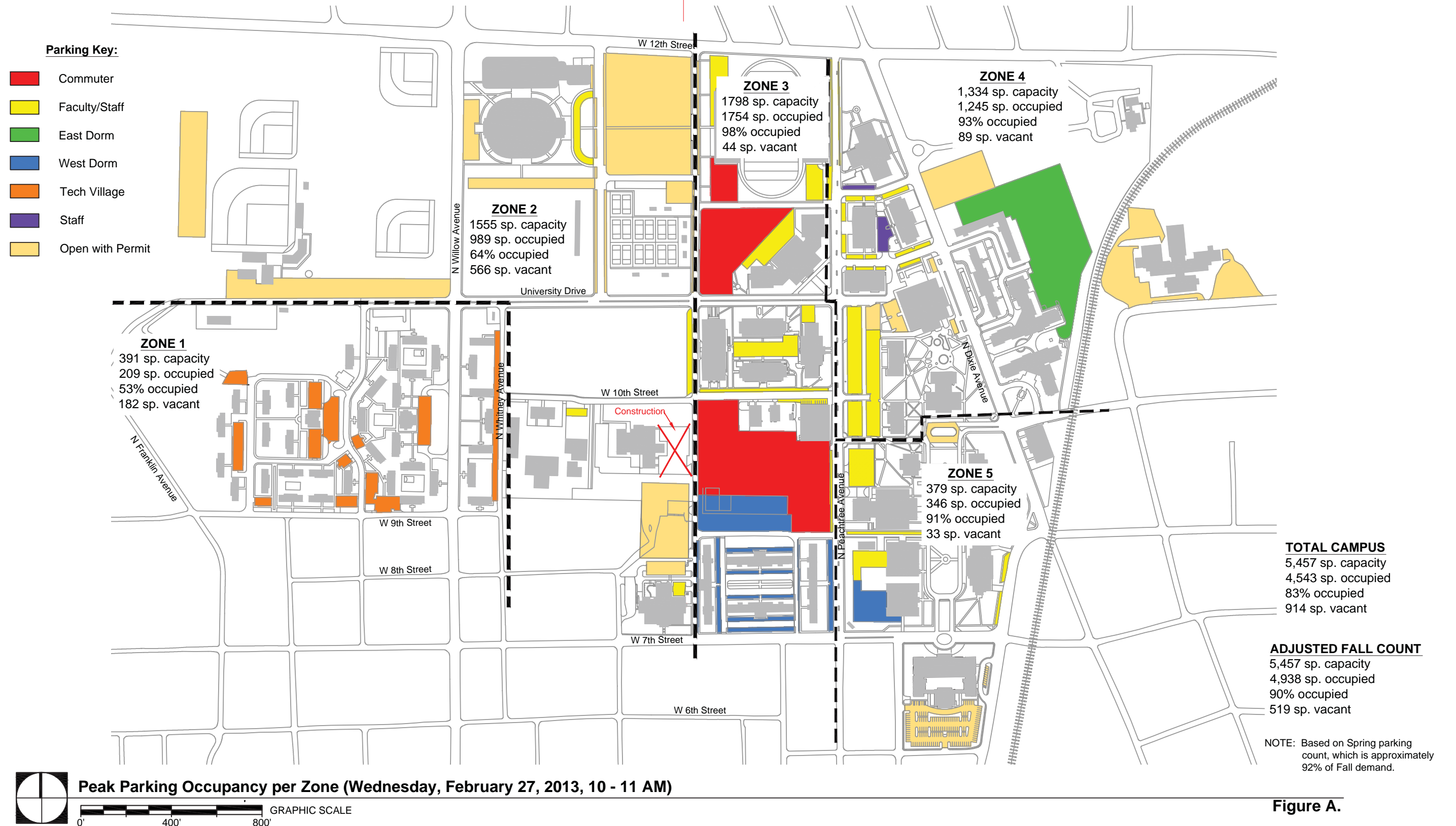


Figure A.

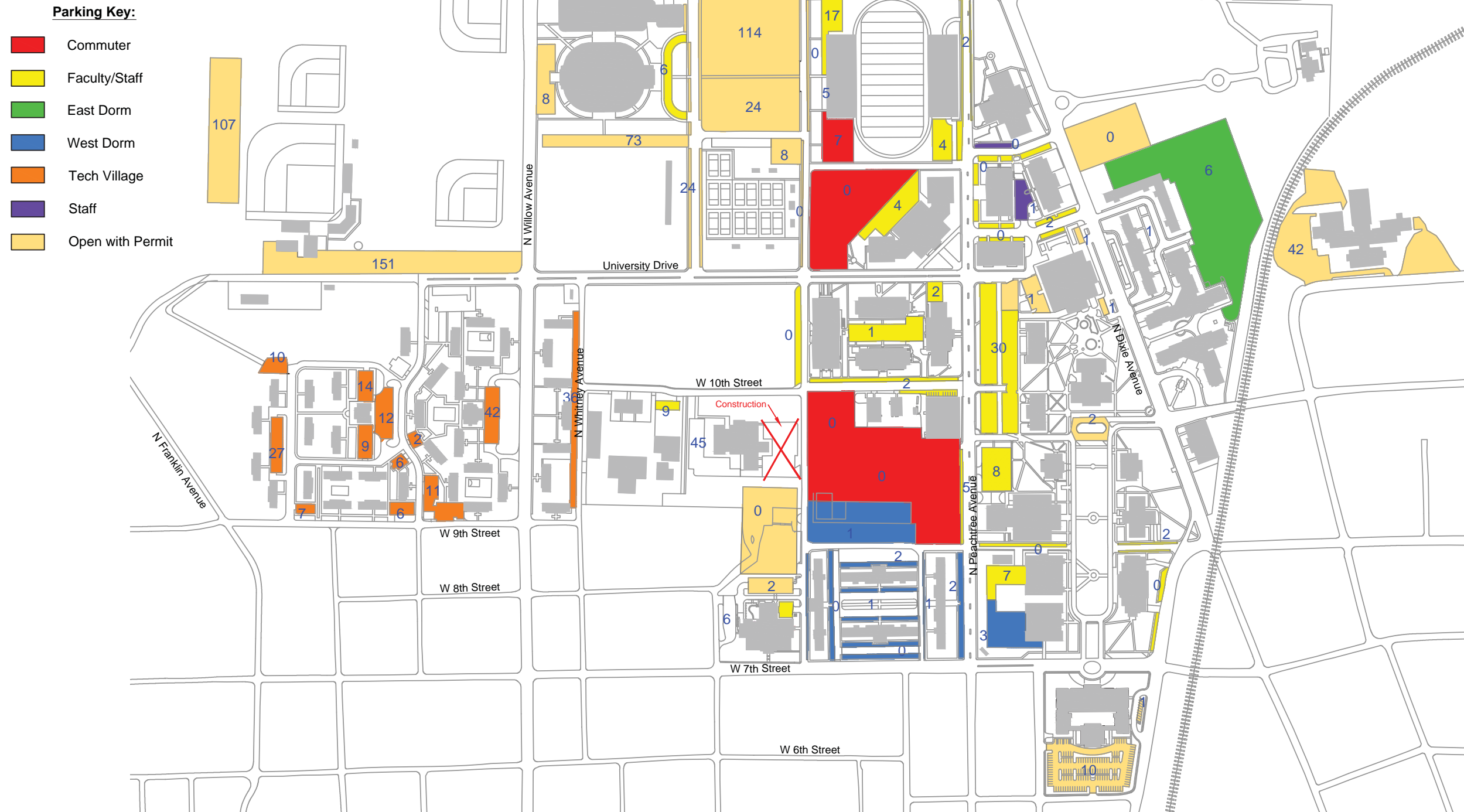


Figure B.

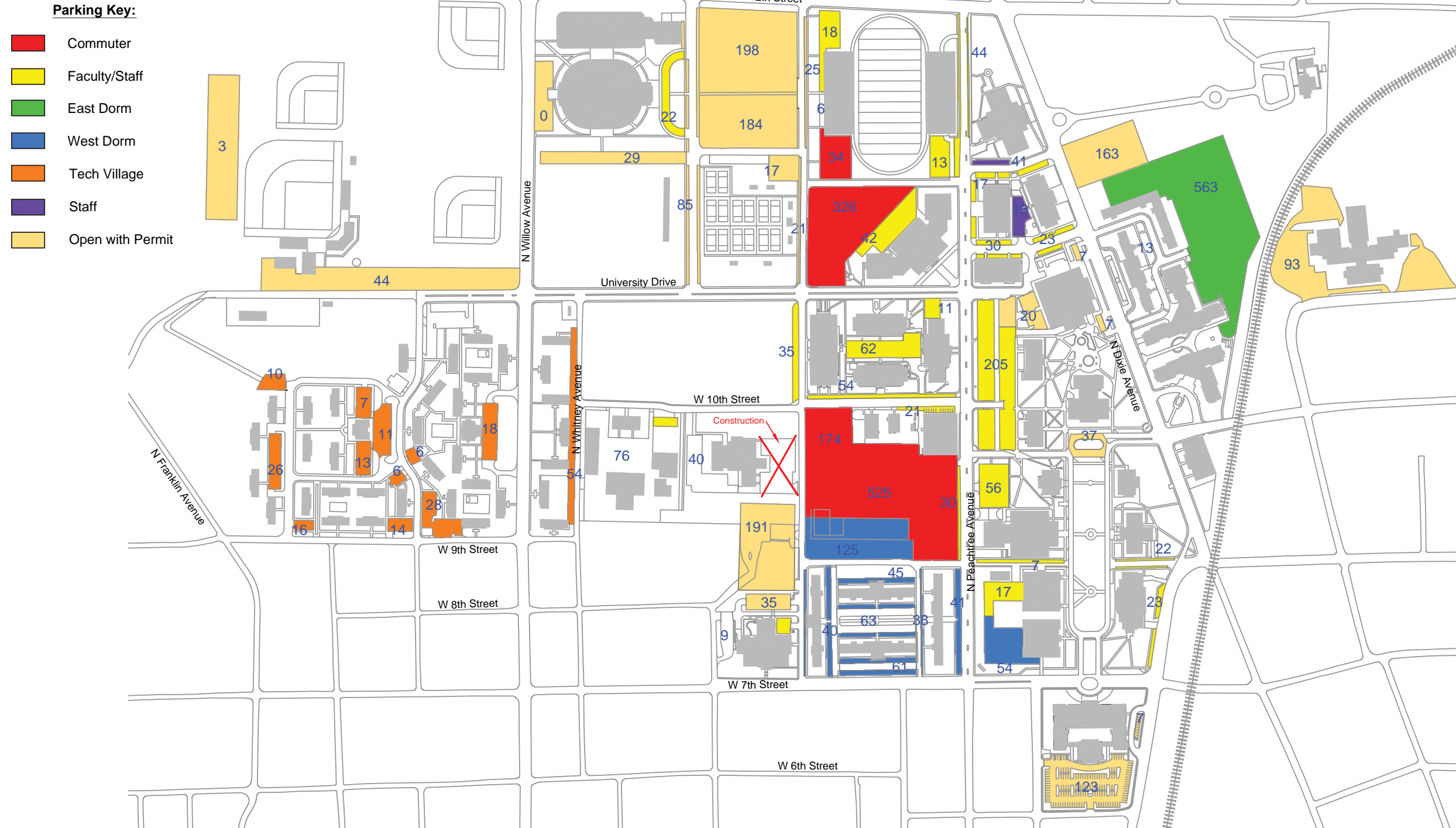


Figure C.

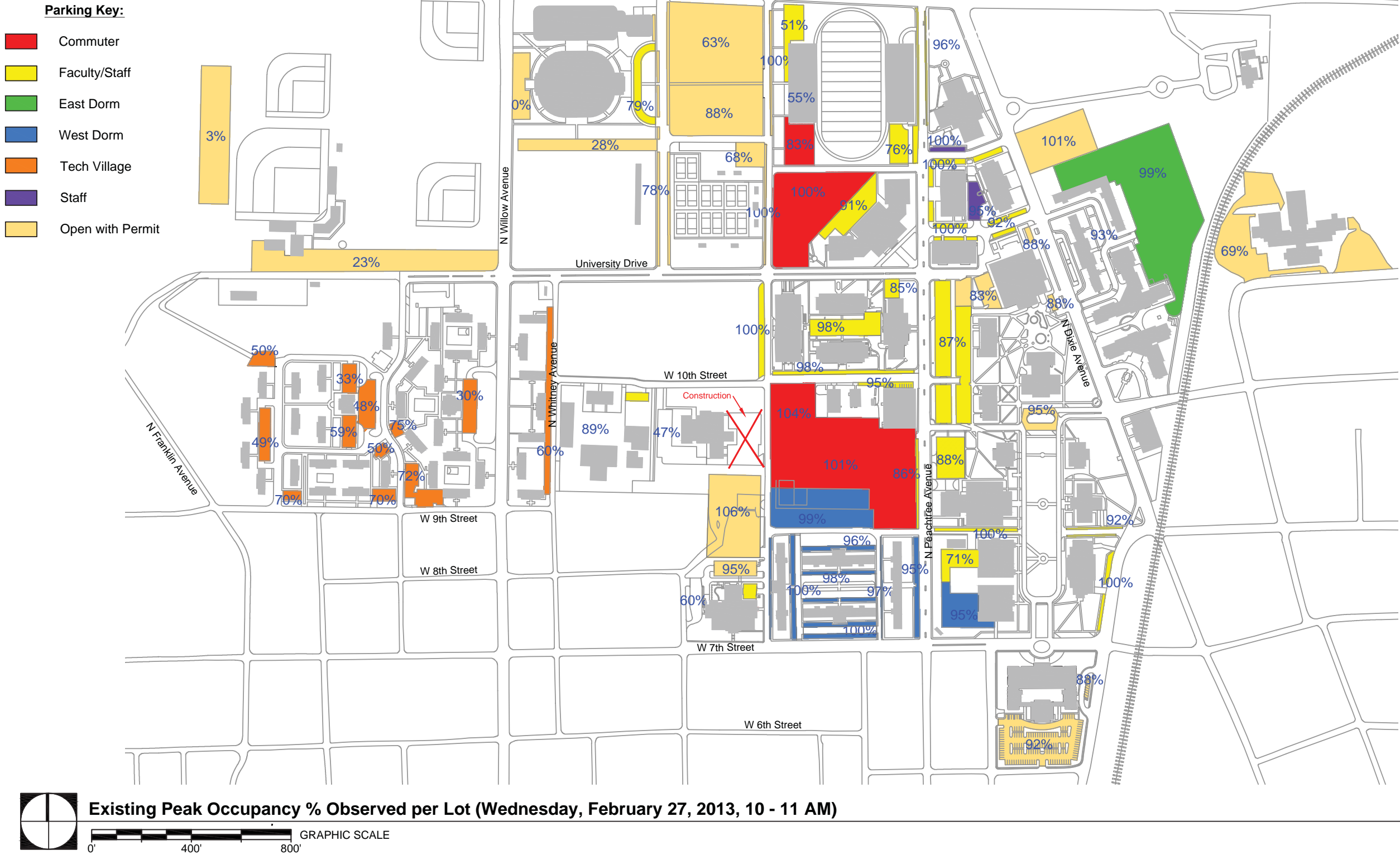


Figure D.

Projected Parking Strategic Plan Concept

12-Apr-13

revised 19 July 13

- Goals
- Greening of the campus
- Accommodate future projection of 7000 spaces

	PH	Add/Sub.	Total	Remarks	Parking	Students
Current Parking Count					4600	10,000
RPM Study			5457	Parking Spaces	5457	11,863
					5980	13,000
					7000	15,217
1 Science Relocation						
Add West Lot(s)	1	1116		New parking south and west of Baseball lot		
Eliminate Peachtree Commuters	1	(699)		Relocate commuter parking to new West Lot		
Eliminate Faculty on street	1	(35)				
Peachtree Housing to STEM Open	1	(126)		Reassign open spaces to Capital Quad		
STEM Open to Stadium West Open	1			Shift to unused capacity at stadium lot		
Trolley Loop	1			~ Dedicated lane, Trolley only signal at Willow		
Commuters (remaining out of Core)	1					
Reassign Library commuters lot	1			Shift 326 Commuters to West Lots		
Eliminate Core Peachtree Parking						
Eliminate Foster Parking	2	(16)		Remove with Foster Demolition		
		240	5697			12,385
2 Parking Additions/Deletions						
Relocate Facilities	1	(85)				
Facilities at new location	1	47		with Facilities located @ N. Franklin & 9th street		
Added Regional Health East lot	1	59				
Eliminate On-street at West Stadium	1	(25)		For stadium renovation		
Eliminate SW Stadium lot	1	(41)		For stadium renovation		
Eliminate Tech Village East	1	(90)		For Rec. Bldg./ Fields		
Radio Tower lots(Rec./STEM/Housing)	1	114		net gain after rearrrangement and shuttle drive		
Prescott Parking- SE	1	91		Net added parking at SE (front)		
Prescott Parking- NE	1	353		Parking at NE field (lower back)		
Prescott Parking At Middle School	1	343		Parking at demolished school (net added)		
Bus Marshalling Lot		37		Net gain after reorganization of lot		
Extend Softball lot	1	42		Net gain after expansion		
		845	6542			14,222

2 Green Refinements

Eliminate Dixie parking at RUC	1	(17)	On-going project
Baseball Lot renovation	1	(19)	Tree islands, street edge planting
Green Stadium West Parking	1	(14)	Lawn, tree islands, no tennis courts in area
Capital Quad at Peachtree	1	(32)	Pull-in parking to parallel, add tree islands
Eliminate Derryberry front lawn	1	(17)	net w/ added lot east of Derryberry
Eliminate Faculty at NE Engineering	2	(13)	
Eliminate East Peachtree Faculty	2	(299)	Relocate Faculty east of Peachtree to Library
Eliminate open spaces at RUC	2	(24)	
Capital Quad building replacement	2	(207)	Remove all parking from Quad interior
McGee Blvd.	2	(63)	Pull-in parking to parallel, add tree row
Green Library Parking	2	(79)	Straighten parking, tree islands, street planting
Create Library outdoor space	2	(97)	Eliminate spaces at Library
Eliminate stadium on-street	2	(29)	at Library block area
Engineering at Stadium Dr.	2	(21)	Pull-in parking to parallel, add tree row
Eliminate Parallel on street	2	(14)	Further reduce internal parking
East Housing /President Lawn	2	(80)	Straighten parking, tree islands, street planting
Johnson/Pennebaker	2	(64)	Pull-in parking to parallel, add tree row
Eliminate Parallel on street	2	(34)	Further reduce internal parking
South Hall @ Mahler	2	(11)	Pull-in parking to parallel, add tree row
Eliminate Parallel on street	2	(12)	Further reduce internal parking
10th Street - Engineering block	2	(58)	Pull-in parking to parallel, add tree row
Eliminate Parallel on street	2	(20)	Further reduce internal parking
Eliminate Jere Whitson lot	2	(24)	potential HC only lot
Green lot south of Hooper Eblen	2	(2)	shift stairs from Hooper Eblen to align
Eliminate North Peachtree	2	(46)	Stadium area to concourse
		(1296)	5246

11,404

4 Parking Garages

South Garage- 624 car (4 Floors)	2	634	Net gain in parking	
		5880		12,783
North Garage- 832 car (4 Floors)	3	480	Net gain in parking	
		6360		13,826
Library Garage- 784 car (4 Floors)	3	588	Net gain in parking	
		6948		15,104
SW Hall Area to Academic/Housing	3	(279)		
		6669		14,498

Phase	Project	Const. Cost	Contingency	MACC	Project Costs	Project Budget
			10%		15%	

Base Project **without** pervious parking spaces

West Parking Lots

A1	New West Parking Lot	\$1,795,000	\$179,500	\$1,974,500	\$296,175	\$2,270,675
A2	Connection Road to Willow	\$665,000	\$66,500	\$731,500	\$109,725	\$841,225
B	Renovate Existing Parking Lot	\$440,000	\$44,000	\$484,000	\$72,600	\$556,600
C	New West Parking Lot at Storage	\$995,000	\$99,500	\$1,094,500	\$164,175	\$1,258,675
		<u>\$3,895,000</u>		<u>\$4,284,500</u>	<u>\$771,210</u>	<u>\$4,927,175</u>

Dixie Improvements

A	Dixie Streetscape & Calming	\$3,300,000	\$330,000	\$3,630,000	\$544,500	\$4,174,500
B	Dixie Roundabout	\$900,000	\$90,000	\$990,000	\$148,500	\$1,138,500
C	Mahler Streetscape & Calming	\$1,080,000	\$108,000	\$1,188,000	\$178,200	\$1,366,200
		<u>\$5,280,000</u>		<u>\$5,808,000</u>		<u>\$6,679,200</u>

East Parking Lots

A	New 126 car lot	\$315,000	\$31,500	\$346,500	\$51,975	\$398,475
B	New 353 car lot at Play Field	\$882,500	\$88,250	\$970,750	\$145,613	\$1,116,363
C1	Building Demoliton	\$1,182,000	\$118,200	\$1,300,200	\$195,030	\$1,495,230
C2	New 443 car lot	\$1,107,500	\$110,750	\$1,218,250	\$182,738	\$1,400,988
		<u>\$3,487,000</u>		<u>\$3,835,700</u>		<u>\$3,835,700</u>

other costs

Shuttle System

Shuttle Stops, Shuttles, management

Phase	Project	Const. Cost	Contingency	MACC	Project Costs	Project Budget
			10%		15%	

Base Project **with** pervious parking spaces

West Parking Lots

A1	New West Parking Lot	\$2,584,800	\$258,480	\$2,843,280	\$426,492	\$3,269,772
A2	Connection Road to Willow	\$665,000	\$66,500	\$731,500	\$109,725	\$841,225
B	Renovate Existing Parking Lot	\$633,600	\$63,360	\$696,960	\$104,544	\$801,504
C	New West Parking Lot at Storage	\$1,432,800	\$143,280	\$1,576,080	\$236,412	\$1,812,492
		<u>\$5,316,200</u>		<u>\$5,847,820</u>	<u>\$1,052,608</u>	<u>\$6,724,993</u>

Dixie Improvements

A	Dixie Streetscape & Calming	\$3,300,000	\$330,000	\$3,630,000	\$544,500	\$4,174,500
B	Dixie Roundabout	\$900,000	\$90,000	\$990,000	\$148,500	\$1,138,500
C	Mahler Streetscape & Calming	\$1,080,000	\$108,000	\$1,188,000	\$178,200	\$1,366,200
		<u>\$5,280,000</u>		<u>\$5,808,000</u>		<u>\$6,679,200</u>

East Parking Lots

A	New 126 car lot	\$453,600	\$45,360	\$498,960	\$74,844	\$573,804
B	New 353 car lot at Play Field	\$1,270,800	\$127,080	\$1,397,880	\$209,682	\$1,607,562
C1	Building Demoliton	\$1,182,000	\$118,200	\$1,300,200	\$195,030	\$1,495,230
C2	New 443 car lot	\$1,594,800	\$159,480	\$1,754,280	\$263,142	\$2,017,422
		<u>\$4,501,200</u>		<u>\$4,951,320</u>		<u>\$4,951,320</u>

other costs

Shuttle System

Shuttle Stops, Shuttles, management

Note: Projected costs revised 03 July 13 to incorporate pervious paving at the parking spaces.
Mahler Scope and cost revised 19 July 13 to extend scope to Sixth Ave.

TRAFFIC STUDY

**DIXIE AVENUE TRAFFIC STUDY
TENNESSEE TECHNOLOGICAL UNIVERSITY
COOKEVILLE, TENNESSEE**

**PREPARED FOR:
TENNESSEE BOARD OF REGENTS**



**Transportation
Consultants, LLC**

**1101 17TH AVENUE SOUTH
NASHVILLE, TN 37212**

JULY 2013

**DIXIE AVENUE TRAFFIC STUDY
TENNESSEE TECHNOLOGICAL UNIVERSITY
COOKEVILLE, TENNESSEE**

PREPARED FOR:
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PREPARED BY:
RPM TRANSPORTATION CONSULTANTS, LLC
1101 17th Avenue South
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TENNESSEE TECHNOLOGICAL UNIVERSITY: DIXIE AVENUE TRAFFIC STUDY

Introduction

On behalf of Tennessee Technological University (TTU) and the Tennessee Board of Regents (TBR), RPM Transportation Consultants (RPM) conducted traffic and parking analyses as part of the University's master planning process. This report summarizes the preliminary analyses that were conducted specifically regarding Dixie Avenue in the vicinity of the University. Dixie Avenue was evaluated to identify potential modifications that could improve pedestrian and bicycle access and safety while maintaining good traffic access. Dixie Avenue cuts-through the eastern side of campus, dividing six residence halls on the east from the main campus core on the west. Therefore, a considerable number of pedestrians cross Dixie Avenue, which through the study area is a four-lane roadway with a curb to curb width of approximately 48 feet.

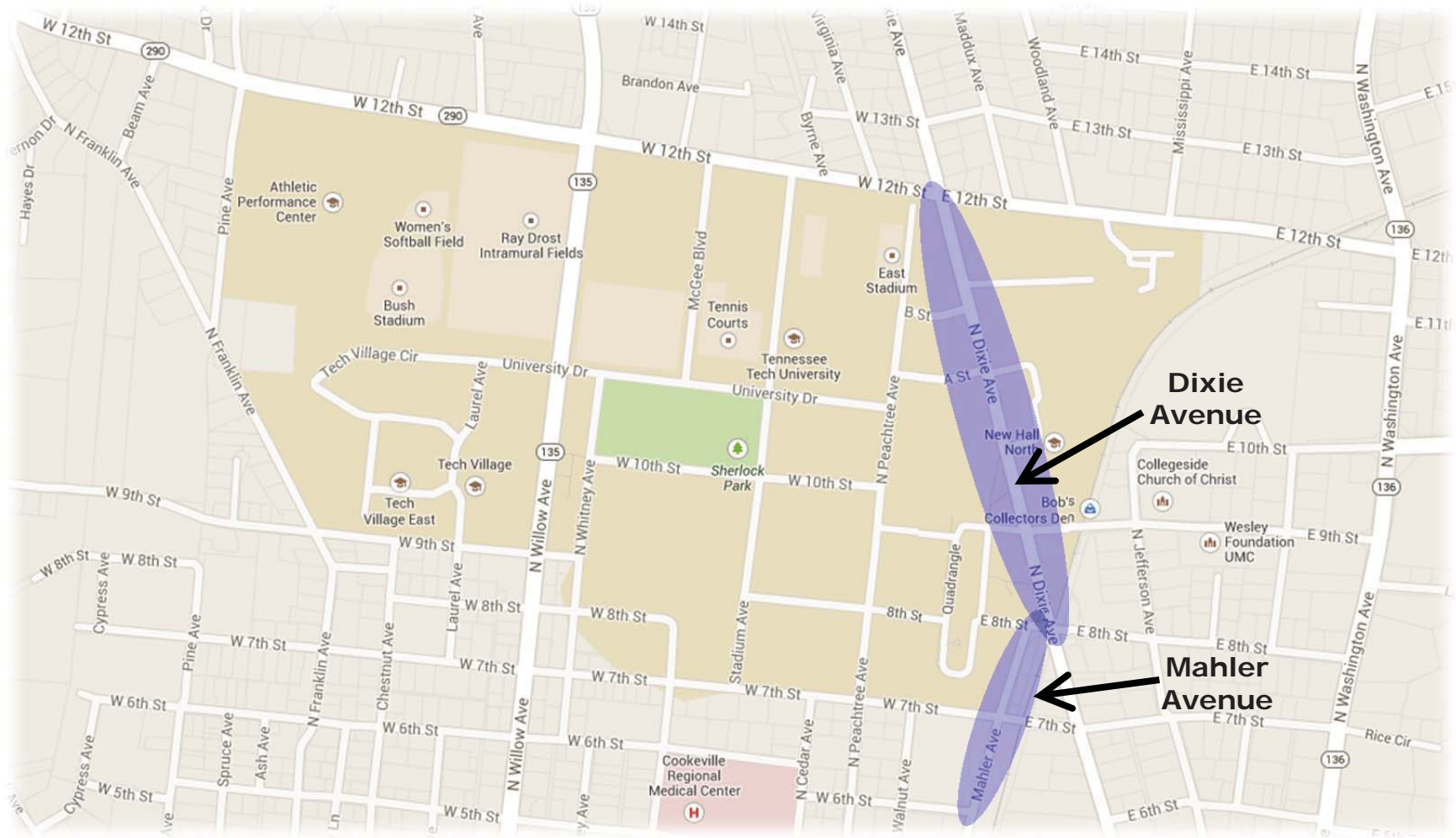
Figure 1 identifies the boundaries of the Dixie Avenue Study Area. The segment of Dixie Avenue that was evaluated is located between 12th Street and 8th Street. Although, sidewalks are provided on both sides of the street, Dixie Avenue is not a pedestrian friendly area due to the width of the street, the number of vehicle lanes that must be crossed, the lack of pedestrian signals or flashers, and the vehicular speeds on Dixie Avenue. In short, Dixie Avenue is dominated by vehicles, with limited accommodations for non-motorized transportation such as walking and biking.

Existing Traffic Conditions

RPM collected and analyzed traffic data for the existing four-lane condition of Dixie Avenue. RPM collected vehicular and pedestrian traffic data at two key intersections along Dixie Avenue. Manual vehicular turning movement traffic counts were collected at the following intersections:

- Dixie Avenue and 9th Street (signalized)
- Dixie Avenue and A Street (unsignalized)

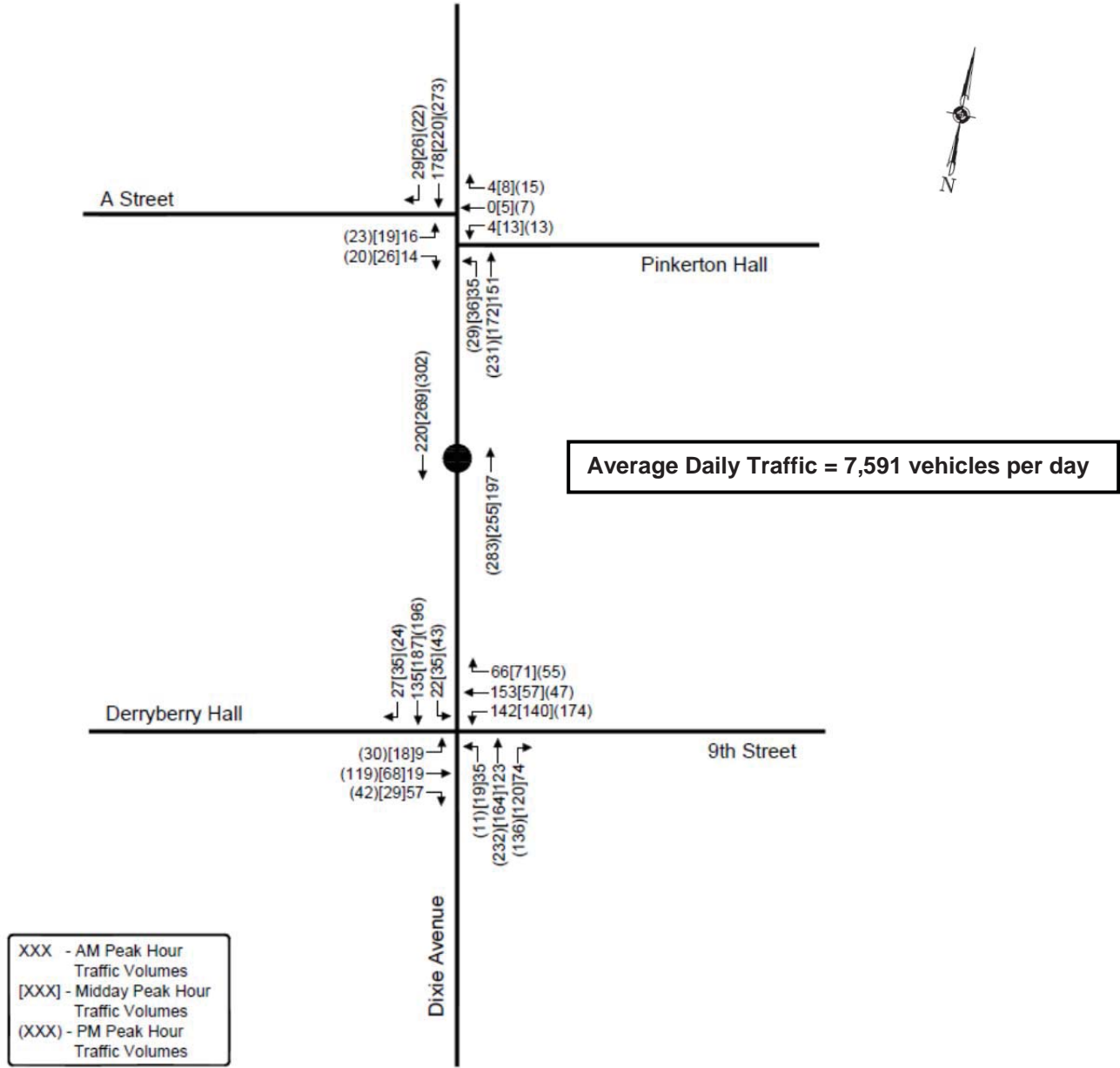
The counts were conducted on a typical weekday in April 2013 while TTU was still in session. Specifically, the counts were conducted 7:00-10:00 AM, 11:00 AM-1:00 PM, and 3:00-6:00 PM. The peak hour traffic volumes for each intersection are presented in Figure 2 below.



Google Maps

Figure 1: Location of Dixie Avenue Study Area

Figure 2: Dixie Avenue Peak Hour Traffic Volumes (April 2013)



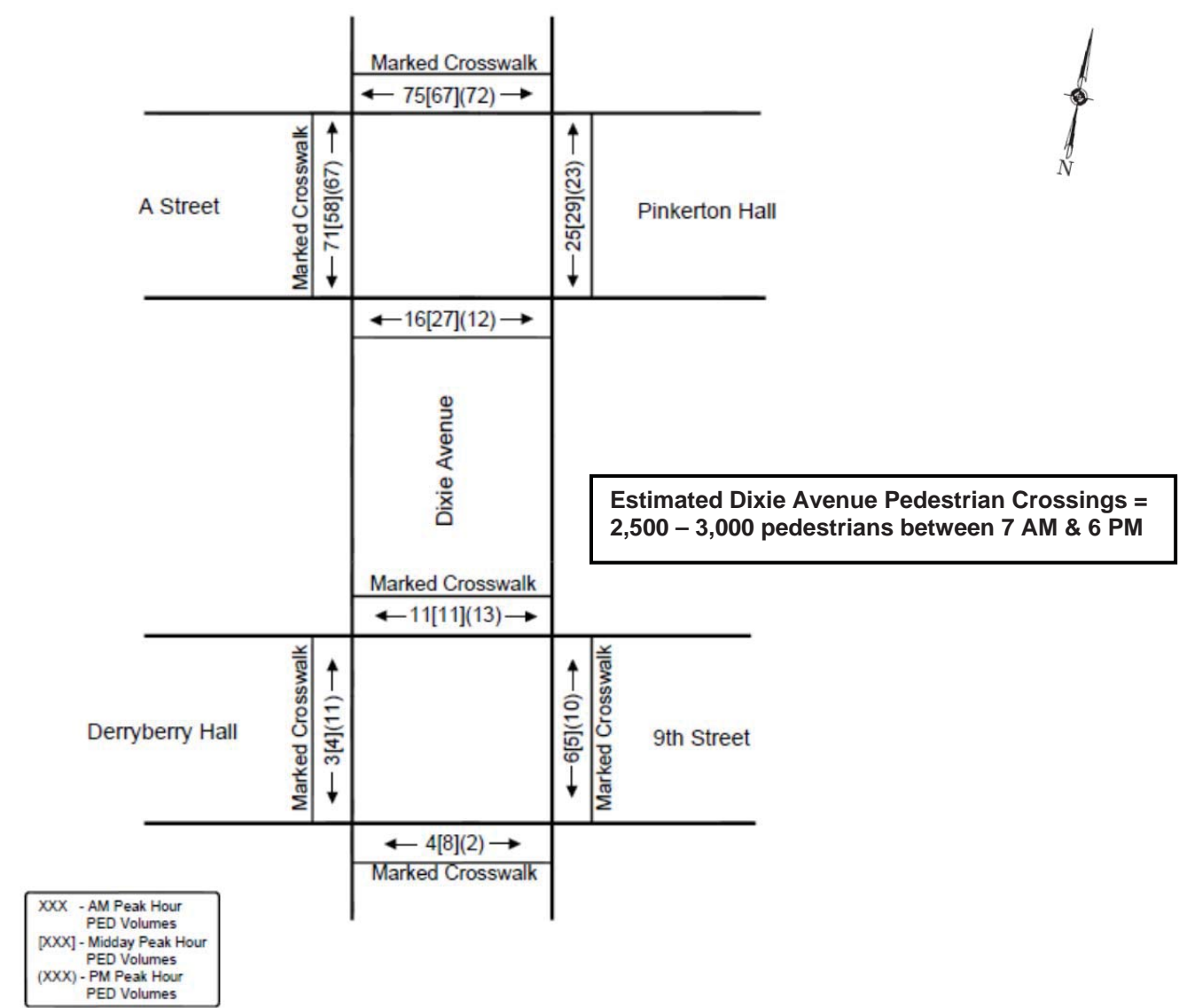
In addition to the turning movement counts, 24-hour machine tube counts were conducted on Dixie Avenue to determine the total daily traffic on the roadway. The machine counts were conducted on Dixie Avenue between 9th Street and A Street. The average daily traffic on Dixie Avenue was measured to be approximately 7,591 vehicles per day. Table 1 presents a summary of the northbound and southbound peak hour and daily traffic volume on Dixie Avenue that was obtained from the 24-hour tube counts. As shown, the northbound and southbound directional traffic flows are fairly balanced during each peak hour, which indicates that Dixie Avenue does not experience a significant commuter pattern. The hourly traffic volume also shows that the traffic volume on Dixie Avenue is relatively similar throughout the day, with the highest traffic volumes occurring in the afternoon between 4:15-5:15 PM.

Table 1: Dixie Avenue Peak Hour & Daily Traffic Volumes

Direction	Hourly Traffic Volume (vph)			Daily Traffic Volume (vpd)
	AM Peak	Midday Peak	PM Peak	
	8:45-9:45 AM	12:45-1:45 PM	4:15-5:15 PM	
Northbound	197	255	283	3,714
Southbound	220	269	302	3,877
Total	417	524	585	7,591
Note: Peak hour traffic volume on Dixie Avenue between 9 th Street and A Street is an average of the counts conducted by RPM on Wednesday, 4/24/13 and Thursday, 4/25/13				

The turning movement counts also included pedestrian crossings that occurred at the intersections. The pedestrian crossing movements during each of the peak hours are presented in Figure 3. As shown, approximately 65-75 pedestrians cross Dixie Avenue during each peak hour at the marked crosswalk on the north side of A Street. An additional 15-30 pedestrians were observed crossing Dixie Avenue just south of A Street where there is not a marked crosswalk. It is important to note that this intersection is not controlled by a traffic signal and does not include pedestrian signals. Therefore, the pedestrians are crossing Dixie Avenue between gaps in vehicular traffic. By extrapolating the pedestrian count data and accounting for the three other marked crosswalks at unsignalized or mid-block locations and the two marked crosswalks at 9th Street, it is estimated that approximately 2,500-3,000 pedestrians cross this half-mile segment of Dixie Avenue per day between the hours of 7:00 AM and 6:00 PM.

Figure 3: Pedestrian Peak Hour Volumes (April 2013)



In order to determine the current operations of the study intersections and to establish baseline conditions, capacity analyses were performed for the AM, midday, and PM peak hours. The capacity calculations were performed according to the methods outlined in the *Highway Capacity Manual*, TRB 2010. The capacity analyses result in the determination of a Level of Service (LOS) for an intersection. The LOS is a concept used to describe how well an intersection or roadway operates. LOS A is the best, while LOS F is the worst. The capacity analyses were conducted for the two intersections that were counted along Dixie Avenue. The results of the capacity analyses are presented in Table 2. As shown, the two study intersections and critical turning movements currently operate at very good levels of service during each of the peak hours. It is important to note that the capacity analyses for the intersections reflect vehicular level of service.

Table 2: Existing Levels of Service
(4-Lanes on Dixie Avenue)

Intersection	Turning Movement	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
		LOS	Avg Delay (sec/veh)	LOS	Avg Delay (sec/veh)	LOS	Avg Delay (sec/veh)
Dixie Avenue & 9 th Street/Derryberry Hall	Overall Intersection	A	7.1	A	6.4	A	6.1
Dixie Avenue & A Street/Pinkerton Hall	Northbound Left Turn	A	8.2	A	8.2	A	8.4
	Eastbound Approach	B	13.4	B	13.5	C	15.8
	Westbound Approach	B	12.5	B	14.4	C	15.4
Notes: For signalized intersections, an overall LOS is presented. For unsignalized intersections, an LOS is presented for each critical lane group.							

Potential Enhancement

Dixie Avenue has the potential to be a complete street that accommodates motorists, bicyclists, and pedestrians alike, which could enhance safety and pedestrian accessibility for TTU students, staff, and visitors. In order to improve accommodations on Dixie Avenue for non-motorized traffic, a Road Diet would be necessary.

Road Diets typically involve reducing the number of travel lanes dedicated to motorists and reallocating the right-of-way to other transportation modes as well as parking and landscaping. Typically, road diets are particularly appropriate for 4-lane roadways with an average daily traffic up to 17,000 vehicles per day. As previously described, Dixie Avenue has an average daily traffic of approximately 7,600 vehicles per day.

The segment of Dixie Avenue through the TTU campus is located between 12th Street to the north and 8th Street to the south. In addition, Mahler Avenue between 8th Street and 6th Street is included in the study area. This segment of Dixie Avenue and Mahler Avenue is approximately a half-mile long and includes three signalized intersections and two travel lanes in each direction. This segment is an excellent candidate for a road diet evaluation given the relatively low traffic volume, roadway width, and surrounding land uses and pedestrian activity. It should also be noted that the only four-lane section of Dixie Avenue is the study area segment in the vicinity of TTU. North of 12th Street and south of 8th Street, Dixie Avenue includes one travel lane in each direction. If a road diet were implemented on Dixie Avenue, the roadway would be a continuous two-lane street. Road diets can also have a traffic calming effect, which would increase safety for pedestrians crossing Dixie Avenue within the TTU campus.

Road Diet Evaluation

In order to evaluate whether a road diet could work on Dixie Avenue, additional capacity analyses were conducted for a three-lane cross-section on Dixie Avenue. For the purposes of the analyses, it was assumed that Dixie Avenue would include one travel lane in each direction and left turn lanes at intersections where needed. The existing traffic volumes were utilized for these capacity analyses. The results of the capacity analyses for Dixie Avenue with three lanes are presented in Table 3. As shown in Table 3, traffic delays would increase slightly. However, the analyses indicate the intersections along Dixie Avenue would continue to operate at very good levels of service if a road diet were implemented and the four-lane roadway were converted to a two-lane roadway with left turn lanes.

Table 3: Dixie Avenue Level of Service Comparison
(Existing 4-Lanes Vs. Projected 2-Lanes & Left Turn Lanes)

Intersection	Turning Movement	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
		LOS	Avg Delay (sec/veh)	LOS	Avg Delay (sec/veh)	LOS	Avg Delay (sec/veh)
Existing Levels of Service (4-Lanes on Dixie Avenue)							
Dixie Avenue & 9 th Street/Derryberry Hall	Overall Intersection	A	7.1	A	6.4	A	6.1
Dixie Avenue & A Street/ Pinkerton Hall	Northbound Left Turn	A	8.2	A	8.2	A	8.4
	Eastbound Approach	B	13.4	B	13.5	C	15.8
	Westbound Approach	B	12.5	B	14.4	C	15.4
Projected Levels of Service (2-Lanes & Left Turn Lanes on Dixie Avenue)							
Dixie Avenue & 9 th Street/Derryberry Hall	Overall Intersection	B	16.5	B	17.3	B	19.8
Dixie Avenue & A Street/ Pinkerton Hall	Northbound Left Turn	A	8.2	A	8.2	A	8.4
	Eastbound Approach	B	14.1	B	14.4	C	17.6
	Westbound Approach	B	13.4	C	15.6	C	16.9
Notes: For signalized intersections, an overall LOS is presented. For unsignalized intersections, an LOS is presented for each critical lane group.							

As previously discussed, road diets from four lanes to three lanes or two lanes with left turn lanes are typically considered and implemented for roadways with average daily traffic volumes up to 17,000 vehicles per day. The average daily traffic volume on Dixie Avenue is approximately 7,600 vehicles per day, which is less than half of the maximum threshold for road diet consideration. Therefore, Dixie

Avenue can be expected to operate at good levels of service even with a reduction in the number of through lanes as shown by the projected levels of service presented above.

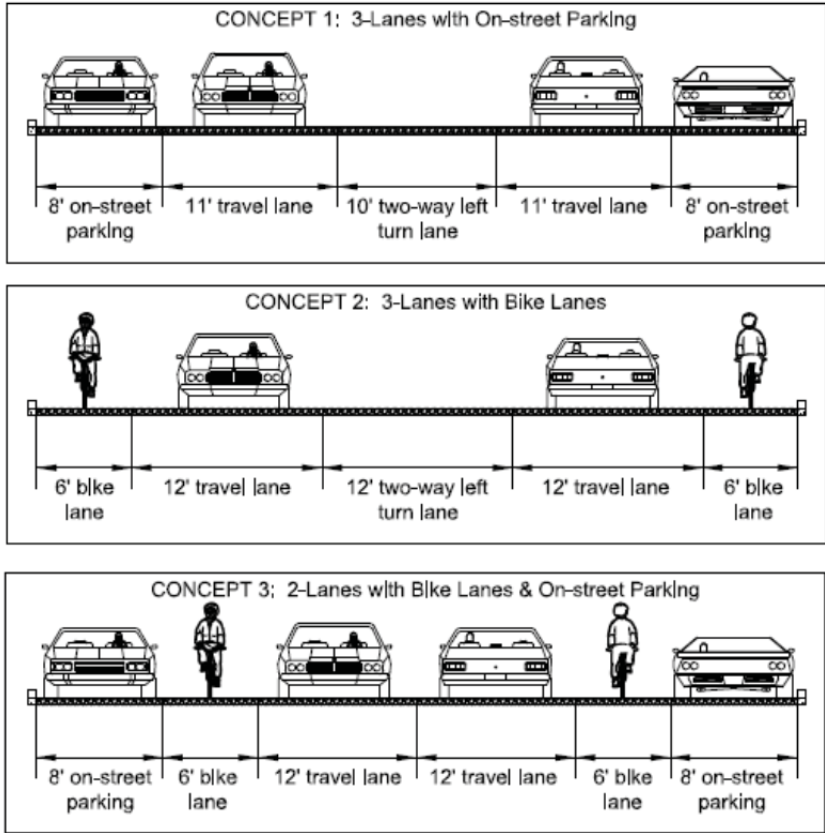
Road Diet/Cross-section Options

Since the evaluation of traffic volumes and roadway conditions indicate that Dixie Avenue is an ideal candidate for a road diet, several cross-section options were evaluated to determine the best utilization of the existing width of Dixie Avenue. The six cross-section concepts that were considered are presented graphically in Figure 4. Based on the vehicular traffic volume on Dixie Avenue, all of these concepts would efficiently accommodate the vehicular traffic. However, there are varying benefits to non-motorized traffic for each of these concepts. Based on the relatively high pedestrian activity along Dixie Avenue and the University's preference to provide bicycle facilities, Concept 6 was selected as the recommended cross-section for Dixie Avenue, which includes one travel lane in each direction with a center median and left turn lanes within the median at intersections where needed and bike lanes with a buffer between the bike lane and the travel lane.

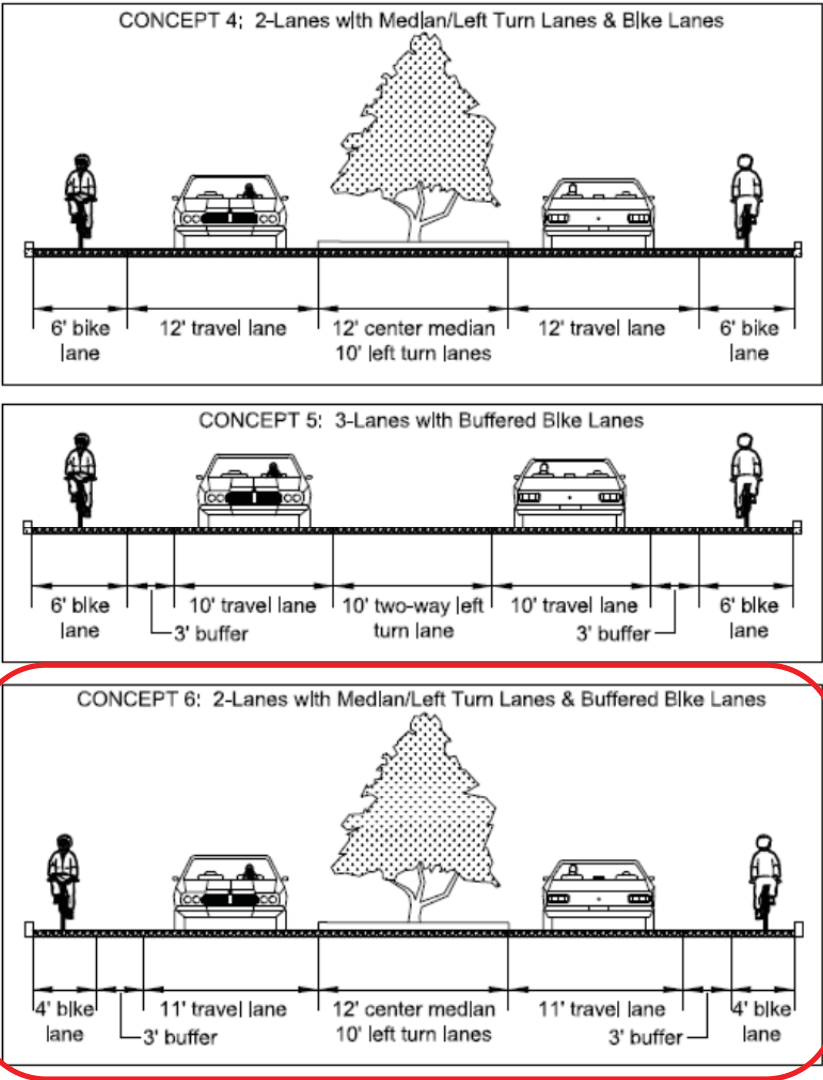
Benefits of Recommended Road Diet Concept

A plan view of the recommended concept for Dixie Avenue is included in the Appendix of this report. As shown in the plan view, this concept would include construction of a median on Dixie Avenue for the length of the study area. Not only does the median enhance the streetscape and provide a greener view of Dixie Avenue, but it also provides pedestrian refuge at the mid-block crosswalks. This allows pedestrians to cross one direction of traffic flow and wait in the median refuge area until it is safe to cross the other direction of traffic flow. The recommended road diet also reduces the number of lanes and distance that a pedestrian must cross on Dixie Avenue, which significantly increases the pedestrian safety along the roadway. Currently, pedestrians must cross a width of approximately 48 feet, which is occupied by four lanes of two-way traffic. There is a narrow, striped divider for the centerline on Dixie Avenue, which provides a width of approximately four feet between the north and southbound traffic; however, this is not an ideal situation for pedestrians to wait for gaps in traffic to cross the street. The median is also expected to reduce the number of pedestrian crossings at unmarked locations since crossing over the median curb and landscaping will be inconvenient for pedestrians.

Figure 4: Dixie Avenue Road Diet Cross-Section Concepts



Note: Not to Scale



In general, road diets provide the following benefits:

- Dedicated left turn lanes where needed
- Width for dedicated bike lanes and buffer
- Street accommodates multi-modal transportation
- Fewer lanes to cross for pedestrians
- Traffic flows similarly with fewer travel lanes
- Smoother traffic flow (reduced stop/go operations due to the elimination of sudden left turns)
- More consistent speeds expected

Additional Roadway Design Concepts to Consider

The recommended road diet cross-section is a preliminary concept based on a limited and high-level traffic evaluation. The purpose of this study was to determine whether a road diet and pedestrian improvements are appropriate for Dixie Avenue; however, there are additional design details that should be further evaluated and considered under the design phase of the project. For example, pedestrian signs should be located at the crosswalks at unsignalized intersections and mid-block crossings. Flashing beacons may be desirable at some of the crosswalk locations. Actuation for the beacons, if provided, should be considered. The implementation of speed tables or raised crosswalks along Dixie Avenue should be considered. Speed tables can be designed for 25-30 mph speeds and are effective in reducing speeds in areas where slower traffic flow is desired due to high pedestrian activity. There are design treatments that can be applied to the streetscape design to channelize the pedestrians to designated locations for crossing Dixie Avenue such as landscaping and decorative fencing within the median. Additionally, new signage will be needed to identify the bike lane. It may be desirable to consider painting the bike lane a color such as green to enhance the bike lane designation.

Preliminary roundabout concept designs were prepared for the intersection of Dixie Avenue and 8th Street/Mahler Avenue, which are shown in the plan view of the recommended road diet concept in the Appendix. The initial evaluation indicates that the intersection would work well as a roundabout; however, more detailed analyses and designs will be required to confirm the specific geometrics of the intersection. Additionally, a rail grade-crossing currently passes through the intersection. Coordination with the railroad owner will be necessary in order to make any changes to the intersection design within or adjacent to the railroad right-of-way. Additional capacity analyses should be conducted in order to determine the impact of the rail grade-crossing on the operation of the roundabout. If the intersection

design is changed to a roundabout, the design of the roundabout should be prepared by a licensed professional engineer with specific expertise in traffic engineering and roundabout design.

Conclusions

As presented in this study, the traffic volumes and high pedestrian activity on Dixie Avenue indicate that the roadway is an excellent candidate for a road diet in order to improve pedestrian safety and accessibility. It is recommended to reduce the existing four-lane roadway between 12th Street and 8th Street/Mahler Avenue to a two-lane roadway with a center median and left turn lanes at intersections where needed. The recommended cross-section also includes bike lanes with a striped buffer.

Preliminary cost estimates for the recommended cross-section and road diet for Dixie Avenue are presented below. As shown, the total road diet and streetscape project including a roundabout at Dixie Avenue and Mahler Avenue/8th Street and the segment of Mahler Avenue to 6th Street, is expected to cost approximately \$6.7 million.

□ Phase 1: Dixie Avenue (12 th Street to 8 th Street)	= \$4,174,500
□ Phase 2: Roundabout (Dixie Avenue & 8 th Street)	= \$1,138,500
□ Phase 3: Mahler Avenue (Dixie Avenue to 6 th Street)	= \$1,366,200
Total = \$6,679,200	

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Conclusions

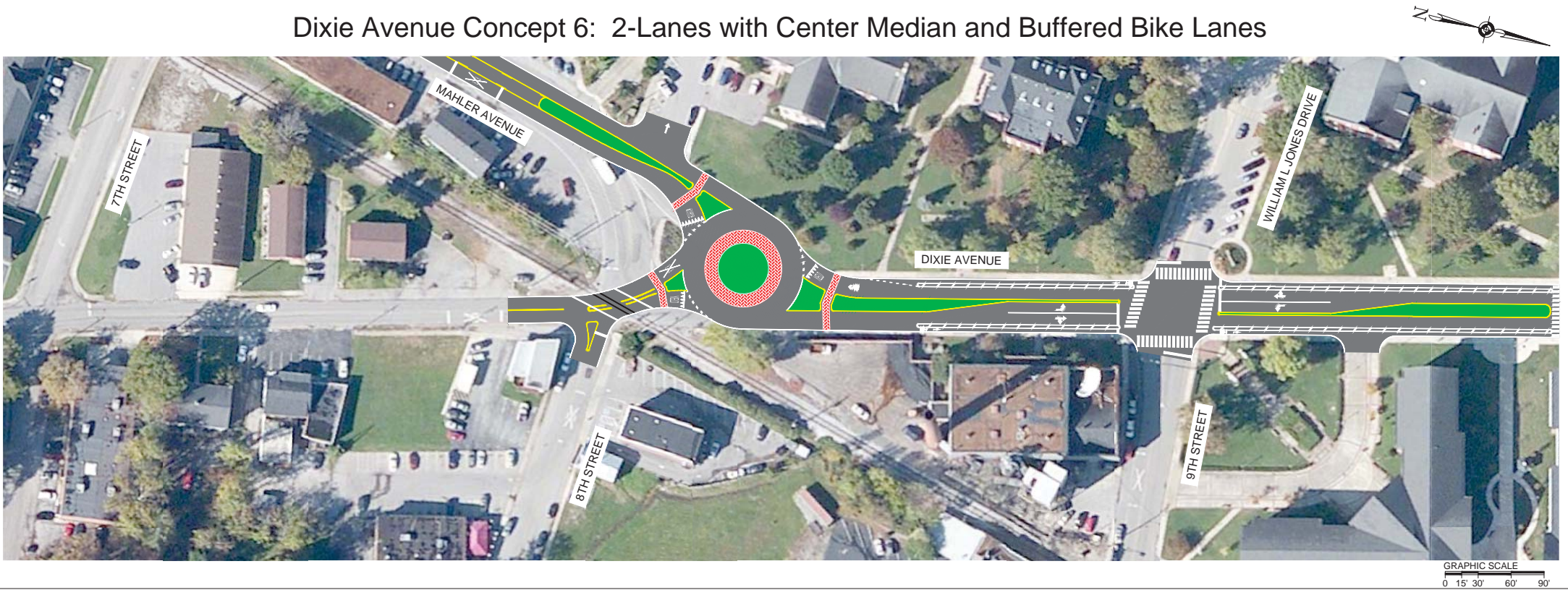
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PLAN VIEW OF DIXIE AVENUE CONCEPT:
2 LANES WITH CENTER MEDIAN/LEFT TURN LANES AND BUFFERED BIKE LANES

Dixie Avenue Concept 6: 2-Lanes with Center Median and Buffered Bike Lanes



Dixie Avenue Concept 6: 2-Lanes with Center Median and Buffered Bike Lanes

